

Encyclopedia of
Language and Education
Series Editor: Stephen May

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Steven L. Thorne
Stephen May *Editors*

Language, Education and Technology

Third Edition

 Springer

Encyclopedia of Language and Education

Series Editor

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Auckland, New Zealand

In this third, fully revised edition, the 10 volume *Encyclopedia of Language and Education* offers the newest developments, including an entirely new volume of research and scholarly content, essential to the field of language teaching and learning in the age of globalization. In the selection of topics and contributors, the Encyclopedia reflects the depth of disciplinary knowledge, breadth of interdisciplinary perspective, and diversity of sociogeographic experience in the language and education field.

Throughout, there is an inclusion of contributions from non-English speaking and non-western parts of the world, providing truly global coverage. Furthermore, the authors have sought to integrate these voices fully into the whole, rather than as special cases or international perspectives in separate sections.

The Encyclopedia is a necessary reference set for every university and college library in the world that serves a faculty or school of education, as well as being highly relevant to the fields of applied and socio-linguistics. The publication of this work charts the further deepening and broadening of the field of language and education since the publication of the first edition of the Encyclopedia in 1997 and the second edition in 2008.

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Steven L. Thorne • Stephen May
Editors

Language, Education and Technology

Third Edition

With 11 Figures and 3 Tables

 Springer

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Editor in Chief's Introduction to the "Encyclopedia of Language and Education"

This is one of ten volumes of the *Encyclopedia of Language and Education* published by Springer. The *Encyclopedia* – now in this, its 3rd edition – is undoubtedly the benchmark reference text in its field. It was first published in 1997 under the general editorship of the late David Corson and comprised eight volumes, each focused on a single, substantive topic in language and education. These included: language policy and political issues in education, literacy, oral discourse and education, second language education, bilingual education, knowledge about language, language testing and assessment, and research methods in language and education.

In his introductory remarks, David made the case for the timeliness of an overarching, state-of-the-art review of the language and education field. He argued that the publication of the *Encyclopedia* reflected both the internationalism and interdisciplinarity of those engaged in the academic analysis of language and education, confirmed the maturity and cohesion of the field, and highlighted the significance of the questions addressed within its remit. Contributors across the 1st edition's eight volumes came from every continent and from over 40 countries. This perhaps explains the subsequent impact and reach of that 1st edition – although no one (except, perhaps, the publisher!) quite predicted its extent. The *Encyclopedia* was awarded a Choice Outstanding Academic Title award by the American Library Association and was read widely by scholars and students alike around the globe.

In 2008, the 2nd edition of the *Encyclopedia* was published under the general editorship of Nancy Hornberger. It grew to ten volumes as Nancy continued to build upon the reach and influence of the *Encyclopedia*. A particular priority in the 2nd edition was the continued expansion of contributing scholars from contexts outside of English-speaking and/or developed contexts, as well as the more effective thematic integration of their regional concerns across the *Encyclopedia* as a whole. The 2nd edition also foregrounded key developments in the language and education field over the previous decade, introducing two new volumes on language socialization and language ecology.

This 3rd edition continues both the legacy and significance of the previous editions of the *Encyclopedia*. A further decade on, it consolidates, reflects, and expands (upon) the key issues in the field of language education. As with its predecessors, it overviews in substantive contributions of approximately 5000 words each, the historical development, current developments and challenges, and future directions, of a wide range of topics in language and education. The

geographical focus and location of its authors, all chosen as experts in their respective topic areas, also continues to expand, as the *Encyclopedia* aims to provide the most representative international overview of the field to date.

To this end, some additional changes have been made. The emergence over the last decade of "superdiversity" as a topic of major concern in sociolinguistics, applied linguistics, and language education is now a major thread across all volumes – exploring the implications for language and education of rapidly changing processes of migration and transmigration in this late capitalist, globalized world. This interest in superdiversity foregrounds the burgeoning and rapidly complexifying uses of language(s), along with their concomitant deconstruction and (re)modification, across the globe, particularly (but not exclusively) in large urban environments. The allied emergence of multilingualism as an essential area of study – challenging the long-held normative ascendancy of monolingualism in relation to language acquisition, use, teaching, and learning – is similarly highlighted throughout all ten volumes, as are their pedagogical consequences (most notably, perhaps, in relation to translanguaging). This "multilingual turn" is reflected, in particular, in changes in title to two existing volumes: *Bilingual and Multilingual Education* and *Language Awareness, Bilingualism and Multilingualism* (previously, *Bilingual Education* and *Language Awareness*, respectively).

As for the composition of the volumes, while ten volumes remain overall, the *Language Ecology* volume in the 2nd edition was not included in the current edition, although many of its chapter contributions have been reincorporated and/or reworked across other volumes, particularly in light of the more recent developments in superdiversity and multilingualism, as just outlined. (And, of course, the important contribution of the *Language Ecology* volume, with Angela Creese and the late Peter Martin as principal editors, remains available as part of the 2nd edition.) Instead, this current edition has included a new volume on *Language, Education and Technology*, with Steven Thorne as principal editor. While widely discussed across the various volumes in the 2nd edition, the prominence and rapidity of developments over the last decade in academic discussions that address technology, new media, virtual environments, and multimodality, along with their wider social and educational implications, simply demanded a dedicated volume.

And speaking of multimodality, a new, essential feature of the current edition of the *Encyclopedia* is its multiplatform format. You can access individual chapters from any volume electronically, you can read individual volumes electronically and/or in print, and, of course, for libraries, the ten volumes of the *Encyclopedia* still constitute an indispensable overarching electronic and/or print resource.

As you might expect, bringing together ten volumes and over 325 individual chapter contributions has been a monumental task, which began for me at least in 2013 when, at Nancy Hornberger's invitation, Springer first approached me about the editor-in-chief role. All that has been accomplished since would simply not have occurred, however, without support from a range of key sources. First, to Nancy Hornberger, who, having somehow convinced me to take on the role, graciously agreed to be consulting editor for the 3rd edition of the *Encyclopedia*, providing advice, guidance, and review support throughout.

The international and interdisciplinary strengths of the *Encyclopedia* continue to be foregrounded in the wider topic and review expertise of its editorial advisory board, with several members having had direct associations with previous editions of the *Encyclopedia* in various capacities. My thanks to Suresh Canagarajah, William Cope, Viv Edwards, Rainer Enrique Hamel, Eli Hinkel, Francis Hult, Nkonko Kamwangamalu, Gregory Kamwendo, Claire Kramersch, Constant Leung, Li Wei, Luis Enrique Lopez, Marilyn Martin-Jones, Bonny Norton, Tope Omoniyi, Alastair Pennycook, Bernard Spolsky, Lionel Wee, and Jane Zuengler for their academic and collegial support here.

The role of volume editor is, of course, a central one in shaping, updating, revising and, in some cases, resituating specific topic areas. The 3rd edition of the *Encyclopedia* is a mix of existing volume editors from the previous edition (Cenoz, Duff, King, Shohamy, Street, and Van Deusen-Scholl), new principal volume editors (García, Kim, Lin, McCarty, and Thorne, Wortham), and new coeditors (Lai and Or). As principal editor of *Language Policy and Political Issues in Education*, Teresa McCarty brings to the volume her longstanding interests in language policy, language education, and linguistic anthropology, arising from her work in Native American language education and Indigenous education internationally. For *Literacies and Language Education*, Brian Street brings a background in social and cultural anthropology, and critical literacy, drawing on his work in Britain, Iran, and around the globe. As principal editors of *Discourse and Education*, Stanton Wortham has research expertise in discourse analysis, linguistic anthropology, identity and learning, narrative self-construction, and the new Latino diaspora, while Deoksoon Kim's research has focused on language learning and literacy education, and instructional technology in second language learning and teacher education. For *Second and Foreign Language Education*, Nelleke Van Deusen-Scholl has academic interests in linguistics and sociolinguistics and has worked primarily in the Netherlands and the United States. As principal editors of *Bilingual and Multilingual Education*, Ofelia García and Angel Lin bring to the volume their internationally recognized expertise in bilingual and multilingual education, including their pioneering contributions to translanguaging, along with their own work in North America and Southeast Asia. Jasone Cenoz and Durk Gorter, principal editors of *Language Awareness, Bilingualism and Multilingualism*, bring to their volume their international expertise in language awareness, bilingual and multilingual education, linguistic landscape, and translanguaging, along with their work in the Basque Country and the Netherlands. The principal editor of *Language Testing and Assessment*, Elana Shohamy, is an applied linguist with interests in critical language policy, language testing and measurement, and linguistic landscape research, with her own work focused primarily on Israel and the United States. For *Language Socialization*, Patricia Duff has interests in applied linguistics and sociolinguistics and has worked primarily in North America, East Asia, and Central Europe. For *Language, Education and Technology*, Steven Thorne's research interests include second language acquisition, new media and online gaming environments, and theoretical and empirical investigations of language, interactivity, and

development, with his work focused primarily in the United States and Europe. And for *Research Methods in Language and Education*, principal editor, Kendall King, has research interests in sociolinguistics and educational linguistics, particularly with respect to Indigenous language education, with work in Ecuador, Sweden, and the United States. Finally, as editor-in-chief, I bring my interdisciplinary background in the sociology of language, sociolinguistics, applied linguistics, and educational linguistics, with particular interests in language policy, Indigenous language education, and bilingual education, along with my own work in New Zealand, North America, and the UK/Europe.

In addition to the above, my thanks go to Yi-Ju Lai, coeditor with Kendall King, and Iair Or, coeditor with Elana Shohamy. Also, to Lincoln Dam, who as editorial assistant was an essential support to me as editor-in-chief and who worked closely with volume editors and Springer staff throughout the process to ensure both its timeliness and its smooth functioning (at least, to the degree possible, given the complexities involved in this multiyear project). And, of course, my thanks too to the approximately 400 chapter contributors, who have provided the substantive content across the ten volumes of the *Encyclopedia* and who hail from every continent in the world and from over 50 countries.

What this all indicates is that the *Encyclopedia* is, without doubt, not only a major academic endeavor, dependent on the academic expertise and good will of all its contributors, but also still demonstrably at the cutting edge of developments in the field of language and education. It is an essential reference for every university and college library around the world that serves a faculty or school of education and is an important allied reference for those working in applied linguistics and sociolinguistics. The *Encyclopedia* also continues to aim to speak to a prospective readership that is avowedly multinational and to do so as unambiguously as possible. Its ten volumes highlight its comprehensiveness, while the individual volumes provide the discrete, in-depth analysis necessary for exploring specific topic areas. These state-of-the-art volumes also thus offer highly authoritative course textbooks in the areas suggested by their titles.

This 3rd edition of the *Encyclopedia of Language and Education* continues to showcase the central role of language as both vehicle and mediator of educational processes, along with the pedagogical implications therein. This is all the more important, given the rapid demographic and technological changes we face in this increasingly globalized world and, inevitably, by extension, in education. But the cutting edge contributions within this *Encyclopedia* also, crucially, always situate these developments within their historical context, providing a necessary *diachronic* analytical framework with which to examine *critically* the language and education field. Maintaining this sense of historicity and critical reflexivity, while embracing the latest developments in our field, is indeed precisely what sets this *Encyclopedia* apart.

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Volume Editor's Introduction to "Language, Education and Technology"

Across the history of human social organization, information and communication technologies have had enormous effects on the processes they mediate. Some technologies have amplified existing activities in areas such as reach or speed, while others have enabled the emergence of novel informational, communicative, and social practices. In the contemporary era, global networks enable culture, music, and linguistic repertoires to propagate, mutate, and cross-pollinate across media and communicative modalities. Recent sociological analyses have documented that the Internet has qualitatively transformed everyday communication and information practices in commercial, financial, professional, educational, recreational, and interpersonal realms (e.g., Castells 2004), all of which provoke questions as to how language educators and researchers should orient themselves to the perennially changing contexts and conditions of linguistically mediated life activity.

Engineering advances in digital technologies have been prodigious over the years, but to paraphrase Internet pioneer Tim Berners-Lee, the Internet is less interesting as a technological fact than as a social fact. Evidence for this exists from the very beginning of the Internet. The initial series of networked computers, called ARPANET (Advanced Research Projects Agency Network), were created in 1966 and designed for file sharing and remote access to then rare computers. Email emerged in 1971 and by 1973, use of email for professional but also interpersonal and recreational purposes – the first listserv in existence, SF-Lovers, catered to fans of science fiction literature – comprised 75% of ARPANET's data traffic. From this early point, the development of the Internet and associated connective devices has continued to mirror the intensely social-relational nature of our species – evidenced by mass participation in the sharing of user-generated content, the mercurial rise of social networking sites, and the rise of infrastructure such as cloud-based computing, mobile devices, and the Internet of things (network-enabled devices for collecting and sharing data) – that perhaps in some ways problematically make technology spatially and temporally ubiquitous in modern life.

This volume assembles the majority of technology-focused chapters in the 3rd edition of the *Encyclopedia of Language and Education*. In the 1st and 2nd editions of the Encyclopedia, contributions addressing various aspects of technology were distributed across multiple topical volumes. The genesis of this new technology-focused

volume emerges from the unquestionably constitutive ways in which many areas of educational practice, and life activity more broadly, are now affected by digital mediation, a condition that creates opportunity but also friction, resistance, and evidence for continuing global inequalities across world regions and social classes.

Contents of the Volume

This volume of the Encyclopedia, *Language, Education and Technology*, is partitioned into five parts that in some cases include overlapping themes and topical areas. In other ways, this volume is perhaps the most heterogeneous of all in the series due to the extremely broad organizing domain of "technology." Contributions synthesize research ranging from discrete attention to particular technology environments, instructional formats, pedagogical orientations, language and literacy learning outcomes, and teacher professional development to issues of multimodality, transnationalism, superdiversity, translanguaging, identity, and methodology (sometimes within the same chapter!).

Part 1, Perspectives on Technology, Multimodality, Literacy, and Language, addresses a number of overarching issues pertaining to technology through the lenses of criticality, literacy, ideology, multimodality, and popular culture content and practices. The contributions in this part directly address the complexity of analyzing and understanding language and literacy development in and through digitally mediated practices and offer holistic and situated insights that help to contextualize many of the more discrete and specific chapters appearing in subsequent parts.

The first entry in this part, by Karin Tusting, describes the ways in which contemporary technologies have transformed everyday literacy practices in multiple ways, such as the inclusion and prevalence of multimodal expression and the entwining of written communication with socially relevant issues of participation and identity formation. The array of technologies now mediating "informal learning" include participation in online gaming and virtual worlds, social media environments, multilingual digital literacies, and the curation of identities and social presence across many of these settings (e.g., Ito et al. 2010). Of particular relevance to language educators, Tusting directly addresses the clashes with accountability regimes in educational settings that informal and recreational use of technologies has provoked in recent years. In the following chapter, Ron Darvin presents a critically informed discussion of digital literacy and argues that technologies are never ideologically neutral. Rather, Darvin notes that technologies and the ways they mediate the circulation of representations, meanings, and identities have redefined notions of private and public space and in so doing, privilege and marginalize certain ideas, cultures, and peoples. Building from a base in Bourdieu, forms of capital, and the notion of *sens pratique* (e.g., Bourdieu 1991; Darvin and Norton 2015; Thorne 2013), Darvin makes a powerful argument for the necessity of attention to how power operates in digital spaces with the implication that language learners and

educators should develop a sustained critical stance regarding biases, assumptions, and the ideological work that occurs in online interaction.

Multimodality is an omnipresent feature of much communicative activity in online environments. Carey Jewitt describes the complexity of multimodal semiotic repertoires that can include written and spoken language, image, gesture and haptics, and three-dimensional forms, among others, and explicates these forms of meaning making through the lens of multimodal social semiotics (e.g., Jewitt 2014; Kress 2010). Bringing together theory and methodology from psychology, sociology, anthropology, and systemic functional linguistics, Jewitt encourages multimodal analysis across school curricula as a way to visibilize new forms of learning in digital environments and to enhance the recognition and acknowledgement of multimodal learning in classroom contexts.

It has been obvious for decades that access to technologies and the Internet is unequally distributed across world regions and within communities (e.g., Warschauer 2003). Tamara Tate and Mark Warschauer present a contemporary and international overview of what is known as the "digital divide," focusing here on language and literacy education in particular. The authors note that while initial concerns regarding uneven access to devices and Internet connectivity remain relevant, the simple binary of haves and have nots does not address the equally relevant issues of individual's and community's opportunities to engage in meaningful economic, social, and professional transactions.

The following three chapters turn more specifically to instructed language education and use various disciplinary frameworks and school-external resources. Lawrence Williams employs sociolinguistic criteria and theory to examine generally text-based computer-mediated communication (CMC) in instructed university-level language learning settings. The particular focus of this chapter is on the development of sociolinguistic competence and includes extended discussion of the variability of language and discourse. The application to language education is that appropriacy and effective communication extends beyond correctness and rather is contingent on a wide range of contextual factors. Addressing early childhood education from multiliteracies (New London Group 1996) and multimodality (Kress 2010) perspectives, Heather Lotherington challenges the fundamental assumption that emerging literacy needs necessarily to focus on alphabetic literacy in isolation from multimodal expression. This chapter, drawing upon innovative multimodal policy, curricula, and assessment methods in Canada, Finland, Singapore, and beyond, suggests that the increasing availability of digital tools enabling multisensory learning offer valuable opportunities for complex multimodal and multiliteracies expression that potentially enhance not only traditional literacy development, but also the development of social and emotional intelligence and critical thinking. The final chapter in this part, by Yiqi Liu and Angel Lin, engages the interface between expectations of formal genres of language in school settings and the broader social world of popular culture relevant to students' interests and lives outside of school. The authors take a critical approach and acknowledge the tensions between institutional directives to prepare students for high-stakes tests and the potential benefits of popular culture as

a resource for the production of identities and exploration of various ethnic, sexual, and socioeconomic themes and societal conditions.

Part 2, *Plurilingual Practices in Digital Contexts*, remains focused on school externalities. All chapters in this part continue many of the themes addressed in Part 1, including use of multiple literacies, multimodality, and identity formation in a variety of digital settings, here ranging from web-based communities to online fandom and social media sites such as Facebook. A defining quality of the chapters in this part, however, is an explicit emphasis on the use by participants of multiple languages. As a brief meta-commentary, while multilingualism is pervasively evident in digital environments, terminology associated with the use of multiple languages within and across communicative encounters has become increasingly complex. In common usage, "plurilingualism" and "multilingualism" are often seen as semantically equivalent, but both terms have been critiqued in recent sociolinguistics research as problematic ideological abstractions, as they evoke the notion of multiple discrete and stable linguistic varieties rather than the mixing and hybridity that are often evident in contemporary communicative repertoires (e.g., Blommaert 2010; May 2014; Pennycook and Otsuji 2015). Terminology describing mixing and hybridity include translanguaging, a descriptor for bilingualism that does not observe diglossic functional separation of the linguistic resources used into separate monolingual idealizations of independent languages (for a discussion, see Blackledge and Creese 2010). Use of multiple semiotic resources from diverse linguistic varieties within and across utterances has been described by García as transglossia (2009), while the term polylingualism (e.g., Jørgensen 2008) refers to the intentional use of multiple languages that may not typically be found in combination with one another (in digital contexts, see Thorne and Ivković 2015). The chapters in this part use differing terminology, but each addresses the Internet as a massive language contact zone and each illuminates various aspects of the multilingual and linguistically hybridized communicative activity visible in many online environments.

Wan Shun Eva Lam and Natalia Smirnov review research on migrant and diaspora youth and address issues of mobility, transnationalism, and identity construction in online interaction. Describing primarily ethnographic research, this chapter emphasizes the resourcefulness illustrated in online participatory practices and shows how young people access, remix, and propagate language and cultural practices as they create transnational pathways and relationships across digital spaces. In an examination of digitally mediated multilingual and multimodal practices, Sirpa Leppänen, Samu Kytölä, and Elina Westinen review investigations of informal, interest-driven participation in contemporary technology contexts that include issues of heteroglossia, resemiotization, and agentive opportunities for exploration of multiple positionalities. This chapter also critically frames challenges associated with the compatibility of informally acquired competences in relation to formal education, the problem of Anglophone centrism, and the need to remain vigilant regarding inequalities of access and participation in geopolitical peripheries (i.e., the Global South). Concentrating on themes of popular media and participatory culture, Shannon Sauro explores burgeoning online fandom communities that

include fanfiction archives, gaming forums, and online interest groups within social media platforms. Research on such affinity spaces (Gee 2005) shows significant relevance for language learning, opportunities for language socialization, and exploration of identity construction that may be particularly helpful for marginalized youth (see also Thorne et al. 2015). Sauro touches on pedagogical approaches for interaction with fandom communities and elsewhere has designed curricula that bring together task-based language teaching with participation in interest-driven fandom communities (e.g., Sauro and Sundmark 2016). The final chapter in this part, by Brook Bolander, continues to explore identity construction through an examination of multimodal and often multilingual participation on the social networking site Facebook. By far the largest social networking site, with two billion reported monthly users, Facebook use is perhaps most importantly positioned as interwoven with identity construction in offline contexts (Bolander and Locher 2015). Bolander traces the global evolution of Facebook use, describes specific Facebook practices such as status updates, reactions to status updates, and the template-driven "about" section as acts of positioning and identity claims. The chapter concludes with an insightful discussion of methodological and ethical challenges to research on social networking sites and encourages continued and internationally focused diachronic and longitudinal research on the relationship between changes to the Facebook interface, mobile versus computer-based access of the site, and effects on patterns of linguistic and multimodal communication.

Part 3, *Technology in World/Second Language Education Contexts*, is the largest in this volume and comprises 13 chapters. While the previous two parts primarily outlined broader themes and informal learning in digital contexts that are generally exogenous to formal education, this part presents an array of pedagogical uses of digital tools that interface with, or are situated within, instructed language-learning settings. Also included are chapters focusing on teacher professional development, computer-assisted assessment, open educational resources, and various second language acquisition research perspectives on computer-assisted language learning (i.e., sociocultural theory and complex dynamic systems theory). This part begins with two chapters addressing overarching issues, namely distance (or location independent) language education and open education resources. Robert Blake synthesizes research on the digital delivery of second language instruction across traditional, blended, and fully online formats. He notes that there is an increase in student interest (e.g., flexible scheduling), that digital materials can serve multiple instructional formats, and that despite understandable hesitation on the part of some instructors, multimodal digital teaching and learning environments are here to stay and have been demonstrated to foster learner autonomy and developmental benefits. In his chapter, Carl Blyth describes the history and evolution of the open education movement, focusing particularly on digital open education resources for foreign/world language education. Supported by an ethos that promotes the openness of intellectual property, open education encourages collaboration between educational stakeholders, the creation of free and adaptable content for widely taught languages, and makes available curricular resources for less commonly taught languages that are less well served or entirely ignored by commercial publishers.

Many of the contributions to this part present overviews on specific pedagogical approaches relevant to, or requiring, digital mediation. Alex Boulton describes the use of language corpora and students' guided but largely autonomous efforts to search out and find answers to language usage questions pertinent to their learning. Termed data-driven learning (DDL), this approach marks a shift from traditional practices such as consulting the teacher or ready-made reference materials. DDL is premised on the notion of student-directed inquiry and exploration of large corpora of authentic texts. Effectiveness research in this area shows that DDL both fosters language acquisition as well as improves language awareness and noticing. The following chapter presents task-based language teaching (TBLT), a method widely used in traditional instructed settings. Marta González-Lloret argues that TBLT represents an optimal approach to fully realize the potential of technology-enhanced language learning. She traces the history of TBLT in digital settings and explores the intersection between task design and a variety of new media, including online gaming virtual environments (see also González-Lloret and Ortega 2014). Another area that the advent of digital technologies has radically transformed is writing. Greg Kessler reports on second language writing in new media environments and describes a coevolutionary dynamic linking digital writing environments with the development of collaborative and co-construction pedagogies. Kessler advocates for collaborative writing pedagogies, in part because of the increasingly collaborative and multi-party participatory dynamics of text production in the online world outside of education.

Two chapters in this part discuss online intercultural exchange (OIE). OIE, alternatively labeled virtual exchange, telecollaboration, and e-tandem learning, involves instructionally mediated processes such as collaborative tasks, collective inquiry, and opportunities for social interaction between internationally distributed partner classes. OIE has been tremendously powerful in transforming participating language learners' experiences from a predominant focus on "language" toward processes that make salient the need to develop the linguistic, intercultural, and interactional capacity for creating and maintaining social relationships of significance. In his contribution, Robert O'Dowd, a primary proponent in this area, presents the origins of OIE and outlines the primary approaches currently in use. Also discussed are extensions of OIE that include intercultural learning in open Internet environments, facilitator-based OIE projects, and an overview of frequent problems and difficulties faced by instructors. Taking an explicitly critical theoretical stance, Francesca Helm reviews OIE research and pedagogical innovations that include *lingua franca* exchanges (where the language of communication is an L2 for all participants), which challenge the assumption that native speakers are necessarily the ideal project partners. She makes the case that *lingua franca* exchanges potentially offer a wider range of identities for participating students that extend beyond that of the deficient communicator that the native speaker target implies. Helm additionally problematizes other widely held assumptions, for example, that intercultural contact necessarily leads to understanding and fosters equality and the erroneous view that technology is a neutral medium.

Vygotskian sociocultural theory, particularly with its emphasis on mediation, has been widely applied to technology-enhanced language learning for both research purposes and as a heuristic lens for designing pedagogical interventions. Sociocultural theory argues that human mental development is fundamentally constructed through engagement with cultural practices, artifacts, and milieus. In this way, sociocultural approaches emphasize the dialectical relationship between ontogenesis (an individual's development across the life span) and the social and material conditions of everyday life, including those comprising formal instructional settings. Rémi A. van Compernelle discusses sociocultural studies that illustrate the differing affordances and constraints of technology use across communicative modalities, for interaction across nation state boundaries (OIE projects in particular), and in relation to the development of particular linguistic, pragmatic, and intercultural communication learning outcomes. He concludes by suggesting that sociocultural approaches are well positioned to address key issues, namely the particular qualities of tool mediation, especially in an era that shows the rapid emergence of new online social formations and environments, and the transfer and transcendence of language learning in technology-mediated environments to communicative activity in other settings. Another emerging approach, complex adaptive systems (CAS, largely equivalent with dynamic systems theory), offers new insights into the contingencies and variability of computer-assisted language learning. Mathias Schulze aligns his CAS-informed chapter with a foundation of cognitive and usage-based linguistics and argues for a dialectical relationship between second language use and development. Schulze describes the relevance of CAS characteristics, such as the interconnectedness of subsystems, nonlinear development, and emergent properties, and reviews recent technology research that highlights these dynamics.

As generational shifts in exposure to and use of new media broaden, teacher professional development has been positioned as critically important to the success of technology-enhanced language learning in instructed settings (Hubbard 2008). Nike Arnold reports on research describing pre- and in-service technology integration in second language teacher education. In addition to discrete skills development with specific technologies, issues such as changing roles for the teacher, building community within and across technologies and residential instruction, developing modeling and scaffolding techniques, and providing social and emotional support in digital spaces all contribute to creating a successful twenty-first century learning environment. In a closely related chapter, Mirjam Hauck and Malgorzata Kurek address the issue of digital literacies in teacher preparation. Observing that learners' digital literacy experiences may not closely align with formal academic discourse competence, this chapter describes multiliteracies frameworks (New London Group 1996), the importance of attending to both historically antecedent literacy conventions as well as those emergent of new media communicative practices (Kern 2014), and multimodality informed approaches, concluding with pedagogical implications for pedagogy.

The final two chapters in this part address the technology-heavy topics of intelligent computer-assisted language learning (ICALL) and computer-assisted

language assessment (CALA). In both cases, the sophisticated technologies involved seek to computationally enable, augment, scale up, and potentially improve upon human delivered instruction and assessment. Trude Heift focuses her review of ICALL technologies on written learner language and includes descriptions of, and second language research on, spell checkers, grammar checkers, automatic writing evaluation, error-specific feedback, and other features subsumed under the rubric of intelligent language tutoring systems. Paula Winke and Daniel Isbell present an inclusive overview of computerized assessment that includes high-stakes proficiency testing, placement tests, and assessment environments that include features such as streaming video, oral-response recording, and enhanced input such as glosses, metalinguistic feedback, and comprehension assistance that aid test completion. They also describe alternative computer-based assessments such as electronic portfolios and self-assessment systems that have been shown to promote self-regulation and which are correlated with documented language development. Both ICALL and CALA share certain advantages such as expedient delivery, digital records of student progress and performance, and automated and objective feedback and scoring possibilities.

Part 4, Gaming, Virtual Worlds, and Social Network Sites for Language Learning, includes discussion of an expansive array of new media and the diverse social practices, cultural formations, and speech communities that colonize them. The mercurial rise of social media sites such as Facebook has been described earlier (Bolander, this volume). For its part, online gaming is now itself a massive industry with the Entertainment Software Association reporting that total consumer spending on the video game industry was 30.4 billion US dollars in 2016 and that two thirds of US households own a device used to play games. A similar pattern appears internationally, in regions of greater affluence, where gaming has eclipsed other major media industries, such as film and music, in terms of revenue. Virtual worlds and massively multiplayer online games arguably comprise the most socially and cognitively complex forms of interactive media currently available. These facts are not meant to valorize these digital media, but they do serve as an encouragement to educators to take seriously the proposition that social media sites, online games, and virtual worlds, as designed environments, present opportunities for both understanding and engineering specific learning content and processes (Plass et al. 2015; Reinhardt and Thorne 2016).

Hayo Reinders reviews the literature on digital games and second language learning both in and outside of educational settings. He notes that there is a large and growing body of evidence-based research showing that game play is correlated with many developmental outcomes, such as more general cognitive and perceptual gains, as well as having positive effects on motivation, willingness to communicate, and opportunities for language socialization. Dongping Zheng and Kristi Newgarden position their chapter on gaming within ecological psychology (e.g., Gibson 1979) and dialogicality (Linell 2009), which they term an ecological, dialogical, and distributed (EDD) approach. This decidedly theoretical contribution describes how EDD research on gaming frames issues such as context, unit of analysis, theories of language, and how interactivity is analyzed, with significant implications for the

future of research in this area. Frederik Cornillie brings the focus back to educationally oriented or "serious" game environments and in particular, game-generated feedback designed to support specific second language learning skills. As Cornillie notes, for language educators, the key issue is how to harness game mechanics in order to maintain a primary focus on meaning and communication while also supporting attention to linguistic form. This chapter highlights the specific affordances of different game genres, such as mini-games for focused practice on form (e.g., DuoLingo), text-only games for reading, and fully immersive games for collaborative activity and sustained engagement. The history, present, and near-future state of virtual worlds is the subject of Randall Sadler's contribution. The chapter begins with a genealogy of virtual worlds, starting with a discussion of early text-based virtualities that were the precursor to contemporary virtual worlds and massively multiplayer online games. Sadler usefully contrasts present-day virtual worlds with online gaming environments, noting both similarities – such as three-dimensional rendered spaces and customizable avatar embodiment for players – but also describes key differences, for example, that virtual worlds include little pre-structured goal-directed activity and are primarily places for social interaction. Sadler suggests that the next evolutionary step in virtual world interaction will likely include virtual reality (VR) technologies, where users will have fully immersive experiences with VR headsets that may also include haptic interfaces and a move from "looking at the screen to feeling that they are part of the scene" (Sadler, this volume).

The final two chapters in Part 1 address social networking sites (SNS), Twitter, and microblogging, with an overarching focus on how such sites and the networks of individuals and communities they bring together might be exploited for purposes of second language learning. Jon Reinhardt acknowledges that social media is a broad term referencing any Web 2.0 digital environment that enables the creation and sharing content, from textual messages (e.g., Twitter) to video clips, remixes and mashups (e.g., YouTube). He therefore bounds his focus to SNS as defined by Boyd and Ellison's (2007) criteria that include user profile construction, connection traversing (friending others), and connection articulation and rearticulation (commenting on and liking posts and status updates). Within this narrowed domain, Reinhardt synthesizes second language research on uses of vernacular sites such as Facebook and SNS designed specifically for language learning. Findings regarding SNS use within instructed learning settings suggest that both vernacular and educationally designed SNS potentially make available opportunities for high engagement social-relational uses of the target language. A cautionary note is pertinent, however, in that students focused on curricular driven objectives and/or high stakes tests may consider social media and the genre of language used in such settings tangential to their academic goals. Lara Lomicka examines research on microblogging environments, the most dominant of which is Twitter. She acknowledges that robust second language acquisition studies of Twitter use have been largely inconclusive, but notes that Twitter use has been shown to enhance communication between students and teachers, increase student production of language, and, through analysis of tweets, has increased students' awareness of aspects of the target language.

Part 5, the final in this volume, is titled *Methods and Methodologies in Technology and Language Education* and includes four chapters that describe methodological issues related to digital tools and environments. These chapters are diverse in that they include conversation analytic methods for analyzing computer-mediated communication, corpus linguistic methodologies for exploration of second language acquisition, the use of digital instrumentation for the study of language awareness, and eye-tracking technology applied to the analysis of computer-assisted language learning activity. Given the complexity of analyzing the structure and patterns of language use, the sequential dynamics of multiparty communication, and the many cognitive and social factors and processes contributing to language acquisition, all of which are relevant to any holistic account of human language development, it is fitting to conclude the volume with these contributions.

Ethnomethodological conversation analysis (CA) has developed over the past 50 or so years to become one of the primary approaches for the study of naturalistic conversation. Premised on core concepts such as language use as social action, turn taking, the orderliness of sequence organization, and forms of repair (to name only a few), CA began with an exclusive focus on face-to-face and voice (telephone) communication. Following the advent of the Internet and explosive rise of digitally mediated communication, CA has been applied to computer-mediated contexts as well. Vincenza Tudini and Anthony Liddicoat orient their chapter toward CA studies related to digital interaction in second language contexts, including voice and text chat, video conferencing, intercultural communication in online exchanges, and other elements of computer-mediated and computer-generated discourse (see also Tudini 2010). In her chapter, Sylviane Granger describes uses of learner corpora serving two primary functions, for making visible the mechanisms of second language acquisition for researchers and as a source of data for language educators that can help them directly address students' attested linguistic difficulties. Various learner corpora and their many research and pedagogical applications are described, including contrastive interlanguage analysis, frequency analysis showing over and underuse of linguistic elements, and studies that describe patterns of language use not available in traditional approaches to grammar.

Christina Sanz and Beatriz Lado outline the benefits of various technologies for the study of awareness in second language acquisition research. They begin by describing the slippery nature of awareness and propose the definition that awareness is an internal phenomenon that can be enhanced, or at least potentially affected, by external attention-focusing techniques. They trace the incorporation of technologies into language awareness research such as computers for reaction time studies, tracking performance by click behavior, and most recently in neurolinguistic research, the use of eye tracking and instrumentation. The latter include, among others, functional magnetic resonance imaging (fMRI) and event-related potentials (ERP) for mapping regions and networks of brain activity and isolating processes associated with specific sensory, cognitive, and motor events. Speaking of eye tracking, in the final chapter of this volume, Marije Michel and Bryan Smith review research on computer-assisted language learning that employs this methodology. Based on the existence of the linkages between eye movement behavior and

allocation of attentional resources, eye tracking can help researchers know the focus of current cognitive processing via analysis of fixations (stable eye movement on, for example, a word or portion of the screen), saccades (movement between fixations), and regressions (reinspection of earlier text). The authors posit that eye tracking provides access to behaviorally observable evidence that in part mitigates the problem of relying on a static written language interaction record when in fact real time language processing, in both production and comprehension modes, is a dynamic and time-sensitive event (Smith 2012).

In Closing

The 3rd edition of the *Encyclopedia of Language and Education* presents a unique opportunity to bring together the expertise of internationally visible scholars in a wide range of language- and education-related areas. This volume, *Language, Education and Technology*, contributes 34 chapters that represent tremendous thematic, conceptual, theoretical, methodological, and pedagogical coverage, each helping to form an expansive mosaic topology that maps ways in which language, education, and technology interrelate with one another.

The contexts and empirical research discussed above represent many issues relevant to language, technology, and education. Technology has catalyzed new communicative hybridities and areas of scholarly inquiry; enabled new research methodologies, assessment practices, and instructional formats; created new forms of social connection and relationship maintenance; and altered the daily practices of students and teachers. Participation in social media and online gaming environments has the potential to propel language learners beyond the confines of the institutional identity of "student" by fraying the boundaries separating language study from social life, student from player, and information consumer from knowledge contributor. As has also been mentioned at various points in this introduction, in some cases technology has also exacerbated inequalities, increased disenfranchisement, and produced dystopic social and psychological effects, suggesting that continued vigilance and the cultivation of empathy and criticality are necessary as we move forward in our collective production of a preferred future.

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Part I

**Perspectives on Technology, Multimodality,
Literacy, and Language**

Ecologies of Digital Literacies: Implications for Education

Karin Tusting

Abstract

This article outlines research on digital literacies which takes a social practice perspective, approaching digital literacies in real-life contexts as part of ecologies of communicative practices, and draws out the implications of this work for education. Early contributions are summarized, including analyses of hypertext and multimodality and debates around the extent to which language online changed from more speech-like to more writing-like forms. Major contributions are then described. These include work on young people's everyday literacy practices, showing how these can transform established understandings of social status and expertise, work which focuses on literacies for informal learning in online settings and in video gaming, the nature of learning in communities in online communicative contexts, and challenges to dominant discourses and moral panics. Current areas of work in progress are identified including gaming and virtual worlds, curation, multilingual digital literacies, and language learning online. Challenges include clashes between the understandings generated by this research and drawn on in some policies and the powerful accountability regimes based on pen-and-paper testing which still frame many educational systems, the need to develop appropriate research methods and ethical challenges in this area, and the imperative of continuing to ensure a diversity of research sites to avoid focusing only on the practices of the privileged. Future directions for research are briefly addressed including the role of digital literacies in social movements and the need for more research in coding literacies.

Keywords

Digital literacies • Multimodality • Information and communication technologies • New Literacy Studies • Digital pedagogies

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Introduction

The possibilities afforded by digital technologies have transformed the way we work, learn, and live. Our social world is mediated by texts, and much of this depends on digital supports (Barton and Lee 2013). Mobile devices like smartphones and tablets have become embedded in our everyday lives. Platforms like Facebook, Twitter, and YouTube have made it easy for anyone to publish online. As Greenhow and Robelia (2009) argue, there are important implications of these shifts for education. People are bringing into education practices of participation and identities that are shaped by their engagement in online environments.

The broad arena of research in language and technology has developed into a range of fields, many of which focus on the language used in digital settings, drawing on content, discourse, or narrative analysis (e.g., Herring 2004). The predominant focus in this chapter is not on this discourse-focused research but on research which addresses digital literacies as social practices, that is, as ways in which people draw on and use material meaning-making resources in particular social, cultural, and economic contexts (Barton 2007), with attention to the values, ideologies, power relationships, and cultural understandings tied up in these practices. This perspective is associated with research which engages with users directly, in addition to analyzing online content. Jones and Hafner (2012) underline that we always draw on technologies, tools, and platforms in relation to each other, so it is important to think about digital technological practices as part of complex ecologies, rather than to focus on the affordances of single tools in isolation. Studies of literacies in social context therefore engage with the use of digital devices and technologies as part of the broader ecology of communicative practices.

Early Developments Including Initial Contributors

In early work researching the Web, attention was given to the possibilities offered by hypertext for making new kinds of reading possible. These are explored in Kaplan's (1995) piece on "e-literacies." Unlike many technologically deterministic commentators of the time, she insists on the social origins and effects of electronic literacy.

Her punning title, “e-literacies,” refers both to the reading and writing resources specific to electronic texts and to the socioeconomic elites whose interests might be served by these. Her hypertext links include extended passages from the authors she cites, so it is a useful essay to look back on for an overview of debates at that time.

One key early area of debate around online literacies was the nature of language in digital settings, particularly whether language online mixes characteristics of speech and writing. An influential article from Baron (1998) addresses the language of email, claiming that email brings together characteristics of written and spoken language. Crystal (2006, first edition 2001) argued that a new language variety called “Netspeak” is emerging. This shows characteristics of both speech and writing, is associated with a particular lexicon including many acronyms, has ways of signaling paralinguistic features with the use of symbols and emoticons, and has distinctive spelling.

Other early works focused on multimodality. Snyder (1998) looks at the implications of the shift from page to screen in a context of rapid change, addressing the widening gulf between expert students and novice teachers. Multimodal communicative practices in a globalized networked world were further explored in Snyder and Beavis (2004), showing the uneven distribution of information and communication technologies across the world. Chapters address what it takes to become competent in a domain where words, symbols, images, and artifacts combine to create complex-situated meanings; how different skills and experiences in this area can transfer across domains, for instance, between home and school; and where these processes are being blocked.

Work by Kress (2000) and colleagues has been particularly significant in this area. He identified how the multimodal possibilities afforded by new technologies alter our whole approach to communication, with school textbooks often looking more like a Web page than like a traditional written text. Building on this, Jewitt (2005) argues writing is becoming increasingly visual in character, with the traditional domination of the word being unsettled by the predominance of the image, and that educators need to develop new understandings of this.

A pedagogical approach to the multimodal communicative landscape was developed in Cope and Kalantzis (2000). This work is framed by an analysis of the contemporary communicative situation as characterized by multimodality, multilingualism, diversity, and post-Fordism. They develop a detailed framework for a pedagogy of multiliteracies which aims to enable students to engage in new literacy practices, producing, using, critiquing, and challenging multimodal texts.

Some early work in this area, particularly in the speech/writing debate, was fairly technologically determinist, addressing changes to literacy and language practices as if technology itself were responsible for generating these differences. Other work insisted on the importance of the social context in shaping the practices which emerged. Reinking et al. (1998) explored key differences between printed and electronic texts, such as the interactivity, multimodality and nonlinearity of digital forms, and the implications of these for redefining what it means to read and write, inside and outside classrooms. The case studies in the book demonstrate that transformations in technology, society, culture, and literacy need to be understood as part of a sociocultural tapestry.

Kress' (2003) analysis identifies social, economic, communicational, and technological factors which shape new literacies. He claims that simultaneous, interplaying changes in these four areas are so profound that we can justifiably speak of a "revolution" in the landscape of communication, which calls for changes in our theoretical perspectives and our education systems. Despite his insistence on the essentially social nature of these changes, this work can tend toward a certain utopianism, claiming that the shift to multimodal, interactive forms of communication carries with it intrinsically democratic potentials. Other writers (e.g., Freebody 2001) would challenge this, claiming that existing structures of power and control are just as likely to be reinforced and continued through the use of new communications technologies – as can be seen, for instance, by the predominance of the English language on the Internet and the dominance of a small number of US corporations such as Google and Facebook. Snyder (2002) explores a range of online literacy practices in the context of a communicative order in which a technological revolution is reshaping the material bases of society, embedded within a dominant political/ideological order of high-tech global capitalism. They argue that the notion of "being literate" changed with the advent of multimodal online practices and show how a complex interplay between the new communication order, new political order, and new work order shapes and circumscribes the lives, identities, and possibilities of teachers and students.

Major Contributions

Major contributions of work in this area from a literacy studies approach have developed this perspective, through studying digital literacy practices in real-life contexts. As Barton and Lee (2013) and Gillen (2014) point out, work which seeks to understand digital literacy and language in its social and discursive context enables effective engagement with and critique of unsupported generalizations, both in giving close attention to the specific details of how language is used and in understanding the contexts and structures within which this takes place.

Research which studies people's everyday digital literacy practices has helped us to understand their characteristics. Often, these studies have worked with young people, exploring the implications of their practices for education and aiming to understand how young people are adopting and adapting new literacies. Early studies such as those in Alvermann (2002) showed how "new" literacies were rapidly becoming part and parcel of everyday life for adolescents. Articles in Carrington and Marsh (2005) similarly identified a "paradigm shift" in communicative practices, showing how in a range of settings the production and use of digital texts by young people were becoming not "new" but "normal."

In the Digital Youth Project (Ito et al. 2010), nearly 40 researchers collaborated in a range of ethnographic studies working with hundreds of young people to understand their engagement with new media, digital literacies, and learning. They identified three different genres of engagement characterizing these patterns. Most young people engaged in "hanging out," using digital literacies to engage with their existing

social networks of friends and extending these networks online. A lot of them were, in addition, “messaging around” – following up a wide variety of interests, using digital literacies to access information online. And a smaller number ended up “geeking out,” following up an interest such as programming in depth, linking into networks of other experts and developing expertise together online. These practices turned traditional social norms upside down, with social status emerging from being expert within the community, rather than from other aspects like age or class. All these genres of participation and learning involved social engagement with others online, driven by young people’s own interests and concerns.

Taking an ecological perspective on new literacies has helped to develop new understandings of learning, by examining the ways people learn to engage with new literacies, which are often very different from traditional ideas about how people learn. Barton and Lee (2013) underline the importance of the learning which is going on constantly in online spaces using language and literacy, informally and in communities, in a predominantly self-directed and autonomous way. For instance, Barton (2012) explores the nature of informal learning on Flickr, showing how people extend their learning both of photography and of writing (including in different languages) through participation in informal social engagement and following deliberate learning projects which change over time as they develop expertise.

Meyers et al. (2013) highlight the importance of informal learning using digital literacies in contemporary society, arguing that the boundaries of learning spaces are fluid and that informal learning through digital literacy needs to be understood as being an intrinsic part of our learning ecosystem, requiring a broader definition of “literacy” than many contemporary discourses adopt. They highlight the need to move beyond a focus on skills and instead to understand how people take advantage of the possibilities afforded to them by socio-technical networks for learning and for connecting with others. Papers in this special issue study a range of informal learning contexts, including a fan writers’ forum (Lammers), gaming within and beyond classrooms (Reynolds), and learning on YouTube (Tan), to show interactions between formal and informal learning contexts.

A different perspective on learning is developed in Gee’s (2003) video games research. Video games can be long, hard to master, and frustrating. Yet many are very popular, with gamers devoting huge amounts of time to mastering them, in contrast to much of what goes on in schools, where keeping students’ attention can be a challenge. Gee argues that by understanding the principles of learning of game design, we can understand more about all learning. He develops 36 principles of learning, including active, critical learning, seeing interrelationships, being rewarded for achievement, incremental learning of tasks at an appropriate level of difficulty, discovering situated meanings, and being part of a learning community. Thomas’ (2005) study of adolescents playing online role-playing games shows their learning in community as they engage in both playing their characters and in discussions on a Web-based forum, including poetry recitals and storytelling, fan fiction, and critique. She claims that the level these children reach in this arena may exceed the expectations of their teachers in schools and that this participation fulfils needs for belonging and development which schools do not address. Similar arguments are made through

Bulfin and North's (2007) case studies of the literacy practices of teenagers in Melbourne, Australia, which show students engaging in practices which flow between home and school environments, leveraging their expertise to renegotiate the affordances of school systems and find ways of drawing on their out-of-school practices in the classroom, in ways which both support and challenge the agendas of teachers.

The social aspect of much of this learning is very clear.

Early work by Rheingold (1993) identified the centrality of communities even from the earliest days of the Internet, and this has remained a common theme. From the mid-2000s, the shift to Web 2.0 and the participatory Internet has led to a huge expansion in the online communities and networks people interact with. These are new kinds of social groupings which require new ways of thinking about how we interact together. Gee's (2005) work on affinity spaces and semiotic social spaces opened up this area for exploration, showing how affinity spaces could be associated with different social languages. Davies (2006) showed the rise of communities of photo-sharers learning together on Flickr, with the site enabling reciprocal teaching and learning partnerships, generating new meanings and discourses, in a dynamic multimodal learning community. Black's (2006) analysis of online learning in the communities on fanfiction sites illustrates how second language learning is supported in an interest-driven space. Ito et al.'s (2010) research, described above, identifies the importance of "voluntary spaces of participation," peer and interest-driven networks in which people choose to learn together.

Work with families and young children has shown how digital literacies extend into the lives of the very young, providing new sets of affordances for children's learning from an early age. Burnett (2010) highlights the gap between the multimodal, screen-based experiences of sensemaking and literacy of many children at home, revealed by studies such as Marsh (2004) and Carrington (2005a), and their book- and paper-based experience of literacy in early years education. In a useful review of research, she argues that educational settings which do not engage with these practices, whether because of policies, dominant discourses about dangers of screen-based learning in the early years, lack of knowledge, or lack of resources, become increasingly anachronistic.

A significant amount of public discourse around digital and online literacy practices highlights fears and concerns, with "moral panics" (Cohen 1972) arising regularly in media and policy discourses around new technologies. Often these are to do with changes in language, suggesting, for instance, that "text language" is starting to be used in inappropriate settings, or with the effects on users of such transformations, such as losing the capacity to spell correctly or to concentrate on extended texts. It is often suggested that language itself is being negatively affected by online interaction, a position challenged by linguists such as Thurlow (2006) and Jones and Hafner (2012). Other "moral panics" have included the effects of video games (particularly "violent" ones) on young people's social and moral development and damaging social practices like bullying and sexual shaming on social media.

Research in new literacies from a social practice perspective can test out these issues by observing people's actual practices. Carrington (2005b) analyzes public

discourses about mobile phone texting, critiquing a discursive chain linking texting, youth, declining standards, poor academic achievement, and social breakdown. Beavis and Charles (2005) challenge the notion that simulation games like *The Sims* encourage gendered patterns in game play, showing how teenagers playing the game in Australian schools used it to subvert traditional gendered practices. But in a social situation where the dominant discourse includes this level of fear and suspicion, it can be hard for the positive messages of research to be taken up in constructive ways.

Work in Progress

Work in progress in this area addresses new and emerging practices and their implications for education. Gaming is attracting increasing attention, with researchers exploring learning and literacy in virtual worlds like Minecraft (Dezuanni et al. 2015), Club Penguin (Marsh 2012), and massively multiplayer online role-playing games (MMORPGs, Steinkuehler 2007). Merchant et al. (2013) bring together a range of studies of children and young people learning in virtual worlds and other interactive online spaces. They highlight the role of young people as active agents, engaging in playful and creative ways with the possibilities afforded by these spaces to build new kinds of social relationships and new forms of meaning-making. By bringing together studies of vernacular and informal settings with research in innovative educational environments using virtual worlds, they show the need to rethink pedagogies and teacher-student relationships in these new kinds of environments.

Another emergent theme is curation. Potter and Gilje (2015), introducing a special issue of *E-learning and Digital Media*, claim that curation – “collecting, cataloguing, arranging and assembling for exhibition and displaying” (p. 125) – is a new kind of literacy practice, with new learning identities and authorships developing as people collect and display online artifacts. This special issue explores curation in a range of online settings including digital media production (Terras, Ramsey, and Boyle), discussions of Minecraft on- and off-line (Dezuanni, O’Mara, and Beavis), film and media production in school contexts (Doerr-Stevens, DeJayne), and Facebook and learning management systems (Birkeland, Drange, and Tønnessen).

Increasing attention is also being paid to the multilingual nature of literacies online and the potential of this for language learning. Researchers are beginning to see the Internet as an “ecology of multilingual environments” (Thorne et al. 2015: 215), providing spaces in which people can curate their online identity drawing on the different linguistic resources available to them, engaging with communities of speakers of different languages, and engaging in language learning both explicitly and implicitly. Thorne et al. (2009) show how informal contexts such as fanfiction forums, virtual worlds, and online gaming are characterized by intense socialization into new forms of communicative practices, supporting language learning through creativity, identity development, and management. Lee (2007) shows Hong Kong teenagers creatively mixing English and Chinese writing in their instant messaging

practices, and Barton and Lee (2013) develop the significance of the Internet as a multilingual space.

Problems and Difficulties

The research described above suggests that the way to prepare students for the digital world is to facilitate playful, explorative communities of peers following up their interests, moving from expert-novice relationships to a relationship of equals exploring together, with activities being realistically responsive to the broader social ecology, and teachers and students prepared to go in unexpected directions. Many national educational policies do now highlight the need to develop twenty-first-century skills (Jenkins 2009) in discourses that echo those of transnational organizations (OECD 2013).

However, this is difficult to achieve in a world in which more and more centralized, prescriptive curricula are being introduced, assessed by pen-and-paper skills testing at increasingly regular intervals, which leaves little space for unstructured, fluid explorations of ecologies of new literacies in the classroom (Luke 2002) – what Lankshear and Knobel (2011: 9) call the “standards-testing-accountability-performance” model. Bigum (2002) argues that schools have often “domesticated” new technologies, adapting them to fit in with existing school culture and practice rather than using them as they are used in the world beyond schooling. Burnett et al. (2014) present a collection of studies of “twenty-first-century literacies” around the world to support a critique of traditionalist discourses around education and literacy and particularly the associated accountability and testing regimes, calling for pedagogical approaches which recognize the range of practices students bring with them and the diversity of meaning-making possibilities, supporting the development of an empowering literacy education which adopts a critical perspective on the social context of literacies. Furthermore, given the rapid pace of change in this field, many teachers know far less about this area than (some of) their students.

Questions also remain open as to the most appropriate methods to use to research this rapidly changing and developing area. Much of the work outlined above draws on ethnographic methods, but how to incorporate the traditional participant-observation approach to understand communicative practices that take place both on- and off-line, in a range of virtual and real spaces in different and rapidly changing communities, remains a challenge. A variety of approaches have been developed to address this. Androutsopoulos (2008) has developed “discourse-centered online ethnography,” which begins with a systematic analysis of the discourse online (in his case working with linguistic analysis of hip-hop Websites and their networks) and then engages more directly with the people who produced these texts through interviews. Davies and Merchant (2007) used auto-ethnographic methods to research their own blogging, highlighting their development of public identities as academic bloggers, their membership of networks and communities, and their affective experiences. Other approaches focus on the mediated action as the site of research engagement. Jones (2004) highlights the need to begin from the perspective of seeing

online engagement as actions rather than texts while at the same time addressing the multimodal nature of the communications that these actions construct.

Ethical issues around researching digital literacies remain matters for debate. People may, for instance, post on public forums which are potentially available to researchers to analyze, without any expectation that their words will be analyzed in this way, making the notion of “informed consent” problematic. Such issues are considered in ongoing fashion by organizations like the Association of Internet Researchers (e.g., Markham and Buchanan 2012) and addressed in more detail in publications like Page et al. (2014) and require careful consideration in all research in this area.

One of the challenges raised by research in this area is the need to ensure focus is broadened beyond the practices of Western privileged middle-class in well-resourced countries. Prinsloo and Rowsell (2012: 271), introducing a special issue on technologies in marginalized contexts, claim that “Much of the digital and new media research takes place in predominantly Anglo-American or middle-class contexts,” and their collection of papers shows how inequalities of power, pedagogy, and resources are clearly shaping the affordances available. Nevertheless, Mills (2010), in a survey of empirical research in this area published between 1999 and 2009, argues that a lot of work addressing digital literacies from a New Literacy Studies perspective is carried out in diverse contexts, challenging dominant assumptions about digital literacies.

Future Directions

Future directions in this area can be hard to predict. Digital literacy practices are changing faster than research can follow them. We do not know what changes may be ahead, but we do know that there will be changes – what Alvermann (in the preface to Lankshear and Knobel 2011) calls the “permanency of the new.” The meanings of such practices are open and emergent, developing unpredictably as people work with and reconfigure the affordances of the platforms they are using for their own purposes (Santo 2011). It is impossible to predict the affordances which people will perceive from new technologies, some of which – such as using hashtags on Twitter to identify particular topics – may be completely unforeseen even by the designers of the technologies (Greenhow and Gleason 2012). And it can be difficult to tell which practices will remain and develop and which are short-lived trends.

Having said this, though, there are areas of research which appear potentially fruitful at the moment. Interest in the area of digital literacy practices in the development of critical social movements has been sparked by the role of Twitter, Facebook, and other social networks in movements such as the Arab Spring and Occupy, in which digital literacy practices made possible rapid informal learning and communication across multiple networks (Gleason 2013). More generally, the importance of drawing on this research to maintain a critical stance toward social media remains (Burnett and Merchant 2011). There has to date been little work from this perspective on the more technical aspects of digital literacy practices such as coding

(currently being introduced into many school curricula), and this is clearly an area for future development. Questions are arising around the use of “big data” by corporations and governments to produce representations of ourselves that we have little control over and to shape the affordances made available to us. Further analysis is needed of the way the designs of digital platforms, and the algorithms driving them, shape particular kinds of ideologies and approaches to the world and therefore change the nature of people’s practices. These areas, along with many of those mentioned above, will continue to make the study of digital literacies and their implications for education a significant area.

Cross-References

- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

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Language, Ideology, and Critical Digital Literacy

Ron Darvin

Abstract

Technology has revolutionized the way we produce and exchange information and developed new modes of communication and socialization. Implicated in relations of power, these digitally mediated practices are not ideologically neutral. They shape the representation of meanings and identities, the circulation of knowledge, the construction of social networks and formations, redefining notions of private and public space, while privileging and marginalizing ideas, cultures, and people. As technology increasingly becomes an integral component of learning, this chapter asserts that learners must develop a *critical digital literacy* to become more aware of how power operates in digital spaces, shaping ways of thinking and doing that are implicated in social and cultural reproduction. By sharpening this critical lens, learners equip themselves with the capacity to examine linguistic and nonlinguistic features of digital media, their biases and assumptions, in order to verify information and access the truth.

Keywords

Critical Literacy • Digital Literacy • Language • Power

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Introduction

Technology has instigated a fourth revolution in knowledge production (Harnad 1991), and by accelerating the speed through which ideas are processed and shared, it fortifies a knowledge economy where the production, distribution, and exchange of information are vital. As people and ideas traverse transnational spaces with greater fluidity, new means of representation and spaces of socialization also provide greater opportunities for the construction of identities and networks. These practices of “communicating, relating, thinking and ‘being’ associated with digital media” (Jones and Hafner 2012, p. 13) or *digital literacies* have not only reconfigured epistemological and social landscapes but also transformed identifications, allegiances, and notions of citizenship. As social practices (Street 2003), these new literacies are implicated in the power structures of the different contexts where they are developed, performed, and valued (Heath and Street 2008; Norton and Williams 2012; Prinsloo and Rowsell 2012; Warschauer 2009). To examine how power operates in these multiple spaces requires a more critical understanding of the “differentiated, situated and enculturated ways in which digital practices happen” (Snyder and Prinsloo 2007, p. 173).

Because of the shared capacity to construct, redesign, and disseminate information through the digital, truth becomes more open to interpretation and reinvention. In an era of “post-truth,” not only is knowledge acquisition now more contextual and situational (Luke 2014), but the ideological mechanisms that govern the production of truth within digital spaces become more invisible. To dissect how power operates in these processes of digital production, consumption, and socialization, learners need to develop a *critical literacy* that will allow them to filter through the abundance of information, to contest, deconstruct, and critique in order to discover legitimate knowledge (Luke 2003). Recognizing how language and other symbolic forms can be a powerful means to maintain and reproduce modes of exclusion, critical literacy also confronts how issues of access, diversity, and design are implicated in structures of power (Janks 2000), shaping identities, relationships, and interactions in unequal ways. As a convergence of both digital and critical literacies, *critical digital literacy* examines how the operation of power within digital contexts shapes knowledge, identities, social relations, and formations in ways that privilege some and marginalize others. It equips learners with the tools to examine the linguistic and nonlinguistic features of digital media, to identify their embedded biases and assumptions, in order to access the truth.

To examine more critically how technology facilitates the reconfiguration of knowledge and the social order, one needs to be aware of the various perspectives that surround it. On one end of the spectrum, technological dystopianism asserts that it diminishes our ability to communicate and interact meaningfully, and is responsible for shorter attention spans, language deterioration, and erosion of privacy. Technological utopianism, on the other hand, subscribes to the idea that it contributes only to progress and greater freedom. The limitation of these absolute positions is that it succumbs to a determinism that views technology as one that ultimately controls ways of thinking and social practices. Ignoring the power of technology in transforming societies and regarding it as ideologically neutral, however, would be an enormous oversight (Jones and Hafner 2012). By asserting that technology operates through power, critical digital literacy needs to strike a balance between these views, and proceed from an understanding that while technology has the capacity to empower and liberate, it also has the capacity to exclude and marginalize others (Darvin 2016).

Early Developments

When electronic text forms and practices were just beginning to change the communication landscape, Peters and Lankshear (1996) called for a critical literacy that would respond to the shifting textual environment and challenge “enclosed” forms of consciousness. Highlighting the dematerialized, interactive, integrative, and manipulable nature of the digital text, these scholars explained how these features enabled greater intertextuality and hybridity, while posing new possibilities and challenges for language and literacy education. Recognizing the attendant dangers of the new digital environment – increased state surveillance, vulnerability to breakdown and sabotage, and risks of cultural imperialism, the paper posited the need for a critical literacy that continually analyzed and evaluated how the digital transforms not only textual and discursive practices, but ultimately ways of doing and being.

In the same year, the New London Group (1996) highlighted how the increasing variety of text forms linked to information and multimedia technologies had great implications for teaching literacy. In proposing a pedagogy of multiliteracies, this group articulated critical framing as an important objective. Through this goal, learners are able to link situated practice and overt instruction to the “historical, social, cultural, political, ideological, and value-centred relations of particular systems of knowledge and social practice” (p. 34). Recognizing that website content may manipulate readers and obscure an ideological agenda, Labbo et al. (1998) pointed out how digital literacy requires being both a critical consumer and producer of information. They defined critical digital literacy as “the ability to recognize, interpret, and evaluate underlying ideologies in various types of hypertextually linked information as it is presented in various data sources” (p. 282). Primarily concerned with being able to bridge the digital literacies learned at school with those required in the workplace, the authors assert that this critical approach is necessary to

strategically navigate through data, and that teachers need to receive the support necessary to develop these literacies.

Luke (2003) observed that with new media, meaning making and knowledge are deterritorialized, and that the fluidity and plurality of engagement are marked by simultaneous decoding, production, and interactional contexts. Making meaning from hypertexts thus require greater lateral thinking – a cognitive mobility across disciplines, genres, modalities, and cultural zones. Recognizing the risks and potential of information and communication technologies (ICTs), Luke proposed a critical ICT literacy that would include “a metaknowledge, a critical and self-reflective analysis of the sociocultural and political contexts of ICTs at global and local levels” (p. 399). Beyond skills training and use of collaborative tools, she asserted the need for critical analyses of power relations, identity politics, and language generated by and through engaging with technology. Challenging the assumption that online communication is hierarchy-free, she believed there should be a way to investigate whether this equity exists, and if students of different cultural or linguistic backgrounds are able to participate freely in these spaces. Activating this critical ICT literacy requires a metaknowledge, a self-reflective analysis of the sociocultural and political contexts of technologies at local and global levels. As online literacies evolve, educational theorizing and research must devise more flexible concepts and methodologies that involve a provisional and transformational epistemology.

In a report on media education in the twenty-first century, Jenkins (2006) suggested that new media literacies should be considered a social skill and that to engage within participatory cultures should involve a capacity to think critically about information that is shared within these diverse spaces. Learners need to acquire a critical understanding of how media representations “structure our perceptions of the world, the economic and cultural contexts within which mass media is produced and circulated, the motives and goals that shape the media they consume” (p. 31). By developing a critical awareness of how media frames worldviews and reshapes experience according to its code and conventions, learners are able to evaluate the quality of information technology has made highly accessible. Drawing from Giroux’s (1994) notion of critical pedagogy, Merchant (2007) identified critical digital literacy as an important component of literacy education. Developing a critical lens is a responsibility of the educational system, and this entails providing learners with tools to analyze discourses related to wider social issues, power relationships, and inequities. While there is a need to nurture and preserve new digital spaces, there should also be a means to understand their constructed nature. As learners participate in these spaces, critical digital literacy enables them to critique and challenge the dominant discourses circulating within these domains.

Major Contributions

As a construct, critical digital literacy continues to be labeled and interpreted in different ways and for different ends. Developing a vision for student success in the new global economy, The Framework for twenty-first Century Learning (Partnership

for 21st Century Skills 2011) identify information, media, and ICT literacies as including both functional and critical thinking skills. In this context, developing new literacies is viewed as necessary to participate as a productive member of the knowledge economy. Concerned with how technology contributes to the collective intelligence in a knowledge society, Poore (2011) refers to these two tiers of digital literacy. Functional digital literacy deals with developing technical skills and changing mindsets and attitudes towards technology through workshops and training. Critical digital literacy, on the other hand, examines digital contexts in a more cultural sense and requires having teachers equipped with philosophical and ethical frameworks for understanding digital cultures. As teachers guide learners through the emerging knowledge space, they need to help bridge a digital divide constructed by differential access to information, relationships, and networks.

Addressing this gap is also important to Facer (2011), who believes critical skills are key to building strategic knowledge that will contribute to social change. Given the ubiquity of online information, learners need to develop the capacity to discern the relationship of information to other information, to goals and interests, and to the contexts in which it is used. By understanding how the management of information flows impacts the lives of other people, learners are able to participate in a new culture of informal learning where technology can transform homes, neighborhoods, and workplaces into an integrated learning society that benefits diverse groups of people.

Because new technologies provide an immersive, interactive experience, Wohlwend and Lewis (2011) use *critical engagement* to describe the critical interpretation and production of digital literacies. As visual and embodied texts and virtual spaces circulate through global flows, they become both universalizing and fragmenting. Critical engagement enables an examination of how the motives of information and communication providers can shape the dissemination of knowledge, how participatory cultures can expand or limit the construction of texts and social networks, and how power relations are inscribed in the practices and norms of digital environments. Subscribing to the notion that emotion is structured through ideology, these scholars posit that the critical interpretation and production of digital literacies is bound to complex desires, and should therefore examine how digital practices are tied to expressions of passions, attachments, and affiliations.

Because digital media does not just enable the production and consumption of texts, but facilitates ways of thinking, relating, and interacting with others, critical digital literacy encompasses these affordances. Research in this area examines how power and ideology operates in the digital practices of representing identities, producing and circulating knowledge, constructing social networks and formations, and managing control and access.

The Representation of Meaning and Identities

At the very heart of critical literacy is the examination of how meanings are represented in ways that maintain and reproduce relations of power. While the

deconstruction of texts can reveal subtexts of power, digital technologies provide means of representation that conceal ideology in new ways. Through wizards, templates, drop-down menus, and preference settings, a semblance of personalization is manufactured to provide the user with a sense of freedom and autonomy. Although multiple and diverse, these affordances are never objective as they channel, and potentially limit, the meanings and representations one can make. To fit into the coding logic of these sites, there is always a predefined set of alternatives that prohibit finer gradations of meaning users can control. These default settings and “givens” steer users to a set of normative behaviors and meanings, indoctrinating users into social practices that are technologized around digital tools (Jones and Hafner 2012). Because Facebook is in the business of selling data about users to advertisers, the default categories users are made to fill out on their profiles (e.g., favorite books, movies, music) also encourage disclosure of personal interests that serve Facebook’s commercial motives. The highlighting of how many friends one has or the number of likes a post receives becomes a way of quantifying popularity, encouraging particular ways in which people communicate with each other and curate their identities. In a study of storytelling styles on Facebook, for instance, Page (2012) observes the frequent use of an affective discourse style marked by a high degree of intensification. Capitalization, repeated exclamation marks, repetition, exaggerated quantifiers like *all* and *everyone*, and frequent use of boosters, e.g., *very*, *really*, *so* are used to report on quotidian events. This linguistic pattern of intensification demonstrates how users believe some form of exaggeration is needed to make their stories “tellable” on social media. In this sense, the range of actions enabled by digital tools promotes particular constructions of self and language use.

The Circulation of Knowledge

Another way technology can limit the perception of the world is the systematic filtering of knowledge through algorithms. While people generally regard the Internet as open arenas where free exploration is the norm, online search technologies choose routes that are determined by programmed algorithms. The algorithmic assessment of information represents a specific logic built on certain presumptions of what knowledge is and the categories in which specific information belongs. By deciding what the categories are and what belongs in each one, this fundamental component of database design and management becomes a powerful semantic and political intervention. It makes assertions of the nature of things, while concealing these evaluative criteria, which are held as trade secrets. The “trending” algorithm of Twitter, for instance, cannot be made public because this would leave them vulnerable to those who may want to manipulate the system to get their sites to the top of the search results or want their hashtags to appear on the trends list (Gillespie 2014). Because of these conditions, the algorithm becomes a legitimate knowledge logic, where commercial interests are integrated and protected. Search directory editors and website designers lobby for specific sites and sponsored links to appear at the top of search results. Some studies have also noted how structural biases of search

engines can prioritize commercial information providers and English language sites (Granka 2010). By operating through these biases, public search tools lead to a hegemonic rationality that privileges certain sources of information, while excluding others (Kirkpatrick 2008).

The Construction of Social Networks and Formations

By calculating what is trending or popular, social networking sites do not only control the circulation of knowledge, they also shape social and political discourse and the publics in which people participate (Gillespie 2014). In a news service, the information that is pushed is tailored to the user's preferences, consequently undermining the diversity of public knowledge and political dialogue. Because of these algorithms that direct users towards likeminded people, they enter into "filter bubbles" where one finds the news one expects and political perspectives one already subscribes to (Pariser 2011). This filter exists in Facebook News Feeds as well where results are based on algorithmic calculations that push status updates and activities of friends whom one already interacts with the most by liking and commenting on their posts. By ranking "objects" like an uploaded photo and "edges" (i.e., interactions), Facebook algorithms shape the interaction of friends through a programmed sociality based on findability and compatibility (Bucher 2013). The construction of online spaces of socialization also enables a mobility that fuels a "networked individualism" where people are linked by scheduling, monitoring, surveillance, and regulation. This individualism transforms life strategies while exerting new demands on the self. Unbounded and deterritorialized, identities are no longer tied to fixed localities, patterns, or cultural traditions (Elliott and Urry 2010), and are able to participate in communities of interest that transcend national boundaries. These communities tend to attract people from similar professions, educational backgrounds, values, or lifestyles. As people build these transnational networks, people can interact less with those from other social positions within their own local communities and country, reshaping their allegiances and sense of co-citizenship (Gee and Hayes 2011; Warriner 2007).

Issues of Control and Access

While earlier views of the Internet recognized it as a decentralized and unregulated space, Sassen (2008) points out how surveillance and management processes are often overlooked. Governments are able to establish technical and operational standard settings that enable agencies to collect data and engage in multiple forms of surveillance. Corporations also privatize capabilities within the Internet that support their interests. While the earlier Internet allowed open access to most spaces, the growth of intranets and e-commerce have facilitated "zoning," which limits access to or distribution of goods and services on the Internet. Apart from the ideologically laden processes of search engines, there have also been attempts by

government agencies and private corporations to undermine net neutrality. By invoking the need to control information traffic for greater efficiency, phone carriers have proposed that Internet content can be delivered at variable rates. Such a proposition would have tremendous implications on access to knowledge as powerful entities that can afford prioritized delivery service can push information that serves their own interests (McKee 2011). This attempt to control the flow of information is also reflected in the cost-free access to the Internet offered by Airtel Zero and Facebook's Internet.org. Marketed as corporate social responsibility efforts, these initiatives enable economically underprivileged users to connect to the internet. This connectivity however is limited to specific sites and applications, thus restraining the knowledge and social networks these users can access (Murthy 2015).

Apart from institutional and corporate mechanisms of control, differential access not only to technology but also digital literacies is an important concern of critical digital literacy. While a great percentage of the population is still not connected to the Internet, Prinsloo and Rowsell (2012) have also pointed out that when technologies travel and are located in new spaces, particularly in the global periphery, how these resources are used can be subject to a number of restraints. They become "placed resources" in that the specificity of place, its material conditions and social practices, largely determine the use and benefits of these resources. This research extends this notion of placed resources to how even within a local context there are a variety of ways in which technology is taken up in specific settings like home and school. In a comparative case study of two adolescent migrant Filipino learners from different social class positions in Vancouver, Darwin and Norton (2014) examine how differences in economic, cultural, and social capital can shape divergent digital literacies and language use. While both learners had similar access to devices, the differences in mentors, home literacies, and social networks can shape their perceptions of what technology is for and how they should use it. In this sense, learners of different socioeconomic backgrounds are socialized into specific digital practices that can either facilitate or disable upward social mobility.

Work in Progress

Drawing from the New London Group's (1996) conception of design as a key component of literacy education, Pangrazio (2016) proposes *critical digital design* as a political model of digital literacy where understandings of discourse, ideology, and power are scaffolded in the critique. Multimodal features of digital texts are analyzed in parallel with the general architecture of technology and the Internet to dissect how these structures reproduce systems of power and privilege. Rather than focusing on specific technologies, the critical framework also begins with a more personal position that reflects on one's beliefs and emotions and refers to individualized practice. Recognizing that ideology is intrinsic to the affective experiences of texts, it links personal responses to digital texts to broader ideological concerns. Through a "transcendental critique," (p.8) learners create a sense of distance from

digital media by decontextualizing everyday use and reassessing their relationship with it. Pangrazio is currently testing the viability of this framework through a study that integrates visualization, self-reflection, and transcendentalism. The hope is that the findings of this study will establish an evidence-based framework for critical digital design.

Recognizing the value of critical digital literacy, Santo (2013) has proposed the term *hacker literacies* to refer to how users can go beyond critique by actively resisting and reconfiguring networked public spaces. Through the dialectical relationship of the social and the technical, digital spaces are malleable, open to reformulation and reconfiguration. Learners are encouraged to be hackers, not in any malicious or unethical sense, but to encourage them to collaborate and tinker with technology and to actively resist systemic patterns of control by powerful entities. Hacking practices could include designing and advocating for alternative models of privacy settings for Facebook and instigating group action where users intentionally alter their Facebook profiles to disrupt the marketing data the networking site sells to companies. Reclaim Privacy, an open-source method of raising awareness of Facebook privacy settings, created a technical response to Facebook's complex privacy interface. Through media watchdog groups and voices in academia, the blogosphere, and afterschool digital programs (Dooley and Exley 2015), learners are able to participate in subcultures that are able to challenge the hegemonic control of established sites. By learning basic coding, game modding, and do it yourself (DIY) approaches, they are able to push back against existing designs of mainstream companies and resist their hegemonic stranglehold.

Problems and Difficulties

A significant challenge to developing a critical digital literacy is that because digital media is so interwoven into the lives of learners and their personal and affective experiences, it makes it difficult to stand back and take a more critical stance. To reconcile the personal with the ideological requires an awareness of how digital texts provoke strong emotions precisely because they reference a meaningful yet ideologically circumscribed experience. Understanding the ideological architecture of the digital is difficult because its technical foundation is complex and opaque, and in schools, developing skills in navigating digital tools are prioritized over critiquing them (Pangrazio 2016). In a study that examines the way young people use Facebook, Pangrazio (2013) also suggests that the highly visual nature of the medium together with the invisibility of the audience pressure young people to adapt to the perceived conventions of the social networking site, rather than to question them. While the participants were able to see how the site shaped their view of others, it was more difficult to see how it shaped their own view of themselves. Critiquing the digital practices around Facebook requires standing outside the discourse. The banning of Facebook in some schools, however, disables the possibility of critical analysis in classrooms. In some cases, literacy curricula do

not just ignore but stigmatize the literacy practices in these social networking sites (Thorne 2013).

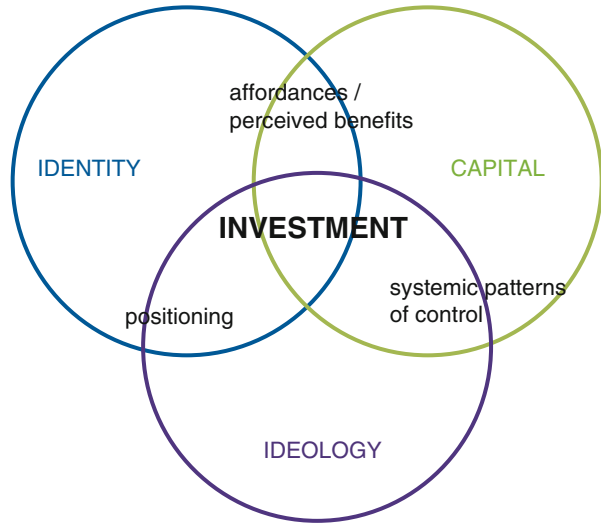
Another challenge in developing this critical digital literacy is that it necessitates an understanding of complex technical processes and political economic mechanisms. Luke (2014) points out that mere digital engagement is not a critical literacy approach. Critical literacy uses media “to analyze, critique, and transform the norms, rule systems, and practices governing the social fields of institutions and everyday life” (p. 20). It seeks to reshape political consciousness, material conditions, and social relations, and examines how new literacies can transform both local and geopolitical relations of power. Because they are developed through a historical materialist lens, critical literacies have no universal model and are contingent on local realities. As digital practices of knowledge circulation, identity representation, and social network construction are carried out within capitalist infrastructure and are implicated in consumer culture, the power asymmetries of digital contexts intersect with a complex political economic order. The challenge in dissecting these contexts is that it requires a new vocabulary to critique the economic structures, flows, and forces through which the digital thrives. At the same time, a critical approach also involves an examination of the complex interplay of information processing, software dynamics, linguistic processes, and cultural practices that are at work within these digital platforms. Software has become a technocultural actor that shapes users’ cultural experiences of and through the web and reflects assumptions of roles, hierarchies, and practices. To examine how these biases and assumptions are embedded in digital platforms thus requires technical knowledge that is not highly accessible (Langlois 2013).

Apart from the challenge of developing technical and political economic knowledge, Pangrazio (2014) points out that current terms in digital studies mask their ideological underpinnings and impede critical thought. Labels such as “participatory culture” (Jenkins 2006) and “networked public” (Boyd 2014), for instance, connote freedom, democracy, and civic engagement while concealing the gatekeeping measures and fragmented nature of these spaces. The word “user” reflects neoliberal ideology that positions the individual as a consumer of resources rather than an engaged citizen. To challenge these connotations, critical discourse analysis needs to dissect assumed meanings of concepts like *free*, *friend*, *link*, *like*, and *open* in digital contexts and to rearticulate these concepts with a counterhegemonic impetus.

Future Directions

Responding to the need for a more critical understanding of how power operates in digital contexts, Darvin and Norton (2015) have developed a model of learning that locates investment at the intersection of identity, capital, and ideology (See Fig. 1). Extending theories of identity and investment developed in Norton’s earlier work (Norton Peirce 1995; Norton 2013) to address the realities of a digital age, the model recognizes that as learners retreat into private, isolated spaces and navigate both online and offline worlds, the mechanisms of ideology become more invisible. This

Fig. 1 Darwin and Norton's 2015 model of investment



opacity makes it increasingly difficult to recognize how specific communicative events are indexical of macrostructures of power. To respond to this challenge, this model of investment highlights how, as learners move fluidly across spaces, ideologies collude and compete, shaping the identities of learners and positioning them in different ways. The value of their economic, cultural, or social capital also shifts as it travels across time and space, and is subject to the systemic patterns of control of institutional structures and processes. By laying bare the interplay of these different forces, the model can serve as a framework for critical digital literacy that examines the operation of power in the digitally mediated construction of knowledge, identities, and social networks.

Instrumental also to developing this criticality, Darwin and Norton (2015) speak of cultivating a *sens pratique* or practical sense that enables learners to know the “rules of the game,” or the mechanisms of power that control digital contexts. Borrowing from Bourdieu (1986), this practical sense enables learners to (i) master the rules, norms, genres, and multimodal features specific to different communicative contexts; (ii) seamlessly shift linguistic codes, practices, and strategies while moving across spaces; and (iii) use linguistic and nonlinguistic resources to gain access to, challenge, and transform these spaces. By repeatedly performing these repertoires and strategies with greater autonomy, learners are able to sharpen their critical lens and navigate different ideological landscapes. Being aware of the linguistic and nonlinguistic features of online genres also help learners to recognize credible news sources and identify online hoaxes. Also borrowing from Bourdieu, Thorne (2013) speaks of the need for literacy education to develop a “generative disposition” among learners by socializing them into ethical standards and raising their awareness of how media shapes perception. Through this cultivated disposition, learners are not only able to identify and work with regularities, selection biases, and performative conventions but also to shape and transform the digital spaces they participate in.

Recognizing how digital practices have the power to privilege some and marginalize others, Hull and Stornaiuolo (2014) have invoked the construct of cosmopolitanism to guide digital production and consumption. By enabling a “global culture of open-mindedness” (Hansen 2010) and an awareness of one’s role as “citizen of the world,” cosmopolitanism calls for an understanding of the ethics of communicating and participating in a digitally mediated world. Hence, while critical digital literacy exposes how power operates in this world, cosmopolitanism shapes dispositions that allow learners to navigate this world with greater respect and responsibility. It enables them to value diverse knowledges, cultures, and identities, and develop a greater openness to the world (Delanty 2006), while addressing the material inequalities that circumscribe it. By complementing critical digital literacy with a cosmopolitan imagination, learners are able to understand that critique is not an endpoint, but a means to achieve genuine social transformation in an increasingly digital world.

Cross-References

- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

Related Articles in the Encyclopedia of Language and Education

Brian Street: [New Literacies, New Times: Developments in Literacy Studies](#). In Volume: Literacies and Language Education

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Multimodal Discourses Across the Curriculum

Carey Jewitt

Abstract

Multimodality approaches representation and communication as something more than language. It attends to the complex repertoire of semiotic resources and organizational means through which people make meaning – image, speech, gesture, writing, three-dimensional forms, and so on. A social semiotic approach to multimodality sets out to reveal how processes of meaning making (i.e., signification and interpretation or what is called semiosis) shape individuals and societies. In this chapter, we use multimodality to refer to “multimodal social semiotics” (Kress, *Multimodality: A social semiotic approach to contemporary communication*. London: Routledge, 2010). Its basic assumption is that meanings derive from social action and interaction using semiotic resources as tools. A variety of disciplines and theoretical approaches can be used to explore different aspects of the multimodal landscape (Jewitt, *The Routledge handbook of multimodal analysis*. London: Routledge, 2014). Psychological theories can be applied to look at how people perceive different modes or to understand the impact of one mode over another on memory, for example. Sociological and anthropological theories and interests can be applied to examine how communities use multimodal conventions to mark and maintain identities. The term multimodality is, however, most strongly linked with theories rooted in linguistics, notably systemic functional linguistics, social semiotic theory, and conversation analysis (Jewitt et al., *Introducing multimodality*. London: Routledge, 2016a). Examining multimodal discourses across the classroom makes more visible the relationship between the use of semiotic resources by teachers and students and the production of curriculum knowledge, student subjectivity, and pedagogy.

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Introduction

Multimodality approaches representation and communication as something more than language. It attends to the complex repertoire of semiotic resources and organizational means that people make meaning through – image, speech, gesture, writing, three-dimensional forms, and so on. Strictly speaking, multimodality refers to a field of application rather than a theory, and over the past decade, it has become a widely used term in the academic world. A variety of disciplines and theoretical approaches can be used to explore different aspects of the multimodal landscape (Jewitt 2014). Psychological theories can be applied to look at how people perceive different modes or to understand the impact of one mode over another on, for example, memory. Sociological and anthropological theories and interests can be applied to examine how communities use multimodal conventions to mark and maintain identities. The term multimodality, however, is most strongly linked with theories rooted in linguistics, notably systemic functional linguistics, social semiotic theory, and conversation analysis (Jewitt et al. 2016a). In this chapter, we use multimodality to refer to “multimodal social semiotics” (Kress 2010).

Multimodality is concerned with signs and starts from the position that like speech and writing, all modes consist of sets of semiotic resources – resources that people draw on and configure in specific moments and places to represent events and relations. From this perspective, the modal resources a teacher or student chooses to use (or are given to use) are significant for teaching and learning. In this way, a multimodal approach rejects the traditional almost habitual conjunction of language and learning. Using a multimodal approach means looking at language as it is nestled and embedded within a wider social semiotic. Examining multimodal discourses

across the classroom makes more visible the relationship between the use of semiotic resources by teachers and students and the production of curriculum knowledge, student subjectivity, and pedagogy.

Early Developments: A Visual Start

A social semiotic approach to multimodality sets out to reveal how processes of meaning making (i.e., signification and interpretation, or what is called semiosis) shape individuals and societies. Its basic assumption is that meanings derive from social action and interaction using semiotic resources as tools. It stresses the agency of sign makers and focuses on modes, their affordances, and the social uses and needs they serve. Gunther Kress, Robert Hodge, and later Theo van Leeuwen developed social semiotics from two main strands of influence: linguistics, including Hallidayan linguistics semiotics (Halliday 1978), and critical linguistics which is now more commonly referred to as critical discourse analysis (CDA). Kress and Hodge set out to expand and reevaluate multimodality's linguistic realm of reference drawing on other approaches (e.g., film theory, musicology, game theory). In the late 1970s, Michael Halliday first used the term "language as social semiotic" (1978) to stress the relationship between a language sign system and the social needs it is used to serve. He understood language in terms of sets of options that shape what people can and cannot do with a language in a given social context. From this perspective, every linguistic act is seen as involving choices. Language is understood as an *evolving* system of *meaning potentials*. In the 1980s, Gunther Kress, Robert Hodge, and others began to build on Halliday's approach to describing language as a system of meaning/semiotic choices, in order to analyze the meaning potential of other sign systems, such as image.

In the mid-1980s, the influential *Newtown Semiotic Circle* was founded in Sydney. Members included Gunther Kress, Robert Hodge, Theo van Leeuwen, Jim Martin, and later Paul Thibault and Terry Threadgold, among others. They started the work of looking at different modes of communication and the ways in which they were "integrated" in texts. As these scholars moved beyond language to consider the "whole domain of meaning," they also drew on ideas from European and American semiotics (e.g., the work of Roland Barthes 1993) and broadened it to *social* semiotics. Hodge's and Kress *Social Semiotics* (1988) examined the social implications of writing and image in "print" media (e.g., advertisements, magazines) and started to extend the focus on power and ideology to other modes (though at that time they did not have the term "mode").

By the mid- to late 1990s, a few books and papers on multimodality were starting to be published. The primary focus of this work was visual communication and the relationship between image and writing. The works of Gunther Kress and Theo van Leeuwen (1996), the New London Group (1996), and Michael O'Toole (1994) were particularly significant for multimodal research within education. This work challenged the notion that learning is primarily a linguistic accomplishment, sketched

key questions for a multimodal agenda, and began to define conceptual tools for thinking about teaching and learning beyond language.

The call to understand pedagogy as multimodal was radical when it was first made. A key design element of a future pedagogy of multiliteracies was heralded as “designs for other modes of meaning” (New London Group 1996). In part this call was a response to the social and cultural reshaping of the communicational landscape (related to globalization, new technologies, and new demands for work). In a sense, the conclusion that reading this “new” multimedia, multimodal landscape for its linguistic meanings alone is not enough was inevitable. A special issue of *Linguistics and Education* on multimodality was an important publication (and one of the first) to provide tools for educational researchers wanting to undertake multimodal research (Lemke 1998).

Attempting to understand the relationship between image and text was central to the development on multimodality. The redundancy of “nonlinguistic” modes was argued against, and the idea that the meaning of modes is incommensurable was key. *Reading Images* (Kress and van Leeuwen 1996) opened the door for multimodality in the way that it discusses key concepts such as composition, modality, and framing. This work offers a framework to describe the semiotic resources of images and analyzes how these resources can be configured to design interpersonal meaning, to present the world in specific ways, and to realize coherence. It demonstrates and generates a series of semiotic network maps showing the semiotic resources of image in play and how discourses are articulated visually through the design of these resources.

Work by Kress on literacy and young children’s meaning making also helped highlight the potential of multimodality for literacy. His concern with font, style, the spatial design of the page, and the materiality of the written text positioned writing as multimodal. This work began to make connections across multimodality and New Literacy Studies – a combination that now offers a distinct theoretical “accent” to multimodality (Street et al. 2014).

Major Contributions: Key Themes in the Study of Multimodal Discourses

From early 2000, there has been an explosion of interest in multimodality within educational research, and this approach has been actively taken up educational researchers across a wide range of learning contexts. Some of the major contributions made by this work are discussed below (see also Jewitt 2014; Jewitt et al. 2016a).

Mode and Semiotic Resources for Meaning

In order for multimodality to be of use to educational research, a clearer sense of how modes are used for meaning making is required. Much is known about the semiotic

resources of language in the classroom and curriculum, but considerably less is understood about the semiotic potentials of gesture, sound, image, and so on. A number of detailed studies on specific modes helped begin to describe these semiotic resources, material affordances, organizing principles, and cultural references. Alongside Kress and van Leeuwen's work on images (1996), other key works that contribute to an evolving "inventory" of semiotic modal resources include Van Leeuwen's work on the materiality of the resources of sound (1999) and color (2010). With a focus on writing as a multi-semiotic resource, Kenner (e.g., 2004) shows how young bilingual learners use directionality, spatiality, and graphic marks to realize meaning and express identities in complex ways. The work of Kress et al. (2001, 2004) maps how these modes interact and interplay in the English and Science classroom. Bezemer and Kress (2016) have worked to map interaction through a focus on the modes of gaze, gesture, movement, and beyond to provide a multimodal theory of learning with attention to notions of sign making, recognition and assessment, and so on.

Shapes of Knowledge, Pedagogy, and Subjectivity

Through detailed multimodal analysis, classroom research shows how teachers orchestrate a range of modes in the classroom. Some key studies include Kress et al. (2001) in relation to school Science and school English (2004) and mathematics (O'Halloran 2004). This research maps how curriculum concepts are "filled in" by teachers' pedagogic movement between, in the case of science, abstract diagrams, embodied action, interaction with models, and canonical images to create complex multimodal narratives. At times, the complex multimodal configurations realized by teachers are designed to enable the tension between discourses and domains of knowledge (e.g., everyday knowledge and specialized scientific knowledge) to reside in the seams between modes: with one mode supporting one discourse and another mode realizing a quite different one. The classroom itself can also be viewed as a multimodal sign that articulates discourses of time, managerialism, ability, subject knowledge, etc., through its spatial arrangements, furniture, visual displays, equipment, and artefacts. This research shows how multimodality can be applied to examine the connection between policies, the use of technologies, pedagogy, and what it means to learn. Student subjectivity and identity have also been interrogated in the work of South African educational scholars working in multimodality, notably Stein (2003) and Archer (2014). In particular, their work demonstrates the potential of multimodality to shed light on the challenges and opportunities of multimodal pedagogy in contexts of diversity.

Multimodality and New Technologies

The ways in which modes are newly configured and made available for teaching and learning via new technologies are a focus of multimodal research (Kress 2003; Jewitt

2008, 2013; Jewitt et al. 2016b). Burn and Parker's (2001) work on media education and digital animation explores how students design meanings across different sites of display and semiotic resources and what this means for learning and literacy. Multimodal research into new technologies and learning also explores the meaning potential of a text's structure: the semiotic facilities of linking, hypertext, and the design of hyperlinks (Jewitt 2002; Lemke 2002; van Leeuwen 2005). These links and structures create relations and continuity or discontinuity between elements, what Lemke calls "hyper-modality" (Lemke 2002). Another term useful to multimodality is "resemiotization" (Iedema 2003), which focuses on how new technologies remediate discourses via multimodal representation and communication across media. A multimodal approach has been used to investigate learning through the analysis of student interaction with a wide range of technologies in the school and informal learning environments (e.g., museums), including iPads and tablets (Crescenzi et al. 2014), mobile technologies (Sakr et al. 2015), tangible technologies (Price and Jewitt 2013), and whole body interaction (Price et al. 2015). Multimodality has also been applied to the analysis of social media and online communication environments (Adami 2009, 2015; Jewitt and Henriksen 2016). This work has explored the changing relationships of image, text, color, and layout and the interactional possibilities of digital texts.

Multimodal Learning and Literacy

Approaching the classroom as a multimodal environment demands a rethinking of learning and literacy. Multimodal research shows the complex decisions of children that are involved in the design of multimodal texts: what mode to use in order to "best" represent and communicate a particular meaning. Considering students in the classroom as *designers* of meaning in this way has important implications for learning such as what semiotic resources are made available in the classroom and, critically, how modes are valued in different contexts. Children's multimodal selections, adaptations, and transformations of these semiotic resources to make their own meanings are examined as one kind of evidence of learning (Kress et al. 2001, 2004; Jewitt and Kress 2003). These transformations have been traced and mapped as links in the "chain of semiosis" (Stein 2003; Pahl 1999). Jewitt has examined the multimodal character of early year literacy practices (2012) and worked to combine multimodality and ethnography in novel ways (2011). This rethinking of learning also has implications for how to think about assessment (Bezemer and Kress 2016).

Developing Theory and Method

Alongside accounts of multimodal research, the need to develop multimodal research tools remains. Kress and van Leeuwen's book *Multimodal discourses* (2001) contributes to the general theory of multimodality in their exploration of

the distinction between mode and medium and the formulation of the relationship between discourse, production, dissemination, and design. Multimodal theory has opened up the question of what constitutes a mode. The idea of mode has also been expanded in van Leeuwen's *Introducing social semiotics* (2005) to look at semiotic resources such as food, dress, everyday objects, as well as image, music, gesture, and writing.

Ethnographic methods have been combined with multimodality to look at semiotic literacy practices as well as texts (Street et al. 2014; Flewitt 2011). Stein (2003), for example, explores how students in South African townships express complex narratives of identities and culture through multimodal texts, highlighting the links between representational means and the production of identities. This work explores how multimodal pedagogy can reconnect linguistically disenfranchised learners – through the use of performance, semiotic artifacts, and visual representation.

Scollon and Wong-Scollon (2004) combined multimodal semiotics and intercultural communication to explore how the physical and material characteristics of language as situated in the world give meaning to people's actions. Norris (2004, 2014) takes up this approach to multimodal discourses and introduces several interesting concepts to the multimodal debate, one of which is the idea of *modal density* (intensity and complexity), a conceptual tool for separating out the modes as analytical units. This sets out a way of thinking about the relationships between modes in terms of a scale of low to high intensity and contributes to the theorization of the relationship across and between modes. Additionally, Newfield (2014) has developed the concept of the *transmodal moment*, which can be used in the examination of processes of modal translation in which meaning is materialized in a range of differently modalized texts.

Work in Progress: Distinctive Directions

There is substantial work in progress that looks at multimodal meaning making across a wide range of sites in preschool and early year writing and meaning making, school English and Media education, games studies, Science education, Music, Maths, and technology-mediated learning (e.g., Bearne and Kress 2001; Carrington and Marsh 2005) and more broadly in surgical education (Bezemer and Kress 2016). Building on this work, researchers are now looking at how the “choice” and use of representational modes and media/technologies shape teaching and learning across the curriculum in different ways – choices that are made by policy makers, teachers, curriculum and software designers, and students at a national level, a local level, and in the classroom. In this way, multimodal discourse analysis has begun to shift from primarily descriptive accounts to connect more explicitly with macro-social, political, and cultural concerns within education.

Ongoing multimodal research focuses on the development of more robust theoretical concepts and methodological tools. Practices of multimodal transcription and systematic multimodal analytical processes for working with video data are an area

where significant work is continuing (e.g., Bezemer and Mavers 2011). The work of conceptualizing modal hierarchies and relations, problematizing the concept of semiotic resource, and moving toward multimodal corpus-based approaches to multimodal meaning making is underway (Bateman 2014).

The need to rethink what it means to learn and to be literate is a thread that runs through much multimodal educational research. This raises numerous research questions in relation to learning including: how do representations impact on thinking and learning? What kinds of opportunities do different modes present for dialogue? How are modes “valued” in and out of the school? And what kind of learners do schools want to “produce”? It also raises questions about what literacy is and could be in a multimodal and multilingual communicational landscape. This line of questioning has in turn led to research that sets out to ask what multimodality has to offer as a pedagogic resource and how it can be shaped as a force for change.

The need to engage with social questions (beyond the role of description) is realized in research that attempts to move from notions of critique to design. As already described, multimodality can be used to build inventories of semiotic resources and to understand how resources are used to articulate discourses across the curriculum. Multimodality can *also* contribute to the development of new ways of using semiotic resources. Focusing (through historical analysis) on how semiotic resources come to be as they are, multimodality can ask why they are as they are. This is a powerful approach enabling people to see *how* it is that a “reality” comes to be represented and offers the potential to *imagine* it differently and to *redesign* it. Highlighting the implications for the learning of how semiotic resources are used can help to bring resources into the awareness of educational practitioners, and this brings with it the potential for new ways of using and configuring – *designing* – multimodal pedagogy.

Problems and Difficulties

Multimodal analysis is an intensive research process both in relation to time and labor. One consequence of this is that research on multimodal discourses is generally small scale and this *can* restrict the potential of multimodality to comment beyond the specific to the general. It is perhaps important to be clear, however, that multimodality can be applied to take a detailed look at “big” issues and questions through specific instances. Nonetheless, the scale of multimodal research can make it difficult to use findings for policy and educational strategy. The technical and theoretical developments mentioned in earlier sections, for example, the development of multimodal corpora, may help to overcome this problem. The potential to combine multimodal analysis with quantitative analysis in innovative ways in the future is an alternative and promising strategy.

A criticism sometimes made of multimodality is that it can seem rather impressionistic in its analysis. How do you know that this gesture means this or that that

image means that? In part, this is an issue of the linguistic heritage of multimodality, that is, how do you get from linguistics to all modes. In part, it is the view of semiotic resources as contextual, fluid, and flexible – which makes the task of building “stable analytical inventories” of multimodal semiotic resources complex. It is perhaps useful to note that this problem exists for speech or writing as well. The principles for establishing the “security” of a meaning or a category are the same for multimodality as for linguistics (or Philosophy or Fine Art). It is resolved by linking the meanings people make (whatever the mode) to context and social function. Increasingly multimodal research looks across a range of data (e.g., combining textual/video analysis with interviews) and toward participant involvement to explore analytical meanings as one response to this potential problem.

Linked with the problem above is the criticism that multimodality is a kind of “linguistic imperialism” that imports and imposes linguistic terms on everything. But these critics overlook the fact that much of the work on multimodality has its origins in a particular strand of linguistics, namely, the social semiotic theory of communication first proposed by Halliday (1978). This strand of research on language and communication foregrounds meaning and the ways in which language contributes to the construction of social life. The social component of this approach to language sets it apart from narrower concerns with syntactic structures, language and mind, and language universals that have long dominated the discipline. From a multimodal perspective, this view of communication can be applied to all modes, to gesture and image no less and no more than to speech and writing. That said, the use of language as a starting point can lead to problems in that it can lead to the shoehorning of other modes into linguistic concepts and categories – we therefore need to be sensitive to the particularities of modes and to use linguistic concepts as a loose framing to support a broader conceptualization of processes of meaning making.

Description is theoretically grounded and contributes to theory building. There is a need to actually ask questions of and through detailed description. For instance, to ask what kind of discourses are being articulated in a classroom and why and what is the social function of the representations being described. For example, to ask how the multimodal design of the English classroom shapes what school English is, what texts are included in English, and how do these choices and processes shape what it might mean to be student in a particular classroom. This analytical focus is important to show how discourses are articulated across the curriculum so that they can be made explicit, shared or challenged, and redesigned. However, multimodal research can be problematic if it offers an endless detailed description that fails to make clear the broad questions it seeks to answer.

The question of where the boundaries of its effective work are located is key for multimodality (as with any approach). In part, this is a question of scale. Multimodal analysis works best with small elements or with larger level elements treated as small, namely, as “signs.” But even this approach tends to exclude questions of aesthetics and ephemeral experiences that are central to lived material experiences, a gap that exploring synergies between the social sciences and the arts may help us to

understand (Jewitt et al. 2017). When the aims of enquiry shift to larger-level relations in process, and historically over time, it may be necessary to shift theoretical paradigms and combine multimodality with other theoretical approaches (Jewitt 2014). Introducing multimodality (Jewitt et al. 2016a) sets out a variety of approaches to multimodality and how such approaches can be combined.

New Directions

The combination of multimodality with theories that attend to the social at a macro-level is an area for development. Multimodal theories of communication and representation emerged at a “pivotal moment” when boundaries were fraying across the communicational landscape: modes were being recast, revalued, and redesigned by the social demands on communication (the remaking of boundaries between nation states, languages, work and leisure, as well as the use of new technologies). Such moments and shifts have happened in the past and will continue to happen in the future. The use and conventions of semiotic resources are established over time and are fluid and situated as well as being shaped by community and culture. The work of describing modes and semiotic resources as they are used in education is therefore an ongoing and important one. To realize the full potential of multimodality research also suggests the need to make links between *what* is happening in the classroom and *why* it is happening – to ask how the micro-social interactions of the classroom inflect, reflect, and connect with the concerns of macro-educational and broader social policies.

The “change potential” of multimodal semiotics is another aspect that may be developed more in the future. The potential for multimodal research to impact on teacher training, the design of learning, and curriculum and software design is immense. By challenging the exclusivity of the link between language and learning, multimodality opens up the need to better understand the relationship between multimodal pedagogy and learning. This raises significant questions about the impact of modes of representation on learning: what does it mean for learning to have all these modes operating in the classroom? What mode is best for what? How does the move between modes impact on shapes of knowledge? What does all this mean for cognitive load and learning? What forms of communication are students being expected (often implicitly) to understand? Questions concerning what educationalists want learning to be and how a knowledge of multimodal semiotics could enable it to be redesigned asks: How can students best be taught the skills to make and interpret multimodal texts? A future direction for multimodality is to theorize the relationship between semiosis and learning. This is needed to find pedagogically productive ways to connect, on the one hand, the ways that students select, adapt, and transform information in the classroom (including the resources that they bring into the classroom for learning) and, on the other hand, the expectations and demands of curriculum subjects.

As the technological landscape evolves, the potential of multimodality to explore, identify, and explain new semiotic resources for learning and communication is

brought to the fore. For instance, new technologies are increasingly drawing the semiotic features and capacities of touch into digital learning and communication (Crescenzi et al. 2014). This points to a new direction for research on multimodal learning, namely, how sensory resources are configured into semiotic modes. Multimodality provides a pathway to explore this connection between the sensory material character of communication and the social semiotic character of communication.

The connection between student practices, curriculum, and pedagogy foregrounds the notion of assessment. There is a glaring disjuncture between multimodal pedagogy, multimodal learning, and a primarily written language assessment process. This is a growing focus within multimodal research across the curriculum and a key direction for research in the future is to tackle the issue of assessment or “recognition” (Archer 2014; Bezemer and Kress 2016) to ask how best to assess students’ learning in a multimodal classroom.

Cross-References

- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

Related Articles in the Encyclopedia of Language and Education

- Ariana Mangual Figueroa: [Ethnography and Language Education](#). In Volume: Research Methods in Language and Education
- Jennifer Rowsell and Diane Collier: [Researching Multimodality in Language and Education](#). In Volume: Research Methods in Language and Education

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The Digital Divide in Language and Literacy Education

Tamara Tate and Mark Warschauer

Abstract

The term “digital divide” is used to describe unequal access to digital technology and information. Simple binary constructions of access, whether of devices or the Internet, have evolved to cover more complicated and nuanced discussions of device density, Internet speed, and even relevant skills and social support. Current concerns about the digital divide no longer simply relate to access to a device or the Internet but rather to people’s ability to make use of the device and Internet to engage in meaningful social practices. As such, rather than being understood as a binary concept, in actuality, the “digital divide” is full of gradations and types of divides. With the rapid growth of the Internet as a medium for both economic and social transactions, being part of this network has become essential for inclusion and participation.

Keywords

Digital divide • Digital technology • Access • Social inclusion

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Introduction

The term “digital divide” is used to describe unequal access to digital technology and information. Originally focused primarily on the issues of hardware (e.g., computers) and Internet access, it has evolved to cover the broader context of their effective use, including skills, knowledge, and social support. With the rapid growth of the Internet as a medium for both economic and social transactions, being part of this network has become essential for inclusion and participation. This chapter will describe the initial construct of the digital divide and the evolving broadening of the concept. It then explores some of the components of the digital divide, including home access, school access, school use, the gender gap, the generation gap, and other potential gaps of concern. Efforts to address this digital divide are discussed, particularly focusing on the issues facing teachers: workability, accessibility, and performativity. Finally, the chapter concludes with a discussion of future directions.

Early Developments

With the growing popularity and use of the Internet following the introduction of World Wide Web browsers in the 1990s, officials became increasingly aware of the potential consequences of unequal access to digital information. The term “digital divide” began showing up in the popular press and was used in a speech by both Al Gore and Bill Clinton in 1996 (<http://www.ntia.doc.gov/legacy/ntiahome/101096clinton.htm>); the same year sociologist Manuel Castells laid out a compelling analysis of the critical role of information technology access and use in generating wealth, power, and knowledge in the current era.

The simplest and earliest construct of the digital divide focused on devices and physical access to devices. This construct allowed for clear lines demarcating haves and have-nots and easy counting of who has how many. Similarly, access to the Internet is only somewhat more complicated to measure in binary terms, although the differences between dial up and broadband access have been acknowledged.

The degree of access to computers by diverse demographic groups has been well documented in the United States through reports issued by the National Telecommunications and Information Administration (NTIA, www.ntia.doc.gov) based on the Current Population Surveys (CPS) of about 50,000 US households conducted by

the US Bureau of Labor Statistics and the US Census Bureau. Another widely cited source of related information comes from the telephone surveys of the Pew Internet & American Life Project (www.pewinternet.org). These reports show increasing computer ownership and Internet access, with differences largely reflective of socioeconomic levels (reflecting differences both in economic status and educational attainment).

Policy initiatives quickly followed the awareness of a gap in digital device access in the United States. Many of these initiatives focused on schools, such as the E-rate program, which has provided funding to assist Internet connectivity in schools and libraries since 1996. Later, the National Broadband Plan, released by the Federal Communications Commission in 2010, aimed to use stimulus funds to bring broadband connectivity and technology education to underserved populations, particularly in rural areas. Other initiatives during the early years of public access to computing and the Internet focused on creating low-cost devices to increase the affordability of device ownership (e.g., Brazil's People's Computer, India's Simputer, and the XO computer used by One Laptop per Child, www.laptop.org).

Some digital technology advocates, particularly during this earlier period, believe that access alone can improve education and other social problems. This belief is exemplified by the "Hole-in-the-Wall" project in New Delhi in 2000, in which an outdoor computer kiosk was placed in one of the poorest slums without teachers or instruction. The idea was to allow children to teach themselves at their own pace and was hailed as groundbreaking by many (e.g., Mitra 1999). Unfortunately the results were less clear (Warschauer 2003), with many researchers and parents concerned by the lack of supervision, instruction, collaboration, and value. Similar US projects with little curricular integration, teacher development, or communication among stakeholders such as the Birmingham, Alabama One Laptop per Child effort resulted in dismal results (Warschauer 2011). However, researchers continue the quest for what they call "minimally invasive education" through projects such as the School in the Cloud project, which won the 2013 TED prize.

Major Contributions

Simple binary constructions of access, whether to devices or the Internet, have evolved to cover more complicated and nuanced discussions of device density, Internet speed, and even related skills and social support. Indeed, digital technology and the Internet have environmental, social, and human consequences far beyond their immediate purposes. The same technology can have quite different effects in varying contexts. What is most important about digital technology and information is no longer seen as simple access to a device or the Internet but rather people's ability to make use of them to engage in meaningful social practices (Warschauer 2003). As such, rather than a binary concept, the "digital divide" is full of gradations and types of divides.

Digital Divide or Divides?

Home Access

Computer access in the home allows a degree of flexibility and autonomy difficult to replicate elsewhere. For example, while teachers in higher socioeconomic communities generally assume home access, teachers in lower socioeconomic communities have to be more cautious when facilitating homework and projects requiring home use of digital technology and provide alternative assignments or access. Students with home access may also have the ability to explore and create in ways that school access rarely accommodates.

Census data from the United States shows that while progress has been made providing computer and Internet access to low-income and minority households, access remains uneven. Computer ownership continues to grow, with 79% of households reporting computers at home in 2012 according to NTIA, a 3 percentage point increase from 2011 and 28-point increase from 2000. Computer use tends to be higher in households with children (e.g., 2010 data shows 86% of families with school-age children had computer access compared to 78% of households without children according to Pew). Low-income households (less than \$25,000/year) were significantly less likely (57%) than higher-earning (\$100,000 or more/year) households (97%) to have a home computer in the 2012 NTIA data. Educational levels also correlate with ownership; households with no high school graduates (49%) are far less likely than households with college graduates (94%) to own a computer in 2012. Racial breakdowns show Asian-Americans with the highest computer ownership and African-Americans with the lowest. International data swings even more dramatically with 42% of students in Mexico, 29% of students in Turkey, 74% of students in Indonesia, and 61% of students in Vietnam not having a computer at home (OECD 2016).

The density of usage, or people per computer, affects the amount of time a computer is available for use by schoolchildren, for example, rather than adults, or for homework versus unstructured uses. One study suggests that there are dramatic differences in household members per computer by racial/ethnic group (Warschauer and Matuchniak 2010). White families have roughly one household member per computer, and Hispanic families have nearly four people per computer. This disparity would certainly restrict computer time available to Hispanic children particularly for nonschool-related exploration and creation, which can be particularly useful for students learning a new or second language. The age, quality, and specifications of the actual hardware owned also impact the quality of home computer access.

Robust computer access requires more than simply owning a computer, it requires access to the Internet, preferably reliable, fast access. Internet use is similar to computer use: The percentage of Internet users generally increased with higher family income levels. For example, in 2012, approximately 76% of people with family incomes from \$40,000 to \$49,999 used the Internet, compared to 91% of people with family incomes of \$100,000 or more (NCES 2015). The percentage of Internet users tended to increase with higher levels of educational attainment. For example, 55% of persons who had not completed high school used the Internet,

compared with 66% of those who had completed only a high school diploma or equivalent and 93% of those with a bachelor's or higher degree (NCES 2015). In 2012, 72% of US households used broadband at home according to NTIA, while 2% of households continued to rely on dial-up service. Broadband access allows for easier, faster use, especially of applications requiring large amounts of data such as video and sophisticated multimedia content of the type most commonly considered valuable for school-age children.

Social and contextual factors are also important in shaping the quality of home computer access (see discussion in Attewell and Battle 1999). Family and friends influence the amount and type of computer usage by students. Indeed, home computers may generate another "Sesame Street effect" or "Matthew effect," where advantaged students gain more from the innovation than disadvantaged students (Attewell and Battle 1999). For example, research suggests that students in lower socioeconomic areas tend to use computers more for content consumption (passively viewing text, images, video, etc. created by others) and social uses (social media, texting, etc.) and less for content creation (authoring their own text, images, and video to express their own ideas) and interest-driven uses (learning more about a subject of interest, exploring personal passions; see, e.g., Witte and Mannon 2010; Zillien and Hargittai 2009). In order for students to use their home computers successfully for more challenging, creative, and constructive purposes, they require not only a higher level of technological resources (quality graphics, multimedia capacity, digital recorders, etc.) but also social resources such as a community that values and enables the sharing of media knowledge and interests. Family and friends also provide resources for troubleshooting as issues inevitably arise and support is critical in developing important digital literacy skills.

School Access

School access refers to the availability of digital technology in schools. If public schools can help compensate for unequal access to computers at home, they can provide an important means for promoting social inclusion and equality. As of 2009, 97% of teachers reported having a computer in the classroom every day, and the ratio of students to computers in the classroom was 5.3:1 according to the National Center for Education Statistics (2010). Despite improved access to computers and the Internet, however, disparities between the quality of hardware, density of hardware, and bandwidth remain.

School Use

Persistent achievement gaps exist in the United States particularly for non-Asian minorities and students from low socioeconomic backgrounds (Chapman et al. 2011). Digital technology offers one avenue to meet these goals through its power to facilitate personalized learning experiences. However, according to a recent meta-analysis (Means 2010) of online learning studies, average students in online learning conditions perform only modestly better than those in face-to-face instruction, and the magnitude of the difference varies depending on several contextual factors. Thus, increases in student outcomes depend on more than simple access to digital

technology. Instead, student outcomes depend on the ways in which technology is implemented and integrated with both the learning context and learner characteristics so that meaningful curriculum experiences, guided by knowledgeable teachers, can promote higher levels of student engagement and motivation (Hassler et al. 2015; Warschauer 2011). The question has become not whether digital learning environments can be effective but *how* to improve these experiences so that more students, in particular from low-income and/or linguistic- and ethnic-minority backgrounds, receive greater benefit. Concentration on the hardware itself, to the exclusion of other factors such as teacher training, technical support, and curriculum reform, has been behind many of the limitations seen in school use to date (Warschauer 2003).

A number of studies (e.g., Becker 2000; Schofield and Davidson 2004; Warschauer 2003; Wenglinsky 1998) provide evidence of a strong correlation between family income and race with the type of school use students encounter. Generally, students in lower socioeconomic neighborhoods or who are black or Hispanic have tended to use computers for lower-level drill and practice activities compared to more complex and authentic activities. To some extent, this reflects that students with lower literacy and language skills require more basic practice to reach proficiency levels (Wenglinsky 1998). Nonetheless, it is important for teachers of all levels of students to use digital technology in effective, meaningful ways. Indeed, technology assists learners the most when it is not the sole or even the main focus of teaching and learning but rather is used to help learners enter new communities, address meaningful problems, and create authentic works (Warschauer 2003).

Blended learning strategies that combine digital and classroom instruction within formal educational programs are becoming more widespread (Dell Foundation 2014; Means 2010; Hashey and Stahl 2014; Staker and Horn 2012). The limited number of rigorous studies of blended learning in K-12 environment (Dell Foundation 2014; Means et al. 2014) suggests that the effective use of digital learning is undermined by inadequate infrastructure and technology, insufficient teacher support, inconsistent quality of available online instruction, lack of coordination with curriculum, limited educator understanding and trusting of the student level data created by such programs, lack of sufficient student self-regulation for independent online work, and lack of a good fit between the online learning opportunities and the motivational characteristics of the students (cf., Dell Foundation 2014).

In addition, the digital interactions can provide data to the teacher and student that should improve educational outcomes (Aleven et al. 2013; Baker and Siemens 2014) if the feedback from the data is provided in a relevant, meaningful, and actionable fashion. Teachers can customize the pace, focus of instruction, modality, and other factors to meet students' unique learning needs and interests (Hashey and Stahl 2014). Today, however, teachers are often inundated with poorly visualized and meaningless data and little opportunity to modify digital content or pathways.

Gender Gap

Do boys and girls use digital technology differently? Early studies raised concerns that girls were being shut out of computer use, and current efforts to increase the

number of girls learning to code, majoring in computer science, and working in the information technology industry reflect similar concerns. Today research tends to show that both genders use computers roughly the same amount but often in different ways. In general, girls seem to use digital technology for social, relational uses and boys tend to use it more for information and gaming (Lehnart et al. 2005). Teachers should be cognizant that it is important to use collaborative games and simulations in ways that allow boys to leverage their interest in gaming and girls their relational interests to improve academic engagement and achievement.

Generation Gap

Finally, there is a gap between teachers and students: their comfort with digital technology and background knowledge may be quite different (Prensky 2001). This can be an important opportunity to model life-long learning, the value of making mistakes, and problem solving techniques while empowering students – and often the less academically engaged students may be the ones showing leadership in digital technology if permitted.

Other Gaps

Additional gaps have been suggested as relevant to understanding digital technology usage. Perhaps there is also a linguistic divide, because the confluence of the Internet allowing for more international communication and the increase in the prevalence of English has served to accelerate and amplify the dominant role of English as a global lingua franca (Crystal 1997). Broad international forums are often predominantly conducted in English. This reality can be leveraged by teachers of English as a second language to provide authentic practice for their students. Conversely, the Internet also protects linguistic pluralism by connecting small numbers of speakers over wide distances and allowing the archiving and sharing of minority and endangered languages (Warschauer 2003).

For both students and teachers, learning is as much about enculturation as it is about transmission or discovery. It takes place in communities through a process of apprenticeship. An ideal learning situation provides the kind of scaffolding needed for apprenticeship learning to take place in a safe, supported way. This scaffolding might include the provision of models and resources, the organizing of learning activities in desirable sequences, and the use of conversation and discussion to tackle difficult questions. In addition, learning environments that include a great deal of informal peer networking maximize students' opportunities to learn (Means et al. 2014). Schools must create these types of environments to break down the digital divides. However, US schooling has been highly resistant to reform, and meaningful reforms that are enacted primarily benefit economically privileged students (Cuban 2013). Reforms in low-socioeconomic schools generally take place on the margins of the educational process and fail to seriously transform the learning process (Cuban 1986). The requirements to cover curriculum, prepare for standardized tests, and maintain discipline while under significant funding constraints limit the ability of teachers to engage in creative, meaningful technology projects.

Work in Progress

The reasons for the disparities discussed above are varied and involve issues of economics, infrastructure, politics, education, and culture (Warschauer 2003). Schools have been a major focus of efforts to overcome the digital divide. Recent political and policy efforts have been aimed at K-16 educational settings. In June 2013, President Obama announced the ConnectED initiative, which is aimed at getting 99% of American students access to next-generation broadband by 2018. EveryoneOn is a related private effort, with national partners working together to increase access to free or low-cost home Internet access nationwide. The E-rate program expanded its goals when renewed in 2014 as the E-rate Modernization Order to include provision of high-speed broadband, particularly Wi-Fi to school and libraries. Future Ready Schools is a multipronged effort led by the Alliance for Excellent Education and the US Department of Education designed to maximize digital learning opportunities and provide schools with support to align technology and digital learning plans with instructional best practices and quality implementation. These are examples of some of the initiatives currently aimed at improving some of the issues related to the digital divide.

Problems and Difficulties

The digital divide(s) create(s) a daunting task for teachers, especially in low income and linguistically diverse communities. Some of the problems and difficulties faced by educators include issues of workability, complexity, and performativity.

Workability

Workability refers to the everyday logistical challenges of coordinating access: keeping it running, scheduling shared use, and updating software and applications. This must be done in a highly mobile community of teachers and children passing through schools for 4–8 years, and of course the highest turnover rate and mobility of students are in found the most challenging social environments.

Complexity

Even if all the digital technology works and is available, it is difficult to integrate quality usage into the (ever-evolving) curriculum. Students have different levels of content knowledge, technology skills, etc. The current environment places a great deal of importance on standardized test scores, many of which are not testing the type of skills best suited to digital technology and only recently are the assessments administered digitally (requiring modality-shifting by students who may not be used to writing on computers, e.g.). Nonetheless, designing technology-enhanced lessons

for culturally and linguistically diverse students can be done and can lead to meaningful learning. In addition, teachers may be able to help students use out-of-school time to improve literacy skills through introduction to authentic communities like fan fiction (Thorne et al. 2009). But educators should note that there is a distinction between basic interpersonal communication skills and academic language skills: Even though students may learn conversational skills by chatting online, most require explicit instruction in using cognitively challenging language necessary for fully participating in academic discourse contexts.

Performativity

Another difficulty often encountered is “performativity,” meaning uses of digital technology for its own sake rather than to increase meaningful learning goals (Warschauer 2011). Students may be able to design complicated PowerPoint presentations including sound and animation but fail to have simple understanding of the content or meaningful communication skills. Comfort and fluency with hardware, software, and the Internet are not ends in themselves but are important components of broader learning goals and should be taught within that context.

Future Directions

As predicted (Warschauer 2003), with the use of the Internet becoming more widespread, it has also become stratified, with some using it principally as an entertainment and social communication device and others using it to seek and create new knowledge. Thus, digital inequality research is increasingly looking at the use of digital technology, moving beyond simple access to look at which groups are using information online, for what purpose and for what length of time. Zillien and Hargittai (2009) refer to this as the “Internet in practice.” Variations in use and outcomes for different subpopulations are also being explored. For example, the “digital production gap” – who is creating digital content – is one focus of current research (Schradié 2011).

In order for all students to participate in educationally relevant uses of the Internet (broadly construed), it must be accessible to people with various disabilities. Universal Design for Learning is a framework for the design of digital learning tools and environments that are flexible and powerful enough to meet the challenge (and opportunity) of personalized and socially interactive learning (Rose and Meyer 2002). The roots of UDL lie in several decades of research and development on learning designs for the most marginalized and unsuccessful of students – students with disabilities, English-language learners, and so forth. The UDL framework takes advantage of developments in two complementary fields: (1) advances in the modern “learning sciences” (especially cognitive and affective neuroscience as they relate to variability in learning) and (2) advances in the technologies available for teaching and learning (especially those technologies that expand the options and supports

available for “non-average” students, Meyer et al. 2014). UDL stresses the importance of optimizing individual choice and autonomy and fostering collaboration and community. Neither of these design features are yet pervasive in cyber-learning environments. For example, many “adaptive learning environments” preclude significant choice on the part of the learner – and thus the engagement that comes with it. Similarly, many cyber-learning environments “individualize” learning in ways that preclude meaningful social interaction and support. As is often the case in instructional interventions, many tasks in digital-learning environments are designed for a mythical average student. In contrast, the UDL framework emphasizes that there are no “average” learners in practice and that effective designs must take into account the fundamental differences that actually exist in any population of learners, especially to achieve equitable results with the most vulnerable and disenfranchised (Rappolt-Schlichtmann et al. 2013).

Future directions in school use focus on optimizing blended learning – which combines in class and online learning environments. Blended learning seems particularly well suited to providing opportunities to personalize learning so that it meets the needs of a diverse range of students, particularly students who are low performing, underrepresented minorities, and poor (e.g., Walkington 2013). Promising advances are being made in adapting instruction based on the characteristics of individual learners, including their prior knowledge, preferences, goals, motivation-related beliefs, mindsets, and interests (Wigfield et al. 2015). Digital technology offers the opportunity to allow educators and learners to interact with, customize, and control digital learning environments. Digital technologies used in conjunction with evidence-based practices offer unprecedented opportunities to support the mastery of and interest in content areas in personalized ways. Digital media that are dynamic, individualized, and interactive can support motivation and skill acquisition across a diverse range of learners (Graham et al. 2004). Integrating digital learning opportunities into ongoing classroom practices if implemented with adherence to UDL principles can allow teachers and students to access content that is interesting, relevant to each student’s life spaces and identities, within each student’s zone of proximal development, and scaffolded to allow each student to reach higher levels of learning than otherwise possible (Means et al. 2014).

The concept of a digital divide has helped focus public attention on a critical social issue: the extent to which the diffusion of digital technology and the Internet fosters stratification and marginalization or development and equality (Warschauer 2003). The policy challenge is not to overcome the divide but instead to expand access and use for promoting inclusion.

Cross-References

- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Language, Ideology, and Critical Digital Literacy](#)

Related Articles in the Encyclopedia of Language and Education

Brian Street: [New Literacies, New Times: Developments in Literacy Studies](#). In Volume: Literacies and Language Education

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Sociolinguistic Insights into Digital Communication

Lawrence Williams

Abstract

This article provides an overview of research in two interrelated areas of language learning and teaching: digital communication (sometimes referred to as *computer-mediated communication* or *CMC*) and sociolinguistics. The research selected for inclusion in this article is primarily centered around the development of the sociolinguistic competence of learners of French because this simply happens to be the focus of major contributions in this field. Nonetheless, many of the studies reviewed here represent the use of a range of different types of digital communication for many different types of tasks and educational configurations.

The early developments and major contributions in this area of inquiry all deal with the analysis of sociolinguistic dimensions of language. This means that the research reviewed in this article is not preoccupied with aspects of communication that are right or wrong. Instead, these are features of language and discourse that are variable and, therefore, can only be considered appropriate or inappropriate according to any number of contextual factors (e.g., age, location, political affiliation, region, social standing, etc.).

Keywords

Computer-mediated communication • Language learning • Sociolinguistics

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Introduction

This article provides an overview of research in two interrelated areas of language learning and teaching: digital communication (sometimes referred to as *computer-mediated communication* or *CMC*) and sociolinguistics. As such, only work that uses digital communication in whole or in part to foster the development of sociolinguistic competence has been included. However, there are other articles that deal specifically with digital communication and sociolinguistics as separate areas of inquiry.

The research selected for inclusion in this article is primarily centered around the development of the sociolinguistic competence of learners of French because this simply happens to be the focus of major contributions in this field. Nonetheless, many of the studies reviewed in the next two sections represent the use of a range of different types of digital communication for many different types of tasks and educational configurations.

The early developments and major contributions in this area all deal with the analysis of sociolinguistic dimensions of language. This means that the research reviewed in this article is not preoccupied with aspects of communication that are right or wrong. Instead, these are features of language and discourse that are variable and, therefore, can only be considered appropriate or inappropriate according to any number of contextual factors (e.g., age, location, political affiliation, region, social standing, etc.).

Early Developments

Although the main contributions to this area of research have been produced in the context of (text based) synchronous chat, one early study (Kinginger 1998) took advantage of videoconferencing technology to link a class of 14 learners of French in the Midwest of the United States and a class of 10 learners of English in Brittany, France. As noted by the author, videoconferencing had already been adopted as a widely used tool for language instruction, but it was typically used within a one-way transmission paradigm. "In [such a] model, although there may be interaction between teacher and student, there is no expectation that the rules of classroom

language use will be altered. The physical arrangement may be different, but the main business of teaching and ‘studenting’ remains the same” (Kinginger 1998, p. 502). Therefore, one goal of Kinginger’s study was to promote active engagement by the learners in both classrooms. “Specifically, during the videoconferencing event, the objective is to encourage topical, relevant, face-to-face exchanges among the members of classes in two (or potentially more) locations” (p. 502).

The motivation for this type of research stems from observations by Kinginger (1998) and others (e.g., Di Vito 1991, 1992; Gilmore 2007; Kramsch 1985) that textbooks often provide a limited range of discourse options for students. In the case of French, for example, dialogs that are presented in textbooks as models for spoken interaction typically reflect more formal, written language. Moreover, various structures and lexical items are often presented to students without contextual information that could allow learners to make decisions regarding which items are more or less appropriate in general or specific circumstances. “The initial decision to include spoken forms must overcome prejudice concerning the ‘correctness’ of spoken language” (Kinginger 1998, p. 503). Another issue highlighted by Kinginger is the choice that must be made on the part of teachers to include or exclude different varieties of spoken French. In sum, previous “studies suggest both that spoken French has its own characteristic structure and forms, and that these forms are not routinely included in American French language instruction, despite the ubiquity of the forms and despite emphasis on speaking in communicative and proficiency-oriented teaching” (Kinginger 1998, p. 504). Therefore, the overarching goal of this study was to create an interactive communication space that would allow students greater access to authentic discourse, and at the same time, a recorded version of this videoconferencing event could be used as a basis for additional learning.

Kinginger’s (1998) study is based on a 30-min period of time (half of the class meeting) when French was used during the videoconferencing session and subsequent work done in the American classroom. An analysis of the interaction led Kinginger to “conclude that the only attempt at learner-learner scaffolding during the videoconference resulted in a difficult and face-threatening event for [one of the American learners]” (p. 507). The difficulties encountered by the American students highlight the importance of understanding sociolinguistic dimensions of (transcultural) communication. Learners who interact only with their own teacher and classmates do not necessarily gain an awareness of the consequences related to choosing and using appropriate or inappropriate structures, styles, and registers. One tremendous advantage of videoconferencing for the learners, as explained by Kinginger, was that they were able to study authentic spoken French discourse (interrogatives, pronouns, negation, etc.) at their own pace after the session had ended. Although this study raised several issues, the two most important of these are the following: “Foreign languages will need to be explained to learners in ways that account for social and situational variation. Ultimately, if [native speaker] models are available and are adequately described, the qualities of desired communicative ability can themselves become a matter of choice” (Kinginger 1998, p. 511).

Another early study that highlighted sociolinguistic dimensions of digital communication in a language learning context explores the developmental trajectory of a Hong Kong immigrant teenager learning English in a California high school. In this article by Kramersch et al. (2000), the authors explore the acquisition of second language (L2) literacy through “two tenets of communicative language teaching—authenticity of the input and authorship of the language user—in an electronic environment” (p. 78). This work mirrors the previously reported study by Kinginger (1998) in that the authors recognize the importance of authenticity and authorship in the acquisition of sociolinguistic dimensions of communication. Moreover, the authors highlight the need to undertake research that goes beyond analyzing traditional modes of communication, such as speaking and writing. “The advent of computer technology in language teaching thus coincides with a renewed interest among foreign language educators in the *text*, as the site where content and form converge for authentic communication (Kramersch & Andersen, 1999)” (Kramersch et al. 2000, p. 80). The authors adopt a postmodern approach to the analysis of computer-mediated communication and discourse borrowed from Graddol’s (1994) writings, which describe three different perspectives on language: structuralist, social, and postmodern. According to Graddol, a postmodern perspective on language “is concerned pre-eminently with texts, . . . it sees text as a combination of many semiotic systems (e.g., words, typographical conventions, layout, photographs, graphs, diagrams) that are uniquely historicized” (Kramersch et al. 2000, p. 81). From this postmodern perspective, the authors argue that “physical characteristics of computer hardware, rather than being separate from the software and from us, its users, in fact define our actions, that is, our existence. In particular, they bring about fundamental changes in the way we use language and other semiotic systems to represent ourselves to ourselves and to others, and in the way we represent the world” (p. 83).

One of the authors (Lam) of this study focused specifically on “young Hong Kong immigrants in California high schools” (Kramersch et al. 2000, p. 89), and her case study analyzed the development of one student (Almon) who “felt discriminated against in school because of his Chinese accent and worried about his future life and career prospects because of his inability to speak English like a native” (p. 89). Lam observed that Almon was ultimately able to develop a sense of authorial authority and narrative freedom in online contexts, which he had not been able to accomplish in traditional communication environments. “Whereas classroom English contributed to Almon’s sense of exclusion or marginalization (his inability to speak like a native), . . . the English he acquired on the Internet enabled him to develop a sense of belonging and connectedness to a global English-speaking community” (p. 95).

The two studies summarized in this section as early developments in sociolinguistic perspectives on digital communication in language teaching and learning highlight the additional benefits that learners can gain if lessons and projects take advantage of new technologies in order to expand discourse options, foster authorial authority, and prioritize authenticity.

Major Contributions

In a series of three articles (Belz and Kinginger 2002, 2003; Kinginger and Belz 2005) focusing primarily on the development of the use of second-person pronouns in French and German, Belz and Kinginger offer substantial insights into learners' abilities to determine appropriate ways of interacting in intercultural communication environments. This type of research – and many of the other studies reviewed later in this section – demonstrates the close ties between sociolinguistics and pragmatics, two areas of (applied) linguistics that are inextricably linked. In the present article, the acquisition or development of pragmatic competence has been included with the acquisition or development of sociolinguistic dimensions of discourse, language, and communication.

In the first article (Belz and Kinginger 2002) of this series, the authors explore L2 pragmatic development in the context of telecollaborative learning. “In particular, we focus on the ‘microgenesis’ or development of the T/V (i.e., instantiations of *you*) distinction in pronouns of address as a test case representative of broader L2 pragmatic concerns” (p. 189). The article offers two case studies, one using data from learners of French (*tu* vs. *vous*) and the other using data from learners of German (*du* vs. *Sie*). The case studies in this article demonstrate that even when students are told specifically that the use of T (e.g., *tu* for French and *du* for German) would probably seem normal to their telecollaboration partners, some students alternated between different forms of T and V, sometimes within the same communicative activity or episode. However, Belz and Kinginger observed that direct contact with native speakers appeared to have had a positive influence on the US learners' development of appropriate second-person pronoun use. The authors specifically argue for greater emphasis on language awareness. “It is not rules that must be acquired, but awareness of complexity, sensitivity to social cues, and the form-meaning pairings that serve to index this knowledge within particular settings” (p. 209).

In the second article of this series, Belz and Kinginger (2003) once again focus on sociolinguistic and pragmatic development, but this time using only data from the learners of German in their 3-year telecollaboration project. This study “examines the microgenetic development of second-person pronoun use in a German-American telecollaborative partnership” (p. 591) over a 2-month period. Data used for the analysis by Belz and Kinginger were collected from Web-based biographies, e-mails, student-designed websites, and multiroom, synchronous chat.

At the beginning of this study, the authors highlight the fact that the German learners of English who initiated contact with the American learners of German used only T forms. “Furthermore, there are no instances of V use by any of the German students over the entire course of the partnership” (p. 617). Nonetheless, the authors observed that in messages from American students, V use was present, sometimes along with T use. This finding is very similar to what had been reported in the first study in this series (Belz and Kinginger 2002).

Two main findings can be drawn from this work. First, even if learners have mastered the morphological and syntactic structures of a particular language, they may not be able to deploy those structures in sociolinguistic and pragmatically appropriate ways. Second, this study provides a clear reminder that telecollaboration can be a powerful learning context for something as complex as the development of sociolinguistic and pragmatic dimensions of language and communication.

In the third article of this series, Kinginger and Belz (2005) once again explored second-person pronoun use in a telecollaboration learning context (case study 1). This article also includes data from study abroad research (case study 2); however, that part of the analysis is not summarized here.

Case study 1 focuses on a learner of German, Grace, “a 19-year-old white woman in her third year of undergraduate university study with a major in history and a minor in German” (p. 378). This particular learner was chosen as the focus of this study because she did not necessarily fit neatly into one of the three categories of development (abrupt development, gradual development, and persistent variation), proposed in the previous article in this series (Belz and Kinginger 2003). “In particular, we were interested in investigating the relationship between Grace’s socio-pragmatic knowledge (In what circumstances and with what interlocutors should a speaker of German use T? When should V be used?), her pragmalinguistic knowledge (Which of the ten forms for ‘you’ in German are T forms? Which are V forms?), and her grammatical knowledge (What are the appropriate forms of ‘you’ in the various cases in German and for the category of number?) . . . as well as her metapragmatic awareness of all three types of knowledge” (p. 379).

A microgenetic analysis of Grace’s trajectory during the period of the telecollaboration project revealed that the inability to classify or understand her development was due to the fact that several dimensions of second-person pronoun use are interrelated. For example, the inappropriate use of a form of address may be due to a lack of grammatical competence or pragmalinguistic knowledge. For Grace, “grammatical competence with respect to number for the T form (‘du’ vs. ‘ihr’) and case (‘ihr’ vs. ‘euch’) [was] not yet firmly established” (p. 404). Moreover, “once she adopt[ed] the T form, she still need[ed] to develop her pragmalinguistic knowledge with respect to the ‘ihr’ form since this form is polysemous in German and can index both T and V” (p. 404). The authors found that although Grace received explicit peer assistance from her German telecollaboration keypals, she was not always able to understand their feedback and see its relevance to her own sociolinguistic and pragmatic development. The authors note that their findings align with work by Aljafreh and Lantolf (1994), “who found that the relevance of explicit and implicit correction in L2 tutoring varied for different pairings of novice learners and expert teachers such that the type and amount of feedback had to be negotiated for each individual pair” (p. 405).

Overall, the three articles focusing on sociolinguistic and pragmatic development in telecollaboration contexts by Belz and Kinginger serve as models for future research in other languages, and they also demonstrate the complexities of sociolinguistic dimensions of communication. The most important is the awareness that this series of articles has raised concerning the importance of giving students access to

expanded discourse options through networked technologies, especially for the development of sociolinguistic and pragmatic competence.

In another series of article, van Compernelle and Williams (primarily) focused on learners' development of sociolinguistic and pragmatic competence in digital communication, and although these articles also feature second-person pronouns prominently, they expand the scope of this area of inquiry to include additional variable features of French, such as negation (e.g., *ne . . . pas* 'not') and the use of *on* "one" vs. *nous* "we." The catalyst for this series of articles was a dissertation by Williams (2003) in which he categorized different areas of focus (i.e., orientations) of the participants who had been assigned to chat in triads comprising one student in French 1 (first semester), another in French 2 (second semester), and one more in French 3 (third semester). The purpose for having a member of each group from a different learning level was to observe how learners with perceived lower levels of proficiency would be able to provide peer-assistance performance to those with perceived higher levels and vice versa. In the case of participants' orientation to sociolinguistic dimensions of communication and language, no clear patterns for providing peer-assisted performance emerged because the students largely ignored inappropriate uses of second-person pronouns. This finding reinforces the importance of early work by Kinginger (1998), which demonstrated the enormous potential for learning opportunities involving interaction in contexts (e.g., videoconferencing with native speakers) where learners must necessarily be aware of and understand the real-life implications of selecting specific sociolinguistic features of a linguistic system and deploying them in ways that are culturally and socially appropriate.

Since the original study (Williams 2003) was designed as an initial exploration of discourse and interaction among learners from different instructional levels, the analysis did not go beyond categorizing and identifying difficulties encountered by learners. The results demonstrated that learners encountered a substantial number of difficulties related specifically to sociolinguistic dimensions of communication. Therefore, the replication study (van Compernelle et al. 2011) examined more closely the patterns of appropriate and inappropriate use of second-person pronouns.

The first result of interest in the replication study is that "although some students tended to use one pronoun or the other more often for singular address, not one learner used T or V categorically" (van Compernelle et al. 2011, p. 74). Another important result (also clearly demonstrated in the original study) is that the participants were seemingly unfazed by any inappropriate use of second-person pronouns. Nonetheless, in the one case (out of 787 times that a pronoun of address was used inappropriately) where a participant mentioned that students could use T forms with each other, one of his classmates did indeed switch to using T forms; however, the third member of their chat group continued to use V singular. This is actually not too surprising since a variable rule (VARBRUL, a type of linear regression) analysis showed that V was quite problematic for these learners. "Pronoun (i.e., T vs. V) emerges as the most influential independent variable (range = 51). The results indicate that V is very unlikely to be used appropriately in comparison to T" (van Compernelle et al. 2011, p. 81). Overall, the results of the initial study and the replication study are strikingly similar. In both cases, it became clear that learners

need additional and/or better instruction and guidance regarding second-person pronoun use beyond what is currently available in introductory and intermediate textbooks.

In two related articles exploring learners' awareness and use of sociolinguistic variation in French, van Compernelle and Williams (2009b, 2012) focused on the morpheme *ne*. The typical negation structure in French is the following: [*ne* + verb + post-verbal morpheme such as *pas* "not," *jamais* "never," etc.]. "Although *ne* is required, or at least expected, in the formal written language and in speech produced in formal contexts, a general preference for post-verbal negation (e.g., verbal negation without *ne*) has been observed in everyday conversation in different parts of the francophone world" (van Compernelle and Williams 2009b, pp. 417–418).

In their first article examining the variable use of *ne*, van Compernelle and Williams (2009b) compared a corpus of noneducational synchronous chat discourse and a corpus of synchronous chat discourse produced by US university-level learners in their first, second, or third year of French. The data from the noneducational context served as a point of departure and benchmark for determining what learners should be taught to anticipate if and when they eventually decided to engage in computer-mediated (synchronous) communication outside of class or even long after they were no longer learning and using French in a formal instructional setting.

The data from the noneducational context (i.e., involving participants who clearly seem to be primarily native speakers of French) showed that *ne* retention was below 20% overall, with younger people (i.e., participants in a public chat room with the name *18–25ans* "ages18–25") using *ne* 12.05% of the time and a slightly older age group (i.e., participants in a public chat room with the name *25–35ans* "ages25–35") using *ne* at a rate of 19.48%. When compared to the data from the educational context, the enormous difference is striking. Learners in their first and second year used *ne* on average 96% of the time, and for third-year learners, *ne* was used at a rate of just under 80%. When taken together, this represents an average use of *ne* in 92.46% of all cases of the educational context.

Given the noticeable difference of *ne* use in educational contexts compared to noneducational contexts, van Compernelle and Williams (2012) developed a pedagogical intervention designed to improve learners' sociolinguistic competence. The participants in this study were at the third-semester level of instruction in French at a US university, and sources of data included notes from the authors' observations of classroom interactions, students' explanations of the variable use of *ne*, and discourse produced by the students during small-group synchronous chat sessions. Although the pedagogical plan included only one formal classroom meeting devoted solely to explicit instruction about the variable use of *ne*, various aspects of sociolinguistic variation were "woven into the broader context of gaining a conceptual understanding of variation in French [throughout the semester], not as isolated phenomena but as part of a functional sociolinguistic system" (van Compernelle and Williams 2012, p. 191).

By the end of the data collection period (i.e., one semester), the overall frequency of *ne* use by this group of learners decreased from 98.5% to 90.0%. Of specific

interest in this study is the observation that “all but one learner was able to define and describe *ne* variation accurately by the end of the semester, and the majority of them were also able to identify *ne* variation as an index of (in) formality in the analysis of two texts. Further, some learners developed an understanding of *ne* presence versus absence that transcended the formal/informal distinction, describing *ne* presence in terms of emphasis or the evocation of one’s identity at the time of utterance” (van Compernelle and Williams 2012, p. 200). This type of pedagogical intervention revealed that learners’ conceptual understanding of variation does not immediately carry over into the discourse that they produce, “especially when [they] are struggling to unlearn what has been learned previously” (p. 192), a phenomenon that has been explored in depth by Negueruela (2003). For this reason, van Compernelle and Williams argue that “variation ought to be systematically introduced at the earliest stages of L2 education” (p. 200).

As an expansion of their work on learners’ awareness of and control over the variable features of French, van Compernelle and Williams (2009a) have also explored *yes/no* questions and the subject pronouns *nous* “we” and *on* “one”/“we.” In this study, 30 US university students in their first, second, or third year of French instruction “engaged in several [50-minute] interlearner synchronous chat discussions over the course of one semester” (p. 479). A corpus of noneducational data (approximately 78,000 words) was used as a point of comparison with the data produced by learners.

Not surprisingly, the first- and second-year learners used informal features of French (i.e., those typical of everyday conversation) much less frequently than the participants in their third year of French instruction. Even the third-year learners were, for example, still quite far below (presumed) native speakers’ (in synchronous chat rooms) use of the informal subject-verb interrogative structure (73.9% for third-year learners vs. 97.7% for participants who produced the discourse in the corpus of noneducational data). The difference between learners’ and non-learners’ use of *on* was even greater in the case of third-year learners (64.2%) compared to data from the noneducational corpus (95.7%). The analysis also revealed that learners seem to learn sociolinguistic variables separately rather than producing discourse that includes parallel levels or types of variation.

The series of articles by van Compernelle and Williams confirms that the typical elementary and intermediate language curriculum (at least for French, in this case) does not provide students with sufficient awareness of sociolinguistic dimensions of language and discourse. Nonetheless, their work also demonstrates that learners can develop sociolinguistic competence through explicit instruction supplemented by opportunities to explore how variable features of language are and can be used in different communication environments.

Work in Progress

Several scholars in the area of sociolinguistics have recently begun to pay more attention to the linguistic landscape as a way to view, analyze, and appreciate

language variation and multilingual communication spaces. According to Landry and Bourhis (1997), “the language of public road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings combines to form the linguistic landscape of a given territory, region, or urban agglomeration” (Landry and Bourhis 1997, p. 25). Although research in this area tends to focus on the physical linguistic landscape, there seems to be increasing interest in the virtual linguistic landscape (VLL). In one of the first major studies of the VLL, Ivkovic and Lotherington (2009) highlighted the ever-changing nature of online communication spaces and, by extension, the ever-increasing number of possibilities for the types of research and teaching projects for which the VLL can be used. Given the unique and evolving nature of the VLL and the growing interest in this area of inquiry, there will be many opportunities for researchers and teachers to explore ways in which language variation and communication in multilingual spaces affect and influence human interactions.

Problems and Difficulties

One challenge related to learners’ development of sociolinguistic competence is the rather heavy reliance on introductory and intermediate textbooks in many – if not most – language programs. This is not necessarily a criticism of publishers or commercially produced textbooks, but rather an observation that requires further explanation. Although textbooks are often criticized for their lack of authentic discourse samples and unclear or incomplete explanations of grammar and discourse, it is important to realize that most publishers send new textbooks and new editions of textbooks to a sample population of teachers in order to gauge their reactions to new, revised, reorganized, or deleted content. If we accept the basic premise of the human condition that change is often difficult – and therefore slow to occur – in both personal and professional contexts, this explains a great deal about the current nature of textbooks, which are often grammar manuals that have often been superficially dressed up as “communicative” or “standards-based” (referring to the *World-Readiness Standards for Learning Languages* of the American Council on the Teaching of Foreign Languages 2015).

A related issue is that teachers who review textbooks may already have a curriculum (i.e., lesson plans that have taken a substantial amount of time to prepare) in place, which could potentially reduce their inclination to challenge publishers of new textbooks or new editions of textbooks to provide more authentic discourse samples and include a greater emphasis on the development of sociocultural competence, which, incidentally, was so important for Hymes (1972) that the main reason for his proposal of a new model of communicative competence was so that sociolinguistic competence could be included as a featured component (see also Celce-Murcia 2007).

Another related issue is the educational background of textbook authors. While it is clear that some may have a great deal of experience as teachers and/or researchers, they do not all have formal training in applied linguistics or, more specifically, in

second-language acquisition. A close reading of the front matter in introductory or intermediate textbooks sometimes reveals outdated, misleading, or inaccurate explanations of theoretical approaches to language learning and teaching. Moreover, content included in the front matter (often provided only in the instructor's annotated edition) sometimes includes a mix-and-match approach to explaining the theoretical foundations of the organization of the textbook's content and its intended use. This observation is not intended to be a generalized indictment of the qualifications of textbook authors. Instead, it is a reminder that textbook reviewers and users have a responsibility to scrutinize any textbook under review or being considered for adoption. Reviewers and users of textbooks must, for instance, decide whether or not they want sociolinguistic competence featured in their curriculum; if so, it is their responsibility to demand more content from publishers and textbook authors that would promote the development of sociolinguistic competence.

Perhaps the greatest challenge related to the development of sociolinguistic competence is the seemingly widespread attitude that learners of a foreign or second language have to master a set of structures and lexical items before they should be allowed to explore variable features of the language. Unfortunately, this mindset is understandable since teaching grammar rules is often considered to be more straightforward (i.e., easier to explain and learn) than delving into sociolinguistic variation, which can be fascinating, yet somewhat nebulous, which can be uncomfortable and disconcerting for some teachers and learners. In addition to the perceived challenges related to fostering the development of sociolinguistic competence, its assessment is often perceived as an even greater challenge to teachers since traditional testing (and textbook test banks) is limited to grammar points, vocabulary, listening, reading, and writing in most – if not all – cases.

There are also some challenges related to the use of digital communication in foreign language programs in all types of educational settings. The most obvious of these is that new technologies are often expensive to purchase and maintain. However, it is also important to point out that simply having access to tools is not a guarantee that anyone will know how to use them or how to integrate them into the curriculum in a pedagogically sound way. A related difficulty for many teachers is that technological innovations happen so quickly that it can seem almost impossible to remain current. Additional details of the problems and difficulties often associated with foreign language education can be found in a survey-based study by Williams et al. (2014).

Future Directions

One suggestion for future research was suggested by van Compennolle and Williams (2009a), “using complementary analyses of performance (i.e., production) and competence (i.e., understanding or awareness) in sociolinguistic variation would contribute to [a greater and more complete] understanding of the development of sociolinguistic awareness in L2 users” (p. 497). This is quite important because there is a noticeable trend in foreign language education research to focus solely on

students' performance without trying to determine whether or not their competence is simply ahead of performance or if their competence is perhaps blocking further development due to an incomplete or inaccurate understanding of how variation works.

Another recommended future direction for research is to analyze learners' participation in noneducational digital communication contexts. One notable example of this is an article by Hanna and de Nooy (2003). However, this type of research is not undertaken very frequently, most likely because it can be extremely time consuming, depending on the method of data collection, the number of participants, the type of digital communication, and the technological capability of the researcher and the learners. Another possible reason for the lack of this type of research might be the unwillingness of some teachers to allow their students to explore communication spaces that are not as structured as a classroom, and, by the same token, researchers may often prefer settings where they can maintain control over all participants. In spite of these possible pretexts for not conducting more research in noneducational settings, it is unfortunate that interaction in real-life, naturalistic (electronic) environments is still largely unexplored.

Cross-References

- ▶ [Computer-Mediated Communication and Conversation Analysis](#)
- ▶ [Sociocultural Approaches to Technology Use in Language Education](#)

Related Articles in the Encyclopedia of Language and Education

Angela Creese and Fiona Copland: [Linguistic Ethnography](#). In Volume: Research Methods in Language and Education

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Elementary Language Education in Digital Multimodal and Multiliteracy Contexts

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Abstract

Early childhood education is intrinsically multimodal. The kindergarten discovery orientation to learning emphasizes play and embodied multisensory learning, but this is traditionally retracted as children gain control of alphabetic print in the early grades. The introduction of digital tools and networks is more recent in elementary education. Digital mediation affords a powerful lens on hands-on learning, augmenting, expanding, and complicating multimodal learning and introducing new tools, textual products, and spaces for reflection and communication. Digital multimodal literacies also challenge fundamental assumptions about the starting point of emergent literacy, which is assumed to be the ABCs.

Keywords

Coding • Digital literacies • ECE • Emergent literacy • Game learning • Inquiry-based learning • Multiliteracy/multiliteracies • Multimodality • Multi-semiotic • Play-based learning

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Early studies of elementary multiliteracies and multimodal learning included research conducted internationally in schools, communities, online learning sites, and homes. Research illustrated the transformative potential of digital multimodal learning by transferring agency to the learner, facilitating collaborative inquiry-based projects, and encouraging learning through play. Curricula espousing twenty-first century competencies are emerging in forward-thinking nations, but political trends in elementary education are neither widespread nor universal. Pedagogical innovations include maker schools and game-based programs. A number of challenges remain in instituting multimodal literacies in elementary learning contexts, including vague notions of what multimodality comprises; a lack of alignment in educational policy, practice and assessment; and difficulties in keeping up with the rapid pace of digital change. Contemporary issues pertaining to the future of elementary literacy education include the place and salience of alphabetic literacy, spelling and conventional grammatical usage in a climate of merging human-digital memory, and the increasing importance of coding as a fundamental literacy skill.

Introduction

Elementary educators are steeped in multimodal practices, which are foundational to early childhood education (ECE). The tried and true routes for developing children's sensory capacities and communicative repertoire are informed by early twentieth century theories of human development that argue for socially engaged, hands-on learning. Consider the child's multisensory engagement in activities such as tracing a sandpaper alphabet, finger painting, playing with puppets, choral singing, and rhythmic clapping. ECE invites embodied learning through play in the service of language development and alphabetic awareness.

Kindergarten is a paradigm of multimodal learning. However, as Robinson (2006) stresses, embodied learning experiences are educationally constricted as children progress toward independence in abstract learning. He posits a universally evident hierarchy of subjects in schools, stemming from the needs of the nineteenth century industrialization that prioritize mathematics and language and relegate least importance to fine and performing arts, commenting, "truthfully what happens is as

children grow up we start to educate them progressively from the waist up, and then we focus on their heads, and slightly to one side” (Robinson 2006, 9:15–9:25).

Contemporary attention to multimodality speaks to rapid digitization, which has dramatically reshaped how we communicate, beginning with the fundamental tools. Powerful, portable networked digital devices enable novel connections, interactions, and modes of expression. Though there is a clear push for digital tools in the school, the incorporation of digital communication in elementary education comes up against the centuries-held notion that learning the ABCs is the starting point for literacy learning. Does this still hold true?

Early Developments

The changing face of literacy was a topic of fertile discussion and debate at the close of the twentieth century. New literacy studies, working from an anthropological perspective, theorized literacy as social practice, opposing the position that literacy was an autonomous cognitive skill (Street 1984). Critical scholars argued identity politics and social justice perspectives in literacy and education (Lankshear 1997; Muspratt et al. 1997). Cultural theorists and media literacy scholars were engaging with the rising tide of pop culture and the onset of the digital revolution (Buckingham and Sefton-Green 1994), and concurrently, ECE researchers were documenting the yawning gap between children’s preschool literacy socialization in pop culture worlds and the agenda of emergent literacy instruction (Dyson 1997; Marsh and Millard 2000).

The galvanizing call to action was the New London Group’s 1996 manifesto on *multiliteracies*, written collaboratively by a collective of eminent scholars to alert educators to the disconnect between the monolingual print-based literacy education of tradition, the culturally diversifying school population given increasing global mobility, and the onslaught of the digital revolution. The New London Group plaintively posed the question of what it meant to be literate at the dawn of the twenty-first century. Their manifesto catalyzed scholars in language arts, critical theory, cultural studies, second language learning, and new media literacies who resounded the alert, pointing to particular and varied aspects of how globalization and the digital revolution were radically changing communication and work patterns.

By 2000, the members of the New London Group had revisited the conceptual terrain and extrapolated the *why*, *what*, and *how* of multiliteracies (Cope and Kalantzis 2000), moving toward an actionable agenda for changing educational practice. Design elements were described in terms of linguistic, visual, audio, gestural, and spatial meaning-making processes and interrelating multimodal patterns; these constituted an elemental framework of multimodality. Scholars, researchers, and educators were actively thinking and writing about how literacy, learning environments, semiotic resources, discourses, and texts were changing. Following Kress and Van Leeuwen’s (1996) foundational theorizing of visual

design, for instance, Unsworth (2001) extrapolated semiotic links between alphabetic print and image in the study of English literature for children in Australia.

It is important to remember that technological development at this time was Web 1.0: basically a searchable, self-publishing bulletin board in a networked world that connected developed nations via wired computers. Documents at the turn of the century could be searched, self-posted, and retrieved but not collaboratively authored or interactively engaged with. Digital civilization had not yet reached the development of Web 2.0 with its dynamic texts, shared authorship, multimodal interaction, and machine-enabled translation, let alone the near future of ubiquitous wireless access on wearable mobile devices. Thus, early theorizing of multiliteracies and multimodality occurred in a climate of whirlwind technological change when the greatest part of the upheaval had not yet hit.

But what was actually happening in school classrooms? When I walked into an elementary classroom in Toronto, Canada, in the fall of 2002, with a research agenda to document where and how trendsetting writing on multiliteracies was affecting educational policy and teaching practice, I discovered that not much had changed, despite the mushrooming professional and research literature. I had had the good fortune to survey two public schools located in communities characterized by immense cultural and linguistic diversity and low socioeconomic status in different corners of Toronto for a comparative international study documenting schools at the forefront of digital technology in 1999–2000 (Granger et al. 2002). Both schools had been at the beginning of impressive journeys into digital literacies, and the administrators, teachers, and children had hugely impressed the researchers, who candidly admitted to each other that the university needed to take a few lessons from kindergarten on emerging digital literacies. Returning later (2002) to conduct ethnographic research in one of these digitally ahead-of-the-curve schools on how the literature on multiliteracies was reshaping instructional practices in the classroom, I realized that governing educational policy (in Ontario) had been moving in a contrary direction, instituting standardized tests, and looking back to basics. The digital literacies the school had been surging ahead with earlier were now being shoehorned into the standards of print literacies.

The term *multiliteracies* had ignited scholarly zeal, but the concept was logistically problematic. The centrality of multiliteracies was appealing to researchers, looking at patterns and crosscurrents in sociocultural communication, but confusing to put into teaching practice, and antithetical to the *back to basics* lobby behind the standardized testing movement that was sweeping across North America. Precisely what *multiliteracies* indexed was vague: one could aspire to a multiliteracy approach doing almost anything that was not traditional monolingual print literacy.

Major Contributions

The fieldwork in multimodal pedagogies grew out of research projects, small and large, that were conducted in schools, communities, online sites, and homes around the globe. The term *multiliteracies* inspired practical questions about how

multiliteracies looked, sounded, and felt in practice and how multiliterate practices could be taught and learned. Fieldwork informing educational practice emerged from studies designed to develop multiliteracy pedagogies in school; studies whose pedagogical trajectory led organically to a multimodal stance; studies based in disciplines that informed multiliteracies, such as digital pop culture and multilingual education; and explorations of digital trends and practices in online communities.

Changing Literacies in Elementary School

A number of early studies of changing literacies in elementary school were motivated by social justice concerns in contexts of cultural diversity. Stein's (2008) formative research and writing about multimodal teaching and learning was pedagogically exploratory, culturally sensitive, plurilingual in its incorporation of multiple languages, and geared to the development of learners' voices for political empowerment. Her teaching of English to young black children in a South African township during the politically repressive apartheid era was the doorway to her foray into multimodal communication. Stein worked educationally to change the record of violence and oppression by inviting children's culturally rich forms of expression into classroom sharing, working with drama, song, music, poetry, and, later, oral histories and storytelling. Spaces opened up to other languages so stories could be told as they were first heard. She describes, "What began as a fairly loose, unstructured language activity was transformed over a year into a sustained project in a narrative across multiple semiotic modes in which students drew heavily on cultural forms and resources familiar to them" (p. 8). Stein and colleagues honed their exploratory, culturally responsive pedagogy toward critical multimodal pedagogy in post-apartheid years.

Jim Cummins' influential work on *identity texts* in education is rooted in activist research in culturally diverse schools. Schechter and Cummins (2003) conducted action research with children, teachers, and community members in two elementary schools in Greater Toronto, working to change the character of interactions and identity negotiations with linguistically diverse populations. The concept of the identity text as a multilingual and multimodal textual vehicle in which emergent bilingual students positively invest in their complex identities was theorized during Cummins' and Early's (2011) explorations of "the instructional spaces that opened up when the definition of literacy was expanded beyond its traditional focus on linear print-based reading and writing skills in the dominant language" (p. 3). The research reported in their 2011 volume includes case studies with young children in schools in demographically diverse Vancouver and Toronto and in a wide variety of international contexts, from orphanages to primary classrooms.

Whereas in Cummins and Early's (2011) and Stein's (2008) studies, the incorporation of digital technologies was marginal to the larger aims of the research, digital exploration was centrally featured in other researchers' agendas. Mills (2011) explored multiliteracies by focusing on digital moviemaking in an elementary school

classroom in a culturally diverse suburb of low socioeconomic status in Queensland, Australia. She noted a significant shift in classroom power dynamics as “students [were] positioned to think and design collaboratively and creatively within a community of practice” (p. 2).

Lotherington (2011) and her colleagues began co-developing multiliteracy pedagogies in 2002, forming a learning community comprising teachers, researchers, and community members. The collaborative action research was conducted in a public elementary school in northwest Toronto. Researchers redefined and rebuilt elementary education using experimental across-the-curriculum, cross-age, team taught projects that connected diverse curriculum threads in plurilingual, multimodal, digitally supported texts. Their momentum to understand, design, and refine pedagogies of multiliteracies for primary and junior learners continued for a decade.

Healey’s edited (2008) volume expounded research on multiliteracy pedagogies in Australia and Singapore that included elementary education contexts. The case studies illuminate interesting fissures accruing to the changing balance of knowledge and agency in the classroom. Sticky problems identified in the volume persist in contemporary practice: teachers fearing their lack of digital know-how restricted the introduction of digital technologies to students who were observed to be technically proficient, and creative teaching and learning being curtailed to prepare students for high stakes testing.

Pahl and Rowsell’s (2006) edited collection merged multimodal and new literacy perspectives to report on a wide-angled view of the expanding field of literacy, welcoming research from different social contexts that included studies with young children. The studies provide multifaceted evidence of the transformative power of multiliteracies that reposition the learner at the center of learning.

Exploring Digital Worlds

Lankshear and Knobel’s (2006) forward-thinking work plunged headlong into burgeoning social media practices, proposing digital epistemologies for classroom learning. They identified the growing wedge between school literacies and children’s after-school social literacy activities, illuminating practices confronting to school literacies, such as remixing, and identifying and exemplifying (then) new practices of blogging and podcasting that have, a decade later, become production modes used in elementary schools. Their book posed tough questions about how wireless and mobile access would change schooling and challenged teachers to acknowledge the churning pace of digital innovation deeply affecting how students communicate in and out of school.

Jewitt (2006) interrogated “*what* resources new technologies make available and *how* these mediate the complex relationship between the learner and ‘what is to be learnt’” (p. 76) in examining how digital resources remediate learner practices. She researched game design and play in the elementary English classroom, where she found that multimodal resources changed not only how learners represented learning but also how they interpreted it.

Gee (2003) began extolling the virtues of video games for learning well over a decade ago when he began to play them with his young son. Gee, a member of the New London Group, brought a distinguished record of discourse analysis research to his focus on gaming as literacy. He applied his conceptualization of the *affinity group* (p. 27) to video gamers' identification as insiders to games and groups and described the sophistication and value of the knowledge bases activated in gaming lifeworlds, listing 36 learning principles of video games, including the multimodal principle.

New Literacies, New Competencies

This brief summary only skims the surface of important and detailed research undertaken in the first decade of the twenty-first century that has led to better educational understanding of multiliteracies and multimodality. What common threads emerge in these studies?

Incorporating multimodal literacy projects in elementary school contexts is transformative: multiliteracy projects encourage collaborative inquiry and transfer agency to the learner. Multimodality enables textual hybridity that accommodates multiple languages in the array of semiotic choice, thus supporting plurilingual designs that positively support language learners and invite a global audience. Digital technologies and social media platforms are sophisticated tools that require knowledge of multiple semiotic resources and invite creative design. Multimodal literacies support play-based learning, both on- and offline. Multimodal literacies, in short, call for new competencies in elementary learning.

Though multimodality is not new in elementary education, it has traditionally been corralled in early childhood education, with the apex of play centered in kindergarten. The play-based orientation of kindergarten is increasingly being held up as a model for learning more generally (de Castell and Jenson 2003). This includes the growing recognition of the salience of creativity in formal education and serves as a clarion call for approaches to learning that encourage innovation.

Work in Progress

In the manifesto *A pedagogy of multiliteracies: Designing social futures* (New London Group 1996), the authors proposed the maxim, "curriculum is a design for social futures" (p. 73, original emphasis). As Robinson (2006) points out, "nobody has a clue . . . what the world will look like in 5 years time, and yet we are meant to be educating [children] for it" (2:12–2:22). Designing pedagogies for an unknown and swiftly moving future is a significant challenge.

The research base amassed since the turn of the century has contributed useful knowledge and perspectives on identifying and understanding multimodal literacies in social context. An important educational outcome of the research on digital multimodal literacies includes the emergence of policy-embedded approaches to multimodal learning in elementary education. Policy, though, is not practice.

A strong movement toward do-it-yourself (DIY) learning is evident in play-based pedagogical approaches, such as *maker schools*, game-based learning, and in online social media networks.

Multimodality in Elementary Curricular Learning

Goals and characteristics of multimodal learning, together with statements of twenty-first century competencies, can be viewed in the elementary curriculum documents of top-performing Programme for International Student Assessment (PISA) scorers. Finland is well known for its devolution of classroom authority to schools and classroom teachers, who utilize curriculum guidelines as advisory rather than a set of specifications to be completed. In its 2016 revised curricula, the Finnish National Board of Education sets out reforms to basic education that include the identification of seven transversal competence areas, a push on formative assessment emphasizing learners' development of critical self-assessment, and a move toward collaborative practices (Halinen 2015, 5). Søby (2015) lists Finland's competencies aimed toward twenty-first century learning as:

- C1. Thinking and learning to learn
- C2. Cultural literacy, interaction, and expression
- C3. Taking care of oneself, everyday life skills, safety
- C4. Multi-literacy
- C5. Digital competence
- C6. Working life skills and entrepreneurship
- C7. Participation, influence, and responsibility for a sustainable future (p. 65)

To offer another example, Singapore promotes a three-ring model of twenty-first century competencies, emerging from a central core of values to a middle ring espousing "Social and Emotional Competencies" (Ministry of Education, Singapore 2015, 5) to an outer ring, representing:

the emerging 21st Century Competencies necessary for the globalised world we live in. . . .

- Civic literacy, global awareness and cross-cultural skills
- Critical and inventive thinking
- Communication, collaboration and information skills (Ministry of Education, Singapore 2015, 6)

Policy is an important indicator of motivation to effect systemic change in education, though the translation of policy into practice is a complex and involved process. Political adoption of multimodal perspectives and twenty-first century competencies in early literacy education is still an emergent trend showing uneven progress: whereas some political jurisdictions are embracing the diffusion of literacy learning across the curriculum (Ontario, Canada), others are prioritizing basic content knowledge in English, mathematics, and science in elementary education (England).

Multisensory, Play-Based Learning

Early childhood education has historically been a bastion of multimodality in the sense that it encourages and creates spaces for multisensory, multi-semiotic play-based learning. In traditional K-grade 6 education, play-based learning spaces were physically and educationally withdrawn, and children were increasingly relegated to desks as their capacity for independence in abstract thinking grew. The linchpin was alphabetic literacy. The traditional thinking went: first children learn to read; then they read to learn.

Learning, however, has changed and so has reading. The design orientation has inspired active, embodied inquiry in settings utilizing maker pedagogies and game learning. Of primary note is the learner's multisensory involvement. Whereas traditional literacy concentrates on visual identification of abstract symbols, maker spaces are inextricably haptic and play based. Indeed, the design manuals for maker groups are called *playbooks* (cf: Makerspace team 2013).

The maker movement has its roots in educational research in the American creative industry sector. Maker spaces are philosophically open and untethered to specified topics, products, or tools. A similar movement is game simulation learning in elementary school, using *Minecraft* as a learning platform. *MinecraftEdu* is "a school-ready remix of the original smash hit game *Minecraft*,"¹ which must be purchased, though educational discounts for licensed use are offered. An extensive sandbox approach to hands-on simulation learning in the classroom is offered in conjunction with licensed educational use.

DIY Learning and Social Media Sharing

Online DIY forums have transformed how teachers are learning, teaching and connecting with learners, teachers, parents, and community members. Online social media sites that offer teachers advice; invite them into conversations; and connect them with ideas, resources, and people run the spectrum from creative industry affiliated educational blogs, such as *Edutopia*,² to state online learning sites, to individual teacher's blogs. Crowd-sourced, cloud-based learning resources and solutions offer a cornucopia of ideas for learning designs.

John Andrews³ is a teacher in the Greater Toronto area with 26 years of experience across the K-grade 8 elementary panel. He began tweeting his grade 2 class's work in 2008 for paperless communication with parents and as a time-saver on the class newsletter. Teaching ECE, he took sole responsibility for the class Twitter handle for privacy reasons but also to avoid young children's confusion in learning to write, given the syntax of a 140 character tweet. In junior and intermediate

¹<http://minecraftedu.com/software>

²<http://www.edutopia.org/>

³Pseudonym

teaching, he devolves responsibility for class tweeting to students, though he strictly polices followers.

There are school board limitations on what the school is permitted to share on social media, and parental approval forms are needed for media release, but John now has close to 100% of parents on board. In addition to tweeting classwork to parents, John has a class YouTube channel, which offers hands-on involvement for young children who can post videos of their school projects (with assistance). Young children learn to use approved software for photo capture and audio-video recording, which assist them in communicating their schoolwork to their networked publics. John lauds the benefits of YouTube posting for learning: children record, post, reflect on, and revise their work for (controlled) public sharing with an authentic audience. Communication and language learning are intrinsically multimodal.

With junior and intermediate grade students, John teaches basic coding. He began with the programming language, *Python*, and then moved to the object coding language built for elementary school learners, *Scratch*,⁴ which the junior/intermediate students taught to primary grade children. Learning to code he sees as part of the changing face of assessment: students cannot code what they do not understand and their coding projects graphically illustrate what they are capable of doing. Kids' minds are very big places, he states, and pedagogies that release students from overly prescriptive models, standards and basics, foster learning through action and creative problem-solving.

Problems and Difficulties

Three significant hurdles to the adoption of digital multimodal perspectives in elementary education can be identified: (1) the concept of *multimodality* is amorphous, so *multimodal literacies* programs cover a broad range of ideas and activities; (2) educational policy, practice, and assessment often do not line up; and (3) the pace of digital innovation outstrips the capacity of formal educational institutions to formulate and institute pedagogical aims, learning processes, literacy tools, and products appropriate to current (much less future) needs.

Conceptualizing Multimodality

The definition of *multimodality* varies considerably with intellectual tradition. The predominant voices in literacy studies are grounded in the social semiotics theorizing of eminent linguist Michael Halliday. Work in this vein has carefully delineated changes in textual communication from alphabetic print on paper to multi-semiotic genres, focusing on the growing importance of image and visual communication in

⁴Scratch: <https://scratch.mit.edu/>

the move from page to screen (Kress 2010; Kress and Van Leeuwen 1996; Jewitt 2006).

The definition of a *mode*, though, is left to cultural agreement. As Kress (2010, p. 79) explains, “Mode is a socially shaped and culturally given semiotic resource for making meaning. *Image, writing, layout, music, gesture, speech, moving image, soundtrack and 3D objects* are examples of modes used in representation and communication.” While this exemplification is intuitively useful, there is crossover and inconsistency in identification of modes, e.g., music and soundtrack overlap, moving images contain still images. Virtually everything is complexly multimodal in this view, including traditional print, which utilizes font, layout, print size, and, in the case of school texts, pictures, charts, graphs, maps, tables, and similar nonalphabetic visual data.

Concepts of multimodality based in linguistic communication are generalized to still and moving images, auditory, and performance arts from language. Elleström (2010) focuses on fine and performing arts in his *intermediality* paradigm and defines four modes that describe all basic media: material, sensorial, spatiotemporal, and semiotic. In the intermediality paradigm, the semiotic category, wherein linguistic meaning is largely contained, is but one of the categories that must be considered.

Norris (2012), who conceptualizes multimodality from a perspective of mediated discourse theory, maintains that modes do not in fact exist but they are heuristic devices that “are not separate units. All communication is based on perception and the embodied senso-motory [sic] processes, making it impossible in practical terms to dismantle them into isolated parts” (p. 4). Despite their inseparability, Norris discusses modes, identified as visual and touch, which are sense data. Indeed, involvement of the senses looms large in the identification of multimodal literacy practices. The sensory alphabet is an analytical tool that Marcus (2009) offers to describe new media from a design perspective. This tool provides a means of analyzing what she calls “pattern language,” (p. 1934) invoking “line, color, texture, movement, sound, rhythm, space, light, shape” (p. 1934).

Modality and multimodality are thus slippery concepts, and multimodal literacies subsume a range of projects, interfaces, and approaches. Nonetheless, varied multiple approaches constitute a monumental step forward from the traditional portrait of monolingual, alphabetic print literacy that continues to feature in much of language testing.

Cohesion in Educational Policy, Practice, and Assessment

Educational policy documents began to incorporate the conceptual arguments and emerging approaches to multiliteracies and multimodality in the first decade of this century. However, conflicting forces affect formal education, including, prominently, the results of the influential Programme for International Student Assessment (PISA) test, which “assesses the extent to which 15-year-old students have acquired key knowledge and skills that are essential for full participation in modern societies”

(OECD 2014, p. 3). The PISA results in mathematics, science, reading, and problem-solving rank 65 participating countries according to performance.

The latest published PISA results are from 2012; the ten top scorers in reading were Shanghai, China; Hong Kong, China; Singapore; Japan; Korea; Finland; Chinese Taipei, Canada; Ireland; and Poland (OECD 2014). These top-billed nations have different educational histories, curricular approaches, and assessment paradigms, spanning education systems that are highly centralized and standardized with strong examination cultures (e.g., China, Singapore, Japan), to those who devolve authority to teachers and schools (e.g., Finland). Analyzed OECD results indicate “schools with more autonomy over curricula and assessments tend to perform better than schools with less autonomy when they are part of school systems with more accountability arrangements and/or greater teacher-principal collaboration in school management” (2014, p. 24). Nonetheless, strong testing lobbies persist, and the disjuncture between inquiry-based curricula facilitating collaborative, across-the-curriculum projects that invite creative textual products, and standardized testing of discrete language items and grammatical usage creates a significant tension.

The Pace of Digital Innovation

There is no doubt that a culture of innovation pervades the high-tech industrial sector. The pace of change in the products available for consumption on portable personal digital devices is staggering, and the modest price of downloads for apps and cloud-based services has encouraged a proliferation of digital products, accompanied by crowd-sourced app reviews. How are schools to determine what children need to know to function in a climate of such rapid change? And how do institutions plan for, budget, and purchase in a timely fashion the digital technologies needed to facilitate learning, given the grinding political machinery of public education oversight?

A first observation is that emergent literacy is deeply affected by the digital revolution. Where once control of a pencil and knowledge of the alphabet allowed a child to begin to write herself into the world, now children need to learn how to operate complex hardware, navigate operating systems, select and use appropriate applications, search and evaluate the legitimacy of information on the Internet, and produce and customize machine-mediated text and code, all in addition to learning to read and write alphabetically. Moreover, children are being socialized into digital literacies before they reach school. Young children in strollers and supermarket carts are seen to be operating smartphones, while their parents shop and do errands with them in tow. These children are essentially learning online navigation as they are learning to walk and talk. As preschoolers, they are engaging in video games that utilize screen navigation tools and multimodal menus that are far more interactive and complex than the static pages of the basal readers they encounter on school entry. The rapidly changing engagement with multiliteracies in the current era suggests the need for an openness to multimodality and an emphasis on creating conditions for learning to learn as primary goals of elementary education.

Future Directions

Multimodality is not new in elementary education, but digitization is (relatively speaking), and digital innovation is perennially and swiftly moving. Digital mediation augments, expands, and complicates multimodal learning; it facilitates multimodal text building and sharing. Portable digital technologies, such as tablets and smart phones, are sophisticated devices that embed multiple, complex programs that enable young children to access, read (with assistance), record, photograph, draw, animate, combine, and remix material that may or may not contain alphabetic text. Using a digital tool to record a child's multimodal production provides a novel lens on abstraction from that envisaged in alphabetic independence in that it permits the child to reflect on his or her own production, as well as to edit or augment it. Children can build iconic texts with the help of a teacher, and then insert alphabetic text, or use other modes of meaning to assist in interpreting letters, so that learning the ABCs need not necessarily precede producing and reading multimodal text. The alphabet is now but one of the available textual building blocks: traditional graphic literacy is essential to school-based learning but is no longer itself sufficient.

The future of responsible and adaptive elementary school education elicits challenging questions regarding the place of physical printing and handwriting, as well as expectations of spelling, grammar, and punctuation as these elements change across the many genres and communicative modalities currently available. The mere suggestion of expanding the focus of elementary education beyond prescriptivist conventions of traditional grammar, spelling, and punctuation is often seen as heretical. But while conventional print literacy skills remain important in many contexts, formal education needs to be much more inclusive and ecologically adaptive to human cognition and contemporary social practices as they become increasingly interwoven with networked computer memory.

Digital literacy tools are immeasurably more complex than pencil and paper in that they are massively mediated. If learning control of the mediating processes in textual access and composition is the primary focus of basic literacy education, then basic literacy should now include coding and programming. Children will have to routinely learn to use machine language if they are to graduate from being capable of consuming digital multimodal products to being capable of creating them from anything other than a template. Maker schools, snap-together coding languages such as Scratch and Snap!,⁵ and game-based learning workshops encourage productive, active multimodal literacies. However, much of elementary learning today is analogous to the nineteenth-century mass education, which aimed to produce workers who could listen, read, and understand directions, but not to write eloquently and analytically of the political and economic bondage such literacy skills enabled. Today's learners are skilled digital consumers. Creating an emancipatory future through education requires not only that students gain the ability to write themselves into the world but also that they gain the ability to code the world.

⁵Snap!: <http://snap.berkeley.edu/>

Cross-References

- ▶ [Ecologies of Digital Literacies: Implications for Education](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)
- ▶ [Multimodal Discourses Across the Curriculum](#)

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Popular Culture and Teaching English to Speakers of Other Language (TESOL)

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Abstract

A review of current research on popular culture and TESOL shows that the recurrent themes revolve around pedagogical affordances of popular cultural resources in TESOL, evaluation of popular culture's pedagogical potential, and construction of learner identities via ESL/EFL popular culture. However, there is a dearth of discussion on development of critical literacies when popular culture is used in English classrooms and existing studies focus mainly on popular cultural resources that are based on Anglo-American and European cultures. Moreover, issues relating to how to use popular culture in school teaching contexts that are constrained by the need to meet official curriculum requirements and preparation for high-stake tests remain under-investigated. It is proposed that more classroom-based and narrative-based research should be done to look into the experiences and desires of EFL/ESL students from various sexual, ethnic, and socioeconomic backgrounds as they learn English via popular culture. In addition, critical literacies and common meaning-making conventions of popular culture can be introduced to TESOL programs so that learners can become critical, active analysts, and producers in the popular cultural world that they are immersed in.

Keywords

Popular culture • Digital literacies • Learner identity • TESOL • Language education • Agency

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Introduction

Although using popular culture in EFL/ESL classrooms is not a new pedagogical endeavor, research on popular culture and TESOL did not gain significant momentum until the late twentieth century. This chapter looks into major issues revolving around the use of popular cultural resources in TESOL. Early developments in this area have been concerned with establishing pedagogical evidence regarding the positive role of popular culture in increasing ESL/EL learners' interest in learning English and facilitating their language attainment. For instance, studies have focused on how the use of popular culture enhances learners' vocabulary and listening comprehension through the use of excerpts of advertisements and TV/radio programs. Further development in this research area has to do with quantitative studies to establish the relationship between use of pop culture and improvement in English-language proficiency. Another strand of research has involved learners' out-of-school consumption and production practices of popular culture, especially with new media and emerging digital technologies, and the subsequent pedagogical implications for formal English instruction. With increasing interest in learners' identities, much research attention has been directed to learners' out-of-school literacy practices vis-à-vis the (co-)construction, negotiation, and contestation of racial, sexual, and social class identities. However, it has also been pointed out that the feasibility of engaging popular culture in TESOL is still much debated in view of institutional constraints and potential tensions between popular culture and school and exam cultures. These will be discussed in detail in the following sections.

Early Developments

With the rise of studies in communicative competence and content-based instruction in the 1970s and 1980s, popular cultural resources were introduced to the ESL/EFL classroom to contextualize L2 learning with authentic content

material. The following quote from Sandsberry (1979) captures well this rising trend:

More recently, however, several concurrent trends have resulted in a new view toward using non-specialized materials for teaching language, trends such as the emphasis upon teaching language in context; the shift of interest from small to increasingly larger units of discourse; the goal of communicative competence taking precedence over that of linguistic competence; and bilingual education, in which students learn the second language through content courses. One consequence of these trends, the move away from strictly controlled language, means that not only can language activities focused upon everything from model villages to recipes now be considered appropriate for elementary as well as very advanced classes, but also that such activities need not be considered second-rate, slated for the last ten minutes on Fridays. (pp. 501–502)

Early studies thus focused on how to use popular cultural resources to facilitate L2 comprehension, enjoyment, and learning, capitalizing on learners' interests while offering grammatically correct and yet authentic materials to consolidate English communicative competence. Research studies in this tradition mainly elucidated the ways in which language teachers used popular cultural resources fruitfully in language classrooms. Specifically, (pop) songs proved to be the pop culture genre that guaranteed most pedagogical potentials. Richards (1969), for example, argued that songs could help to teach children new sounds, rhythm and stress, polite forms, and vocabulary due to its pleasurable nature. However, nonstandard grammatical structures in songs were thought to hinder language learning, and teachers were asked to adapt songs in classroom presentations. In addition, pop songs were seen as "affective, simple and repetitive" (Murphey 1989), and teachers were asked to design various song-based activities (e.g., role-play, grammar/listening comprehension drilling, teaching vocabulary/translation) for classroom use that would align with learners' preference. On the other hand, pop songs were considered to have the "song-stuck-in-my head" (SSIMH) effect, or in Barber's (1980) term "Din in the head" (Murphey 1990), and so they were thought to be able to assist teachers in instilling some information into learners' minds (Murphey 1992). In the context of Mexican secondary schools, Domoney and Harris (1993) reported that Spanish-speaking students lacked interest in learning English because it was seldom used outside the classroom, and teachers explored how to capitalize on students' interest in rap music to bridge the gap between out-of-school English exposure and formal learning. Song-based fill-in the gaps were also found to facilitate language attainment rather than just for atmosphere and mood enhancement among Japanese EFL university students (Kamel 1997).

TV dramas proved to be useful aids in teaching English listening, pronunciation, and vocabulary. Handscombe (1975), for example, documented how to appropriate the TV series *The Sunrunners* in the Grade 3 ESL classroom in Ontario, Canada, for exposing pupils to multiple dialects of English as well as consolidating their grammatical knowledge and vocabulary of English. Videotaped news broadcasts were also found to be useful materials to enhance students' listening comprehension in the classroom. In order to address the uneven development of the four language

skills (i.e., listening, speaking, reading, and writing), Brinton and Gaskill (1978) maintained that compared with artificial language examples, news broadcasts could bring real language materials to classrooms and enhance students' English listening comprehension, vocabulary, and understanding of the target language culture. TV comedy was also found to present useful resources for teaching English as a foreign language (McLean 1976).

Earlier research viewed popular culture as exciting and practical and to provide a proxy environment similar to the actual English-speaking world. It was assumed that the more students were exposed to authentic language use, the more competent they would be able to cope with English in real life situations. For example, Hafernik and Surguine (1979) advocated for the use radio commercials to teach listening in ESL classes due to the high recording quality, the entertaining nature, and the provision of everyday English in a contextualized manner. They proposed designing instructional activities such as (1) true/false, (2) multiple choice, (3) short answer, (4) matching, (5) cloze dictation, (6) adapted role-play, (7) values clarification, (8) discussion, and (9) contact assignments based on English radio commercials. In Hong Kong, Cheung (2001) pointed out that popular culture, such as television, movies, music, gossip magazines, comics, fashion, computer games, and the Internet, exerted significant impact on young people's feelings, attitudes, and knowledge about society. Therefore, teachers were advised to tap into students' "encountered knowledge" (Cheung 2001) to design meaningful and communicative tasks in classrooms to enhance their motivation to learn English.

In related research, comic strips were found to have an effect on ESL learners' reading comprehension (Liu 2004). With a factorial design involving factors of English proficiency (i.e., high-level or low-level ESL learners), text difficulty (i.e., difficult or easy English texts), and visual support (i.e., with or without comic strips), Liu (2004) argued that the reading comprehension of low-level ESL learners could be significantly enhanced when difficult texts were supported with relevant comic strips, because key information was abstracted and represented in comprehensible visuals. However, the high-level ESL learners in Liu (2004) did not benefit from comic strips because comic strips distracted their attention from complex language structures and did not provide more information than they could understand from the texts. It was therefore recommended that teaching material developers should choose the visual supports that reflected the texts' linguistic complexities so as to increase the quality of readers' language input and output.

Another way of using popular culture in TESOL was to make use of both its language forms and content. For example, Sandsberry (1979) used magazine advertisements in ESL classrooms to teach logical thinking and English language alternately by asking students to interrogate the logics of the advertisement. Despite the diversity of opinions toward using popular culture in classrooms, there was general consensus that careful planning and adaptation was the key the successful integration of popular cultural resources in English-language education.

Major Contributions

Pedagogical Affordances of Digitally Mediated Popular Cultural Resources

With the transnational popularity of new information and communication technologies, popular culture is no longer seen as supplementary material for language teaching but is increasingly seen as an important external force that can foster change in EFL pedagogies. For example, Stapleton and Radia (2010) argue that L2 writing pedagogies need to go beyond the debate among different perspectives, i.e., “product,” “process,” and “genre,” and propose that emerging software and online resources can supersede such a theoretical debate. Specifically, they evaluate the effectiveness of existing resources and recommend that teachers draw upon corpus-based and thesaurus tools to give feedback to learners’ writing.

Concerning the results of the new National English Program for Basic Education in Mexico featuring early start EFL instruction and a sociocultural approach, Sayer and Ban (2014) investigate Mexican primary school students’ engagement with English outside the classrooms by interviewing 61 fifth and sixth grade students, their teachers, and parents in central Mexico. It is found that students use English outside schools more than commonly thought, mainly through computer-/technology-mediated popular culture. They also find that students regard school English lessons positively because such English lessons enable them to engage in out-of-school English popular culture consumption. Due to the centrality of popular culture, it is proposed that teachers should tap into students’ lived popular cultural experience, and some teacher control should be given up to make way for learners’ voices in the lessons.

Compared with earlier studies, learners in recent studies are seen as playing a more active role in the use of popular cultural resources for language teaching and learning. For example, Murphy (2014) recommends YouTube videos and Ted Talks as materials from which EFL/ESL teachers select intelligible, comprehensible, and meaningful nonnative English speech samples for teaching pronunciation. As an integral part of this process, learners are required to engage in detailed analysis and imitation of the nonnative English speech samples so that they can counteract effects of native speakerism in appreciating the linguistic, paralinguistic, and rhetorical strengths of clear and intelligible nonnative English speeches.

The area of computer-assisted language learning (CALL) has made significant contributions to TESOL and emerging technology-mediated popular culture. For example, Thorne and Reinhardt (2008) propose bridging activities to engage the internet generation’s vernacular digital practices for enhancing relevance of formal language education in advanced foreign-language learners’ day-to-day language use. Specifically, learners are guided to compare the linguistic and multimodal features as well as the social purposes of new literacy genres such as instant messaging, blogs and wikis, remixing, and multiplayer online gaming with the traditional literacy practices such as face-to-face spoken conversation and print media genres. Through comparison and reflection on their own new literacy practices, students can become

more aware of their agentive role as critical genre analysts of both conventional and digital text forms. In another study, Wang et al. (2012) maintain that *Second Life* supports constructivist learning as it enables a more active student role and supports students' knowledge construction via the recreation of public entities and infrastructures that can include opportunities for intercultural exchange. Based on the principles of task-based learning, authentic activities, and collaborative learning, a three-step activity model is proposed for designing foreign-language learning activities with *Second Life*, which include Setting the Stage, Acclimating, and Testing the Waters. "Setting the Stage" refers to giving technological support to novice users and encouraging ESL students to develop a *Second Life* user manual in their native language; "Acclimating" pertains to establishing a safe zone in *Second Life* where EFL/ESL learners will be gathered to discuss assigned topics via text messages in order to achieve higher English proficiency; finally learners will interact with native English speakers in *Second Life*, i.e., "Testing the Water."

Evaluation of Popular Culture' Pedagogical Potential

While some studies on popular cultural resources counteract the dismissal of popular culture as purely recreational and underscore learners' language gains after active analysis and participation in pop culture, another emerging theme is the assessment of language gains by analyzing the pedagogical potential of a specific popular culture genre and exploring the ways in which popular cultural resources can be effectively used with quantitative research. For example, Rodgers and Webb (2011) examine the word types, vocabulary reoccurrence, and the vocabulary size necessary to reach 95% coverage of different English TV series in order to ascertain the value of watching TV series for learning English vocabulary. Specifically, using the computer software RANGE (Nation and Heatley 2002), Rodgers and Webb (2011) compare the frequency of vocabulary in 142 episodes of six TV dramas, *24*, *Alias*, *Crossing Jordan*, *CSI*, *Grey's Anatomy*, and *House*, which are treated as related TV programs, with 146 episodes of six other randomly chosen TV dramas. Fewer word types and families and higher vocabulary reoccurrence are found in related TV programs than the unrelated, randomly chosen TV programs, and a vocabulary size of the most frequent 3,000 word families is considered sufficient for understanding 95% of the words in the TV programs. Therefore, for less proficient English-language learners, it is better to receive narrow, repeated L2 aural input by watching different episodes of a single TV program or a single episode multiple times. However, more advanced English-language learners benefit from receiving more broad L2 aural input. Furthermore, teachers can design comprehension questions and pre-teach some low-frequency words from the TV programs as classroom-based activities to aid students' comprehension.

Lai et al. (2015) identify the close ties between out-of-school English learning with information and communication technologies (e.g., the Internet, movies, TV dramas, songs) and English proficiency with a group of junior secondary EFL learners in a large city in southern Mainland China with both quantitative and

qualitative data. In particular, she finds that English movies and English songs are what this group of students opt for in out-of-school English learning, and parents and teachers are the most important socialization agents for this group of students. The study suggests that in learning contexts where in-class instruction focuses heavily on language forms rather than on language meaning, diversity of out-of-school English learning activities should be enhanced to facilitate the learning of English-language meaning. Lai (2015) also posits that teachers play a significant role in undergraduate students' digital self-directed foreign language learning (including English) with semi-structured interviews and online questionnaires. In particular, teachers' affective support can improve students' sense of the perceived usefulness of technologies. Additionally, teachers' capacity support and behavior support are found to be important in facilitating learning conditions and improving students' computer self-efficacy. However, quantitative evaluation of popular culture's pedagogical potential tends to overlook the effects of learner identities on learning and seems to regard learners as homogeneous, rendering research findings in this tradition dubious at a time of "superdiversity" (Blommaert 2013), when learners' attitudes and understanding of a popular culture text can vary considerably even within the same classroom. In the next section we will turn toward a review of studies on the issue of learner identities.

Construction of Learner Identities via ESL/EFL Popular Culture

An important research focus in popular culture and TESOL examines the construction of English-language learners' identities, whether in traditional, print-based media, or in new media environments powered by emerging technologies. Specifically, this line of work is less concerned with pop culture as an English-language teaching/learning resource and rather examines the possible ways in which English-language learners construct their relationship with English and the imagined communities of English speakers via popular culture, including how power relations in English learning/teaching are implicated in popular culture.

Pioneering work in this tradition is found in Lam (2000, 2004), who explores how immigrant youths in the United States utilize popular culture to acquire more symbolic resources, such as English-language competency and friendship. Lam (2000) contends that computer-mediated communication (CMC) engenders vernacular L2 development and enables users to construct more positive and powerful identities for themselves compared with the negativity experienced in schools. Albeit constrained by dominant ideologies, ESL learners manage to transcend their social marginalization due to low academic English proficiency via connection with a global English-speaking (including EFL) community. The enhanced social capital and emotional support they create are central to sustaining a positive learner identity. This view is also echoed in other recent studies (e.g., Lee 2013, 2014) on EFL youths' use of social media, and it is predicted that "newer social media will only give rise to even greater diversity of both technology users and linguistic practices" (Lee 2014, p. 180).

Hip-hop music genres are also found to have the potential to empower working-class secondary EFL students, evidence for which is documented in Lin and Man (2011)'s study. An extracurricular English hip-hop learning activity, called "The ELT Rap Project," was piloted in a low performing school in Hong Kong. The authors investigate the possibility of transforming working-class students' inferior learner identities with rap and dance workshops offered by local artists and an English tutor with dual foci, one on rap and the other on English phonetic skills. With pre-and post-questionnaires and focus group interviews, it is found that the students have demonstrated more positive learner identities and more linguistic capital, such as knowledge of letter-sound relationships, which help to increase their investment in English.

Popular culture can also help English learners to critically reflect on their identity formation. Mackie (2003) provides a critical account of the influence of popular culture on formation of one's subjectivity after examining how she acquired implicit knowledge about race from popular American films and her experience of being othered when teaching English in China. Mackie and Norton (2006) examine the affordances and complexities when teachers include films as resources for teaching literacy in the L1 context. In related research, popular culture texts are found to be conducive to language learning as language learners use these texts to "construct their identities as learners, users, and consumers of the English language" (Chik and Breidbach, 2011).

Recent studies have also examined how learners are positioned and position themselves in second languages when they are involved in consumption and production of popular culture texts. In engaging with popular culture in English teaching and learning, social inclusion or exclusion is a significant dimension. Due to the diversity of students, more attention over selection of pop culture materials is advocated to avoid marginalization of learners. Indeed, as pointed out in Duff's (2002) study on pop culture and ESL students, teachers should know about the relevance of the popular culture resources in students' everyday life, especially when they come from different sociocultural and linguistic backgrounds; moreover, teachers should unpack the forms and functions of hybrid pop culture texts for immigrant students, because "relevance and access cannot be taken for granted. People often do not share the necessary sociocultural and psycholinguistic repertoires, practices, and abilities, and need assistance from others to understand them. For newcomers to a discourse community, references to dominant local pop culture are often both intriguing and confusing, especially in highly intertextual or hybrid oral texts" (p. 486).

In the same vein, Black (2009) discusses the pedagogical value of Internet-mediated communication for TESOL in the twenty-first century with examples of English-language learners' engagement in online fandom. Specifically, Black (2009) identifies three major benefits of engaging in leisure-time, pop culture-based, technology-mediated activities in L2 English: improving English-language and composition skills (i.e., print literacy), developing "the twenty-first century skills" of information literacy which refers to the ability "to seek out and critically evaluate information across a range of media" (p. 693), and finally developing positive identities as "powerful learners, language users, and as active producers of their

own social, cultural, and ideological materials” (p. 696), i.e., boosting learners’ academic self-concept.

Similarly, Norton and Vanderheyden (2004), in studying the ESL preadolescent Archie comic readers who newly immigrated to Canada, observe that engaging in ESL popular culture consumption such as reading L2 English comic books can benefit English-language learners’ sense of belonging to the new community as well as their language development. Specifically, they find that reading Archie comics can help the newly arrived students learn the sociocultural practices of Canadian society. In addition, the practice of lending the Archie comic books to native English-speaking classmates’ can empower the ESL learners in terms of fostering interpersonal relationships.

Work in Progress: Digital Language Learning via Popular Culture

As discussed in the previous section, the potential benefits for integrating popular culture in school-based EFL/ESL teaching have been well documented. Recently, researchers have attempted, in an emerging body of work, to explore students’ informal, autonomous learning afforded by digital popular cultural resources. A literature review on computer-assisted language learning (CALL) and second-language acquisition (SLA) done by Mroz (2014) identifies two main types of virtual language learning environments (VLEs) which can provide opportunities for meaningful use of L2 English, i.e., online commercial video games and non-gaming three-dimensional multiuser virtual environment (3-D MUVE) such as *Second Life*. In particular, virtuality is conceptualized as providing a “holistic and complex” immersive environment and affording agency to language learners (Mroz 2014, p. 334).

In terms of the relation between gaming and L2 English learning, Sylvén and Sundqvist (2012, 2016) find that L2 English proficiency is related to the frequency of gaming and types of games played for a group of well-resourced Swedish fifth graders. In the naturalistic setting of home life, frequency of gaming (i.e., ≥ 5 h/week) and the variety of games are found to be correlated positively with the acquisition of L2 English vocabulary. A study on Japanese university EFL learners’ collaborative interaction in and attitudes toward *Second Life* conducted by Peterson (2012) reveals that learners can obtain peer correction and peer scaffolding for unknown lexis. Additionally, the students hold positive attitudes toward learning on *Second Life* due to the appealing personalized avatars and the low-stress environment as compared with a regular English class.

Despite the generally positive research findings regarding using digital popular culture for self-directed English learning, and due in part to significant learner diversity, a number of factors have impeded the effectiveness of learners’ self-regulated language learning with technology. For example, Lai and Gu (2011) indicate that lack of digital literacy, unawareness of useful technologies for language learning, or little metacognitive knowledge about how to use them effectively can significantly undermine learning foreign language via digital popular culture resources and platforms. These issues are further explored in the section below.

Problems and Difficulties

While popular culture is celebrated as stimulating accessible resources for language and content learning, there are several problems and difficulties regarding using popular culture in TESOL. The research literature compels language education researchers and practitioners to reconsider the ways in which popular culture is positioned in formal English instruction and how it can be optimally integrated into both formal and informal, self-regulated English learning. In particular, the question of how to capitalize on popular culture in language education is complicated by the differences between two social institutions: schools which favor academic achievement and traditional values and the mass media which features diverse values and pursuit of pleasure and desires. In particular, teachers' ability to recognize students' local funds of knowledge about popular cultural tends to be circumscribed by the institutional constraints which are "characterised by a nationally governed curriculum, an emphasis on testing, and externally specified teaching frameworks" (Burn et al. 2010, p. 13). Lo (2013) echoes this view in a study about the conflicts between students' production of L2 English comic strips and the formal literacy requirements expected in primary school English. While teachers are encouraging students to learn English in online entertainment and participatory culture settings, Lo (2013) reveals that teachers are also caught in the dilemma of meeting formal English teaching requirements. Therefore, special emphasis should be placed on the ways in which educators can address and finesse these institutional tensions and how to formulate possible pedagogical designs which allow students and teachers to do what they are institutionally expected to do while meeting their own personal interests in popular culture.

Much new media research on popular culture and L2 learning suggests that learners can benefit from popular culture-/technology-based classroom activities because students can potentially develop powerful identities and gain recognition for their prior experience and knowledge (e.g., Black 2009). However, there is reason to be concerned about the issue of accessibility as disenfranchised learners without ready access to suitable devices and/or mass media texts may be excluded. For example, what if some students have not watched the most widely discussed TV drama? In order to address this concern, one way forward will lie in adding the emic perspective in initiatives of using popular culture in English classrooms by using ethnography to incorporate students' pop culture practices. In addition, more learner training in terms of digital literacy and awareness of useful technologies for language learning should be offered to English learners in need (Lai and Gu 2011).

Numerous research has critiqued the dominance of written language (e.g., the New London Group 1996; Gee 2004; Lankshear and Knobel 2007) and acknowledged the potential of digital popular culture (e.g., social media and virtual environments) as an affordance for young people with sociocultural and linguistic differences to construct alternative and positive identities (e.g., Lam 2000; Lee

2014). This said, symbolic violence regarding gender, race, and class is of course present in cyberspaces, and how such power relations are enmeshed in students' L2 English learning have not yet been adequately and critically investigated. In addition, the global and local symbolic capital of particular languages and cultures can be a serious issue: many popular culture resources, whether Web 2.0 technology or more traditional media such as films and TV dramas, are often Anglo-American and European. A potential corrective action is to utilize popular cultural resources in the learners' mother tongue or to incorporate those based on non-Western contexts in order to decenter dominant cultures while also fostering multilingualism and desires to learn other languages and cultures (Janks 2004).

Another potential problem lies in the register and language level of popular culture materials. While most students need to acquire the powerful forms (i.e., academic register) of dominant foreign languages (e.g., English, French) for upward socioeconomic mobility, the style of language in popular culture tends to be vernacular. The vernaculars which students are acquiring through engagement with the popular culture world are not always appropriate for, or readily transferred to, use in academic settings (Madge et al. 2009; Thorne et al. 2009). In addition, a mismatch between the proficiency level of beginning foreign-language learners and the complexity level of authentic popular culture materials is reported by Lai and Gu (2011). If teachers are not making conscious efforts to provide language support and bridge the gap between L2 English everyday vernaculars and L2 English academic language, students may not be able to benefit from popular culture-inspired language instruction. English-language teachers should therefore caution against the assumption that exposure to L2 English popular culture is always beneficial for students' linguistic attainment and teach with more register awareness when popular cultural resources are used.

Future Directions

Learning language via popular culture in the digital age is not "a lazy throwing open of the school doors to the latest fad, but rather committing to a principled understanding of the complexity of contemporary cultural experience" (Willis 2003, p. 411). Given the developments and problems in the field, future research should be conducted toward more understanding of diverse popular culture's influence on L2 English learning and teaching, both in terms of students' language attainment and their identity development. Specifically, more naturalistic or (design) experimental research can be done to examine the efficacy of using popular culture in TESOL and to investigate when and form whom popular culture can be useful and in which dimensions of the language ability. Additionally, more classroom-based or narrative-based research can be done to reveal the affect and desires of learners from various sexual, ethnic, and socioeconomic backgrounds when they learn English via popular culture so that language teachers can design language curricula accordingly. Another

future direction would be further studies and innovative pedagogical practices that involve multilingual popular culture texts from a wider range of cultural contexts, which can promote multiculturalism.

Furthermore, popular culture is a powerful source of fun, excitement, fantasies, and desires as well as social controversies. Students immersed in popular culture often do not have a chance and/or the analytical tools to critically reflect on how their own subjectivities and identities, ways of seeing things, and relating to others are implicitly and ideologically shaped or influenced by the popular cultural texts that they consume pleurably every day. Therefore, critical literacies can be introduced to English-language learning programs so that students can identify ideologies and biases implicitly embedded in popular culture and contest negative subject positions which are discursively constructed by some popular culture texts.

Finally, as Lin (2012) points out, “[I]anguage (e.g., L1, L2, L3) should not be seen and planned as discrete separate entities but rather as continua (Hornberger 2003; Canagarajah 2005) and. . .part of multimodal communication (Kress and van Leeuwen 1996, 2001).” Teachers and researchers are encouraged to explore ways to equip students with the techniques and meaning-making conventions of popular culture and to teach them different ways to creatively produce content for the purpose of promoting social justice and heteroglossia (cf. Lin and Luk 2005). In this way, students are not merely passive consumers of popular culture but are also critical, active analysts and producers of the cultural world.

Cross-References

- ▶ [Ecologies of Digital Literacies: Implications for Education](#)
- ▶ [Elementary Language Education in Digital Multimodal and Multiliteracy Contexts](#)
- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Language and Identity on Facebook](#)
- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)
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Part II

Plurilingual Practices in Digital Contexts

Identity in Mediated Contexts of Transnationalism and Mobility

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Abstract

This chapter reviews research on the relation of literacy and identity in the context of transnational migration and changing linguistic and communicative landscapes with online connectivity. In particular, we focus on the ways that youth of migrant backgrounds use digital and online media to construct networks and affiliations with diverse cultural and language practices. The studies we review have provided lenses into how youth of migrant backgrounds draw from multiple linguistic and semiotic resources to represent themselves, how they navigate participation in diverse communities and networks that span national borders, and how diaspora youth blend their cultural heritage and affiliation with transnational youth culture in online participatory practices. The youths' digital practices indicate that they are orienting to different cultural discourses and practices coming from both local and translocal spaces, across their countries of origin and settlement, as these discourses and practices are accessed, remixed, and circulated on new media platforms. We propose that, at a broader level, these practices point to the ways in which people maneuver differentiated social spaces within and across countries, how people create their own (cultural and historically informed) pathways through them, and in the process reconstruct their understanding and relationships across these spaces. These processes of traversal and reconstruction of social spaces have important implications for further research and educational practice that seek to enhance people's mobility in a global world.

Keywords

Literacy • Identity • Transnationalism • Mobility • Online practices • Digital literacy

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Early Developments

Since the early 1990s, research on international migration has increasingly turned to the notion of *transnationalism* to understand the various kinds of cross-border connections that are created and sustained in the process of migration and how the identities of individuals and groups of people are negotiated within social worlds that span more than one place (Levitt and Jaworsky 2007; Vertovec 2009). These connections are multilayered, multisited, and are influenced by a complex ecology of labor and capital flow, circulation of ideas, cultural and material goods across the world, and increasing digitization of social life. Research in diaspora media studies has explored the adoption of various technologies, such as mobile phones, e-mail, text messaging, video chat, and Internet websites among migrants to engage in relationships of care and building cultural and political affiliations with family, friends, conationals, and others across distances (Miller and Slater 2000; Panagakos and Horst 2006). The “transnational turn” in anthropological and sociological research of migration has provided a “new analytic optic” (Caglar 2001, p. 607) for making visible how people constitute daily routines, activities, and institutional affiliations that simultaneously connect them to more than one society. These contexts of migration and mobility gave rise to the impetus to reassess our understanding of literacy and communicative practices, and how youth draw upon various linguistic and multimodal resources to (re)define their identities and relations to multiple localities and communities.

In educational research, scholars have argued that given the growing scope of cultural and linguistic diversity in public and private spheres of society, coupled with the changing communicative landscape, literacy pedagogy needs to move beyond formalized, standardized, and its largely monolingual and monocultural framework that currently is centered around the nation state (Cope and Kalantzis 2000; Luke 2003). Scholars associated with the New London Group proposed the concept of multiliteracies to describe the literate abilities to navigate and negotiate diverse social practices and representational forms that are integral to our changing societies (New London Group 1996). The authors argued that mastery of contemporary multiliteracies demands continual adaptation to new emerging textual forms, comfort with hybridization and crossing cultural boundaries, and the ability to reenvision social futures. Importantly, along with others, they argued that linguistic and cultural diversity is not a problem that needs to be standardized or normalized but should be

seen as a cultural, civic, and economic resource in organizing literacy pedagogy. The article (New London Group 1996) proposes three constructs for scholars and educators researching literacies in the twenty-first century: (1) the construct of “productive diversity,” which means seeing difference as a capitalizable resource, (2) “civic pluralism,” which refers to the recognition of a broad range of affiliations, values, and perspectives beyond national borders or traditions, and (3) the idea of “multilayered lifeworlds” in which individuals participate and in the process develop complex, textured subjectivities.

In developing constructs of identity as an analytic lens for educational research, Gee (2000), who was coauthor of the New London Group article, contended that the contemporary global economy, popular culture, and youth sociality promote new contexts for constructing social identities that he termed affinity groups or affinity spaces. An affinity group identity is developed through networking, collaborating, and affiliating, sometimes across distances, around common interests, joint endeavors, and shared causes. The source of this identity is coparticipation in a set of distinctive practices – practices that are reflected in diverse kinds of youth engagement with media around hip-hop, anime, music, games, and fandoms. Gee (2000/2001) pointed out that affinity group identity can coexist with other forms of identity that come from institutional positions and cultural discourses. In this sense, Gee’s formulation opens up an analytic space to think about how different kinds of social structures (from societal institutions, cultural heritage, and affinity group networks) may interact in practices of cross-border communication, and how people may draw from discourses from these different sources for representing and enacting identity.

Gee’s notion of affinity space is echoed in the idea of “participatory culture” in the field of communication studies (Jenkins 2006), which refers to how everyday people and groups engage in networking, media use and production to pursue their interests and, in the process, shape the flow and circulation of media. The idea of participatory culture has spurred educational research to examine digital spaces as important sites for social connection, literacy practices, and cultural production.

These early developments provided some broad theoretical signposts for studying the relation of literacy and identity in response to changing demographics and migratory contexts, linguistic and communicative landscape, spatial affiliations, and online connectivity. In particular, research began to examine the ways that youth of migrant backgrounds use digital and online media to construct networks and affiliations to diverse cultural and language practices. The next section describes some major themes from this research that have begun to build a complex portrait of youths’ transnational digital practices.

Major Contributions

Studies of youths’ literacy and identity practices in transnational contexts have provided lenses into how these youth draw from multiple linguistic and semiotic resources to represent themselves, how they navigate participation in diverse communities and networks that span national borders, and how diaspora youth blend

their cultural heritage and affiliation with transnational youth culture in online participatory practices.

A number of studies have focused on the online texts produced by immigrant youth and shown how young people use their personal profiles and self-produced narratives in online journals, instant messaging, and social networking sites to signify their identifications with multiple communities across borders (McGinnis et al. 2007; McLean 2010; Sánchez and Salazar 2012; Yi 2009). These signifying practices include written texts, images, and music used by youth to reference the national symbols and popular culture of their natal countries, and narrative texts that target different audiences and contain references to the youth's social relations and schooling experiences in their different homelands. For example, McGinnis et al. (2007) profiled how Julia (pseudonym), who migrated to the United States in her fifth-grade year, used a variety of modalities, such as Latin music, graphics of Colombian flags, and English and Spanish, to express her Colombian ethnic identification on Myspace (a social networking site). Her online gallery of friends reflected her affiliation with other Colombian youths from her high school and allowed her to maintain relationships with friends in Colombia. Additionally, Julia expressed her community involvement with immigrant rights by using the site to promote awareness and mobilize protests. The researchers' analysis of the multimodal and multilingual texts of the youths in their case study led them to assert that the online environment served as dynamic representational spaces for the youths to express multiple identities and multiple loyalties and to reflect on the different social and cultural contexts of their lives.

Besides serving as a narrative space to express one's multisite and multilayered affiliations, digital media are also platforms within which young people cultivate their relationships with different communities. Studies have explored the diverse online networks of youth and the nature of the communicative practices within these networks, particularly how social, linguistic, and semiotic resources are accessed and developed within these networks (Elias and Lemish 2009; Lam 2009; Lam and Rosario-Ramos 2009; Stewart 2014). In a study of the instant messaging practices of a 17-year-old girl who had migrated to the United States from China 2 years prior, Lam (2009) examined how the youth acquired and made choices among different varieties of Chinese and English to develop simultaneous networks across countries. The linguistic repertoire that the youth demonstrated in her online communication includes standard American English and hip-hop English that she used with an online network of Asian American youth, a combination of Cantonese, Mandarin, and English with her peers in the local immigrant community, and a blended form of Mandarin and Shanghainese that she used to interact with her peers and learn about events in her hometown of Shanghai. The researcher argued that such synchronic movement across social networks represented the desire of the youth to develop the literate repertoire that would enable her to thrive in multiple cultural communities and mobilize social and semiotic resources within those communities. The study also shows how the youth's participation in these networks is oriented to diverse linguistic economies where particular language norms, cultural resources, and forms of creativity are circulated and take on symbolic and functional value.

In an ethnographic study with four high-school youth from Latin America who had been living in the United States for 9–20 months, Stewart (2014) demonstrated the diverse networks and forms of literacy practices that youth navigate across online and offline contexts. By interviewing and observing the youths' routine activities in different spaces, she noted how their social networking activities on Facebook connect them to friends and family back home and those in diaspora communities across Latin America and the United States, maintain their Latina/o identities through music and other forms of popular culture, and enable them to cultivate relationships through English with colleagues in their workplaces. Their online activities mediate their simultaneous participation in diverse sets of social relationships and institutional practices across geographic space.

These patterns of simultaneity of connection, navigation, and positioning in different cultural communities through online media are replicated and further illustrated in interview studies that draw on larger samples (Elias and Lemish 2009; Lam and Rosario-Ramos 2009). Elias and Lemish (2009) interviewed 70 immigrant youth from the former Soviet Union who had been living in Israel from between 6 months and 5 years, and found that the youths used the Internet to connect with their homeland and co-ethnics as well as to learn about the host society and to create friendships with local peers. The youths orient to online media and communicative platforms both as a source of information about the new society and a connection to Russian language, information, and cultural symbols of identity. These forms of continuity and simultaneous affiliations are actively cultivated and mobilized by the youth to navigate and circumvent the ruptures and social marginalization that they experience in relocation. Elias and Lemish (2009, p. 547) suggest that the youths' experiences are indicative of "a postmodern experience of diaspora in which homeland and identity have become fluid" and "new possibilities of identity formation and notions of belonging that emerge in this process today."

Other studies have shown how diaspora youth creatively signify their cultural heritage and affiliation with transnational youth culture in online participatory practices (Black 2008, 2009; Domingo 2012, 2014). In her study of youth of Filipino heritage in London who are members of a hip-hop production group that has transnational membership and affiliations, Domingo (2012, p. 178) proposes the notion of linguistic layering to describe the "design and circulation of multimodal texts as rhetorical resources for managing linguistic variety and cultural affiliation across discourse communities." The youth call themselves the "Pinoys" and network with youth of Filipino heritage across Europe, Asia, and North America to engage in various forms of digital hip-hop production. Their hip-hop music involves hybrid lyrical and beat-making, visual and textual displays that draw from symbols and references of diverse discourse communities of Filipino, British, hip-hop, and youth pop culture. These multimodal ensembles and layering of culturally informed expressions are produced and circulated in the wider online communities to express their multiple affiliations and articulate social commentaries on their heritage and sense of global belonging. By circulating and discussing their projects across online platforms including Facebook, YouTube, and SoundClick (an online music-based social networking community), the youth are not only creating messages about their

linguistic and artistic identities but also shaping digital and technological platforms through their collaborative authorship across space.

Black's (2008, 2009) study of multilingual and diaspora youths' participation in anime fan fiction community also shows opportunities for language development that draws from diverse media genres, cultural knowledge, and linguistic skills. For example, Black documented how youth of Chinese and Filipino descent who were studying English as a second language were able to draw on their knowledge of Asian cultures and languages to construct English texts with multilingual elements, express pride as Asian-origin writers, and attain expert status in the transnational anime fan fiction community. These youth, who were located in different countries, also collaboratively reviewed and supported each other's development as writers within the networking spaces of Fanfiction.net. The study shows how the transborder flows of cultural, symbolic, and ideological material in this online community influence the identities the youth enact through their fan texts, the global connection they develop, and the shaping and dissemination of their own media products.

These research studies on the digital literacy practices of youths of migrant backgrounds show the multiple and complex influences that contribute to the literate repertoires of these young people. The diverse influences are visible in the use of multiple languages and hybrid linguistic codes; media genres and multimodal expressions; as well as the content and cultural references that are represented through the diverse semiotic forms in the youths' digital texts. Indeed, the youths' digital texts indicate that they are orienting to different cultural discourses and practices coming from both local and translocal contexts, across their countries of origin and settlement, as these discourses and practices are accessed, remixed, and circulated in new media platforms.

What we also see from these cases is the creation of social and knowledge networks across countries. The creation of these networks via digital platforms allows the youth to connect to diverse cultural communities, access symbolic and social resources, cultivate simultaneous affiliations, and reconstitute their sense of belonging across geographical spaces. The reconstruction of social space in literacy and learning requires further exploration, particularly as we conceptualize forms of learning that relate to the transnational experiences and communicative repertoires of migrant learners. In the following section we discuss some empirical and theoretical work that move in this direction.

Work in Progress

A group of scholars supported by the MacArthur foundation in the United States have been developing "Connected Learning: An Agenda for Research and Design" (Ito et al. 2013). The report and related work argue for design and research of learning environments that are interest-driven, peer-supported, and oriented towards economic, educational, and political opportunity. By leveraging digital media technologies, the educational designs under the connected learning framework look to: "(1) offer engaging formats for interactivity and self-expression, (2) lower barriers to

access for knowledge and information, (3) provide social supports for learning through social media and online affinity groups, and (4) link a broader and more diverse range of culture, knowledge, and expertise to educational opportunity” (ibid, p. 6). Examples of connected learning include Quest Schools, a network of public schools that incorporate approaches from game design and game-based learning to reimagine school curriculum, culture, and pedagogy. Other environments are teen library spaces where youth explore their various interests and receive mentorship from adults and peers on diverse forms of creative and multimedia production. The aim is to harness different forms of support structures across online and offline spaces and across institutional boundaries to promote more equitable and personalized learning for young people.

The Connected Learning framework is an educational movement seeking to reimagine social spaces for learning and to support young people’s personal interests and passions to craft meaningful learning and career trajectories. It also has the expressed aim to relate to a broad range of knowledge and cultural communities with which students affiliate. However, in order to do so, we need more understanding and incorporation of the diverse profiles of cultural affiliations and resources for learning mobilized by young people. The different kinds of social and knowledge networks developed and valued by youth of diverse cultural backgrounds need to be considered to truly promote more equitable learning.

To capture variation in forms of connectivity and learning practices, de Haan et al. (2014) offer the notion of “networked configurations for learning” to describe the particular online and offline connections that people form as related to their social, cultural, and geographical history of mobility. Using social network interviews, the researchers studied the online and offline networks of 79 youth from Native Dutch, Moroccan-Dutch, and Turkish-Dutch backgrounds in the Netherlands. They found that the second-generation youth of Moroccan and Turkish descent show both local and transnational online connectivity, whereas Dutch youth of European descent have online networks that are distributed more nationally (within the Netherlands). For native Dutch youth, the Internet allows them to pursue individual hobbies and learning interests with close friends and in online communities. For Turkish-Dutch youth, their online networks are spread out across family and friendship networks in the Netherlands and Turkey, including access to media resources of Turkish origin, which provide them with particular cultural models and values. Moroccan-Dutch youth maintain transnational relationships with family across countries but also seek out online networking opportunities with other second-generation youth of Moroccan descent around common interests and concerns (e.g., on issues of gender, religion, and politics) as they negotiate diverse norms and values in a multiethnic society.

This study shows that, among youth of migrant backgrounds, their online practices and learning are informed by cultural and ethnic affiliations, transnational and diaspora social networks, and the need and process for navigating multiple cultural values and ideologies as ethnic minorities in the society. These social and structural relations contribute to the priorities that the youth demonstrate in their online practices. Hence, in order not to risk normativizing particular digital practices as

more conducive to learning, we need to understand the culturally configured practices of youth from diverse backgrounds, the historical context of their formation, and the potential they hold for expanding literacy and learning opportunities for young people.

Also as an effort to reimagine social spaces for learning, Lam and Warriner (2012) propose that we consider issues of scale in understanding the ways in which migrant learners relate to language and literacy norms and practices that are prevalent within different geographical spaces, locally and translocally, and that have functional purpose for them. The concept of scale is developed in social geography to analyze how geographical spaces, and the social practices associated with these spaces, are socially differentiated as well as contested and reconfigured through human activity and institutional practices (Herod 2011; MacKinnon 2010). Scale is a way of conceptualizing how power in society is exercised through the making and remaking, through the production and transgression, of boundaries among different places and sites of social practice. Such spatial boundary making and contestation are carried out through both discursive/representational and material processes. For example, the relations between English and Spanish in the United States, and the legitimacy of each in different spaces (school, home, the workplace), are the object of discursive struggle through society-wide debate and representation of the value of these languages as well as the material processes of political mobilization, institutional regulation, and legislation. The process of spatial differentiation produces language norms and social practices that are prevalent in different geographical scopes within and across nations. Recent work in sociolinguistics of globalization and migration has drawn upon this geographical concept to describe how people's uses of language and literacy are scaled – that is, how they are indexed to or respond to values, discourses, and practices at various geographical scopes and institutional spaces (e.g., Blommaert 2010; Collins et al. 2009).

Our discussion of youths' transnational media activities in the previous section illustrate how they orient to different cultural discourses and practices coming from both local and translocal contexts, even as these discourses and practices are juxtaposed and engaged in parallel or sometimes blended and remixed in their literacy practices. For some youth, their simultaneous interactions with diverse communities allow them to shift across scales as a means of expanding their identities and developing linguistic, information, and social resources with diverse communities. Other youth, for example, the Moroccan Dutch youth described in deHann et al. (2014), develop through their online practices a new kind of "scale" for the youth to express their common concerns and experiences, and to reference and contest the language and cultural ideologies coming from their home and host societies. In other words, these youth are constructing a new geographical scale of practice that articulates relations to cultural ideologies at other scales. While these informal digital practices of the youth may not penetrate into their schooling experience, they hold functional purpose and social value for the youth and may serve to counteract the more limiting positions for immigrant learners in the traditionally monolingual and nationalist milieu of schooling.

Problems and Difficulties

We obviously can benefit from more research to help us better understand the digital practices and culturally configured networks of immigrant youth as well as other youth who develop transnational relationships through their online, interest-based engagements. We also need to understand how different social and demographic variables affect levels and types of engagement, including capturing forms of variation within ethnic groups. More comparative studies within and across migrant communities would allow us to consider the social and structural conditions that give rise to particular forms of transnational literacy practices. These conditions may include geographical distance and economic and political relations between the countries of origin and settlement, historical patterns of migration, the structural positioning of migrants in the country of residence, and intersections with transnational youth culture and media infrastructure across the different homelands.

The particular issue we want to point out and offer some suggestions for focus on how the different lenses for investigating literacy and identity among immigrant youths' digital practices can be synergized for future research and rethinking educational opportunities for young people. The studies we have discussed adopt different lenses for understanding immigrant youths' digital practices. These lenses include seeing the online practices as forms of representation of identity that draw from diverse sources of cultural and ideological materials; as particular types of social networks that connect people and artifacts across spaces; as affiliating and navigating through these networks in specific cultural and linguistic economies; and as creative adaptation of technological infrastructure to promote the preceding processes. At a broader level, these lenses point to the ways in which people maneuver differentiated social spaces within and across countries, how people create their own (cultural and historically informed) pathways through them, and in the process reconstruct their understanding and relationships across these spaces. We believe these processes of traversal and reconstruction of social spaces have important implications for further research and educational practice that seek to enhance people's mobility in a global world. In the next section, we offer the concept of scale as a perspective to bring together the different lenses on literacy and identity in mediated contexts for future research.

Future Directions

The concept of scale allows us to examine how people's language practices and affiliations span different geographical distances, and how through their practices and activities they also reconstruct relationships between these spaces. Here we propose three interrelated dimensions of scale for future research focusing on youth media practices, identity, and learning. Firstly, how do young people navigate differentiated social spaces and position themselves in diverse communities and economies across geographical distances? Secondly, how do they develop ways of

knowing and representing the relationships between these different spaces? Thirdly, how do networking technologies or other material practices contribute to reconstructing spaces and creating new social spaces? In asking these questions, we are interested in how young people both relate to and reorganize their understanding of and participation in diverse social environments in society for their own learning and identity development.

In regard to the first question, scale allows us to attend to the differentiated spaces and norms and practices in these spaces that people navigate through their online (and offline) activities. We have seen that digital media allow youth who have access to them to construct relationships with people and communities that span various geographical distances and engage in diverse language practices. It is important to understand how these language practices contribute to a larger communicative and knowledge repertoire that the youth may leverage to position themselves in our interconnected economies and societies. To do so, it is necessary to both study the configurations of the digital networks that young people develop as well as situate these networks within the social and linguistic practices prevalent in a particular geographic community and economy. This may require a combination of methods to map out the spread of networking activities of young people (e.g., through survey, social network analysis, or interviewing) and ethnographic and historical study of the communities with which youth are engaging through their activities.

For example, deHann and her colleagues (2014) show through social network interviews that Turkish Dutch youth develop a distinct pattern of ethnically based family and friendship networks that span across the Netherlands and Turkey. Lam's (2009) ethnographic study of the online networks of one Chinese youth in the United States shows that the youth was navigating quite specific local language norms in her Chinese immigrant neighborhood in comparison to her language practices with people in her hometown of Shanghai. Studying how youth participate in transnational networks may complexify our understanding of ethnicity and the diverse linguistic, symbolic, and ideological sources that contribute to the construction of Turkishness or Chineseness or other forms of identity. It may also allow us to see how these sources of identity and social practices are mobilized by the youth in their educational, career, cultural, and personal endeavors.

As people move across different geographic communities, they also construct ideas and ways of knowing and representing the relationships between the different spaces (Jones 1998; Moore 2008). This representational aspect of constructing spatial relations is seen in Domingo's (2012, 2014) study of Filipino youth in Britain who participate in transnational hip-hop production as the youth draw from symbols and references of diverse cultural and geographic communities. Their rhetorical movements across spaces are manifested, for example, in the footage of their music videos that connects sites in Manila and London, including scenes of poverty and people in the Philippines protesting on the streets. The visual assemblage is coordinated with the youths' lyrics and bodily expressions to express a uniquely Filipino hip-hop social commentary. As Domingo (2014, p. 16) stated regarding the youths' literacy practice: "Their digitally enabled text making is an ongoing process that involves continued reshaping of multimodal ensembles across spaces." The

youths' narratives that interweave events and practices across geographic communities create knowledge of the interrelationships of cultures and societies as well as new pathways for the youth as hip-hop artists. Such narratives for re-presenting the relationships between diverse social spaces may be particularly promoted and supported in collective practices that serve an artistic, educational, professional, or political purpose. However, they may just as well be present in the everyday narratives that young people construct as they navigate cultural norms and practices and grapple with information and perspectives from diverse societies. Further research can explore how youth develop ideas and narratives that variously affect their pathways and mobility across societies and different institutional domains of society.

Lastly, we need to understand the role of networking technologies and other material infrastructures in contributing to creating spaces of social contact and cultural flows across geographic locations. Countries that have widespread online infrastructure and home-grown media companies with a Web presence can readily reach out to its diaspora populations with their media products and platforms. Individuals and groups may also adapt these media infrastructures for their own localized communication or networking with conationals in other migration countries. Immigrant communities that have strong civic and community groups may promote online platforms for young people to participate and communicate around their common concerns and interests. These structural conditions are important to consider in understanding the geographical scale of people's social connections, the types of networked and mobile media that facilitate these social connections, and the flows of information and material products and language practices in these networks.

While we do not want to lose sight of continuing disparity in people's access to technology both within and across societies, it is also important to attend to how people actively shape technological media for social purposes both individually and collectively. This happens for undocumented youth living in precarious financial and political circumstances who develop their resilience and define their own identities as transnational Latina/os (Stewart 2014) as well as for hip-hop artists who mobilize multiple media platforms to collaborate in creative production and to reach a transnational audience (Domingo 2014). Understanding how youth affiliate within and across territorial boundaries can help us reimagine forms of learning and belonging that serve to support their social, economic, and political engagements in our contemporary world.

Cross-References

- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Language and Identity on Facebook](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

Related Articles in the Encyclopedia of Language and Education

Kevin Leader and Cynthia Lewis: [Literacy and Internet Technologies](#). In Volume: Literacies and Language Education

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Multilingualism and Multimodality in Language Use and Literacies in Digital Environments

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Abstract

This chapter focuses on language, discourse, and literacy practices in contemporary informal digital environments. We will discuss work in sociolinguistics, new literacies, and discourse studies that have investigated multilingual and multimodal aspects of digitally mediated practices. Moving from early key developments in the field via major contributions of the early 2000s to current work in progress, we review key studies that have explored the interconnections of multilingualism, multimodality, new literacies, and digital environments in different ways. Finally, we briefly discuss the implications of informal, interest-driven digital literacy practices to focal societal issues such as learning and challenges of compatibility and adaptability of informally acquired competences in formal education and everyday life – as well as issues of equality and digital divide(s).

Keywords

Multilingualism • Multimodality • Discourse studies • Digital environments • Digital literacies

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Introduction

Multilingualism is a pervasive feature of digital environments. However, what multilingualism means can vary a great deal. For some, it can mean a repertoire that allows them to fully participate in a range of sites and types of communication, while for others, it can involve a more limited and context-specific set of heterogeneous linguistic resources. The “language” of digital media also involves multimodality – it is a texture of heterogeneous semiotic materials that are woven together (Kress and van Leeuwen 2001) in ways that are socioculturally significant to the individuals, groups, and communities of practice using it. To which degree participants in digital activities and interactions can draw on and mobilize their semiotic resources often depends on the normativities in play in the specific environments with which they engage. These normativities are often polycentric, ranging from site-specific norms to more general, institutional, cultural, and social ones. Who gets to use what resources with whom and when is, thus, as much an issue in digital environments as it is in physical, face-to-face communicative situations (e.g., Leppänen et al. 2014).

By digital environments, we refer here to digital media platforms that enable the creation, sharing, and exchange of user-generated multimodal content and involve social interaction between participants. In addition to digital platforms explicitly building on the idea of mutual exchange of content (such as web forums or social networking sites), we also discuss digital environments in which the main content can consist of primarily single-authored or monophonic discourse but that also offer an opportunity to authors and recipients to interact (such as discussion sections of institutional media sites or blogs) (Androutsopoulos 2010, 2011; Leppänen et al. 2014).

In this chapter, our focus is on language, discourse, and literacy practices in contemporary informal digital environments. We will discuss work in sociolinguistics, new literacies, and discourse studies that have investigated multilingual aspects and multimodality of digitally mediated activities. Moving from early key developments in the field via major contributions of the early 2000s to current work in progress, we review key studies that have explored the interconnections of multilingualism, multimodality, new literacies, and digital environments in different ways. Finally, we briefly discuss the implications of informal, interest-driven digital literacy practices to focal societal issues such as learning, challenges of compatibility and adaptability of informally acquired competences in formal education and everyday life, as well as issues of equality and digital divide (s) (such as in the global South, from and about which significant work in these areas is emerging).

Early Developments and Initial Contributors

The history of the study of multilingualism in digital environments is relatively short, with more concerted efforts beginning in the early 2000s. This area of study has been characterized by a diversity of approaches (e.g., Androutsopoulos 2010, 2011; Leppänen and Peuronen 2012; Kytölä 2014; Lee 2015). Besides the studies that have attempted to measure the presence of particular languages on the Internet, from the early 2000s onwards, an increasing number of studies, representing ethnographic, discourse analytic, pragmatic, or (socio)linguistic perspectives, have focused on detailed analysis of language use and interactions by participants (e.g., Danet and Herring 2007).¹ In these studies, the focus was often on young people, thanks to their role as early adopters and adapters of new technologies, and the main objective was frequently a descriptive one. The novelty of the technologies and applications, often text-based only at this stage, and their linguistic and communicative innovations spurred a great deal of interest but also concerns about the alleged spread of “incorrect” and “inappropriate” language forms in such usages (Androutsopoulos 2011). In addition, until the early 2000s, in these studies, the primary interest was the English language, and the bias toward the Anglo-American Internet sphere was rather strong.

As a prime example of an insightful early contribution to the field, Georgakopoulou (1997) drew attention to Greek–English code-switching in e-mails between intimates and style switches within monolingual Greek messages. With its focus on both code and style switches, it also was an example of a more holistic and inclusive view of linguistic diversity. Other examples of research at the turn of the millennium are illustrated by the studies included in Danet and Herring (2007). These studies on diverse contexts of multilingual language use online represent an important turning point in language-focused research because, as opposed to the Anglo-American bias mentioned above, they opened up research focused on the multilingual nature of the Internet.

Since data in these earlier studies comprised mostly text-based digital discourse, multimodality rarely featured as a focus of analysis. However, with the emergence of Web 2.0, and the diversification of possibilities of digital communication, in the early 2000s, multimodality started to attract scholarly attention, too (see Thurlow and Mroczek 2011). One example of this emergent interest was Lemke (2002) who emphasized “hypermodality” as a crucial aspect of hypertexts, giving rise to new semiotic politics in hypermedia design. Suggesting a semiotic scheme for the analysis of composite verbal–visual meanings, he highlighted the importance of investigations that focus on the interplay of verbal and visual resources, creating affordances for new forms of informational and design complexity. Other notable examples are the multiliteracies approach by the New London Group (e.g., Cope and

¹Note that Danet and Herring (2007) is an edited volume, an updated and upgraded version of a special issue in the *Journal of Computer Mediated Communication* published in 2003. Thus, it represents pioneering work done in the first years of the new millennium.

Kalantzis 2009) and Kress and van Leeuwen's work (2001) that emphasized the importance of looking at not only language uses but also other modalities. According to them, literacy – including digital literacy – should no longer be seen as mono-modal only, but plural (hence “literacies”), and that multimodality, especially visuality, needed to be taken seriously both in research and education as a crucial means for meaning-making and communication.

Major Contributions

What characterizes much of the current language-oriented work on digital discourse is an increasing focus on heterogeneity. Studies have shown how in some instances it can involve an overall switch to using a particular language, whereas in other contexts, it can manifest as a thoroughly enmeshed polyphonic style, involving features conventionally associated with different languages, varieties, or styles, in ways that are situationally motivated (e.g., Androutsopoulos 2011; Leppänen and Peuronen 2012; Lee 2015). From this perspective, multilingualism in digital social media cannot be seen as an exception but rather as an example of the “multilingual” nature of human communication in general (Androutsopoulos 2010, 2011; Leppänen 2012; Tagg and Seargeant 2014; Kytölä 2014).

A key scholar in this area is Jannis Androutsopoulos, whose prolific empirical work on computer-mediated communication, online communities, and social media, as well as his theorizations and methodological suggestions integrating insights from sociolinguistics, ethnography, and discourse studies, has played a crucial role in the development of the agendas and approaches in language-oriented scholarship on multilingual computer-mediated discourse. Androutsopoulos (2010), while empirically focusing on YouTube videos and their comments sections, is an insightful discussion of the intersections between “Web 2.0” affordances, increased (and more complex) participation frameworks, multimodality, and vernacular digital literacies. Androutsopoulos (2011) extends this discussion to multilingual language use, using the notion of *heteroglossia* to cover both multilingual (and stylized) language use and issues of multimodal design and layout that create increased affordances for participation in digital environments. His most recent work continues to discuss aspects of digital multilingualism, online participatory cultures, and networked multilingualism (i.e., being digitally connected to others *and* being in the web; Androutsopoulos 2015).

Although the educational potential of information and communication technologies and the Internet has been recognized from the 1980s onwards (see Warschauer 1997, for an early discussion of the role and value of computer networking for language education), work that has explicitly focused on multilingualism, literacies, and language learning has only recently started to gain more scholarly attention. An example of important work in this area is Eva Lam's research that has examined the multilingual digital literacies of immigrant teens in the United States. For instance, a study by Lam with Rosario-Ramos (2009) looks at how teens utilize various languages in their transnational, social, and information networks to create interactions, to maintain

social ties across and between various geographical locations, and to search for information from multiple sources. Their study shows how proficiency in multiple Englishes and in multiple languages, in general, is often key to participation in a global and networked society, suggesting that these multilingual literacy practices that are transnational in scope could help form educational practices that fully consider and embrace such resources, experiences, and knowledge.

Recent studies on digital multilingualism have also begun to pay more attention to multimodality as a dimension. For example, Lee (2015, 2017) has shown how people draw upon a wide range of multilingual and multimodal resources to project new global identities, also discussing the implications that such semiotic action has for education.² The work by Leppänen and her colleagues (e.g., Leppänen et al. 2014, 2017) has highlighted how communication in digital environments is increasingly characterized by both multilingualism and multimodality and how processes of recontextualization and resemiotization are recurrent digital activities in which semiotic material is circulated and resignified for different purposes and audiences.

In the field of second/foreign language teaching and learning, multimodality has also been recognized as something that both research and educational practices need to take seriously. For example, drawing on key works on both multimodality research and new literacies, Malinowski and Nelson (2010) give an informative overview of key advances in understanding multimodality as a crucial ingredient in all human communication and illustrate the complex interplay between language and multisemiotic composition in the context of a Japanese university student's digital storytelling.

In an orientation to online intercultural exchange they term "telecollaboration 2.0," Guth and Helm (2010) bring together chapters discussing a range of contexts and aspects of the deployment of Web 2.0 affordances and "new online literacies" (Guth and Helm 2010, p. 21) in educational institutions. Several of the chapters discuss telecollaboration 2.0 from the perspective of multimodality, while multilingualism features in some of them. For example, Steven Thorne, one of the key actors in this field, discusses in his chapter (2010) how social media activities can offer opportunities and incentives for intercultural communication and language learning. Such themes have been central in his work more generally (see also Thorne 2006), exploring, from a sociocultural perspective, various media technologies both outside and within formal educational settings and their affordances and challenges in connection with first/second/foreign language learning, multilingual literacy, and communication.

In this kind of work, what is often highlighted is students' active engagement with digital media that provide them with meaningful opportunities for communication, interaction, and identity work. Studies often make an explicit connection to the informants' out-of-school digital activities, but the main focus of research has primarily been on formal educational contexts, such as classrooms, schools, and

²These themes have also been addressed in collaborative work by Carmen Lee and David Barton.

teacher training. This is the case with Lotherington and her colleagues who have investigated practical means for redesigning multilingual and multimodal literacy instruction for linguistically heterogeneous urban classrooms, informing policy makers and contributing to theory (e.g., Lotherington and Jenson 2011). A similar interest in studying linguistically and culturally diverse students is illustrated in work by Ntelioglou et al. (2014) that discusses teaching approaches and practices which showcase the significance of multilingualism, multimodality, and multiliteracies in classrooms for the construction of students' identity positions as "experts" in their own right. In related research, Lytra (2014) has examined multilingualism and multimodality in relation to media engagement in classrooms, involving Turkish-speaking communities, paying attention to how students make use of, combine, and transform different sets of linguistic and other semiotic resources in their classroom activities, often with the help of a mobile phone. Her study emphasizes drawing conclusions on interactional, individual, and community levels as regards linguistic and cultural change: the students' heteroglossic performance highlights culture as a lived, transnational experience. In the Nordic context, chapters in Pitkänen-Huhta and Holm (2012) explore changing and complex literacy practices and their connections, from the highly local and situated to the global and mobile practices, thus highlighting literacy as a multiple, multilingual, multimodal phenomenon, constantly under negotiation.

Many studies argue explicitly that it is necessary to integrate young people's out-of-school digital literacy practices with formal educational agendas and practices. For example, Fraiberg (2010), in the context of the twenty-first-century composition, engages with multimodal–multilingual literacy practices across (un)official spaces, emphasizing the complex blending of multimodal/multilingual texts and literacy practices in teaching and research (see also the collection by Guth and Helm 2010). The resources students have, their ways of engagement with, and the availability of digital activities are not, however, always empowering or equally distributed. Studies have shown that, rather than being universally advantageous, digital activities can in fact be "partially complicit" in a "widening of the gap," whereby inequalities can be produced and processes of class reproduction can happen in home contexts in relation to new media resources (Lemphane and Prinsloo 2014; see also the introduction to and studies in Prinsloo and Stroud 2014).

Pedagogies that unproblematically assume equality of access, resources, and ways of engagement with digital activities can thus further enforce the disenfranchising of already disadvantaged students. In this respect, a study by Gachago et al. (2014) is particularly interesting as it provides insights into how pedagogies can directly tackle varied student positionalities. Their multimodal analysis of digital storytelling and "counterstorytelling" shows that pedagogies that build on and critically extend students' digital literacy practices can also provide them with means to challenge social and racial injustices. Their empirical context was a teacher education course in South Africa, on which notions of difference, dominance, and resistance to unequal structures were powerfully brought up via means afforded by digital multimodality.

Current research has thus displayed a growing awareness of the complexity of language use and literacies in digital environments, as well as of the potential they have in terms of formal education, while also highlighting the inequalities and divisions involved in digital activities both within and outside the contexts of formal education.

Work in Progress

An emergent theme in recent work is that digital discourse and literacy are not studied in isolation, rather digital and physical environments are seen as interwoven (see, e.g., Peuronen's research on Christian lifestyle sports 2013). A similar approach has also been taken up by Stæhr and Madsen (2015) in their study of the linguistic practices of a group of young rappers of migrant origin in both musical productions on YouTube and in their peer interactions. Their study also highlights the educational aspects of this cultural production as the mentors not only guide the young rappers in rap-related skills but also as regards their official educational development. Other examples of studies that span the on- and offline environments include the investigation of "Internet language" in physical public spaces and texts, such as multimodal and translanguaging signs (Lee 2015). The connected and networked nature of digital activities also shows in how transnationality and translocality of digital activities are recurrent themes in current research. Such a perspective appears, for instance, in Thorne and Ivković's (2015) investigation of the plurilingual commenting on the multilingual Eurovision Song Contest in YouTube, which forms a translocal, multimodal, and virtual linguistic landscape (see also Androutsopoulos 2010; Leppänen et al. 2014).

Creativity and playfulness also feature in ongoing work related to multilingualism and multimodality in digital environments. These qualities are highlighted in Ana Deumert's (2014) recent research in which she investigates multilingual digital writing in varied digital applications (such as SMS, e-mail, Facebook, tweeting, and Wikipedia) as a creative semiotic practice. Remixings, resemiotizations, and recontextualizations also illustrate current researchers' interest in playful and parodic activities and their social, cultural, and even political functions. For example, Koven and Marques (2015) have investigated heteroglossic, semiotic practices in the recontextualization of migrants' speech online, and Leppänen and Kytölä (2017) have looked at resemiotization as a resource for (dis)identification. Moreover, Rymes (2012) has examined the various semiotic affordances of YouTube as influencing young people's communicative repertoires in ways that have implications for multilingual and heterogeneous educational spaces (see also Knobel and Lankshear 2015).

A cursory (and by necessity not exhaustive) look at papers given in recent major international sociolinguistic conferences can also give some indication of current themes in the area of multilingualism and multimodality online. These include foci on the semiotics of constructions of identity, alterity, ethnicity, and gender (Tetreault, Maly and Varis, Peck), popular cultural activities in digital settings (e.g., hip hop (Westinen)), (re)constructions of humor and parody (Spilioti, Georgakopoulou, Leppänen), promotional digital activities (Vazou and Politis, van Nuenen and Varis), and out-of-school literacy practices and language learning (Taylor-Leech, Chau).

Problems and Difficulties

From an educational perspective, the intensive and sustained investment that many (young) people make in communication and activities in digital social media is something that clearly merits a reappraisal of the value and significance they can have more generally. As argued by Knobel and Lankshear (2010), participants in long-term committed cultural activities can develop into “professional amateurs,” with resources that enable them as legitimate and knowledgeable actors in participatory cultures or communities of practice. Why such resources can be particularly important has to do with the fact that they can become a form of expertise that is far from trivial or esoteric but that can actually constitute significant communicative resources in managing complex, late modern societies. For language and literacy education, this poses a new challenge, and opportunity, to revise their agendas: the emphasis laid on the role of communication in this picture suggests that networked communication is a central means through which such transformations of expertise can take place.

The way in which formal education can contribute to the further development of digitally literacies and multimodal practices is not, however, without its problems. Although activities and interactions in digital environments often entail a great deal of explicit instruction of, learning of, and socialization into particular language uses, styles, genres, and literacy practices (e.g., Leppänen and Piirainen-Marsh 2009; Kytölä and Westinen 2015), participants in such activities may themselves resist any institutionalized attempts at the appropriation of what they see as their own cultural, communicative, and literacy territory. The ways in which formal education can usefully intervene in such a territory is a matter of negotiation – whether or not and in what ways it can usefully build on the expertise students already have and enhance their capacity to apply it in communication in other settings – education, work, and citizenship, for example (for insightful suggestions, see Alverman 2015). Another challenge, already touched on above, that further complicates the task of educational policies and practices building on students’ existing capacities is the fact that digital environments are not free from divides. On the one hand, there are the haves and have-nots – those who have or do not have access to and means for digital participation. On the other hand, there are also second-level digital divides between the highly varied experiences and differences in participants’ resources and capacities that can reinforce further divisions between learners at particular intersections of class, gender, and ethnicity.

Future Directions

While non-Anglophone contexts have gradually become more prominent research foci, existing work still falls short of properly encompassing geopolitical peripheries such as the global South, where more striking digital divides may still be in place and the lack of access to technologies may have consequences in terms of educational opportunities, equality, and agency. Recent work that has begun, however, to cover this ground includes, for example, Velghe’s (2014) study of the potential of mobile

phones as a means for improving and expanding the literacy skills of women in a township in South Africa and Juffermans's (2015) investigation of multilingualism, local languaging, and literacy in the semiotic landscapes of Gambia.

Due to the increased and accelerated flows of migration and mobility on a global scale, research should pay more attention to migrants' multilingual and multimodal communications via mobile technologies as part of their trajectories, as well as the demographically, socially, and sociolinguistically complex and diverse settings in which many of them find themselves (see, e.g., Omerbašić 2015; Sabaté i Dalmau 2012). No less important topics for future research are the languages, literacies, and discourses with which identifications and disidentifications, springing from tensions related to migration, economic crises, violent conflicts, and various political, cultural, and religious polarizations, are articulated, debated, and countered in the discursive battlegrounds of digital environments. Such activities clearly call for more concerted research efforts from scholars of digital language and literacies.

For the purpose of sociolinguistic understanding and explanation of everyday language uses and literacy practices, digital media activities – in contexts where they are easily available and accessible – should also be taken as *one* of the sites of contemporary everyday life, to be investigated not in isolation as such but as connected and enmeshed with other facets of everyday life. For this purpose, multi-sited ethnography is needed as a perspective in order to fully understand and describe the multilingual and multimodal practices and communication of the youth (Peuronen 2013; Stæhr and Madsen 2015). Digital media should indeed be seen as responsive to, contributing to, and in interplay with “the world outside the web” – that physical and virtual settings are often intertwined and inseparable in young people's lives. This said, we should still welcome studies that, through close ethnographic, sociolinguistic, and multimodal analyses, trace the ways in which participants – in the confines of digital media sites – negotiate and craft their messages and meanings. Such analyses can highlight characteristics, patterns, and functions of language and other semiotic practices that are specific to particular genres and activities, while being interconnected with and responsive to messages and practices in other social and traditional media.

In the future, social media are likely to become an even more important venue for nonformal and informal learning in interest-driven, participatory cultures, in more organized communities of practice centering on joint enterprises, as well as in grassroots political action. For instance, collaborative crafting of materials for the purpose of informing and guiding others in their activities will provide an alternative to mainstream education, an education that is geared toward the needs and objectives of particular like-minded individuals and their shared, collective agendas. For example, the participatory Web 2.0 is populated by various resources for learning, e.g., “how-to-do-x” types of sites, Wikipedia-type entries, and instructional materials for people to educate others and themselves. Learning very specific literacies in different languages in the context of fan fiction or mash-ups are cases in point. The pedagogies involved in such activities often rely on interventions and playful modifications and, in so doing, encourage the kind of analytical and critical sensitivity that are at the core of formal education, too.

Cross-References

- ▶ [Ecologies of Digital Literacies: Implications for Education](#)
- ▶ [Elementary Language Education in Digital Multimodal and Multiliteracy Contexts](#)
- ▶ [Language and Identity on Facebook](#)
- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Multimodal Discourses Across the Curriculum](#)

Related Articles in the Encyclopedia of Language and Education

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Fandom and Online Interest Groups

Shannon Sauro

Abstract

Within the scope of technology for language education, fandom and online interest communities encompass a range of affinity groups in which individuals can develop skills and knowledge potentially supporting language learning or language mastery relevant to use in online and offline contexts. Initial work on online interest groups investigated individual and collaborative literacy practices and identity development among users of pre-Web 2.0 technologies such as Usenet discussions and personal fan websites. More recent research on online interest groups, language learning and use looks to the creative work and gameplay of international and multilingual users whose communities have flourished as a result of Web 2.0 technologies, including fanfiction archives, gaming forums, and wikis, and more general social media platforms. Altogether, studies of fandom and online interest groups within the area of language, education, and technology have revealed ways in which language learners and language users make use of these online communities for language learning, identity work, and the development of other skills and knowledge and which hold implications for the integration of technology and digital practices in language teaching.

Keywords

Fandom • Fanfiction • Identity • Collaborative writing • Web 2.0 • Twitter • Multiplayer gaming

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Introduction

Within the scope of technology for language education, fandom and online interest communities encompass a range of affinity groups in which individuals can develop skills and knowledge to foster their potential language learning or language mastery for use in online and offline contexts. Online fandom describes affinity groups comprised of fans, people who share a deep positive emotional and psychological connection to something or someone and who often engage in online fannish practices such as writing stories about the object of their interest (i.e., fanfiction), discussing their fan interests with others, or engaging in activism inspired by or in response to the person or thing they are fannish about (Duffett 2013). Online spaces have also been welcoming to the formation of other groups of users who may not share the same deep connection to a text or public figure that fans do but who instead come together to engage in shared practices or offer support around shared experiences. These online interest groups can include, for example, a Usenet group for Chinese students, scholars, and employees working and studying abroad in the United States (Bloch 2004), discussion forums for players of popular video games (Chik 2014), and coffee drinkers and appreciators who partake in larger conversations through use of the #coffeehashtag on Twitter (Zappavigna 2014a).

Taken together, educational research on fandom and online interest groups reveals ways in which participants make use of these online communities for language development, identity work (i.e., increased self-efficacy, confidence, social inclusion), and the development of other skills and knowledge, with implications for the integration of technology and digital practices in language teaching.

Early Developments

Initial work in online interest groups is exemplified by the early studies of Lam (2000, 2004, 2006) and Bloch (2004), who investigated individual and collaborative literacy practices and identity development among users of pre-Web 2.0 technologies.

In the first of these, Lam (2000) used a case-study approach to explore the language and literacy development and identify formation of a second language (L2) English learner, Almon, during 1996 and 1997. Almon, a youth who had emigrated to the United States from Hong Kong 5 years earlier, expressed fear about being marginalized as a result of his English skills. After an introductory course on email and Internet use, he began using these new skills to teach himself web design to create a fan page for a Japanese pop singer and thereby establish his presence as a member of an online fan community. Entry into this online interest group granted Almon access to a global network of fellow fans with which he was able to use and develop knowledge of the English of adolescent pop culture through instant messaging and regular email correspondence. Such involvement contributed to Almon's language and identity development by allowing him to overcome the exclusion and marginalization he often felt in formal classroom contexts, where his English skills had led to a feeling of alienation relative to his English-speaking US-born peers. In contrast, Almon's access to an online fan network of English language users allowed him to garner opportunities for English language use and to subsequently negotiate a new identity as a global English speaker.

Such identity negotiation via digital technologies and fan networks was explored further in another case study by Lam (2006) which followed the online fandom practices of Lee, whose family had moved to the United States from Hong Kong when he was nine. Like Almon, Lee's entry into online fandom took the form of the creation of a fan website, this time related to Japanese anime. While Almon's personal correspondence with fellow fans emphasized mutual interpersonal support, Lee's correspondence grew out of his sharing of links and offering of support for those interested in collaborative projects or web development. In his online global fandom community, Lee developed the reputation of being a helpful webmaster and fandom expert. As in Almon's case, Lee's online fandom identity validated his English language competence among a community of global English users. Additionally, his technical expertise was acknowledged in a manner not recognized in offline spaces. In both cases, these online fan communities provided L2 speakers of English and youth immigrants to the US alternative spaces for both language and identity development.

Lam's early work (Lam 2004, 2006) also explored language learning and identity development among L2 English users in online interest groups beyond those associated with fandom. This included virtual chatrooms frequented by L2 English speaking youth in the United States who engaged in valuable identity negotiation and English fluency development by interacting in hybrid or multilingual online spaces. Lam's focal participants, Tsu Ying and Yu Qing, were cousins who had emigrated from Hong Kong to the United States several years prior and who experienced social distance from their English speaking peers offline. Online, they regularly took part in synchronous chats with other ethnic Chinese from around the world who shared varying degrees of proficiency and comfort in communicating in English or hybrid forms of written Cantonese and English. The linguistic hybridity of these chatrooms served as a gateway toward greater ease and comfort in English language use since both girls were able to more easily carry out English conversation there without worrying about being embarrassed by their accent or accuracy. As a

result, they found themselves gaining confidence and using more English in offline interactions as well (Lam 2004). Much as Almon and Lee had done through their involvement in global online fandom, Tsu Ying and Yi Qing were able to develop their English competence and carry out identity work that resulted in greater access to, and a growing confidence in, their use of English.

Other early work on online interest groups also includes Bloch's (2004) investigation of the collaborative writing practice and development of hybrid rhetoric among a Usenet community for Chinese students, employees, and researchers in the United States. Bloch's analysis follows the mobilization of the members of this Usenet group in 1994 in response to a news broadcast featuring a prominent Chinese American newscaster on a major US television network regarding alleged Chinese spying in the United States. What began as a critique of the broadcast transformed into a collective written response as members of this community agreed that they had the same rights as US citizens to speak out. The resulting collectively written letter, detailing the potential harm of such stories for Chinese living in the United States, drew upon both Chinese and US rhetorical norms and granted members of this community the chance to write for an authentic audience.

Taken together, these early studies demonstrate the role of online interest groups that used computer-mediated communication environments common to the late 1990s and early 2000s to carry out important identity work, language development, and collaborative writing in a manner that enhanced or extended their competence and social involvement as newcomers to the United States and as L2 speakers of English offline.

Major Contributions

More recent research on online interest groups and language learning and use looks to the creative work and gameplay of international and multilingual users whose communities have flourished as a result of Web 2.0 technologies. As defined by Kaplan and Haelin (2010), Web 2.0 consists of online platforms in which "content and applications are no longer created and published by individuals, but instead are continuously modified by all users in a participatory and collaborative fashion" (p. 61). Web 2.0 environments encompass spaces such as fanfiction writing communities, forums dedicated to multiuser gaming communities, and even corners of social networking sites that have attracted online interest groups who often engage in play or the use of tags or in-group language to index their affiliation. Research on online interest groups and language learning in these areas has explored creative production of identity development, the use of online spaces to index global citizenship and multilingualism, the critique of gendered social expectations, and the mechanisms through which participants index their affiliation in a wider international network.

Within online fandom, the advent of Web 2.0 ushered in greater opportunities for the publishing and sharing of creative fanworks with a broad global audience. The most prominent of these fanworks, fanfiction, has been the subject of research on

identity construction and literacy development among L2 and multilingual writers. Fanfiction, defined as a type of creative writing in which fans remix, extend, or reinterpret an existing text or piece of popular media (Jamison 2013) and subsequently share, read, review, and critique one another's writing among a community of fans. The online publishing of fanfiction and the communal interaction around it was fostered by the establishment of fanfiction archives including the multifandom archive Fanfiction.net (FFN), founded in 1998. Adolescent fanfiction writing on FFN has been explored in several case studies which have focused not only on the literacy development of these young L2 writers but also on their use of the affordances of the fanfiction archive to manage and build identities around their writing (Black 2009; Thorne and Black 2011). A key feature of the fanfiction published to FFN is the Author's Notes, which accompany each story and which authors use to communicate additional information and requests to their readers. Such was the case with one writer, Nanako, who first used the Author's Notes to communicate her novice writer and new fan status in her earliest piece of fanfiction (Black 2006) and used these same Author's Notes to disclose other aspects of her cultural and linguistic background (i.e., that she was an L2 speaker of English, that she was of Asian heritage) as a way to negotiate the type of responses or feedback she was open to receiving from her readers with respect to her writing style and the content of her stories (Thorne and Black 2011).

The use of the affordances of the fanfiction platform and the community norms of fanfiction writers and readers to negotiate aspects of L2 writer identity was also employed by two other fan writers, Grace and Cherry-Chan (Black 2009). As these L2 writers of English became more established in their fanfiction communities, they also began emphasizing the multilingual and global aspects of their identity in the themes or language incorporated into their fanfiction stories. This included, for example, use of Romanized Mandarin Chinese (*Hanyu Pinyin*) and Romanized Japanese (*Romaji*) to incorporate song lyrics and dialog from Mandarin and Japanese as a way to index their language background, multilingualism, and knowledge of multiple cultures within the FFN international online community. Similarly, the use of multiple languages in stories written by young Finnish fans of both Japanese anime and US television programs revealed the writers' fandom affiliations, which they indexed through the use of language associated with the fandom source material (Leppänen 2009). Finnish fanfiction authors also displayed translocal identities in the case of bilingual stories written in both Finnish and English (Leppänen 2007).

Beyond providing authors with a space to develop their writing skills and index their affinity with a global community, online fanfiction communities have also provided young and developing writers a space in which to confront or challenge identify conflict and the social issues they face offline. Leppänen's (2008) investigation of young female Finnish authors of Mary Sue fanfiction, a type of self-insert fanfiction in which the author writes herself into the story as an original character (a Mary Sue) is one such example. In this study, these young authors used Mary Sue fanfiction to explore nonsexualized and often humorous romances that challenged the dominant sexual identity scenarios regarding young women's sexuality within Finnish society.

Like fandom, online gaming represents another area around which online communities have formed using Web 2.0, which have served as a source of L2 learning and socialization. While research exploring links between digital games and language learning has more often focused on language learning during gameplay or aspects of game design thought to be most beneficial for language learning, a select group of studies has looked at L2 learning and use on game external web sites and forums developed to support gameplay. Thorne et al. (2012) investigation of 64 Dutch and American *World of Warcraft (WoW)* gamers brings together both strands of research through its complexity analysis of language produced during gameplay as well as its use of questionnaires and interviews to uncover sites and communities gamers regularly visited to support their gameplay. All respondents indicated frequent use of these external *WoW*-related websites to find information on strategy, lore, and weapons before, during, and after gameplay session, leading Thorne et al. (2012) to conclude that game external sites were crucial to the gaming experience. More importantly, however, the three most frequently visited sites consisted of one fan generated wiki and two sites that included extensive fan forums, highlighting the relevance of an online community for creating, sharing, and discussing these resources as part of gaming (see also Thorne 2012, for a discussion of *WoW*-related fanfiction).

Game external sites that hosted discussion forums were also integral for both gameplay and language learning in Ryu's (2013) investigation of nonnative English speakers who engaged in English language learning through participation in online game culture. In this study, Ryu relied upon the unofficial fan-based website Civfanatics.com for the game *Civilization* to recruit participants. At the time of the study, this fansite was home to over 50,000 members who could contribute to a wiki and interact and collaborate with one another via moderated forums. Ryu's participants revealed a strong connection between their gameplay and language learning and the reliance upon this online community to foster both. In particular, while gaming was determined to be useful for the development of English words and phrases or knowledge of history or geography, interaction with peer gamers in the community of Civfanatics.com was valuable for the development of discourse level English skills.

The significance of these online communities for gamers who frequently gamed in their L2 was further explored by Chik (2012, 2014), who investigated the L2 learning practices of a focal group of online gamers from east Asian contexts (China, Malaysia, and Hong Kong) and who regularly played games in either English or Japanese. Gamers acknowledged relying on forums and the online community for developing both the gaming skills and linguistic knowledge needed to play in an L2. This included, for example, resources provided by more experienced gamers on language learning practices, or links to related games that used simpler English for those interested in developing their English skills. Some gamers were also active in using their language skills to provide amateur translations of the games into their L1 before official versions were released (Chik 2014). This practice is similar to that of fan-subbing, amateur subtitling of television shows and movies that teams of fans produce before an official version are made available (Pérez-González 2006, 2007). Taken together, gaming communities and associated websites provide L2 speakers support and opportunities for autonomous language development and target language practice.

While the affiliation of online communities around fandom and gaming often intersect and share often very visible affiliations related to popular media, a third type of online community includes those that emerge from the affordances of the specific Web 2.0 applications. Here, affordances are defined as “. . .users’ interpretation of what is made possible by the technology, based on their own technical competence and communicative intent” (Tagg and Seargeant 2014, p. 165) and include such things as a specific interest on Twitter (Zappavigna 2014a) and the degree of openness and language choice in personal profiles on Facebook (Lee 2014).

Another form of affiliation through communication-like exchanges that do not involve direct interaction between individuals but instead rely on shared and solidarity-invoking practices is also prevalent in social-media based online interest groups (Zappavigna 2014b). In her study of the Coffeetweets corpus, a subcorpus of the HERMES corpus, which consists of tweets containing the string “coffee,” Zappavigna (2014b) explored how users of Twitter formed a community around their shared interest in coffee through the use of the #coffehashtag. Similarly, language choice can be another solidarity-invoking practice that has been explored, this time among bilingual users of other types of social media. Lee’s (2014) study of the techno-linguistic lives of bi- and multilingual undergraduates from Hong Kong documented the online and offline interaction behind language choice among these users on different social media platforms. For instance, the decision to use English in Facebook comments but not in public discussion forums was tied to participants’ real-world identities or affiliations. For example, using English in the more private and personal space of Facebook comments allowed one user to foreground his identity as an English major among his friends and peers, but his concern over his insufficient English knowledge led to the avoidance of English in a more public online space where he might be judged for making a mistake. In another case, the use of Mandarin Chinese and the avoidance of English in online forums predominantly populated by users from mainland China was a way for one student to index his Chineseness without revealing his Hongkongness, an affiliation that would be given away through Chinese-English codeswitching.

These major contributions include research into online affiliations that arise from shared interests in popular media and gaming and which result in fanworks that transform the original source material (e.g., fanfiction) or the sharing of information and strategy for the purpose of deeper engagement in gameplay. In addition, such research also includes studies that examine affiliation that is indexed by the awareness of the affordances (and constraints or inhibitions) of different social media platforms and communities.

Work in Progress

Building upon the major contributions in this area are several different types of works in progress that look more closely at language learning as a result of ambient affiliation in social media (Solmaz [under review](#)) or which attempt to bridge the

literacy practices employed in online fandom spaces with literacy development in classroom contexts (Sauro and Sundmark 2016).

Employing an auto-ethnographic approach in which he was both researcher and informant, Solmaz (under review) documented his use of Twitter hashtags to make use of ambient affiliation for the purpose of developing his Spanish language skills. Using multiple methods of data collection, including a journal, recordings of formal Spanish lessons he took during this time, screenshots of Twitter conversations he had with fellow Spanish speakers, and the collection of Tweets he produced, Solmaz identified several patterns in his own practices to garner opportunities for interaction in Spanish. This included the use of specific and popular hashtags to join active conversations about Spanish football (e.g., #UCL, #AtletiBarca), hashtags to engage in talk about celebrations or losses at individual and national levels (e.g., #FelizSabado to wish a friend a happy Saturday; #11M10Aniversario in remembrance of the 10th anniversary of the bombings in Madrid), and to a lesser extent, the use of hashtags to index memes or jokes (e.g., a hashtag that mixed Turkish and Spanish to share humorous observations about Turkish culture). Solmaz's work, therefore, represents an in-depth look at how an autonomous language learner takes advantage of the affordances of Twitter, in this case hashtags, to successfully gain access to speech communities in his target language.

Taking an opposite approach and beginning first by observing the literacy practices of online fandom to inform the design of a task-based project for advanced English language learners, Sauro and Sundmark (under review) incorporated collaborative blog-based fanfiction writing into a literature class for preservice secondary school English teachers in Sweden for the purpose of both language and literary development. The design of this fanfiction project was modeled upon blog-based role-play fanfiction found in the Harry Potter fandom on LiveJournal (Sauro 2014). Students were self-organized into small groups of 3–6 and given instructions to write a missing moment from Tolkien's *The Hobbit*, a required text for the course. To foster discussion and collaboration, each group member took ownership of and was responsible for writing six paragraph-length contributions to the group's story from the perspective and voice of a specific character from *The Hobbit*. This required careful reading and discussion of the text to identify a plausible missing moment from the story that would not interfere with the rest of the narrative as well as careful attention to language choice and characterization to capture the voice of each character and Tolkien's writing style. Sauro and Sundmark's work therefore represents analysis and incorporation of online fandom literacy practices to inform classroom activities that draw upon real world creative language use.

Problems and Difficulties

As with all research that explores naturally occurring data and existing communities in online contexts, research on online interest groups poses a number of ethical challenges and difficulties. In addition, researchers and teachers who wish to explore

online fandoms and fan communities must also be mindful of engaging with a subculture that may feel particularly threatened by exposure to or invasion by more dominant mainstream perspectives (Duffett 2013).

Page et al. (2014) identify several major areas of concern when conducting research on social media. Many of these challenges stem from the difficulty of distinguishing what is public, private, and semi-private data in these online spaces and the degree to which online discourse is to be treated as decontextualized text or to be treated as inextricably connected to a person and therefore subject to the same need for consent and anonymity. The former challenge reflects not only the many various entry conditions and affordances of social media sites (e.g., a Twitter account can be set to public or private) but also the various perspectives among the social media users themselves. This can be seen, for instance, in online fandom members' responses to actors being asked to discuss fanfiction about characters they portray in television and print interviews (e.g., Minkel 2014, October 17). Although such fanfiction is available on technically public archives that can be viewed by anyone, many who publish in these archives consider them a semi-private space and therefore perceive the reading of fanfiction out of context to be a violation of local community norms that envision a wall between mainstream media and fandom (see, for example, the roundtable discussion in a fan podcast on fan perspectives and the fourth wall: *By Fans For Fans*, 2014, July 1). The latter challenge, that of distinguishing between the text and the individual, is of particular salience in light of research that shows the extensive and valuable identity work that youth and language learners engage in through the texts they produce online (e.g., Black 2009; Lam 2000, 2004, 2006; Leppänen 2008).

In addition, researchers must also be aware of and contend with the restrictions articulated in the terms of service of social media sites and which limit how and what kind of data researchers are permitted to collect and analyze (Page et al. 2014). A further challenge stems from the ephemeral nature of online data and what to do when online data are deleted or made private by an individual, communities, or through changes to the social media platform.

An additional challenge with a possible set of solutions is the degree to which applied linguistics research into online fandom is willing to be influenced by fandom studies and the practices and concerns fan studies researchers regularly grapple with. Duffett's (2013) introduction to the study of media fan culture identifies several areas of tension that have arisen when fans and fan communities have been the subject of research or public scrutiny. This includes, for instance, the historical tendency in the media and sometimes in psychology to pathologize fan behavior and to exploit such negative perceptions for the purpose of increasing readership/viewership and profit. Such treatment can make members of online fan communities particularly hostile to outsiders wishing to seek permission to research fans or their digital literacy practices. Duffett (2013) recognizes the positive contributions of fan scholars, those who are both fans and researchers, who have drawn upon their own familiarity with media fan culture to approach fandom in a manner that is respectful and fan-positive and who therefore can serve as models for other scholars carrying out research on fan communities.

Future Directions

Within the domains outlined above – fandom, gaming, and online interest groups – language learning and identity and literacy development have primarily focused on the practices of young people, often teenagers or university-aged students. Such a focus has shed light on practices of particular relevance for youth, for instance, how ESL students in the USA make use of online communities to negotiate alternate identities to that of English language learner and new and greater opportunities for English language use than may be available to them in offline classroom contexts (e.g., Black 2009; Lam 2004). However, autonomous online language learning and participation in online interest groups are not merely the domain of youth. Future research on older fans, gamers, and social media users who do so in a second language or for the purpose of broadening their literacy skills in their first language (e.g., middle aged fans of a television show who begin writing fanfiction as training for writing original fiction) represents a rich area for exploring lifelong autonomous learning and literacy development.

In addition, the formation of intentional online interest groups for those seeking alternative spaces represents an area where innovative practices in language socialization and language use could expand. This can be seen, for example, in numerous online fandom groups that provide fans with communities for exploring alternative interpretations of popular media as a way to address social and identity issues among marginalized groups, including those that relate to gender and sexual orientation (Duffet 2013). Such exploration often takes place in the writing and reading of fanfiction in which familiar characters (e.g., Sherlock Holmes) are depicted as having a different gender, race, or sexual orientation vis-à-vis their portrayal in the original media, thereby allowing fans to depict themes or issues that may not be present in the source material. An additional example involves the negotiation of fandom community norms around pronoun use. In online discussions and on fans' profiles on social media sites, there is a growing awareness of the responsibility to be inclusive of the needs and experiences of those who identify as transgender or genderqueer (Thorne et al. 2015). These online fandom practices present rich areas for exploring the way in which language and literacy practices are used to critique or reinforce dominant discourses around identity within a global online interest group.

Cross-References

- ▶ [Digital Games and Second Language Learning](#)
- ▶ [Identity in Mediated Contexts of Transnationalism and Mobility](#)
- ▶ [Language and Identity on Facebook](#)
- ▶ [Second Language Writing, New Media, and Co-Construction Pedagogies](#)
- ▶ [Twitter and Micro-Blogging and Language Education](#)

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Language and Identity on Facebook

Brook Bolander

Abstract

As a site catering explicitly to the maintenance and construction of personal relationships, social networking site (SNS) Facebook provides its users with a wide range of spaces and means through which they can construct and perform their identity. Despite technological advancements, including a notable and progressive shift to increased multimodality, language remains central to these practices. It constitutes a key way through which one can “type oneself into being” (Sundén 2003, p. 3). This chapter provides an overview of sociolinguistic research on language and identity on Facebook. In addition to delineating the rise of SNSs and research on identity in SNSs, it reviews major contributions to the study of language and identity on Facebook, outlines work in progress, addresses major research challenges and difficulties, and provides an outlook to future research.

Keywords

Social network sites • Facebook • Identity • Online-offline relationship • Web 2.0

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Introduction

Early research on identity tended to conceptualize online communication as separate, disembodied, and less “real” than offline communication, with means of identity construction typically being explained through recourse to the medium, particularly anonymity (e.g., the criticism of early approaches in Thurlow et al. (2004), Androutsopoulos (2006), and Page (2012)). While sociolinguistic research on identity was rare (Androutsopoulos 2006), its upsurge in the mid-2000s was accompanied by a progressive shift to a view of online identity as “multifaceted and interwoven with identity construction offline in complex ways” (Bolander and Locher 2015, p. 105).

As a site catering explicitly to the maintenance and construction of personal relationships, the social networking site (SNS) Facebook provides its users with a wide range of spaces and means through which they can construct and perform their identity. Despite technological advancements, including a notable and progressive shift to increased multimodality, language remains central to these practices. It constitutes a key way through which one can “type oneself into being” (Sundén 2003, p. 3). This chapter provides an overview of sociolinguistic research on language and identity on Facebook. In addition to delineating the rise of SNSs and research on identity in SNSs, it reviews major contributions to the study of language and identity on Facebook, outlines work in progress, addresses major research challenges and difficulties, and provides an outlook to future research.

Early Developments

The Rise of Social Networking Sites

The emergence of SNSs needs to be contextualized within a broader development from Web 1.0 to Web 2.0, or a shift towards “the social web,” which is characterized by increased dynamism, participation, and interaction (Zappavigna 2012, p. 2). Following boyd and Ellison (2007), SNSs can be defined as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system.” SNSs, in other words, reflect “a shift in the organization of online communities” from communities centering on interests to platforms “organized around people” (boyd and Ellison 2007). Moreover, many of these serve to “support pre-existing social relations” (boyd and Ellison 2007) and are thus substantially different from the anonymous environments studied in early research on identity online.

The first SNS, [sixDegrees.com](http://sixdegrees.com), was launched in 1997, yet the majority of SNSs emerged from 2003 onwards, for example, MySpace in 2003, Flickr and Facebook (the Harvard-only version) in 2004, YouTube and Facebook (for high school networks) in 2005, and Twitter and Facebook (for everyone) in 2006 (boyd and Ellison 2007). Indeed, “[b]y the end of the first decade of the 2000s, social network sites had become an integral part of modern life the world over, and figured as paradigmatic examples of the increased social-orientation of online activity” (Seargeant and Tagg 2014, p. 2).

Research on Identity in SNSs

Scholarship on SNSs goes back to the early and particularly mid-2000s, a timeline which reflects the upsurge in the sites themselves, with major early research topics being “impression management and friendship performance, networks and network structure, online/offline connections, and privacy issues” (boyd and Ellison 2007). An early focus on identity construction in SNSs is not surprising given that SNSs, or “networked publics,” (boyd 2010) cater to the development and maintenance of personal relationships. Such early research includes boyd’s (2004) article on identity in Friendster; Donath and boyd’s (2004) research on social connections and links to identity in Friendster, Orkut, Tribe.net, Ryze, and LinkedIn; and Donath’s (2007) application of signaling theory and its implications for identity construction in SNSs (cf. also the list of early research on impression management in boyd and Ellison 2007). Scholarship on identity in SNSs has continued to proliferate, as evidenced, for example, by edited books devoted to the subject (cf. e.g., Papacharissi 2010).

Research on identity construction on Facebook emerged slightly later, since Facebook only became publicly available in 2006. As with other SNSs, identity and impression management were important early themes. Indeed, Facebook provides numerous options for identity construction. These include a profile page, where Facebook users engage in labelling and description practices through which they share information about themselves (e.g., age, sex, relationship status, schooling, and educational background), a profile picture (or cover photo post-2011), photo albums, and a wall (pre-2011) or timeline (post-2011) where they write or post photo/video status updates (prompted by a system message “What are you doing right now” pre-2009 and “What’s on your mind” post-2009), perform other activities (like sharing music, YouTube clips, and videos), and interact with their Facebook “friends,” for example, by commenting on status updates. Importantly, as this list implies, language is a key means through which an individual performs and constructs his/her identity, and it is through the use of language (in combination with audio-visual practices) in these different spaces and over time that a discourse centered on the Facebook user emerges.

Notable early publications on identity on Facebook include Walther et al.’s (2008) paper on the collaborative nature of Facebook and ties to impression formation and impression management; Zhao et al.’s (2008) study of implicit and explicit processes of identity construction in the Facebook accounts of 63 university students; and

Papacharisi's (2009) comparative paper on Facebook, LinkedIn, and ASmallWorld, which addresses ties between the architecture of these sites and identity and community.

Major Developments

In one of the first linguistic studies of language and identity on Facebook, Bolander and Locher (2010, p. 169) maintain that the “[l]iterature on Facebook thus far has tended to come from communication studies, sociology and network studies. Linguistic interest has been relatively limited”. However, since then, there has been an upsurge in (socio)linguistic research on language and identity on Facebook, mirroring a general rise in research on language and identity in various other online environments.

Major contributions to the study of language and identity on Facebook include Bolander and Locher (2010, 2015), Lee (2011), Page (2012), Barton and Lee (2013), West and Trestler (2013), Deumert (2014), Lee (2014), Leppänen et al. (2014), Locher and Bolander (2014, 2015), Page (2014), and Koteyko and Hunt (2016). Common to these contributions is an approach to identity as a multifaceted and multi-layered performance and as emergent online when individuals use language and other modes to engage in interaction. In this vein, Lee (2014, p. 91), for example, refers not to “identity” but to “identities” in the plural; Bolander and Locher (2015) to identity as “acts of positioning” and Leppänen et al. (2014, p. 112, emphasis in original) to identity as “acts and processes of *identification* and *disidentification*.”

Identity construction is conceptualized as a process, which is continuously enacted when Facebookers go onto their Facebook accounts and, as stated under “early developments” above, intricately linked to the individuals’ offline lives and identities. This process begins the moment a user establishes a Facebook account, as s/he is encouraged to complete information about him/herself, for example, his/her date of birth, relationship status, work and education, and hobbies. The majority of this information is provided through written language, e.g., through the act of writing short entries about one’s political and religious views, through copy/pasting links to groups or one’s personal homepage or choosing from a list of pre-determined response options pertaining to one’s relationship status – “married,” “single,” “engaged,” etc.

While the “About” section prompts individuals to complete templates containing information about themselves, on the remainder of the wall/timeline, Facebookers are comparatively unconstrained with respect to what they want to post and how they want to post it. Bolander and Locher (2010, p. 178) refer to this as “[c]reative language usage.” This creativity is underscored by Lee (2011) who adopts a virtual ethnographic approach to study the status updates and online profiles of 20 Cantonese-English bilinguals in Hong Kong, notably to analyze the “primary communicative functions” of the status updates and how they are “embedded meaningfully and creatively in the everyday lives of Facebook users” (Lee 2011, p. 111). Her comparative analysis of the primary communicative functions of the status updates in

connection with the 2009 shift in status update prompt (from “What are you doing right now” to “What’s on your mind”) shows a “relatively high percentage of messages expressing personal opinions, judgments, or beliefs about themselves, other people, or events” (e.g., “Ariel thinks that no news is good news”, Lee 2011, p. 115, emphasis removed). Lee (2011, p. 115) interprets this finding as suggesting “that the participants often ignored the mechanical constraints imposed by Facebook.” In other words, even despite the presence of a prompt, individuals perceive the status updates as providing a social space for the performance of identity, as well as other types of interpersonal behavior.

As stated by Vásquez (2014, p. 67), there was a tendency in early research to prioritize profiles, typically considered the “backbone” of SNSs (boyd and Ellison 2007), and the major site for identity work. Yet existing research on language and identity on Facebook goes beyond an analysis of personal profile pages to examine identity construction through status updates (e.g., Bolander and Locher 2010, 2015; Lee 2011; Page 2012, 2014; Lee 2014; Leppänen et al. 2014; Locher and Bolander 2014, 2015); reactions to status updates (e.g., Page 2012; West and Trester 2013; Bolander and Locher 2015), alternate actions like “friending,” “liking,” or ritual acts like posting birthday messages (e.g., Page 2012; West and Trester 2013; Deumert 2014); and through multimodality (e.g., Deumert 2014; Leppänen et al. 2014). As the list of examples indicates, the tendency is for researchers to explore identity construction across different practices within the SNS Facebook. In this way, scholars attempt to take account of and do justice to the interrelatedness and convergence of the practices, spaces, and modes where and through which identities are performed on Facebook.

Bolander and Locher (2010) and Locher and Bolander (2014, 2015), for example, explore identity construction in personal profile pages, status updates, and reactions to status updates of ten Facebookers living in Switzerland and ten Facebookers living in the UK. Adopting a mixed qualitative and quantitative approach, they develop and apply a data-driven coding scheme to analyze the types of identity claims made in status updates. On the basis of the analysis of a corpus of 474 status updates, they determine that individuals most often use status updates to make claims about their personality, followed by their pastime endeavors, sense of humor, work, and relationships. For example, the status updates “Peter has lived miami to the fullest” and “Peter packs” are categorized as “pastime endeavours,” since in both instances, Peter underscores his status as someone who travels (Bolander and Locher 2015, p. 100). Through subsequent analysis of 228 reactions to status updates, Bolander and Locher (2015) are able to further show the tendency for the identity claims in the status updates to be supported in the reactions to them.

In addition to underscoring the creative use of language in various Facebook spaces, research highlights that a range of social and medium factors influence processes of identity construction. Writing about the emergence of sociolinguistic research on computer-mediated contexts, Androutsopoulos (2006) underscores a move away from first “wave” approaches which over-emphasize the medium towards research which acknowledges the interplay between technological affordances, like synchronicity and social properties, such as participant relationships. Sociolinguistic

research on language and identity on Facebook similarly underscores and analyzes this variety.

Thus, Page (2014), for example, draws attention to the role played by the medium factor of privacy as well as the social factors of participant relationships and audience in her study of identity and authenticity in connection with Facebook “frape,” a practice whereby a user hijacks another person’s Facebook account to, for example, write status updates (e.g., “I’m such a filthy girl when I’ve had a drink”, Page 2014, p. 58) or to change profile information (e.g., the person’s relationship status). In such instances, language is used to make identity claims about and in the name of someone else, which can be more or less “at odds with the victim’s ‘genuine’ identity” (Page 2014, p. 58). The technological affordances of Facebook are such that audiences who are typically separate outside of Facebook (e.g., work colleagues and family members) become a single group in the Facebook environment (Page 2014, p. 48), a factor typically referred to under the label of “collapsed contexts” (boyd 2008, p. 34). This effects how frapes are interpreted, with different types of addressees typically reacting differently to instances where expectations of authenticity are violated (Page 2014). Indeed, “[t]he audiences constructed in Facebook [...] blur the distinction between online and offline contexts, where the interactions online influence the identities and interactions that spill over into offline contexts” (Page 2014, p. 48). Through her analysis of examples of frape coupled with the use of interviews, and with reference to both “the technology and social setting” (Seargeant and Tagg 2014, p. 14), Page (2014) is able to demonstrate intricate links between authenticity and identity and to problematize these links with respect to the complex relationship between online and offline constructions of social reality.

Additional important themes in the literature on language and identity on Facebook are multilingualism and multimodality. The move towards research on these subject matters mirrors appreciation of the multilingual Internet (cf. Danet and Herring 2007) and recognition of the tendency for individuals to perform identity work and to engage in interpersonal behavior through various modes or channels, not solely language (cf. Bolander and Locher 2014). Multilingualism on Facebook has been studied in connection with code choice, code-switching, and code-mixing (see, e.g., Lee 2011; Barton and Lee 2013; Deumert 2014; Locher and Bolander 2014). Locher and Bolander (2014), for example, explore ties between identity construction and code-switching practices in a corpus of 474 status updates and 795 reactions to status updates produced by Facebookers in Switzerland and the UK. Their results demonstrate these ties with respect to differences between the two focus groups with the Swiss focus group projecting “a more multilingual group identity” (Locher and Bolander 2014, p. 172), as well as with respect to differences in degree and type of code-switching in the status updates compared with the reactions to status updates. While the status updates tend to be monolingual, the reactions are comparatively multilingual, a finding which the authors interpret as reflecting a decrease in the breadth of addressivity. In the small conversations between individuals which emerge as reactions to status updates, the interlocutors draw on the varieties they also use when interacting with one another offline, namely,

on Standard or Swiss German. In switching to these languages, they thus also “index closeness” and make “friendship identity claims” (Locher and Bolander 2014, p. 181).

While language remains central to the performance and construction of identity on Facebook, “[p]eople combine images and other visual resources with the written word online” (Barton and Lee 2013, p. 18). Indeed “[m]aking meaning through multimodal means is a way of positioning the self and others” (Barton and Lee 2013, p. 19). A prominent example on Facebook is the use of images. As shown in Zhao et al.’s (2008) study of implicit and explicit identity construction in a sample of 63 Facebookers living in the USA, individuals tend to use photos to index a group identity, even in profile pictures (with 31.1 % choosing a profile picture in which the user appeared with a friend/s). For the authors, “[t]he fact that the majority of the users chose either not to show their faces at all or to show their faces along with the faces of others in their profile cover picture is very revealing, indicating, among other things, an effort to construct a group-oriented identity” (Zhao et al. 2008, p. 1827).

Linguistic means for identity construction on Facebook are often also intricately interwoven with paralinguistic means like creative orthography and the textual performance of images. This is highlighted in Deumert’s (2014) research on the use of Facebook (and other SNSs) for the creative performance of a ludic self and for online play. For Deumert (2014, p. 27) such involvement entails “mobiliz[ing] [. . .] a particular type of self, as well as a particular set of social relations: light-hearted and creative, enjoyable and full of possibilities,” through “text, sounds, and images.” Posting happy birthday messages by drawing on different spellings or by drawing a birthday cake by using various symbols and letters on one’s keyboard, for example, constitute acts through which an individual not only performs “an important social ritual” but also a means to publicly show “one’s linguistic creativity and originality” (Deumert 2014, p. 36). For discussions of multimodality and the use of various linguistic, visual, and textual means to perform identity, see also Kytölä et al. (2014) and Koteyko and Hunt (2016).

Finally, the research highlights and presents evidence for the intricate links between offline and online, thereby challenging a clear split between the two (cf. also Jones 2004). This has both epistemological and methodological implications. In this vein, for example, Lee (2014, p. 94) argues for the importance of a “situated” approach. This can be interpreted with respect to the need to contextualize and analyze identity on Facebook within the SNS itself, i.e., across different spaces on Facebook and notably, with respect to how Facebook activities are situated in participants’ offline lives (see e.g., Lee 2011, 2014; Page 2012, 2014; Barton and Lee 2013; West and Trester 2013). Further, Barton and Lee (2013) and Lee (2014) introduce “techno-biographic” interviews as a methodology for studying the situatedness of Facebook practices. Inspired by narrative approaches to interviews, they combine a focus on linguistic practices on Facebook with an interview designed to delve into the participants’ “life stor[ies] in relation to technologies” (Lee 2014, p. 94). Part of the techno-biographic interview consists of a 30-min screen recording of the participants’ activities, which s/he subsequently views and discusses with the

researcher. This combination of observation and insider perspectives is argued to be “crucial” for studies of identity online (Lee 2014, p. 94; cf. also Barton and Lee 2013). The mixture of online observations with interviews and discussions with participants about their own practices is also compatible with the discourse-centered approach to online ethnography outlined in Androustopoulos (2008), and it mirrors an appeal for more ethnographic research on Facebook (West and Trester 2013) and in digital spaces more generally (Bolander and Locher 2014).

Problems and Difficulties

Two major challenges for research on language and identity on Facebook are methodological and concern ethics and access to data. There has been widespread change in ethical parameters, from a view which prioritized technical access to a site as the key determinant for whether informed consent was needed, to one which acknowledges that “public” and “private” can but need not overlap with “accessibility” (cf. Landert and Jucker 2011; Bolander and Locher 2014). For example, there are sites which are openly accessible online but which contain sensitive content or are run by minors, both factors which would prompt researchers to ask for consent. At the same time, technological parameters often provide a first starting point for ascertaining whether permission should be sought from participants. In other words, while numerous factors influence whether scholars seek informed consent from participants interacting in publicly accessible sites online, there is general agreement that when sites require registration, consent should be sought.

The comments by, and the practices adopted by, researchers studying language and identity on Facebook suggest that consent needs to be sought to study the Facebook accounts of individuals who are not public figures and with whom one has to become “friends” in order to access smaller or larger portions of their profile (in accordance with individual privacy settings). While it is relatively unproblematic for a researcher to ask an individual for consent to download parts of his/her Facebook account for research (cf. Bolander and Locher 2010; and West and Trester 2013 for ways in which this can be done), it is more challenging to deal with the scores of other users whose information one ends up downloading, too (e.g., in the comment sections) and from whom consent also needs to be sought. One possibility is to ask all participants for consent. Page (2012), for example, obtained written consent from each of the 100 participants whose profiles and status updates she archived (Page 2012, Page, personal communication), and she did not use or quote from profiles or status updates of individuals from whom she had not gained explicit permission. Another similar way is to only quote examples produced by participants from whom one has obtained consent and to use the other data, for example, as background information (cf. Locher and Bolander 2014; Bolander and Locher 2015).

A second methodological challenge is access to participants. Sampling strategies are evidently steered by research focus, as well as by feasibility. The two can also overlap. It is probable that interest in a particular phenomenon stems from observation

of that phenomenon, i.e., through one's use of Facebook or participation in a particular Facebook community of practice. Perhaps this is a key reason why many of the studies (which include information on sampling strategies) appear to focus on the practices of university students and staff (and potentially on their friends and families).

It is more challenging to get access to individuals with whom one does not directly have contact online oneself and to study how their Facebook practices are embedded in their offline lives, particularly, for example, if they live in different geographical areas from the researcher (does one travel to the site to do ethnographic fieldwork offline?), are part of a diaspora community (where should one study the situatedness of practices – in the “sending state” or “receiving state?”), or highly mobile (which geographical spaces are most relevant?). While online interviewing can offer a useful means of obtaining more detailed insight into participants' own perspectives on the social meanings of Facebook and the role of language, there are also many places where Internet connections are not stable enough to facilitate online interviews. Clearly there is no simple solution to the challenges of finding suitable participants. Yet scholars should be aware of and make explicit in their publications how and why they chose their particular group of participants and whether this choice was research-question driven, data-driven, convenience-driven, or a combination of the three.

Work in Progress

Since the early 2000s, there has been an increase in sociolinguistic research on language and globalization. This has been accompanied by an upsurge in new terminology, often lexicalized by the affixes “super” or “trans,” for example, “trans-idiomatic,” “translanguaging,” and “superdiversity” and by increased interest in “transnational spaces,” both offline and online. Underlying these terms is the idea that “globalization forces sociolinguistics to unthink its classic distinctions and biases and to rethink itself as a sociolinguistics of mobile resources, framed in terms of trans-contextual networks, flows and movements” (Blommaert 2010, p. 1). This interest is, for example, reflected in a recently published article by Schreiber (2015) entitled “‘I am what I am’: Multilingual identity and digital translanguaging.” The paper presents a qualitative case study of the multilingual practices and semiotic resources employed by Aleksandar, a student of English studying at a Serbian university. Drawing on observations and analysis of Aleksandar's Facebook practices, and a lengthy semi-structured interview held via Facebook chat, Schreiber (2015, p. 70) aims to “complicate our understanding of the relationship between first and second language identity, exposing the deep gap between students' lived literacy practices and the narrow conception of language use still widely held in language classrooms.” She thereby applies Canagarajah's (2011, p. 401) concept of “translingualism” or “the ability of multilingual speakers to shuttle between languages, treating the diverse languages that form their repertoires as an integrated system.” Schreiber (2015) then uses her results to reflect upon the

pedagogical implications for students and teachers learning/teaching English as a foreign or second language.

Future Directions

Much valuable research has been produced on the multifaceted nature of identity construction through language, through different languages, and through different semiotic resources, in various Facebook spaces, since the first upsurge of scholarship on language and identity on Facebook roughly half a decade ago. The geographical spread of this research has also been diverse, with scholars focusing on individuals living in various places around the world, for example, the UK (Page 2012; Locher and Bolander 2014, 2015; Bolander and Locher 2015), Switzerland (Bolander and Locher 2010, 2015; Locher and Bolander 2014, 2015), Hong Kong (Lee 2011, 2014; Barton and Lee 2013), South Africa (Deumert 2014), the USA (West and Trestler 2013), and Serbia (Schreiber 2015). It is my hope that this body will continue to grow, for example, through more research on Facebookers from backgrounds and age groups which have, to date, received less attention, for example, adolescents and elderly Facebook users, and Facebook users living in countries of the developing world. That this is a pertinent direction for future research is underscored by Dovchin, Sultana, and Pennycook's recent (Dovchin et al. 2016) paper on "Unequal Translingual Englishes in the Asian Peripheries," which uses Facebook in combination with other data obtained through ethnography to address identity construction amongst young adults in Mongolia and Bangladesh.

Future scholarship should also incorporate more diachronic and longitudinal research on change, including the effects of increased multimodality and modifications to the Facebook interface, for example, in the spirit of Lee (2011) and Page (2012), whose work includes analysis of the 2009 shift in status update prompt from "What are you doing right now?" to "What's on your mind?," and Koteyko and Hunt (2016), who conducted a longitudinal (4-month long) observation of 20 Facebook profiles in their study of health identities on Facebook. The progressive rise of Facebook via smartphone and via tablets (resulting from both the increase in smartphone and tablet usage and the launching of apps, e.g., the Facebook for iPhone App in 2008 and the Facebook for iPad App in 2011) warrants more research on language and identity construction on mobile Facebook, too.

Finally, what has not yet been studied is how processes of identity construction do not just straddle online and offline, or different spaces within Facebook, but also different modes of computer-mediated communication. Facebookers are constructing even wider networks across these modes, for example, through the use of tweets as status updates and through the sharing of YouTube clips or blog posts on Facebook. Such practices raise further questions about the boundaries and borders between identity construction on and across different digital environments, as well as about the social meanings and embedding of these practices in the offline lives of the users themselves.

Cross-References

- ▶ [Ecologies of Digital Literacies: Implications for Education](#)
- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Multimodal Discourses Across the Curriculum](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

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Part III

**Technology in World/Second Language
Education Contexts**

Distance Education for Second and Foreign Language Learning

Robert Blake

Abstract

Using technology to deliver second-language (L2) instruction is becoming commonplace, whether in support of traditional, blended, or fully online formats. This article provides an overview of best practices with these new digitally enhanced learning spaces that respond to greater student autonomy and the search for increased access to the authentic cultural materials for all world languages. Online language learning must also focus on the student's need to find a place in a multicultural, digitally infused world. In technological terms, the online formats for L2 instruction will continue to evolve rapidly, making the issues of teacher training in iterative cycles a pressing concern for any language program. If the online language field retains an emphasis on collaborative exchanges and co-construction of learning (i.e., the interactionist perspective), these new or yet-to-be imagined technical advances have the potential of being smoothly absorbed into a digital educational era that is here to stay.

Keywords

Blended learning • Computer-assisted language learning (CALL) • Computer-mediated communication (CMC) • Online learning

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Using technology to deliver second-language (L2) instruction is becoming commonplace, whether in support of traditional, blended, or fully online formats. These new digitally enhanced learning spaces respond to greater student interest in digital learning, the need for more schedule flexibility, the search for increased access to the authentic cultural materials for the world languages, and increased focus on student autonomy. Although many in the language profession still question whether or not online L2 learning can support the same type of linguistic interactions purportedly fostered in the classroom, the research on computer-mediated communication (CMC) has clearly documented developmental benefits. However, teachers require repeated training on how to best use these new online affordances and help in leveraging technology in service of the L2 curriculum. Cross-culturally perspectives also need to be reexamined with respect to online language courses because it should not be assumed that everyone interacts online in the same way and with the same cultural understandings and conventions. With respect to research, the field of computer-assisted language learning (CALL) has begun to move away from asking comparative questions such as which is better, in-class or online learning, to a more nuanced examination of the L2 processes that highlight how students use technology to further their L2 development. CALL is now framed in a much more multimodal context where learners enjoy greater agency and autonomy to produce language through digital forms. Today's student not only learns grammatical structure in a new language but also finds a place in this multicultural and digitally infused world.

Introduction

The use of technology to deliver second-language (L2) instruction is becoming commonplace in the foreign-language curriculum (Blake 2013), whether in support of traditional, blended, or fully online formats. This new practice constitutes a response to student demand for (i) greater use of a medium they find inherently attractive; (ii) more schedule flexibility unconstrained by time and place, and (iii) better access to the authentic cultural materials, especially for less commonly taught languages (LCTLs). The emphasis in education circles on more autonomous, student-driven, and constructivist learning environments has only reinforced these student preferences. Increasingly, our students have already entered the work force but still need to finish a degree or pursue continuing education. They might be simultaneously juggling school, work, and maybe even a family. While the needs of work and family tend to be relatively inflexible, school schedules offer the only component that can accommodate student life. Likewise, students are becoming increasingly aware of the importance of world languages such as Arabic, Persian, Hindi/Urdu, and Korean, to name only a few. Unfortunately, these languages are

infrequently taught on many college campuses. In the face of scarce resources for LCTL instruction and weak material response from publishing houses (it does not pay for them), administrators and teachers have turned to blended or fully online formats in order to enrich their language and culture programs. Nevertheless, many in the language profession question whether or not L2 online learning can support the same type of linguistic interactions purportedly fostered in the classroom through seat time, which has traditionally constituted the gold standard. Research in computer-mediated communication (CMC; see Blake (2016b) and Sauro (2009, 2011) for a general overview of CMC research) has partially addressed some of these fears by documenting the benefits derived from electronic exchanges among L2 students carrying out online tasks with other students or native speakers. However, teachers still require training in best online practice in order to take advantage of these new online affordances.

Early Developments

Previously, L2 online learning (what used to be referred to as *distance learning*) was delivered through multimedia sources such as CDs, DVDs, Internet links, and the use of electronic writing forums. Today's L2 online delivery typically takes place within a learning management system (LMS) such as Blackboard, Moodle, Brightspace (Desire2Learn), or Canvas. These platforms provide users with both asynchronous and synchronous communication tools, along with a reasonable amount of storage for PowerPoint Presentations, documents, files, Web pages, Internet links, and LTI (i.e., *learning tools interoperability*) extensions to other third-party applications.

Telecollaboration or tandem learning projects are commonly treated as a separate instructional activity that focuses on the development of intercultural competence between students with different L1 languages and lies outside the scope of this review (but see Guillén 2014; Belz and Thorne 2005; O'Dowd 2007). Telecollaboration may still require students to be physically present at a specific place and time to accommodate differences between overseas time zones.

Overall, the L2 field has produced relatively few empirical studies proving the effectiveness of online language learning in comparison to the performance in traditional classrooms. Early studies concentrated on evaluating hybrid courses, where only part of the curriculum is delivered in class while other tasks occur online. Understandably, the divergent array of tasks and curricular materials that each language course exploits poses serious challenges for carrying out a felicitous comparative study. However, the findings to date on hybrid courses suggests that students who learn language with an online component may develop their literacy skills to higher level than students just working in a classroom environment (Warschauer 1996). In a study sponsored by the US Department of Education (Allen and Seaman 2010), hybrid learning, without specific reference to a particular discipline, appeared to produce better student outcomes than any other formats, at least as measured by grades – “the best of both worlds: online and classroom.”

What language-specific comparative studies that do exist – Adair-Hauck et al. (1999), Blake et al. (2008), Chenoweth and Murday (2003), Green and Youngs (2001), and Grgurovic et al. (2013) – more often than not report no significant difference between the performance of hybrid/online and classroom learners. These studies appear to make the case that online learning can contribute to the student's L2 learning, but much depends on the learning environment, pedagogical materials, task design, administrative support, and individual differences among both teachers and L2 learners. Since most of these studies combine online instruction with face-to-face class meetings, it is difficult to generalize results to language courses fully implemented in an online format.

One of the primary worries that language teachers voice with respect to using technology to teach a L2 has to do with speaking: How can the use of the computer replace the face-to-face oral production that occurs in the classroom, along with all of the live interactions with the instructor, who represents the students' best or only model for correct usage? In the context of a fully virtual language course, this issue often becomes the main obstruction to granting online class credit; some faculty and course committees steadfastly refuse to accept online courses as equivalent to presential language classes. These doubts often arise because of lack of knowledge about the many speaking options offered by computer-assisted language learning (CALL) and the different learning components routinely designed into the online curriculum. These attitudes also reflect a belief that every presential class is a winner, in terms of pedagogy.

Most recently, video conferencing using a variety of Internet 2.0 communication tools (e.g. Zoom, Skype, Adobe Connect, Big Blue Button, to name only a few) offers real online opportunities for communication, even if this type of exchange cannot strictly be considered *equivalent* to face-to-face exchanges. Clearly, tangible L2 developmental benefits result from both activities (Blake 2016a, b). Videoconferencing gives students an alternative to the type of small-group speaking practice that is assumed to occur in the classroom but often does not actually take place given large class sizes and other practical classroom or personnel limitations.

Small-group videoconferencing – for example, one instructor working online with two to three students for an hour – allows for a far more intensive speaking experience than sitting in class and responding maybe two or three times in an hour. During the hour-long videoconference session, students are constantly taking turns speaking in the L2, which can be an extremely active and a rigorous speaking experience. Naturally, the instructor must prepare the conversational tasks ahead of time so that the students know exactly what to expect and are primed with the appropriate vocabulary and grammar constructions needed to bring the task to a successful completion. In this way, students can gradually build up greater fluency, reinforce vocabulary and lexical chunks, and smooth their discourse transitions – all of which are important components of speaking proficient. Unfortunately, speaking progress via videoconference is difficult to measure, partly because defining the basic construct of *speaking proficiency* is a complicated undertaking, whether in the face-to-face or CALL context (Hulstijn 2011).

Major Contributions

To date, only three studies – Blake and Delforge 2006, Cahill and Catanzaro 1997, Soo and Ngeow 1998 – have evaluated fully online language courses on the basis of empirical data. In all cases, online learners were found to outperform students from conventional courses on a grammar output measure.

Cahill and Catanzaro (1997) reported on an introductory online Spanish class that relied on materials from *Dos Mundos*, a popular introductory Spanish text, along with the accompanying audiocassettes and lab manual. Online activities included synchronous chat sessions, open-ended Web assignments, practice tests, and a substantial number of pen-pal letter writing assignments. Responses to two essay questions were used to compare the progress of students participating in the experimental group with that of students enrolled in conventional Spanish classes. Based on ratings of global quality and percentage error scores, the writing samples of students in the online course were judged to be significantly better than those from the traditional classes. Although not discussed by the authors, it seems clear that more writing was demanded of the online students, a fact that clouds to some degree the ability to isolate the effect that the online format had by itself on performance.

Soo and Ngeow (1998) compared the performance of 77 students enrolled in conventional English classes with 111 students who studied English exclusively through use of a multimedia computer-assisted language-learning (CALL) program. A comparison of pre- and post-Test of English as a Foreign Language (TOEFL) scores revealed that the students in the online group made significantly greater gains with respect to those who took part in conventional classes. In addition, given that the experimental group started studying 5 weeks later than students in the control group due to technical difficulties, it might be said that the online students not only made more progress than learners in the control group but also that their language skills improved more rapidly.

Blake and Delforge (2006) compared 21 continuing students enrolled in *Spanish Without Walls* (SWW) through a university extension using both quantitative output data (i.e., grammar tests and compositions) and qualitative measures (i.e., student surveys). SWW was a totally virtual, first-year Spanish course that combined a first-year CD-ROM packet (i.e., *Tesoros*, McGraw-Hill, 2001), Web readings with online content-based activities, and bimodal CMC (i.e., sound and text) in both a synchronous and asynchronous format. The data showed that students enrolled in the SWW course fared statistically better than the undergraduates enrolled in conventional introductory university Spanish classes in terms of grammatical accuracy. The authors speculated that the online format with its primary focus on textual input forced students to pay more attention to their textual output and, therefore, heightened their metalinguistic awareness (Schmidt 1990) of discrete grammatical contrasts. These results suggest that well-designed distance language instruction can offer a viable option for learners without access to the traditional classroom setting or for those who prefer the online learning environment to the conventional sit-down class format. However, again, the question of whether or not the SWW students developed the same oral proficiency as classroom students was left unanswered.

As in the case for the hybrid courses reviewed earlier, the outcome data from these three fully online L2 studies lend support for the notion that online language learning can be effective, at least as a means of improving writing, reading, and listening comprehension abilities. Nevertheless, determining which aspects of the online learning environment were responsible for these gains remains a daunting and perhaps insurmountable endeavor. Perhaps the online students had a higher engagement level with the texts themselves. More research will be needed to substantiate these initial observations, but the individual variables put in doubt whether or not the question could ever be resolved to the satisfaction of CALL researchers.

In recent years, the CALL field has shifted its research focus away from these comparative assessments plagued with uncontrollable factors towards an approach that delves more closely into how students actually use online materials and feedback in the course of improving their L2 competence. Heift's (2002, 2010) research, known in the field as ICALL or intelligence CALL, is representative of this new perspective that seeks to chronicle the learners' progress. In order to do this, a database sits behind the learning system tracking student responses and reactions to any feedback they receive. She found that 85% of her German students carried out their assignments without peeking at the answers, while the weaker students tended to be the most flagrant *peekers*. Her work also demonstrated that explicit feedback, including metalinguistic clues, had a positive correlation with improved student outcomes. These findings are consistent with an interactionist framework for L2 development, even when students are working individually with tutorial CALL activities. The interactionist theories of L2 development prominently feature notions such as the proximal zone of development, focus-on-form, negotiation of meaning, task-based learning, and pair work – all constructs that rely on harnessing the power of human interactions and appropriate feedback to stimulate language acquisition.

Another current line of investigation for online learning can be found at the intersection of task complexity and L2 development. Since oral production – and L2 proficiency, in general – is significantly affected by the complexity of any particular task (Robinson 2011; Skehan 2003), researchers seek to discover if the online affordances (i.e., Internet 2.0 tools) allow students more processing time in order to process successfully and carry out their assigned tasks with long-term memory benefits (i.e., true L2 acquisition). In a recent case study, Guillén and Blake (2016) found that one L2 learner's syntactic complexity and accuracy improved significantly by being able to post online asynchronously her *best-effort* videos as compared to what she was able to do when faced with the immediate pressures of speaking during a synchronous videoconference session.

In general, present-day implementations of online courses strive to combine both tutorial CALL programs and apps designed for individual study with synchronous CMC communication intended for use in group practice, drawing on interactionist theories about L2 development. The potential benefits of collaborative exchanges, whether set in the classroom or managed online orally or in writing, depend more on sound pedagogical design of the tasks the participants are asked to accomplish rather than on the actual locus of the learning event (Doughty and Long 2003; Kern et al. 2004; Salaberry 2000; Van Deusen-Scholl et al. 2005). In other words, people

working together perform better whether in a face-to-face or CMC environments, provided that the activities have been well thought out so as to stimulate maximum interaction among the participants.

Finally, fostering opportunities for L2 writing continues to be a fertile application in online learning environments. The act of both personal and collaborative academic writing, whether mediated or not by the computer, should ideally involve an iterative or staged process that constantly recycles analysis, design, development, implementation, and evaluation (Caws 2012). Obviously, CMC tools can be used to foster collaborate work and feedback at these various stages of the writing process, as Oskoz and Elola's (2014) study has illustrated. Writers, whether in their L1 or L2, seek to produce texts that are coherent, well-organized, rich in content (including a critical sense of multicultural knowledge in the case of L2 writing), appropriate with respect to rhetorical and genre conventions, and accurate with respect to linguistic and pragmatic norms. Clearly, these goals are a moving target where frequent revisions and rewritings are part and parcel of the process. Any digital tool that helps L2 learners engage in this process is bound to produce improvements over the long run, as long as learners are engaged in this iterative design process. A blog puts more emphasis on personal writing with the occasional reactions from other readers, while wikis or *Google docs* facilitate a more collaborative product. Today's digital tools combine aspects of both collaborative writing and reading (Blyth 2014), while also creating a sense of audience, which in turn, tends to stimulate more effort, if not better writing, from L2 participants (Yoon 2008; Oskoz and Elola 2014).

Work in Progress

Interest has also increased in using CMC as a way to link native and nonnative speakers in a growing variety of cultural exchange projects. In this context, CMC takes on a new meaning as a medium of socialization. This line of inquiry has been dubbed Internet-mediated intercultural communication in foreign language education (Belz and Thorne 2005). From this perspective, researchers concentrate on the importance of having online L2 learners develop sensitivity to one another's cultural identities and communicative styles. Proponents of this approach want their L2 students to reflect upon the fact that their own identity is culturally contingent on certain patterns of interactions (Kern et al. 2004). Researchers caution the field against viewing CMC as a simple tool-using activity in service of linguistic practice. They argue that participating in online interactions is not a culturally neutral endeavor but embedded in specific cultural and social norms that may or may not be familiar to all participants, L2 and native speaker alike (Thorne 2003). Accordingly, this more sociocultural approach seeks to examine the concept of digital literacy in a way that goes beyond the ability to read and write online: How do L2 learners co-construct their own online roles and identities? The end result is that L2 students are increasingly responsible for diverse representations of knowledge and learning (Van Deusen-Scholl et al. 2005), but, in many cases, participants will need

training in how to do this if the CMC exchanges are to be successful (Belz and Kinginger 2002).

On a completely different front, video gaming provides another venue where new technologies and CALL could possibly be harnessed for the benefit of L2 development (Thorne et al. 2009; Peterson 2013). Games foster role-playing and agency by allowing players to do something and construct meaning for themselves. Games make the users feel that they are being competent and independent problem solvers. Games encourage a participatory culture with different rates and learning paths in response to the gamers' interests and abilities. Within these designed experiences, the participants enjoy the freedom to fail with low risks, experiment, fashion imagined identities, exert varying degrees of effort, and interpret. However, there have been few experimental studies to date that examine how L2 learners fare within a virtual learning environment, which is a serious drawback to evaluating the appropriate place for video gaming in the L2 curriculum (Peterson 2013).

Problems and Difficulties

Implementing and evaluating online language courses represent two separate issues, each with their own respective challenges, as has been already mentioned above. To implement a language course in an online format, L2 teachers cannot simply clone existing print materials for the Web (Zhang 2014) or teach in ways familiar to past experiences. Careful attention must be paid to making the online activities as stimulating as possible as a function of the strengths of this particular medium. Zhang (2014) recognizes five characteristics that are key to successful online course design: (inter)active, constructive, intentional, authentic, and cooperative. For this reason, the creation of an online curriculum is both expensive (i.e., the Open University spends around 2 million dollars per course on an 8-year cycle) and time consuming – two facts largely ignored by administrators and departments. By and large, a content- or task-based approach (i.e., learning language through the study of a specific subject matter or through a series of real-world tasks) renders better results than the more traditional focus-on forms common to traditional grammatical instruction.

Likewise, administrators tend to see the online format as a solution to over-subscribed language classes. Large enrollments taught in the online format are just as difficult to manage, if not more so, than in classroom formats. Teachers of online language classes need to resist attempts by administrators to stuff their online classes with more students than is the norm for language classroom (i.e., around 25 students).

On the practical side of delivery, extensive user support is key to maintaining student interest and avoiding the frustrations that commonly afflict online delivery formats (Simpson 2000). It is wise to remember that roughly half of the enrolled online students are predicted to give up and drop the course (Carr 2000). It must be

realized that not all students are ready to work independently and take responsibility for the direction their own learning. No one is to be blamed when students are not ready to work within the parameters of a given learning environment, although some training is possible in all cases. Fortunately, LCTL students tend to already possess solid skills for working independently in a steady fashion, a fact that would favor the outcome of using online format for LCTL instruction.

The process of evaluating online courses encounters its own difficulties, as discussed above, beginning with the obvious fact that the students have only a virtual presence – they never see their instructor in person. Getting virtual L2 students to participate in pre-/posttests or evaluation instruments not related to the computation of their grade is not as easy in an online environment, compared to the captive audience that the presential teacher controls.

Perhaps the greatest hurdle to generalizing findings about online language courses is a characteristic shared with the realities of doing L2 research in general: inherently uncontrollable factors such as different instructors, different materials, different time on task, different tasks and activities, different students all with their own unique personality traits and cognitive endowments. With technology also involved, individual differences, which account for a major portion of the outcome variability, are just exacerbated since L2 learners mostly perform their assignments from their own respective home environments, which are all radically different. At the same time (and, unfortunately, for research purposes), allowing L2 learners to self-direct their own learning activities constitutes one of the major attractions of this learning environment. Similarly, longitudinal studies – which, again, are relatively rare even in mainstream L2 studies – are almost impossible to carry out in the online context where students are here today only virtually and gone tomorrow with the flick of the on/off switch.

Fortunately, the CALL field has mostly moved on from asking the overly simplistic question, “which is better, in-class or CALL L2 instruction and practice?” This issue cannot be answered without controlling for factors that are inherently out of the researcher’s hands.

In the best of circumstances, isolating the effects of the online format itself as opposed to those of the learning materials or individual differences is exceedingly hard to operationalize. Not surprisingly, the field has not made much progress on teasing these factors apart.

Future Directions

Just as the linguistic field is beginning to view L2 development in more sophisticated and integrated terms (for instance, learning vocabulary and collocations also implies syntax), the heavy emphasis on an approach that only considers the four skills (i.e., production, listening, reading, writing) is beginning to diminish. Likewise, CALL

practice itself no longer deals with digital writing as separate from reading nor implements speaking practice in isolation from listening. Speaking tasks will now involve listening and writing as well, as students produce and post their videos; listening will entail reading captions, linking to glosses, and reflecting on cultural differences; and writing will be carried out in stages that leverage collaborative chatting, wikis, videoconferencing, and repeated negotiations of their multicultural competence and linguistic proficiency. And, again, as the sociocultural theorists would remind us, none of these activities should be separated from the notion of multicultural competence and the construction of a bilingual identity – what Kramsch (2009) has called finding the third place vis-à-vis the L1 and the L2. CALL is now framed in a much more multimodal context where learners enjoys greater agency and autonomy to produce language through digital forms. Today's student not only learns grammatical structure in a new language but also finds a place in this multicultural and digitally infused world (Kern 2014).

Accepting that online formats have a significant contribution to make to the L2 curriculum will continue to be unpalatable for some in the language profession, especially given the fact that many teachers have an entrenched resistance to using technology or even fear that online instruction will eventually replace them. Higher education is beginning to reconfigure its delivery mechanisms in the face of new affordances, growing costs, and instructor shortages (as in the case of LCTL offerings), and the L2 curriculum will not be exempt from these trends. The field must experiment and plan for alternate delivery mechanisms if it is to have a significant say in how the L2 curriculum will be organized.

Further research is needed to demonstrate how synchronous CMC can help maintain high levels of conversational interactivity using the new generation of online communication tools. Similarly, more data should be gathered on how best to use new advances in videoconferencing so as to formulate guidelines of best practices for prospective online instructors who must be trained how to participate in these digital exchanges.

Finally, the field must provide online instructors and curriculum developers with more insights on how the CMC medium can be used most productively to foster intercultural contexts. Students and instructors alike should not assume that everyone uses chat in the same way and with the same cultural understandings and conventions (Thorne 2003, 2016). This realization opens the door to using CMC to construct and reflect upon one's own identity in a new L2 space, as both Kramsch (2009) and Kern (2015) have suggested.

In technological terms, the online formats for L2 instruction will continue to evolve rapidly, making the issues of teacher training in iterative cycles a pressing concern for any language program. If the online language field retains an emphasis on collaborative exchanges and co-construction of learning (i.e., the interactionist perspective), these new or yet-to-be imagined technical advances have the potential of being smoothly absorbed into a digital educational era that is here to stay.

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Open Educational Resources (OERs) for Language Learning

Carl S. Blyth

Abstract

The term “open educational resources” (OER) refers to materials used for teaching and learning that, unlike most materials produced by commercial publishers, carry an open copyright license. Because of its open license, OER give users’ rights traditionally reserved for authors and publishers, such as the right to adapt the original work and the right to disseminate derivatives free of charge. A global, grassroots phenomenon, the OER movement coalesced at the end of the twentieth century and the beginning of the twenty-first century when educators sought to create intellectual content that was accessible to the Internet public. Thanks to a democratic ethos that promotes the sharing of intellectual property, the OER movement has resulted in the collaboration between educational stakeholders, the creation of uniquely adaptable content, and the production of much-needed resources for less commonly taught languages that are frequently ignored by publishers. During the first decade of the OER movement, advocates focused on the development and dissemination of free materials to combat rising costs. During its second decade, however, the movement has begun to focus on empirical research to ascertain the impact of OER on student learning, including FL learning. In addition, open educators are beginning to explore different strategies for bringing OER into the educational mainstream.

Keywords

Open education • Open educational resources • Open educational practices

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Introduction

First coined in 2002 during a UNESCO meeting, the term open educational resources (OER) refers to openly licensed educational materials that allow end users' rights covered by copyright law, such as the right to adapt the original work and the right to disseminate derivatives free of charge. Plotkin (2010, p. 1) defines OER as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits sharing, accessing, repurposing – including for commercial purposes – and collaborating with others.” In contrast to the static nature of print materials, digital OER are increasingly produced in editable formats that make them better suited to the dynamic and emergent nature of language learning in informal, online environments. An extremely heterogeneous category, OER vary widely in terms of their pedagogical goals and uses: annotation tools, assessment instruments, language corpora, reference grammars, supplementary readers, textbooks, etc. (see examples at <http://nflrc.org>). In addition, OER are diverse in terms of their size and sophistication (Weller 2010). Despite these differences, however, OER are all distinguished by an open copyright license that allows users' rights traditionally reserved for authors and publishers.

Early Developments

OER are the concrete products of open education (OE), a global, grassroots movement that coalesced at the end of the twentieth century and the beginning of the twenty-first century. OE is a collective term that refers to the advancement of education through “open technology, open content and open knowledge” (Iiyoshi and Kumar 2007). Viewed in its historical context, OE is an extension of the open-source movement whose revolutionary idea was to give software developers free and open access to source code (Perens 1999; Raymond 2001). Concerned that the rising costs of tuition and textbooks were shutting out potential students, educators sought to open up access to educational content as a means of democratizing the system. Consequently, educators began to envision pedagogical materials as learning objects that could be designed to foster adaptation by subsequent users. Richard Baraniuk,

a professor of computer engineering and a leading figure in the OE movement, sums up the paradigm shift in terms of a set of widely shared values and beliefs.

The OE movement is based on a set of intuitions shared by a remarkably wide range of academics: that knowledge should be free and open to use and reuse; that collaboration should be easier, not harder; that people should receive credit and kudos for contributing to education and research; and that concepts and ideas are linked in unusual and surprising ways and not the simple linear forms that today's textbooks present. OE promises to fundamentally change the way authors, instructors, and students interact worldwide. (Baraniuk 2007, p. 229)

One of the precursors to the OE movement was the UK's Open University, established in 1969 as a distance learning institution with minimal entrance requirements (<http://www.open.ac.uk/>). Today, millions of people from all over the world access the Open University's online content on a daily basis. Another early example of OE is the open courseware initiative (OCW) that started at the Massachusetts Institute for Technology (MIT). In 2000, MIT faculty proposed that their courseware (e.g., syllabi, exercises, lectures, etc.) be placed online and be made available to the public. Two years later, MIT launched a website that contained open content from 50 courses. Today, according to the OCW website, the entire collection of MIT courseware is open to the Internet public (<http://ocw.mit.edu/index.htm>).

As the OE movement took shape, it became apparent that the rise of informal learning on the Internet required a new generation of flexible materials. Soon, open educators began to think in terms of "open content" and "open design" (Conole 2013), and in 2002, the term "open educational resources" (OER) was coined during a UNESCO meeting of the Forum on the Impact of Open Courseware for Higher Education in Developing Countries (Johnstone 2005). Soon thereafter, the new term was employed by the Organization for Economic Co-operation and Development (OECD) (<http://www.oecd.org/>). Thus, the general concepts of open content and open courseware gave rise to the more specific concept of OER. Today, the distinctive feature of OER is the open copyright license that promotes "4R" activities (Wiley and Green 2012, p. 81):

- Revising – adapting the OER to meet the needs of the end user
- Remixing – combining or "mashing up" the OER with another OER to produce new materials
- Reusing – using the original or derivative versions of the OER in a wide range of new contexts
- Redistributing – sharing the original work or derivative versions with others

Major Contributions

During the past decade, educators have taken advantage of the affordances of OER to make major contributions to the field of FL education. In particular, OER have played a major role in facilitating the collaboration between educational

stakeholders, in the creation of adaptable content, and in the publication of materials for less commonly taught languages (LCTLs).

Fostering collaboration among educational stakeholders is a goal of most OER. Open educators contend that educational publishing is largely controlled by a small group of people in developed countries – publishers, editors, and academics – who rarely collaborate with teachers and learners as coproducers of pedagogical content. The new practices that are at the heart of OE and its “participatory culture” (Jenkins 2009) exemplify the concept of “cognitive surplus” (Shirky 2010), that is, the increase in humanity’s ability to create things together for the common good, thanks to the infrastructure of the Internet. A good example of how OER can facilitate collaboration between multiple contributors is *Français interactif*, an online first-year French program developed by faculty and graduate students at the University of Texas at Austin (Blyth 2012a). Most commercial textbooks are written by two or three authors who work closely with an editor. In contrast, *Français interactif* was developed by a large team of more than thirty French professors, graduate students, and undergraduates. The program focuses on the lives of undergraduate students who were participants in a summer study-abroad program in Lyon, France. In a series of documentary videos, these students describe their experiences living with their host families in Lyon. As such, these students were central players in the development of the materials, suggesting ways to create videos that documented the growth of their linguistic skills during the study-abroad program. In addition to the participation of undergraduates, graduate student instructors (GSIs) played a key role in the making of *Français interactif*. GSIs contributed to the curriculum as part of their professional training by designing new materials and testing the materials in their classrooms.

Acceso, a second-year Spanish program developed at the University of Kansas, was also the work of a large team of contributors, including GSIs. In fact, according to Rossomondo (2011, p. 140), the professional development of GSIs was tightly woven into the development of the *Acceso* curriculum itself. Rossomondo contends that the creation and production of *Acceso* gave GSIs not only marketable skills in developing digital materials but also a deeper understanding of how materials relate to classroom practice. In short, because GSIs played an active role in helping to develop the *Acceso* materials, they became more proficient users of the materials and were more committed to the success of the materials. Finally, Rossomondo (2011, p. 140) points out that *Acceso* fostered collaboration with other higher education institutions through a wiki-based content development area and a discussion forum.

While most OER focus on a specific language as is the case of *Français interactif* and *Acceso*, some OER function as tools that can be used for the teaching and learning of any language. A good example is *The Mixxer*, a website whose goal is to promote collaboration between FL students and native speakers via Skype (Bryant 2013). Telecollaboration has become a well-known method in intercultural approaches to FL learning. And yet, such exchanges are often time-consuming and difficult to organize. Moreover, teachers who wish to integrate telecollaborative

methods into their pedagogy do not always know where to find language partners. To meet the need for a clearinghouse, *The Mixxer* was created as an archive of personal profiles of “language partners.” Learners peruse the archive to locate potential partners who match their language interests and proficiency levels.

OER are often touted as being more flexible than copyrighted, print-based materials due to their open licenses that enable adaptation. Unfortunately, many OER are difficult to adapt. For example, some are written in formats that are not easy to edit such as PDFs, while others have few instructions to facilitate adaptation. Nevertheless, newer OER are increasingly editable and accompanied by documentation such as manuals or guides. A good example of this new generation of OER is the Open University’s *Languages Open Resources Online* (LORO) (<http://loro.open.ac.uk/>). Essentially an archive of learning objects such as lesson plans or classroom activities, *LORO* contains resources that have been written in an accessible file format such as Microsoft Word, openly licensed with a Creative Commons license and tagged with metadata that explain the purpose and use of the object. While many faculty members at the Open University archive their course content in *LORO*, any FL teacher may upload content as long as he or she follows the required editorial guidelines. Every *LORO* resource must carry a meaningful title and a brief description of what the learning object entails. In addition, information about attribution, target language, and course unit must be specified. Other repositories such as NFLRC.org and MERLOT.org have taken similar steps to assure that the content of their OER is easy to find and adapt.

Another example of the new generation of OER designed for adaptation is the Foreign Languages and the Literary in the Everyday project (FLLITE.org) supported by the Center for Open Educational Resources and Language Learning (COERLL) at the University of Texas at Austin (USA) and the Center for Educational Resources in Culture, Language, and Literacy (CERCLL) at the University of Arizona (USA). The *FLLITE* project constitutes a curated archive of literacy-based FL materials. The project seeks to train FL instructors in the open digital practices needed for the production and dissemination of OER: how to find open, authentic texts, how to create an effective multiliteracy lesson based on an open text, how to choose an open license, and how to share materials and documentation with other members of the community. Thus, the overall goal of *FLLITE* is to create an educational community of practice whose members help each other to generate crowd-sourced materials specifically designed for adaptation.

Finally, the expansion of high-quality LCTL resources constitutes a major contribution to FL education. OER are particularly relevant to the LCTL context because they represent a promising alternative to traditional conceptualizations of educational publishing associated with the values of more commonly taught languages (Blyth 2012b). Defined by their relatively small enrollments and faculties, LCTLs are largely ignored by commercial textbook publishers who focus on the more profitable major languages. Lacking pedagogical materials and institutional clout, some LCTLs may not even have a departmental home at their institution and,

as a consequence, may be administered through a campus language center. Given these circumstances, resource centers such as the National FL Resource Centers in the USA and LangOER in Europe have begun creating OER for the LCTL market. For instance, LangOER produces materials for European LCTLs, e.g., Frisian (<http://langoer.eun.org/>). High-quality LCTL resources are also produced by the Language Flagship program that offers degrees in nine so-called critical languages as determined by the US government (e.g., Arabic, Hindi, Korean, Persian, Portuguese, Russian, Swahili, Turkish, and Urdu). Created in 1991 to develop “global professionals,” the Language Flagship program is administered by the National Security Education Program (NSEP) of the US Department of Defense (<http://www.thelanguageflagship.org/>).

Work in Progress

While surveys indicate that the use of OER is fairly widespread in North America and in Europe, there is still a lack of empirical research about educational impact. Thus, after more than a decade of intensive OER development, open educators are beginning to develop a research agenda to determine the effects of OER on student learning. The OER Hub, an initiative of the Open University, is serving as a de facto clearinghouse for the many studies currently in progress (<https://oerhub.net/>). The OER Hub seeks to create a network of OER researchers across four education sectors (K-12, community college, university, and informal learning) who agree to share methods and results. Findings of research studies are displayed in terms of 11 guiding hypotheses. The first two hypotheses pertain to the nature of openness and are relevant to all OER research studies:

1. The use of OER leads to improvement in student performance and satisfaction.
2. The open aspect of OER creates different usage and adoption patterns than other online resources.

The next nine hypotheses examine specific ways that OER may impact students, teachers, and the learning environment:

3. Open education models lead to more equitable access to education, serving a broader base of learners than traditional education.
4. The use of OER is an effective method for improving retention for at-risk students.
5. The use of OER leads to critical reflection by educators, with evidence of improvement in their practice.
6. OER adoption at an institutional level leads to financial benefits for students and/or institutions.
7. Informal learners use a variety of indicators when selecting OER.
8. Informal learners adopt a variety of techniques to compensate for the lack of formal support, which can be supported in open courses.

9. Open education acts as a bridge to formal education and is complementary, not competitive, with it.
10. Participation in OER pilots and programs leads to policy change at institutional levels.
11. Informal means of assessment are motivators to learning with OER.

While there is strong evidence for the claim that OER reduce costs for students and institutions (Hypothesis #6), the claims that OER promote student learning (Hypothesis #1) and improve teacher cognition (Hypothesis #5) are still in need of further evidence. Moreover, to date, there are few published research studies that investigate the impact of OER on FL learning. In light of this situation, COERLL and LangOER launched a joint 4-year study in 2014 to assess the impact of FL OER in the USA and in Europe (<http://coerll.utexas.edu/coerll/projects/oer-research>). In 2015, COERLL surveyed 1,100 FL educators working at all levels of the American educational system. The survey targeted American educators from all 50 states and from different types of institutions (private vs. public, urban vs. rural). The goal of the survey was to determine the obstacles to OER adoption in the USA as well as to understand the motivations of early adopters. Based on the findings of the OER survey, the next phase will involve a needs analysis of FL educators in the USA. Data for the needs analysis will come from interviews with targeted teacher populations in high schools, community colleges, and 4-year colleges.

Problems and Difficulties

Before achieving widespread acceptance, OER must first overcome two major obstacles: lack of awareness about open licenses and concerns about quality control. A 2011 survey conducted by the National Institute of Technology and Liberal Education (NITLE) found that faculties at small liberal arts colleges in the USA had minimal knowledge of OE and were unclear about how to locate OER. Based on the responses to the survey, the authors suggest that there is a pressing need for OER of high quality that are also easily “discoverable,” that is, optimized for search engine recovery (Spiro and Alexander 2012, p. 1). Two years later, a survey of FL program directors in the USA found similar results – teachers are confused about how to find and teach with OER (Thoms and Thoms 2014). In fact, Thoms and Thoms (2014, p. 144) note that many FL program directors “were not familiar with the term *open educational resources* per se.” In 2015, in response to such survey results, the US Department of Education hired an open education advisor to disseminate information about OER via social media (e.g., Twitter campaign #GoOpen).

According to the OER evidence report disseminated by the OER Hub, teachers who are new to OE rarely distinguish between OER and other pedagogical materials found online (OER Evidence Report 2014, p. 14). As noted, the distinctive feature of OER is an open license that allows its creators to share rights with end users in a way that is legally sound and globally applicable. Surveys cited in the OER Evidence Report discovered that educators who do not understand open licenses tend to treat

OER like any other commercial product. Once they become aware of the implications of open licenses, however, teachers begin to adapt elements of the OER. Then, with increased OER experience, teachers start to create their own materials, sometimes remixing several OER. Finally, according to the report, the most experienced open educators actually begin to create resources and share them with their peers using a Creative Commons license (OER Evidence Report 2014, p. 15).

In addition to lack of awareness, OER must overcome the public's persistent concern about quality control. In face of these concerns, OER developers have adopted different approaches to ensure the quality of their products. In one approach, the academic institution where the OER is produced plays a leading role in vetting the OER according to traditional academic practices of peer review. A more digitally native approach to quality control is crowdsourcing, as pioneered by the open-source software community. In this approach, the quality of the OER becomes the responsibility of the crowd of users who write reviews and aggregate ratings for the public to consult (Plotkin 2010, p. 6). More recently, OER developers have begun combining elements of peer review with the newer crowdsourcing approaches. For example, many professional societies and organizations, such as *OER Commons* (www.oercommons.org), *Open Content Consortium* (www.ocwconsortium.org), *Community College Open Textbook Collaborative* (<http://collegeopentextbooks.org>), *MERLOT* (www.merlot.org/merlot/index.htm), and *WikiEducator* (http://wikieducator.org/Free_textbooks), hire editorial teams to vet online content and to organize it in ways that help educators find what they are seeking. *OpenStax College*, an open publisher of higher education textbooks headquartered at Rice University (Houston, Texas, USA), has adopted a quality control process that combines peer reviews from experts and informal feedback from teachers in the field (<https://openstaxcollege.org/>). To further increase the quality of their free and open textbooks, *OpenStax College* encourages users to report typos and errors that may be periodically sorted and posted as errata sheets and editorial updates.

Future Directions

Educators and developers are taking different paths in their efforts to promote OER. Headed in one direction are OER proponents such as the Hewlett Foundation who seek to drive down the costs of education by bringing OER into the educational mainstream. In general, these proponents seek to co-opt traditional publishing practices in an attempt to render OER more “familiar” and therefore “adoptable.” Headed in another direction are proponents who seek to revolutionize pedagogy by emphasizing the unique features of OER. This group tends to focus on open educational practices (OEP) that have the greatest potential to change the classroom ecology (Zourou 2016a).

In a 2013 white paper entitled “Breaking the Lockbox on Education,” the Hewlett Foundation outlined their strategy for mainstreaming OER in terms of three global

megatrends: an increased demand for education, an economic recession, and a surge of interest in educational technology.

In the USA, state and local governments have made deep cuts in education over the past few years as they have grappled with declining revenues that are the result of the worst recession since the Great Depression. While the trend may be reversing as the broader economy improves, overall school funding remains well below pre-recession levels. . . . While overall state spending has contracted, interest in innovation and private investment in education have nearly quadrupled in a decade, from \$62 million in 2005 to an estimated \$1.1 billion in 2012. This education technology investment has given rise to a number of new players that, like OER, are looking to retool classrooms.

The Hewlett white paper argues that the main problem facing OER is a critical lack of “off-the-shelf offerings that teachers can adopt as their primary resources.” In other words, the Hewlett white paper argues uneven and disorganized supply of high-quality content is the biggest obstacle to mainstreaming OER. As such, the report calls for developers to create future OER that rival commercial materials in integration, usability, and completeness. Along these lines, the Hewlett white paper cites Rice University’s *OpenStax College* as a model developer who has embraced the goal of mainstreaming OER. Supported by several nonprofit foundations, *OpenStax College* produces free, open textbooks for introductory college courses with large enrollments, e.g., Psychology, Sociology, Statistics, American History, etc. Run by professionals with years of experience in educational publishing, *OpenStax College* focuses on producing textbooks that meet industry standards for scope and sequence requirements. In addition, all *OpenStax College* textbooks are rigorously peer reviewed and accompanied by a suite of ancillaries such as online exercises and teacher’s editions. By producing open textbooks that rival commercial products in terms of their production values and standards-based content, *OpenStax College* hopes to overcome concerns about quality.

In contrast, some advocates reject the strategy of producing OER that resemble commercial products. Rather, these advocates hope to attract new adopters by demonstrating how OER support open educational practices (OEP) (Blyth and Dalola 2016; Kurek 2016; MacKinnon et al. 2016; Whyte 2016; Zourou 2016b). OEP refers to teaching practices that are made possible by open licenses. These teaching practices amount to the collaboration between content creators that invariably involves the reuse of resources created by other persons (often peers). As an example of OEP, Blyth (2012a) recounts the story of a French professor teaching in a Nigerian university who asked her students to modify *Français interactif*, an OER intended for American students learning French. To make the OER more suitable for Africans, the professor asked her students to replace American cultural referents found in the textbook with African equivalents. This practice not only led students to reflect more deeply about the relationship of language and culture but also resulted in an African version of the original. As advocates explore different ways to attract new users, OER, despite their inherent diversity, will likely become part of the educational mainstream within the next decade.

Cross-References

- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [The Digital Divide in Language and Literacy Education](#)

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Data-Driven Learning and Language Pedagogy

Alex Boulton

Abstract

Language corpora have many uses in language study, including for learners and other users of foreign languages in an approach that has come to be known as data-driven learning (DDL). This boils down to the learner's ability to find answers to their questions by using software to access large collections of authentic texts relevant to their needs, as opposed to asking teachers or consulting ready-made reference materials. As such, not only do corpora contain the potential to answer many language questions, the consultation itself is likely to lead to improved language awareness and noticing. This chapter discusses the nature of corpora and their relevance in language learning, outlining the processes involved in DDL, and looks at the history and research development in the field from its beginnings to the present day, taking into account its limitations and gaps in our current knowledge with an eye to the future.

Keywords

Corpus • Data-driven learning • DDL • Corpus-based language learning

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Introduction

The essential condition for any language learning is exposure to the language itself. In foreign language contexts in particular, such exposure may be inadequate: Zahar et al. (2001: 558) estimate that an hour's reading may lead to the incidental learning of just two words; at that rate, it would take decades to build up a sizeable vocabulary. Clearly exposure alone is not enough in such cases and may be complemented by formal instruction intended to help speed up the process by drawing learners' attention to important points, explaining, demonstrating, providing examples, and so on. Fortunately, syntheses show that instruction does make a difference (e.g., Norris and Ortega 2000), though that does not mean that any type of instruction works equally well for all learners in all contexts (Hattie 2009). Formal teaching may however oversimplify things: the contrived language that is presented, the all-purpose definitions provided, the abstract rules given, as well as the structured tasks to be completed. These can all have their uses, but if that is all there is then they may lead to dependence on the teacher and an inability to work with authentic language – i.e., to make the most of any real exposure.

This is where language corpora can be of use in what has come to be known as data-driven learning (DDL). The basic concept is to allow massive exposure that is still organized and focused. Using the power of computer software, learners can query large collections of texts relevant to their needs, looking at frequencies and distributions and multiple occurrences of target items in context. This essentially constructivist, inductive approach means they can then reach their own conclusions that are meaningful to them individually, and the cognitive processing should lead to longer retention than simply “being taught.” This may be quite time consuming at the start, but the real advantages lie not so much in the explicit knowledge gained as in the processes involved – ability to deal with authentic texts in different genres; awareness of frequency, chunking, and collocation; noticing forms and variation; formulating hypotheses and inferring meanings; and so on. In other words, it should help students become better language learners and users.

Early Developments

The word “corpus” can mean different things to different people in a variety of disciplines. In corpus linguistics, it is a large collection of authentic texts that has been deliberately sampled to be representative of the type of language one is interested in; it is accessed by software often called a concordancer, though it can usually do more than just concordancing as we shall see below. This is, however, a prototypical definition, and corpus linguistic tools can be used with just a few thousand words (wherever repeated searches can beneficially be conducted by computer rather than regular reading), a single text (e.g., a novel), “non-authentic” text (arguably simplified readers or textbooks, or learner essays), and collected automatically (in the case of web-compiled corpora) or at least partly serendipitously (depending on resources available). In language teaching, the overriding criteria are

pedagogical rather than theoretical, and the ad hoc creation of a small, specialized corpus of texts can be much more relevant to learners' needs than some of the large, general-purpose corpora that are publically available.

The first modern corpus is no doubt the Brown corpus, a million words carefully sampled from 500 extracts of texts that had been published in 1961 (Kučera and Francis 1967). This was partly motivated by dissatisfaction with the tools then available for describing English which derived largely from intuition and fortuitous examples. The goal here was to introduce greater scientific rigor from a more systematic base. Later, the Bank of English at Birmingham University was designed for linguistic purposes but also with pedagogical aims in mind (see Sinclair 1987, for a review). This monitor corpus was designed to increase over time to account for developments in British English, but originally just over 7 million words were used to produce the first Cobuild dictionary. The corpus could be sorted on the computer and then the short contexts (concordances) were printed out for every occurrence of every item; the lexicographical work took place entirely on paper, similar to earlier hand-compiled concordances from the Bible or Shakespeare, for example. The 100 million words of the British National Corpus (see Aston and Burnard 1998) represented a truly monumental undertaking when it was built in the early 1990s, but later advances made it possible for a single person to create the Corpus of Contemporary American English semiautomatically from the Internet, currently standing at 520 million words (see Davies 2009). Entirely automated procedures now mean that billion-word corpora are regularly compiled (e.g., Baroni and Bernardini 2006). At the top end of the scale, the searchable Internet has debatable status as a corpus but can be usefully queried via regular search engines or more specialized software for pedagogical purposes.

In the hands of experts, corpora can be useful in preparing all kinds of pedagogical materials and resources, from general and specialized dictionaries to grammar books and usage manuals, from syllabus design to testing, from wordlists to coursebooks. Such uses are beyond the scope of this chapter, which is concerned with how learners can use corpora directly.

Many of the early attempts at learner corpus consultation are based around Birmingham with teachers in contact with the Cobuild project. McEnery and Wilson (1997: 12) mention uses dating back to 1969, though the earliest publication seems to be from San Francisco where McKay (1980) describes activities encouraging learners to identify grammatical patterns to distinguish semantically similar verbs, based on sentences printed out from a corpus. In Surrey, Ahmad et al. (1985) had their advanced learners using a computer to query a corpus directly, though such early software could be exasperatingly slow. Things really took off in the late 1980s back in Birmingham, with Tim Johns as a leading pioneer often cited as the founding father of DDL. He created a concordancer specifically designed with language learners in mind (Micro-Concord, which later morphed into WordSmith Tools; see <http://www.lexically.net/wordsmith>), and published a number of papers explaining many different ways in which he used corpora for and with his students, with many widely-cited sound bites and frequent citations, especially from the seminal collection of papers he coedited (Johns and King 1991) and which included two papers of his own.

Johns created or used different types of corpora – scientific texts, parallel corpora of translations, a single novel – to be relevant to the learners’ needs. Authenticity was important in terms not just of text but also of needs and indeed the task, since corpus consultation involves exploring and thinking about language – crucial to any language learning. In this way the learner was seen as a researcher with direct access to the data, and the teacher as guide rather than dispenser of linguistic knowledge. Proactive materials could be printed out for repeated use with lower-level students for general purposes, while more advanced students could explore the corpus individually or collaboratively, using the concordancer themselves for serendipitous browsing or focused querying. Johns would leave the concordancer on in his classes as an informant and used it in his one-to-one advising sessions to help with academic writing. For him, DDL was not just learner centered but also provided a means to keep language (especially lexicogrammar) firmly center stage. All of this was argued to lead to greater autonomy; indeed, his final paper (Johns et al. 2008) provides some evidence that the DDL participants outperformed the control group even on items that had not been explicitly covered, suggesting that the processes may improve language skills as a whole. The tremendous variety of uses of corpora promoted by Johns set the agenda for years to come, though of course he was not alone, especially in the UK and Europe. Of particular note is the biennial Teaching and Language Corpora (TaLC) conference series inaugurated in Lancaster in 1994, each event giving rise to a selected volume of papers; further information can be found in Thomas and Boulton (2012: 17–34).

Major Contributions

Before going any further, it may be useful to see what DDL actually looks like. Traditionally the user sees corpus data in the form of a concordance, typically in KWIC (key word in context) format. Fig. 1 shows a random selection of 20 concordance lines taken from a corpus of academic writing (110 papers focusing on DDL,

| | | |
|-----|--|---|
| 1. | Jackson 1997); and in translation studies | (e.g. Pearson 1996; Aston 1999; Mallikamas 2001; |
| 2. | t is against the ideal of learner autonomy | (e.g., Johns, 1991a). As in real life, learners p |
| 3. | ally favourable in this and other research | (e.g. Johns 2002; Hadley 2002; Ciesielska-Ciupek |
| 4. | er-initiated and teacher-initiated queries | (e.g. Yoon 2008). As with corpus use in general, |
| 5. | oncentrating on written academic discourse | (e.g. textbooks and articles), and the other on o |
| 6. | significantly over that of a control group | (e.g. Goyette). Indeed the point of click-on reso |
| 7. | offer more readily recontextualised input | (e.g. EEL sub-parts of the EGAP and ESAP register |
| 8. | r-, or under-use of particular L2 features | (e.g., Granger, 1998; Granger, Hung, & Petch-Tyso |
| 9. | studies have examined vocabulary learning | (e.g. Kaur & Hegelheimer, 2005; O'Sullivan & Cham |
| 10. | ed according to formal linguistic criteria | (e.g., verbs, nouns, prepositions) or according t |
| 11. | lass activities into the intermediate class, | e.g., letting students have hands-on practice, w |
| 12. | evens, 1991; Tribble, 1991) or translation | (e.g., Aston, Gavioli, & Zanettin, 1998; Bernardi |
| 13. | me lexical items were shared by both texts | (e.g., export/shipping products, taking action, o |
| 14. | re should be minimal formal accountability | (e.g. no required summaries or book reports). Ind |
| 15. | ies where English is not the main language | (e.g., China and India). As an illustrative examp |
| 16. | were items which were felt to be too noisy | (e.g. headlines). 5. Method The overall aim w |
| 17. | competent writers. Here corpus technology | (e.g., general corpus concordancing) is a promisi |
| 18. | of patterns, extrapolation to other cases | (e.g. Scott & Tribble, 2006: 6; Gaskell & Cobb, 2 |
| 19. | 1995; Louw, 1997) and of translation (see, | e.g., Bowker, 1998; Zanettin, 2001). This sectio |
| 20. | only be understood at the discourse level | (e.g. Braun 2005; Hughes and McCarthy 1998). Ther |

Fig. 1 KWIC concordance of, “e.g.”, in a corpus of academic writing

600 k running words) for the search term, “e.g.” here centered and in bold. This very simple formal example highlights a number of features which may be useful to learners. On the left, it is immediately apparent that most occurrences occur within brackets (other searches show that this is true in 85% of cases), the implication being that it is unusual in the syntax of the main sentence and should not be overused in this way in this type of writing. On the right, the presence or absence of a comma owes more to individual journal style guides than any generalizable pattern. Beyond that, it is often used to introduce references, which can lead to further searches for citation practices and discussion of whether in other disciplines or other languages, research cited is thus typically relegated to brackets or not. Most corpus analysis software offers this basic concordancing function. Other features include frequency counts of individual words or clusters, collocates, distributions, and so on, all of which can prove useful to L2 learners.

It is in the nature of innovations in computer-assisted language learning (CALL) that early publications tend to be descriptive of classroom practices and software developments. The situation gradually evolves, and Boulton and Cobb (2017) identified over 200 publications attempting some kind of evaluation of corpus use by L2 users; some of the more widely cited are briefly outlined below.

Much of the initial interest lay in emic studies to find out what learners thought about DDL. The data were often gathered through interviews, diaries, or especially questionnaires; the latter are still frequently used but often now as a complement to other aspects. Long-term ecological studies are particularly valuable here, such as Baten et al. (1989) who received overwhelmingly positive feedback from 400 Dutch economics students after 4 months. More recent is the frequently cited paper by Yoon and Hirvela (2004), who introduced corpora to their ESL students in the USA over several weeks. The questionnaires again revealed considerable enthusiasm, especially among those with comparatively low levels of linguistic proficiency, which opens up the question of who DDL is most appropriate for. Across all studies, the response is overwhelmingly positive which no doubt owes something to the novelty factor and the Hawthorne effect, given that most researchers/teachers were themselves enthusiastic. Nonetheless, it seems that DDL can appeal to a wide variety of learners, though Turnbull and Burston (1998) provide a detailed case study of two students needing English for a master’s degree in Australia: one was found to be field independent and took to corpora very quickly; the other was field dependent and found it largely a waste of time.

Another focus has been on the uses learners make of corpora, again mostly by asking learners about their practices; a notable exception is Pérez-Paredes et al. (2012) in Spain who tracked their learners’ searches. They found that lack of training led to fairly unsophisticated queries, with learners approaching corpora in much the same way as they did Internet searches; indeed, the most successful outcomes were found to be combinations of corpus and web searches. The types of queries formulated are analyzed by Kennedy and Miceli (2010), who usefully distinguish pattern hunting (i.e., search for inspiration) and pattern defining (i.e., checking specific questions); success was linked to trial and error, among other things. Charles (2014) had her graduate students compile their own discipline-specific corpora to

help with academic writing and followed up use a year later. Eighty six percent of the respondents continued to use corpora at least occasionally in drafting or revising their academic writing and 38% of them regularly. The overall picture that emerges is that most students can use concordancers directly, though it remains controversial how much training is needed. Where time or resources are limited, or for students with lower levels of L2 proficiency, linguistic sophistication, or motivation, work with printed data can provide one solution (e.g., Boulton 2010).

Others have attempted to see whether DDL leads to measurable outcomes from a more etic perspective, i.e., whether it “works” or not. These again split into two groups, the first evaluating the use of corpora as a learning aid, focusing on learning outcomes usually of specified target items. The results generally derive from some kind of language test, whether pre/post or control/experimental designs. Among the earliest and most ambitious, Cobb’s (1997) PhD thesis and papers derived from it showed that lower-level Arabic students were able to learn large numbers of words using DDL over a long period of time and were significantly more likely to retain them long term than control groups with word lists and dictionaries only. Most other studies come to similar conclusions for vocabulary and lexicogrammar in general, which may be what DDL is most suitable for, whatever the level of the learners (Lee and Liou 2003). Much of the work here is relatively ecological, being based on a regular course over several weeks or a semester. Chujo and Oghigian and their colleagues in Japan run a semester-long DDL course on a regular basis enabling different types of data collection and analysis, especially as they tweak the course each time. In a 2012 paper looking at noun and verb phrases over two semesters, the experimental group made significant gains in most areas compared to the control group; the results are found to be particularly promising when printouts and hands-on concordancing are combined.

The other group of studies interested in outcomes looks at the impact of corpus use not as a learning aid but as a reference resource, especially while writing (drafting or revising texts or translations). Some of it is short-term experimental work such as by Frankenberg-Garcia (2014), who provided her Portuguese high-school learners of English with dictionary definitions and multiple concordance lines. Both were found to be useful for comprehension, but as few as three carefully-chosen corpus examples proved significantly more effective in production. O’Sullivan and Chambers (2006) got their Irish students of French to correct their own essays; following training, they successfully corrected many underlined errors of grammar and lexis in particular, as well as syntax and even formal things such as spelling where dictionaries or other resources would have been quicker and just as effective. Geluso (2013) also had his learners produce essays especially for the study, but then got them to use Google frequencies as a test of formulaicity for sequences in inverted commas which the students themselves chose as dubious. Four native English speakers rated the results as being significantly more “natural.” Search engines were also used by Todd (2001), but here with the snippets as an equivalent to concordance lines to help correct errors; again, the results suggest that learners can indeed make significant use of such self-selected data.

Work in Progress

The essential ingredients in DDL are corpora and the software to query them, and users today have access to tremendous numbers of both. More and larger corpora can be compiled quickly and easily and distributed free or at small charge via the Internet for many different languages: SketchEngine alone currently lists over 50 languages, some with many different corpora (www.sketchengine.co.uk). However, the prevalence of (semi)automatic compilation aids means that few corpora are as rigorously compiled as the BNC, for example, and care inevitably needs to be taken in interpreting the results. Some tools such as BootCaT (bootcat.sslmit.unibo.it) are publicly available and mean that ordinary users can compile rough-and-ready corpora in a few minutes for specific purposes: all that is needed is to input a handful of “seed” words which are characteristic of the type of language required; the tool does the rest. The availability of large quantities of text via the Internet also means that teachers or learners can manually identify and download texts to build their own corpora for local use. These are often far smaller, which can be an advantage when the needs are highly specific. Software development has also led to increasing numbers of query tools often freely available on the web or for download, which again helps to make DDL much more accessible. Some of these are highly specific, some are intended for experienced researchers; others though are extremely simple and sufficiently general for ordinary L2 learners to be able to work with. AntConc (www.laurenceanthony.net/software/antconc) deserves a special mention here as it has been among the most widely used in recent DDL studies, including some of those mentioned above.

Technological advances have made DDL faster, simpler, more intuitive, prettier, more accessible, and so on. But in terms of methodologies, the essential aspects of DDL remain largely unchanged, typically featuring induction from multiple occurrences in context, augmented with lists and charts of frequencies, collocates, wordsketches, etc. This means that much of the research has been in piloting specific corpora or software, or in testing the basic approach with different learners in different contexts with different needs and questions in mind – all the while doing quite similar things. The advantage of this is that enough evidence has accumulated to be able to take stock. Boulton and Cobb (2017) have undertaken the first systematic meta-analysis of DDL with 88 unique samples from 64 separate studies. The results show large effect sizes overall, both within and between groups. Moderator analyses reveal gaps in the research agenda, including for languages other than English, spoken skills, long-term uptake and occupational uses, etc.

Three trends in recent years are of particular note. First, a number of studies apply essentially DDL-like practices to the web as corpus. The value here is that the web itself is large and varied enough to contain almost anything the user might want; the challenge of course lies in finding it using regular search engines as surrogate concordancers (cf. Boulton 2015). At the same time, users are already familiar with the web and with search engines, which may go some way toward countering objections of technical difficulties, and further training in their use is more likely to

be taken up long term precisely because the tools are so general purpose. A second way to help integrate DDL into learning is to graft them into CALL packages. Cobb's Compleat Lexical Tutor (www.lextutor.ca) provides a number of tools in addition to regular concordancing, allowing learners or teachers to create gap-fills automatically from multiple concordance lines, to visualize the frequency bands of words in a particular text, to click on a word in their own text for a concordance to pop up, to consult and share concordances during writing or error-correction, among other things. This is a way of bringing DDL to the learners rather than expecting them to come to corpus linguistics. Finally, the traditional interest in lexicogrammar is being complemented by more work at the level of discourse, especially using corpora as a reference resource for academic writing. This is not necessarily obvious, since many features of interest may be difficult to search for at surface level; having the students build their own small, specialized corpora increases ownership and familiarity and is one way forward suggested by Charles (2014).

Problems and Difficulties

The advantages of DDL notwithstanding, the fact that it is not mainstream practice suggests that there are difficulties involved. Various questionnaires have noted problems from the learner's perspective, but many of these have dissipated over time, and solutions exist for others. Despite copyright issues and questions of ownership, lack of access to appropriate data is far less a problem today with the increasing availability of large numbers of corpora, as well as the Internet itself. Technical problems can be eliminated if the teacher prepares printed handouts for activities, and software and interfaces have become far more user-friendly in recent years. The ubiquity of Internet search engines have gone a long way towards bridging the gap between everyday practice and DDL: the concept of data searching is familiar and the techniques are largely transferable; users are able to read concordance lines nonlinearly just as they are Google snippets and are less concerned with "drowning in data." Some learners may find the language in corpora difficult: smaller, more relevant corpora may make them more approachable, especially where learners are involved in choosing familiar texts. At lower levels of proficiency, learners may be more comfortable with parallel corpora of translations (see below) or even with corpora of simplified texts or graded readers (available for English on www.lextutor.ca/conc/eng).

Perhaps the biggest problem lies in simply knowing what to query in the first place: much work with error-correction, for example, relies on teachers indicating problem areas (e.g., O'Sullivan and Chambers 2006). One possibility is to rely on frequency data from the web as an indication, focusing on rare items except where they include proper names or highly technical items, as suggested by Geluso (2013). To the extent that DDL enhances language awareness, increased practice is likely to make this easier and more intuitive over time. There is still the problem of formulating the question as a query that the software can understand, and then interpreting the results. Training is recommended by many just to get the most out of Internet

search engines, and more may be required for dedicated concordancers and other corpus software. How much training is needed for hands-on concordancing is a controversial issue, though it will ultimately depend on the learners' own needs and preferences, and how much they are likely to want to use corpora in the future.

This raises the further question of the types of learners that DDL is likely to suit best, given that there is considerable variation in their appreciation of the approach and the benefits they derive from it. By far the majority of studies to date have focused on university students, though there is no intrinsic reason why younger learners cannot also benefit. On the other hand, there has been considerable work with learners at lower-intermediate level who are majoring in disciplines other than language, suggesting that language proficiency and sophistication may not be insurmountable barriers. It may even be that DDL is more appropriate in such cases for learners whose previous experience with more teacher-centered, deductive approaches has left them uninterested or struggling (cf. Yoon and Hirvela 2004). All that can really be said at the moment is that further work is needed in a number of areas – which leads us to the final section.

Future Directions

Empirical DDL research has largely focused on university students with intermediate to advanced levels of English as a foreign or second language. It may be that this is where it is most useful and appropriate, though for a more comprehensive picture we would expect more work with younger learners, in secondary or even primary schooling, in private language schools, and outside formal education. This last point seems particularly important: if corpus consultation is argued to be useful for real needs, then we know to know what it can bring to professional situations. Interest in long-term uptake of DDL is at present limited (though see Charles 2014), and introducing it to the workplace seems to be nonexistent except for academic writing.

As far as the corpora themselves are concerned, English is likely to remain the major preoccupation for the foreseeable future, but we would expect more work on other languages too. More important, concordancers work only with written text (including transcriptions); since many learners are primarily interested in spoken language, we would expect the next few years to see development of aligned corpora with sound and even video. It is extremely time consuming to collect spoken data, and the few that currently exist tend to consist largely of interviews (e.g., www.uni-tuebingen.de/elisa/html/elisa_index.html or www.um.es/sacodeyl). An obvious bypath would be to use existing subtitled documents which are already aligned, albeit imperfectly: Aston (2015) describes such uses of the TED talks using Word-Smith Tools; Quaglio (2009), among others, has shown that scripted dialogues are closer to “authentic” spontaneous conversation than might be thought, and thus also have their place in a spoken program of DDL for general language learning purposes.

Parallel corpora of translated texts may also be further developed: at the moment, they are relatively rare outside specialist translation courses, despite their obvious

uses in many areas, as well as for learners at lower levels of proficiency. There are currently very few that are freely available and easy to use, and they often have their limits: of note is EuroParl, the proceedings of the European Parliament in 21 languages (www.statmt.org/europarl). While the status of Linguee (www.linguee.com) as a parallel corpus may be debatable, it can be used in ways compatible with DDL but with more than one language. Other initiatives can be expected as it becomes easier to align translations for analysis with free parallel concordancers (e.g., www.laurenceanthony.net/software/antpconc).

Technological advances have helped to bring DDL closer to its potential users, with numerous corpora and software designed with L2 learners in mind. At the same time, as technology and the Internet in particular become second nature, learners are already involved in everyday practices that bring them closer to DDL. Johns was originally determined to present DDL as radically different to traditional teaching; the time may have come for it to be seen as an extension of ordinary practice. It will be interesting to see if and to what extent web searches and DDL merge. Finally on the technological front, smart phones and other mobile devices may also bring about substantial changes, but interfaces will need to adapt to allow for screen size and processing speed in particular; entirely new practices may emerge. For the most part, the basic shape of DDL was formed quite early on: recent studies can in many cases be considered replications of earlier work.

DDL is in line with a number of theories of language, learning, and use, some of which derive from insights gleaned from corpus linguistics, but this is largely a one-way relationship. The future may usefully see more empirical studies explicitly designed to analyze the theoretical foundations in more detail. Among other things, we know that language consists of regular overlapping sequences in the form of chunks that are processed, stored, and retrieved as wholes rather than being constructed bottom-up from grammar “rules” as traditionally thought, meaning that any individual item is typically found in a limited number of contexts (Sinclair 1991, on the idiom principle; Hoey 2005, on lexical priming; Millar 2011, on psycholinguistic evidence for chunking). This breaks down the grammar/lexis divide suggesting that our language knowledge is the sum of the encounters we have with it, both receptively and productively, in line with emergentist, usage-based theories (Tomasello 2005). Taylor (2012) talks by analogy of the “mental corpus,” highlighting that many of these theories not only support corpus linguistics and DDL but owe much of their origins to them.

Finally, new research practices are needed to test the real benefits of DDL – not just for learning specific items but in helping users to become better language learners, more sensitive to language as a whole. This is the central claim, but so far the only evidence is incidental and at best suggestive (Johns et al. 2008; Allan 2006). What is needed are careful longitudinal studies that specifically focus on this. Ideally, for any technology or approach to become really useful, it needs to be taken up outside the context of a single course – with teachers of other and subsequent courses, and after the end of the instruction period.

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Technology and Task-Based Language Teaching

Marta González-Lloret

Abstract

The inclusion of technology in language education is a standard practice today. However, not all technologies are equal, and it is essential that, if they are to be used for language learning, their design, implementation, and evaluation are guided by language development research. Among the existing methodologies for language teaching, task-based language teaching (TBLT) presents an ideal platform for informing and fully realizing the potential of technological innovations for language learning. This chapter reviews the trajectory of the merge of technologies and tasks from 2000 to today, highlighting those contributions that impacted the way we understand technology-mediated task-based language teaching today. The chapter presents current research that explores the intersection between task design issues (e.g., task complexity, language production) and innovative technologies (e.g., online multiplayer games, mobile digital augmented reality games, virtual environments). The implementation of new technologies and new language learning methodologies is never an easy and smooth process. And without a doubt, there are some difficulties and issues that still need to be resolved about technology-mediated TBLT: a clear definition and operationalization of a task, a plethora of possible technologies to include in a curriculum, and the fast emergence of innovations. Finally, the chapter offers possible future directions for the field.

Keywords

Technology-mediated Task-based Language Teaching (TBLT) • Task • Needs analysis • Curriculum design • Language learning • L2 culture • Computer-mediated communication (CMC) • Web materials • Experiential learning • Innovation • Gaming • Virtual worlds • Augmented reality • iCALL

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Introduction

The inclusion of technology in education is the norm today, and second and foreign language courses are not an exception. However, not all technologies are equal, and motivation and novelty are not necessarily sufficient to make them effective tools for language learning. It is essential that their design, implementation, and evaluation be guided by curricular principles based on education and language development research. Among all the existing methodologies for language teaching, task-based language teaching (TBLT) presents an ideal platform for informing and fully realizing the potential of technological innovations for language learning.

TBLT is based on the idea of “learning by doing” or “experiential learning” (Dewey 1938/1997). That is, we learn a language by doing something with it rather than knowing about it. Rather than mastering a particular linguistic piece of the language, in TBLT, the goal is to achieve communicative competence that is accurate, complex, and fluent through tasks which require engagement with that target language. Although there are multiple understandings of TBLT as a methodology, they all agree that tasks are the building blocks of a TBLT curriculum.

Corresponding to different views of TBLT, tasks are also defined and operationalized quite differently, from tasks as more traditional classroom activities (Nunan 2004) to tasks as the real things we do every day in life (Long 1985). However, a few characteristics are common and essential to all tasks. See Ellis (2003) and Skehan (1998) for in-depth discussions of types of tasks. Tasks are meaning oriented, are communicative in nature, and focus on the content of the message. Tasks aim to replicate target language use as authentically as possible and should be goal oriented, incorporating real contextualized language with application outside of the activity itself. Therefore, the assessment of a task is not so much on the use of discreet language items but rather on the task outcome and the achievement of the task goal.

Early Developments

Early incorporations of technology into task-based language learning were mainly translations of exercises/tasks that fulfilled principles of TBLT in face-to-face contexts into a computer platform. Technologies, mainly computer-mediated text-based

communication (CMC) platforms, were used to engage students in jigsaw, dictogloss, information gap activities, decision-making tasks (closed-ended), and discussion tasks (open-ended). These tasks were used to investigate the effects that the technology had on the language produced by the learners, in comparison to face-to-face interaction using the same task (i.e., Lee 2002). Results focused on the amount and quality of interaction (modifications, feedback, uptake, etc.) and varied across studies. While some of these studies found task-based CMC interactions to be productive and conducive to language learning, others found negotiation in CMC not as abundant as in face-to-face interaction. See Ortega (2009) for an in-depth evaluation of negotiation in CMC research. The commonality of these studies is their focus on the type of interaction produced by learners when facilitated by media rather than focusing on the study of the task itself.

A subset of CMC studies were based on telecollaborative (teletandem) projects among learners sharing each other's L1s as L2s. These projects occupied several weeks of the course syllabus and had a strong cultural learning goal. The tasks used were mainly discussion tasks and were based in numerous shared cultural artifacts. See Helm (2015) for an up-to-date review.

During the early years, a few researchers looked at the effects of task design (type of task, number of participants, task difficulty) on learners' interaction when it was mediated by technology (e.g., Blake 2000; Keller-Lally 2006; Lee 2002; Smith 2003). The results of these studies are also quite inconclusive. While some found no effect for task type (e.g., Keller-Lally 2006), others found jigsaw tasks to produce language that incorporated more negotiation of meaning (e.g., Blake 2000), and others found that decision-making tasks included more negotiation than jigsaw (e.g., Smith 2003). This early debate is still a productive line of research. See, for example, Yilmaz (2011).

The idea that technology extends learning opportunities in ways that would be difficult if not impossible to achieve in traditional classrooms (Sykes et al. 2008) pushed the field to design task-based studies incorporating technologies other than CMC. Some of the early research developed and evaluated tasks enhanced through video (Levy 1999) and glosses (Plass et al. 1998), tasks embedded in web-based spaces (e.g., González-Lloret 2003), and tasks delivered through interactional multimedia software (Schrooten 2006). These studies aimed at assessing the potential that the technology had to enhance comprehension as well as to produce the types of rich interaction believed to promote language and cultural learning.

Major Contributions

During the early years of computer-assisted language learning (CALL), research started to make connections between the use of technologies and tasks for language learning, which served as the foundation for all subsequent research. Chapelle (2001) laid out a task framework for CALL in which she proposed that tasks in CALL should be authentic, practical, focused on meaning, and appropriate to the students' level and learning goals. CALL tasks, according to Chapelle, should also provide opportunities for focus on form (an integral characteristic of TBLT

instruction) and have an added benefit beyond the learning of language (i.e., developing skills to use technology outside of class, increase students' interest in the L2 culture, etc.).

2003 was a productive year for work on technology and tasks. Chapelle's (2003) book examined second language learning principles and connected them with the way technology may be most effective to promote language learning. She proposed two types of technology-mediated tasks: those that employ CMC in their design and those based on interaction between the learner and the computer. Both types of tasks have been developed since then (CMC tasks in particular), with a growing interest for the second group, which has moved the field into exploring tasks embedded in and delivered through games, virtual environments, and augmented reality through mobile technologies. These will be presented below.

Also in 2003, an article by Doughty and Long appeared in the open online journal *Language Learning & Technology* which featured a clear intersect between technology and TBLT. In line with Chapelle (2001), they proposed that technological choices should be based on second language acquisition (SLA) research findings and offered methodological principles of TBLT as guidance for task development, such as using tasks as the unit of analysis, including activities that promote "learning by doing," providing rich, elaborated input, corrective feedback and focus on form; respecting the learners' developmental processes, including individualized instruction; and promoting collaborative learning.

Finally, Skehan's (2003) article in the *Computer Assisted Language Learning Journal* pointed out the opportunities and dangers in the use of web-based materials for language learning. Among the main advantages of technology, he maintains the potential of the web as a source of language learning materials and input. However, all that input by itself (simple exposure to information and language) is not enough to develop language. Web materials, according to Skehan, need to be manipulated to promote interaction, focus on form, and noticing of features of language and then to consolidate those features through activities/tasks. Skehan points out that the task literature can help with making decisions about what types of web materials to incorporate based on existing knowledge about, for example, task complexity, whether we want to focus on accuracy and fluency (language structure) or complexity and accuracy (interactivity), what to include as pre-task, task, and post-task, etc. Researchers are still currently trying to operationalize these ideas, investigating, for example, what "task complexity" means when the task is mediated by technology or whether we can even apply the same concepts and models from tasks that are not technology-mediated. See section "[Work in Progress](#)" below.

Since 2003, multiple studies have looked at several technologies employing tasks (from more traditional jigsaw-type tasks to more real-world tasks). In the last few years, a renewed interest in technology-mediated TBLT has spiked, as demonstrated by recent review studies (Lai and Li 2011; Thomas 2013) as well as volumes on TBLT and technology addressing both practical and theoretical matters (Al-Bulushi 2010; González-Lloret and Ortega 2014; Thomas and Reinders 2010).

Thomas and Reinders' (2010) edited volume follows Chapelle's (2001, 2003) call to investigate the interface between task-based L2 research and CALL. The volume

is a collection of research which explores the potential and challenges of different technologies (mainly CMC) to incorporate tasks. Echoing previous research, the *Afterward* of the collection points out the importance of developing technology-mediated tasks that are informed by SLA research findings, as well as investigating language learning within the digital environments in which students are commonly immersed.

In a recent edited volume, González-Lloret and Ortega (2014) propose a new understanding of technology-and-task integration, one that is fully integrative and not just a translation of face-to-face tasks to online environments and one in which pedagogic tasks would maximize the benefit of transformative new technologies. In order to reach this full integration of TBLT and tasks, González-Lloret and Ortega propose that, first, a clear definition of task should exist. Tasks integrated with technology should primarily focus on meaning, rather than on grammatical forms. They should also be holistic and authentic, drawing on real-world processes of language use. Tasks should be learner centered, considering students' needs and wants for language, their technological applications, and their digital skills. Lastly, tasks should bring reflection to the learning process; they should provide opportunities for higher-order learning as part of principles of "experiential learning" (Dewey 1938/1997). In addition to a clear definition of task, for a full integration of technology and tasks, it is important to be aware of the implications that adding technology has on the task. In addition to the emergence of new aspects to familiar tasks, both new tasks and learning to use new technologies may need to be incorporated into the curriculum. Finally, in line with contemporary views of TBLT (Van den Branden et al. 2009), a programmatic understanding of TBLT is advocated that pays attention to all aspects of a language curriculum, from needs analysis to assessment and evaluation, and that considers the role of technology in all of them. Although we have still not seen many fully developed technology-mediated TBLT curricula, recent research has started to define the different components for such a curriculum, from illustration of a needs analysis incorporating technology and tasks (González-Lloret 2014) to issues of task selection based on complexity (Adams and Nik 2014), task implementation (Cantó et al. 2014), student assessment (Winke 2014), and course evaluation (Nielson 2014).

Work in Progress

The recent interest in technology-mediated TBLT is growing in parallel to a burst of innovations beyond CMC tools that connect speakers with new possibilities through faster hardware that allows multimedia, multiuser platforms. As with any new field, pioneers in language learning through these technologies are exploring, first and foremost, their general potential for language learning and integration into teaching and their possible articulation with teaching and learning methodologies.

Among the new studies, gaming for second and foreign language learning has gained special attention from the CALL community. There are strong connections between gaming principles and the concepts behind TBLT. For example, the

structure of most games is based on the completion of tasks, best known as “quests,” which are sequenced according to principles of complexity (contextual, organizational, algorithmic, etc.) and aim at actively engaging participation in “doing something.” In addition, game players shape the games by the actions they take and the decisions they make, much like speakers shape a task once they are immersed in it. Game players learn to play mainly by playing (as well as talking to other players, reading about the game, etc.) which fits with TBLT’s main educational philosophy of experiential learning.

A few authors have explored the efficiency of tasks to promote language learning within games and other virtual environments, but this is very much a work in progress. Among the first studies is Sykes’ (2012, 2014) research into a virtual environment called *Croquelandia*. The tasks in this environment were designed to expose students to Spanish pragmatic speech acts that were infrequent in the classroom (refusals and apologies), by interacting with avatars that presented different situations common in the daily life of a student. Another example of the incorporation of tasks and task-based principles into new technologies is Holden and Sykes’s (2012) work on a mobile-based game *Mentira*. The game was designed for Spanish students to interact among themselves, with the mobile devices, and with a physical neighborhood in Albuquerque, New Mexico, through a mystery-type activity composed of several tasks. Similarly, Collentine (2013) has also explored a built 3D environment in which students need to engage in two different tasks to find clues about a crime (one missing-person case and one murder mystery) interacting with other learners via CMC as well as avatars (non-player characters) and a variety of objects. Collentine investigated the relationship between linguistic complexity in the input and L2 production. This is the first study that, using regression analysis, looks at different measures of input complexity from a 3D world in Spanish to find out which variables were actually affecting the complexity of learners’ output. Collentine found that more information in the input resulted in more information production and more linguistic complexity in the learners’ output. The learner’s output contained more lexical variety when the input was dense (included nouns, verbs, adjectives, and adverbs) but lacked lexical variety, and their output was more dense when the input lacked lexical variety and was not syntactically complex. Finally, the learners’ output was syntactically more complex when the input was semantically but not syntactically complex. Collentine’s research demonstrates the importance of designing tasks that include certain linguistic features in the input (input rich in information rather than complex) for learners to generate complex language.

In a similar line of investigation, Adams and colleagues (e.g., Adams and Nik 2014) are looking at several dimensions of task complexity (following Robinson’s cognition hypothesis) to be able to predict student output. In their research, they have found that in CMC tasks, when learners perform tasks more complex by a lack of prior knowledge, they produce more lexical complexity and less negotiation. However if they perform tasks for which they have prior knowledge, their quantity of language increases, but not their lexical complexity or their accuracy. This research also consistently points out the limitations and challenges of employing theoretical

frameworks of face-to-face TBLT in the study of technology-mediated TBLT. See Ortega and González-Lloret (2015) for a review of research on task complexity in technology-mediated TBLT.

Another technology that is receiving considerable attention recently are social virtual worlds and Second Life (a free 3D virtual world where than 450,000 users can interact in a variety of academic and social settings) in particular. Investigation into tasks performed inside Second Life have been studied looking mainly at the affordances of the medium to promote L2 cultural awareness and cultural acquisition through tasks. It should be noted that the work of the NIFLAR European Project is managed by the University of Utrecht, which has developed several environments in Second Life as well as pedagogical tasks to promote social interaction and cultural awareness. More information can be found at <http://niflar.eu/>.

One more emergent area of research is that of augmented reality as a place for tasks. Thorne et al. (2015) present research focusing on understanding how language learners interact with a mobile digital augmented reality game played in groups around one mobile phone (a pedagogically driven decision to promote collaborative work and negotiation in the L2). The study investigates how participants orient to the mobile device (a phone), to the physical world around them, and to each other for the completion of the task. The importance of the device and the holder of the device is demonstrated by how frequently participants orient to them for instruction and leadership, by how the device was the center of most interactions and how information from the device was made public and available through talk. We certainly need more research to build a corpus of knowledge about how tasks and mobile technologies interconnect, and this study is a first step toward this goal.

As new technologies emerge, new research will be needed to gauge the impact that incorporating tasks and technology-mediated TBLT principles within innovation may have on language learning. Research will have to adapt and evolve as we apply principles and theories of non-technology task-based research to technology-mediated task research. New advances of theory, research, and practice will be essential to have a clear set of concepts of what technology-mediated tasks are (Chapelle 2014). These will not only help design research, develop materials, and plan evaluation research, they will also help in moving the field of technology-mediated TBLT forward. This idea brings about as much excitement as concern, emphasizing one of the clearest challenges of technology-mediated TBLT: the speed of innovation.

Problems and Difficulties

Given the rapid changes in technology and innovation, predicting what tools students will need in the future to be able to accomplish a task in the L2 is pure speculation. We can certainly find out what technologies students need to use currently, but predicting those that they will need after graduating in 4, 5, or 10 years is almost impossible. For this reason, it is essential to focus research on the affordances of a tool, environment, or activity which promote language learning,

so that, when technology changes, we can revisit whether these essential components are still intact.

This rapid change of technology affects one of the central tenets to TBLT: the idea that there should be a close connection between the tasks performed in class and in the real world, that the tasks should be as authentic and real-world as possible (Van den Branden 2006). This notion gets even more complicated when we try to define what is “authentic” in relation to technology. In most language classes, we will have students who only use technology for academic purposes (word processor, search engines, email. . .), others who may use technology to engage in social networking with speakers of the target language, and there will probably be a couple of gamers who would want to have access to a game in the target language. All of these constitute real authentic uses for these learners and may pose difficulty when developing a task-based curriculum. Deciding what technologies to include in a classroom curriculum should not be different from the multiple needs and desires that students may have regarding topics and activities in the classroom. A well-developed needs analysis, with a balance of sources and methods, should help decide which tasks, what language, and which technologies to include in the curriculum.

Another important challenge to technology-mediated TBLT (and to TBLT in general) is the lack of a clear definition of task. As innovation brings more variety in what we can do with technology, the definition of a task within technology may get stretched and diluted. In order to maintain a recognizable methodology, we need to keep the core characteristics and principles of a task intact while adapting it to new media.

Even with a clear definition of task, some of the issues that face-to-face research on task faces do transfer to technology-mediated tasks, for example, the idea that a task gets transformed by the students when they engage in it in ways that cannot be predicted by the task designer. As Seedhouse (2005) argues, differences between “task-as-workplan” (the expectations for how the task is implemented and executed) and “task-in-process” (what actually happens when the learners engage with the task) exist. These differences may actually be amplified by the inclusion of technology, since it adds one more layer to the task design and therefore additional opportunities for the task design to be changed. It is important, then, that technology-mediated TBLT research pays attention to both “task-as-workplan” and “task-in-process.” This necessitates the collection and analysis of data about the actual carrying out of the task, rather than just making claims about the task before it is executed and evaluated. It also necessitates inclusion in the analysis of possible interactions that occur “around” the task that may be relevant for the completion of the task as well as for language learning.

Finally, for the field of technology in TBLT, and CALL in general, it is essential to understand technology as integral to the education system but without “technological determinism” (Warschauer 2004). We need to develop a critical capacity for the “analysis of the affordances of technology, needs of language learners, and opportunities missed when technology is selected” (Chapelle 2014, p. 329). Therefore, the inclusion of technology (and what technologies exactly to include) should be driven by the analysis of learners’ needs and conditions for task completion, and it should be as carefully planned as any other aspect of the task design.

Future Directions

The directions for future research into technology-mediated TBLT will be heavily influenced by the changes and new affordances of innovations in technology, which, as stated above, are almost impossible to predict. However, future research will also have a lot to do with the direction that CALL research and SLA in general are exhibiting now.

Parallel to the evolution of CALL and SLA toward epistemological diversity and inclusion of new theories (e.g., emergentism, dynamic systems, complexity theories under the usage-based philosophy), technology-mediated TBLT will incorporate new research agendas not yet addressed. In particular, it will include research topics incorporating social dimensions of second language learning such as issues of identity construction through tasks; the role that the technology has in mediating knowledge; how we conceptualize privacy and social spaces; how knowledge is distributed, co-constructed, and shared through different media in time and space; what role pragmatics of a language play in the design of tasks; etc (González-Lloret and Ortega [in press](#)).

In addition, as technologies reach populations that have not traditionally been part of SLA studies, there will be more variety in studies. Technology use is now pervasive among very young children, and we will need studies into pre-school and school-age children learning language mediated through innovation in and out of institutional settings. See Butler (2015) for an excellent example of research with Japanese children on understanding gaming for language learning from the children's perspective. In addition, as people's capacities to engage in technology evolve, we will need studies of people learning languages with high and low computer literacies, as well as multilinguals engaging with different technologies within a TBLT framework.

Although Chapelle (2001) has already mentioned the need for more multilevel analysis of technology-based tasks (analysis of the software, analysis of the task, task success, and empirical evaluation of the learner's performance), this is an area that is still neglected in the field. Most studies are still constrained to the study of just one of the aspects above. This may be a consequence of the difficulties of large time and resources consuming research, as well as the still existing limitations of space for publication in main journals in the field. A few examples of how multilevel analysis can be conducted with tasks and technology are starting to emerge (e.g., Sykes 2014), but, without a doubt, more is needed.

With more research in all areas of technology-mediated TBLT, and a more programmatic view of TBLT that will incorporate a range of aspects from needs analysis to student assessment and evaluation, we will most likely see more research on curriculum implementation and formal evaluation. Nielson (2014) is one of the few studies today that has evaluated a technology-mediated full curriculum (for a Chinese language course).

As language education becomes more specialized, the design and research of technology-mediated language tasks for specific purposes will advance. Although we only have a few examples for journalism (Appel and Gilabert 2002; Reeder 2010)

and vocational technical professions (Schrooten 2006), the idea of incorporating tasks designed specifically for a group of learners with common needs and goals fits perfectly within the TBLT framework. As more technical training in second/foreign languages is tailored to be delivered virtually through the Internet, we will need more research on its development and implementation, as well as its efficacy and generalizability to other similar contexts.

One last field of CALL that has just started to intersect with task-based language teaching is iCALL (intelligent CALL) which employs AI (artificial intelligence) practices. Up to now, most of the existing research has focused on written interaction between the learner and the computer system. The first examples of iCALL for language learning in the mid-1990s could be considered the first gaming and simulation environments for second and foreign language learning, designed to present the learners with interactive input, allowing them to set the action of the activity, as well as providing them with corrective feedback. For examples and discussion, see Schulze (2010). Although most research up to date focuses on L2 reading and writing skills, as voice recognition software improves, we will probably see more iCALL research focused on all four skills (reading, writing, speaking, and listening). We could say that CALL research on gaming (see above) is in some way iCALL research, but focusing on the user side of the application rather than on the system that facilitates the human-computer interaction.

Finally, of great importance for the successful implementation of technology-mediated TBLT is teacher education. Without proper methodological education, teachers revert back to the techniques and classroom resources that are familiar to them. Not to mention how intimidating technology can be for teachers without proper training. For an example of teacher education in the creation and implementation of technology-mediated tasks, the reader can see Winke's presentation in the colloquium "Technology-mediated TBLT" at the 2013 TBLT Conference at <http://technology-mediatedtblt.blogspot.com/2013/10/tblt-2013-colloquium-technology.html>. With a few examples of investigation in this area as a starting base (e.g., Raith and Hegelheimer 2010), this important research will certainly increase in the near future.

Cross-References

- ▶ [Digital Literacies in Teacher Preparation](#)
- ▶ [Educationally Designed Game Environments and Feedback](#)
- ▶ [History and Key Developments in Intelligent Computer-Assisted Language Learning \(ICALL\)](#)
- ▶ [Online Intercultural Exchange and Language Education](#)
- ▶ [Technology and Second Language Teacher Professional Development](#)
- ▶ [Virtual Worlds and Language Education](#)

Related Articles in the Encyclopedia of Language and Education

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Online Intercultural Exchange and Language Education

Robert O'Dowd

Abstract

Online intercultural exchange (OIE), also referred to as telecollaboration or virtual exchange, refers to the engagement of groups of students in online intercultural interaction and collaboration with partners from other cultural contexts or geographical locations under the guidance of educators and/or expert facilitators. This chapter begins by examining the origins of this activity and outlines the main types of OIE that are currently being employed in foreign language learning contexts. It then moves on to discuss new models of online interaction and exchange and reviews some of the problems that educators have encountered in its application in the classroom.

Keywords

Online intercultural exchange (OIE) • Telecollaboration • Language learning • Intercultural communication • Intercultural communicative competence • Tandem learning

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Introduction

Online intercultural exchange (OIE), also referred to as telecollaboration or virtual exchange, refers to the engagement of groups of students in online intercultural interaction and collaboration with partners from other cultural contexts or geographical locations under the guidance of educators and/or expert facilitators (O'Dowd 2013). Online exchange has traditionally involved bilingual/bicultural interaction between students in different countries who were studying each others' languages. For example, English students learning German may engage in online communication with students of English in a German partner institution. However, an increasing number of new exchange models and constellations are beginning to emerge across the globe which engage learners in online intercultural communication in a myriad of ways. It is not uncommon, for example, to see students using a lingua franca such as English in order to work on collaborative projects in online platforms such as Wikis or Second Life. At university level, there are also a growing number of facilitator-led models which have intercultural experts who take part in and guide the online communication between students.

Online intercultural exchange (henceforth OIE) has come to be seen as one of the main online activities for developing foreign language (FL) communication skills and intercultural awareness in the foreign language classroom (Corbett 2010; Thorne 2006) as it allows educators to engage their learners in regular semi-authentic communication with members of other cultures in distant locations, and it also gives learners the opportunity to reflect on and learn from the outcomes of this intercultural exchange within the supportive context of their classroom under the guidance of their teacher.

Over the past two decades, OIE has begun to receive a great deal of attention in the academic literature and in research circles. Several book publications have dealt exclusively with the topic (Belz and Thorne 2006; Dooly 2008; Guth and Helm 2010; O'Dowd 2006, 2007; Warschauer 1995) as well as two special editions of the journal *Language Learning & Technology* (volumes 7/2 and 15/1). Significant amounts of funding have also been made available for research projects dedicated to the area including the European Commission's projects *Moderating Intercultural Collaboration and Language Learning* (Dooly 2008), *Intercultural Communication in Europe* (Kohn and Warth 2011), and *Integrating Telecollaborative Networks in Higher Education* (O'Dowd 2013). In the USA, significant funding has also been invested in numerous projects in this area, including the *Penn State Foreign Language Telecollaboration Project* (Belz 2003).

Early Developments

The origins of OIE in FL education has been traced to the learning networks pioneered by Célestin Freinet in 1920s France and later by Mario Lodi in 1960s Italy, decades before the internet was to become a tool for classroom learning

(Cummins and Sayers 1995, pp. 119–136). Freinet made use of the technologies and modes of communication available to him at the time to enable his classes in the north of France to make class newspapers with a printing press and to exchange these newspapers along with “cultural packages” of flowers, fossils, and photos of their local area with schools in other parts of France. Similarly, Lodi motivated his learners and helped to develop their critical literacy by encouraging them to create student newspapers in collaboration with distant partner classes. The link between the principles and activities of these educators and the online work being carried out today is discussed in detail by Cummins and Sayers (1995) and by Müller-Hartmann (2007).

Despite the emergence of the internet and local area networks (LANs) in the early and mid-1990s, initially there was relatively little telecollaborative interaction between classrooms in different geographical locations as educators did not yet have wide access to partner classes in other locations, and students found it difficult to access the internet outside of the classroom. In this context, online interaction was limited to learners in one class using synchronous text-based communication, such as chats, MOOs, and LANs, to interact together in the target language. The text-based nature of the communication was seen at the time as being a manner of allowing FL learners to reflect on and plan their utterances in the FL before committing them to the online interaction with their classmates.

Nevertheless, some isolated examples of online intercultural exchange in the early 1990s can indeed be found in the literature. Early reports include the work of the Orillas Network (Cummins and Sayers 1995), the AT&T Learning Circles (Riel 1997), as well as more in-depth research studies into tandem exchanges (Brammerts 1996; Eck et al. 1995). Warschauer’s publication, *Virtual Connections: Online Activities for Networking Language Learners* (1995), included a collection of “cross-cultural communication” projects that reported on students creating personal profiles, carrying out surveys, and examining cultural stereotypes with distant partners. At this stage a number of websites, including Intercultural E-mail Classroom Connections (IECC) and E-Tandem, also became available online in order to link up classrooms across the globe and to provide practitioners with activities and guidelines for their projects, while practitioners such as Ruth Vilmi in Finland and Reinhard Donath in Germany helped to make the activity better known by publishing practical reports of their students’ work online (Donath and Volkmer 1997). Vilmi’s work focused on online collaboration between technical students at universities across Europe, while Donath provided German secondary school teachers with a wide range of resources and information about how projects could be integrated into the curriculum.

The IECC website also contained a very active discussion forum between 1994 and 1995 where practitioners were often asked by the moderator and IECC co-founder Bruce Roberts to react to questions related to how online intercultural exchanges could be integrated into the classroom and what type of tasks were successful in online exchanges. The responses to these questions reveal not only many of the challenges which pioneering telecollaborators were facing during the

infancy of the internet; they also demonstrate that many of the key pedagogical principles of the time are still highly relevant for twenty-first-century teachers using OIE. Practitioners wrote about the need for adequate time for students to reflect on their email interactions as well as for adequate access to resources to ensure fluid communication between classes. They also mention the importance of pedagogical leadership on behalf of the teachers in organizing and exploiting the exchange. Roberts summed up what he considered to be the key to success in email classroom connections as being the pedagogical integration of the activity into the class and the learning process: “when the email classroom connection processes are truly integrated into the ongoing structure of homework and student classroom interaction, then the results can be educationally transforming” (1994, n.p.).

Major Contributions

In the past decade, OIE has become one of the main pillars of network-based language teaching (NBLT), and the contribution of online contact and exchange to the development of intercultural awareness and intercultural communicative competence (ICC) has been one of the main areas of research in this area (Müller-Hartmann 2000; O'Dowd 2003; Ware 2005). Initially, however, the intercultural learning outcomes of such contact tended to be at times exaggerated or oversimplified. For example, it was common to read that intercultural learning could be “easily achieved through [email] tandem learning” (Brammerts 1996, p. 122).

Soon, however, a more critical and in-depth body of research was producing findings which demonstrated the difference between intercultural contact and intercultural learning. Kern suggested that in the context of online learning, “exposure and awareness of difference seem to reinforce, rather than bridge, feelings of difference” (Kern 2000, p. 256). Similarly, Meagher and Castañós (1996) found in their exchange between classes in the USA and Mexico that bringing the students to compare their different attitudes and values leads to a form of culture shock and a more negative attitude toward the target culture. Furthermore, Fischer (1998), in his work on German-American electronic exchanges, warned that very often students, instead of reflecting and learning from the messages of their distant partners, simply reject the foreign way of thinking, dismissing it as strange or “typical” of that particular culture.

Over the past two decades, the main models of OIE that have been used in foreign language education have been e-tandem and blended intercultural models. Each of these will now be looked at briefly.

The first of these, e-tandem (O'Rourke 2007), emerged from the tradition of tandem language learning that has been widely practiced in many European universities. Tandem learning is essentially a language learning activity which involves language exchange and collaboration between two partners who are native speakers of their partners' target language. Its online equivalent, e-tandem, thus involves two native speakers of different languages communicating together and providing feedback to each other through online communication tools with the aim of learning the

other's language. E-tandem exchanges are based on the principles of autonomy and reciprocity, and the responsibility for a successful exchange generally rests with the learners, who are expected to provide feedback on their partners' messages and on their FL performance. In this sense, tandem partners take on the role of peer-tutors who correct their partners' errors and propose alternative formulations in the target language. In the e-tandem model, the teacher assumes a facilitating role, and learners are encouraged to take responsibility for finding their own themes for discussion, correcting their partners' errors, and keeping a learner diary or portfolio to reflect on their own learning progress. E-tandem began to gain popularity throughout European universities in the early 1990s, and a centralized internet site with resources, bibliography, and guidelines was financed by European project funding during this time.

In contrast to e-tandem models, the blended intercultural approach to OIE placed a greater emphasis on intercultural aspects of language learning and required students to work together with their international partners to make comparisons of their cultures. Belz (2002), for example, reports on a USA-German exchange which involved developing a website which contained bilingual essays and a bilingual discussion of a cultural theme such as racism or family. Another popular intercultural task for classroom-integrated exchanges has been the analysis of parallel texts. Belz defines parallel texts as 'linguistically different renditions of a particular story or topic in which culturally-conditioned varying representations of that story or topic are presented' (2005, n.p.). Popular examples of parallel texts which have been used in telecollaborative exchanges include the American film *Three Men and a Baby* and the French original *Trois hommes et un couffin*. In German, telecollaborative projects have engaged learners in the comparison of the German fairy tale *Aschenputtel* by the Brothers Grimm and the animated Disney movie *Cinderella*.

A further task which reflected this approach was the application of ethnographic interviewing in synchronous online sessions. O'Dowd (2005) trained a group of German EFL students in the basic techniques of ethnographic interviewing, and the students then carried out interviews with American informants in the USA using group-to-group videoconferencing sessions and one-to-one email exchanges before writing up reflective essays on their findings. The combination of synchronous and asynchronous tools allowed the students to develop different aspects of their intercultural competence. Videoconferencing was seen to develop students' ability to interact with members of the target culture under the constraints of real-time communication and also to elicit, through a face-to-face dialogue, the concepts and values which underlie their partners' behavior and their opinions. However, email was employed to both send and receive much more detailed information on the two cultures' products and practices as seen from the partners' perspectives. In other words, email was suited to foster cultural knowledge, while videoconferencing supported the development of students' intercultural negotiating skills.

Another OIE activity which has become very popular in recent years is the *Cultura* exchange (Furstenberg et al. 2001; O'Dowd 2005). This intercultural exchange uses the possibility of juxtaposing materials from the two different cultures together on web pages in order to offer a comparative approach to investigating

cultural difference. When using *Cultura*, language learners from two cultures (e.g., Spanish learners of English and American learners of Spanish) complete online questionnaires related to their cultural values and associations. These questionnaires can be based on word associations (e.g., What three words do you associate with the word Spain?), sentence completions (e.g., A good citizen is someone who. . .), or reactions to situations (e.g., Your friend is 22 and is still living with his parents. What do you say to him/her?). Each group fills out the questionnaire in their native language. Following this, the results from both sets of students are then compiled and presented online. Under the guidance of their teachers in contact classes, students then analyze the juxtaposed lists in order to find differences and similarities between the two groups' responses. Following this analysis, students from both countries meet in online message boards to discuss their findings and to explore the cultural values and beliefs which may lie behind the differences in the lists. In addition to the questionnaires, learners are also supplied with online resources such as opinion polls and press articles from the two cultures that can support them in their investigation and understanding of their partner class' responses. The developers of *Cultura* (Furstenberg et al. 2001) report that this contrastive approach helped learners to become more aware of the complex relationship between culture and language and also enabled them to develop a method for understanding a foreign culture. It is also important to point out that in this model, while the data for cultural analysis and learning are produced online, the role of face-to-face teaching is considered vital in helping the learners to identify cultural similarities and differences and also in bringing about reflection on the outcomes of students' investigations on the *Cultura* platform.

Work in Progress

In recent years, alternative models and applications of OIE have begun to appear. These involve forms of online intercultural interaction which are completely free of institutionalized learning setups and others which are led, not by teachers, but outsourced to educational organizations specialized in setting up and facilitating online interaction initiatives. Each of these trends will now be briefly described.

The first of these "new-style" telecollaborative exchanges function completely outside the "traditional" class-to-class arrangement and engage learners in specialized online interest communities or environments that focus on specific hobbies or interests. Thorne et al. (2009), for example, describe the potential for intercultural contact and learning in online fan communities, where learners can establish relationships with like-minded fans of music groups or authors and can use Web 2.0 technologies to remix and create new artistic creations based on existing books, films, and music (see also Thorne et al. 2015). Learners also have increasing opportunities to use their FL skills and hone their intercultural communicative competence through participating in online multicultural communities such as multiplayer online games and public discussion forums (Hanna and de Nooy 2009). Researchers working in this area are

finding a complex range of data sources emerging from these noninstitutionally located intercultural exchange contexts. Pasfield-Neofitou (2011), for example, analyzed a corpus of blogs, emails, social network site (SNS) interactions, chat conversations, game profiles, and mobile phone communications between 12 Australian learners of Japanese with Japanese partners they had contacted outside of their formal learning environment, in order to explore issues of language choice, identity construction, and feelings of national identity and “foreignness” online.

Models of OIE which function at this level of integration require learners to assume greater responsibility for how their linguistic and intercultural learning progress online as they are given greater freedom in their choice of potential intercultural learning partners and learning environments – many of which, as has been stated, may be completely independent of organized classroom activity. Thorne describes this form of telecollaborative learning as “intercultural communication in the wild” (2010, p. 144) and speculates that this learning may be “situated in arenas of social activity that are less controllable than classroom or organized online intercultural exchanges might be, but which present interesting, and perhaps even compelling, opportunities for intercultural exchange, agentic action and meaning making” (Thorne 2010, p. 144).

The second new-style telecollaborative approach involves “facilitated” models of OIE where trained online facilitators are hired by universities to guide synchronous online discussions between learners in different universities. The project *Perspectives on the Euro(pean) crisis* (Sharing Perspectives Foundation 2013), for example, involved eight European universities and was coordinated by the Sharing Perspectives Foundation, a Dutch organization which has been set up purely to promote virtual exchange. During each week of this exchange, lectures on the theme of the European crisis were recorded and broadcast online to students from the participating institutions. These lectures were then followed by synchronous discussions between the participants using a unique web-based videoconference tool. These discussions were hosted by professionally trained facilitators. At the end of the project, two students from each university were selected to go to Brussels to present the results of their research to members of the European Commission.

Another facilitator-based OIE project is the *Soliya* program which brings together students from the East and West with the aim of developing a deeper understanding of the perspectives of others around the world on important socio-political issues and also to develop critical thinking, intercultural communication, and media literacy skills (see Helm, this volume). Each iteration of the project connects over 200 students from over 30 different universities in the USA, Europe, and the predominantly Arab and/or Muslim world. Students are placed into small groups of 8–10 students and guided through a 9-week, English-language dialogue program by pairs of trained facilitators. Students receive credit from their local institution for participating in the project, even though the facilitators and the online exchange environment are contracted from the *Soliya* organization by the different universities.

Problems and Difficulties

The literature on online intercultural exchange demonstrates that these activities potentially result in negative attitudes toward the partner group and their culture, misunderstandings, and unachieved objectives. The main question which has occupied many researchers is why this is the case and whether these instances of intercultural communication breakdown should be seen as something problematic or as opportunities for learning.

Kramsch and Thorne (2002), for example, found that the reasons for online communication breakdown between participating French and American students were due to both groups trying to engage in interaction with each other using not merely different communicative styles but culturally divergent discourse genres. Neither group appeared to be aware of this difference in discourse genres. While the French students approached the exchange as an academic exercise and used factual, impersonal, restrained genres of writing, the American group regarded the activity as an opportunity for bonding with their French age-peer partners and subsequently favored the strategy of seeking interpersonal rather than academic solutions to the problems which arose.

Several other studies also looked at how the outcomes of intercultural exchanges could be influenced by both macro- as well as micro-level aspects of the environments in which they took place. Belz (2002), reporting on a semester long email exchange between German (studying English) and American (studying German) foreign language students, found that the context and the setting of the two partner groups had a major influence on the success and results of the exchange. Issues such as different institutional and course demands and varying levels of access to technology led to misunderstandings with regard to deadlines for teamwork and therefore hindered the development of relationships on a personal level.

Other research has revealed how individual students' motivation and intercultural communicative competence can have an important influence on the outcome of online partnerships. In reference to motivation, Ware (2005) identified individual differences in motivation as being an important factor in the low functioning of an exchange. In her study, success in the asynchronous exchange required students to spend a substantial amount of time reading and replying to correspondence, and this often clashed with the amount of time students had put aside for such an academic activity. The importance of individual students' intercultural competence is also illustrated in O'Dowd's study (2003) of five Spanish-English email partnerships. He found that the essential difference between the successful and unsuccessful partnerships was whether students had the intercultural competence to develop an interculturally rich relationship with their partners through the creation of effective correspondence. This type of correspondence took into account the socio-pragmatic rules of the partner's language, provided the partner with personal opinions, asked him/her questions to encourage feedback, tried to develop a personal relationship with the partner, and was sensitive to his/her needs and questions.

In order to prepare educators for the challenges that await them in their telecollaborative exchanges, O'Dowd and Ritter (2006) provided a structured inventory of possible reasons for the breakdown of telecollaborative exchanges. The inventory organized the reasons for failed communication into four different levels: socio-institutional, classroom, individual, and interaction levels. The individual level refers to the learners' psychobiographical and educational background, the classroom level refers to how the exchange was organized and carried out in both classes, the socio-institutional level deals with the different levels of access to technology and institutional attitudes to online learning, while the interaction level looks at the actual quality and nature of the communication which takes place between the partner classes.

The question remains as to whether the repeated cases of communication breakdown and intercultural misunderstanding should be seen as a negative aspect of telecollaborative exchange or rather as a potential "jump-off" point for exploring why members of different cultures interpret behavior differently and how different cultural perspectives can be reconciled. Intercultural communication in face-to-face contexts and out of the classroom is also often characterized by misunderstandings and the need to deal with different behaviors and beliefs. It is therefore fair to argue that these cases of "failed communication" should be exploited as "rich points" for learning in the classroom. Belz goes so far as to argue that "the clash of cultural faultlines in telecollaborative learning communities . . . should not be smoothed over or avoided based on the sometimes negative results of a study such as this one; indeed, they should be encouraged" (2002, p. 76).

Future Directions

The chapter sets out to review how OIE has been employed to develop learners' foreign language skills and intercultural awareness. After two decades of intense practice and research, the following conclusions can be drawn about this activity: First, OIE has at this stage demonstrated its educational potential and can make an important contribution to language learning and intercultural competence and clearly has the potential to form an important part of the foreign language curriculum. Second, it is an extremely complex activity that is both time-consuming and challenging for teachers and for students to engage in successfully. Third, in order for it to be sustainable, OIE needs to go beyond being an isolated activity practiced by practitioner-researchers in the area of computer-assisted language learning and should instead form part of the common battery of educational tools (e.g., MOOCs, the flipped classroom) used by educators across academic disciplines. Fourth, the long-term success of OIE also depends on support by school/university management and policy makers in the form of training for staff, academic recognition of students' work, and acknowledgment of its value and importance in educational policy documentation. Finally, in order to achieve the wider mainstreaming of the activity,

practitioners and researchers also have a role to play by providing further transparent research into the educational value of telecollaboration and by developing models of telecollaborative exchange which are adaptable to other university disciplines and which explicitly attend to the transversal competences that educators are required to develop in their teaching.

Cross-References

- ▶ [Critical Approaches to Online Intercultural Language Education](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)

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Critical Approaches to Online Intercultural Language Education

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Abstract

This chapter explores critical approaches to online intercultural language education, also referred to as telecollaboration or online intercultural exchange. The origins of online intercultural language education lie in a critical view of the traditional language classroom. As the practice has evolved, several researchers have adopted a critical approach, questioning the many assumptions that have become ingrained in foreign and online intercultural language education. Major contributors have challenged notions such as intercultural learning being a natural outcome of online contact or the concept of a static, monolithic, national standard language as the target of language learners, whose ideal interlocutors are “native” speakers of this language and experts of its equally static culture. They have also unpacked conceptualizations of sociocultural competence and communicative language teaching as well as the notion that technology is merely a tool through which learners communicate. Recent work has looked, for example, at lingua franca exchanges, which challenge the power dynamics of traditional exchanges and offer a wider range of identities than the nonstandard, deficient communicator that the native speaker target implies. The ecologies of online intercultural language education and the mediating and shaping role of technology and its relations with society have also garnered interest recently. Problems and difficulties in the adoption of critical approaches include the reluctance of teachers to take a political stance and the need to constantly question one’s practice. The chapter concludes with reflections on preferred futures for online intercultural language education.

Keywords

Online intercultural exchange • Telecollaboration • Intercultural communication • Critical pedagogy • Intercultural negotiation

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Introduction

In the 2010 edition of *Issues in Language Program Direction*, entitled *Critical and Intercultural Theory and Language Pedagogy*, the editors of the volume present critical theory as “a means for language program directors, teachers, and students to unpack, examine, and transform assumptions that have become so ingrained in curricular, language-program-direction and teaching practices that they are considered second nature” (Phipps and Levine 2010, p. 6). This is a good starting point for this chapter since like other areas of applied linguistics, online intercultural language education, also known as telecollaboration, is imbued with assumptions about languages and society, culture and identity, and of course technology. These “common sense” beliefs and ideologies contribute to the maintenance of inequalities and power differentials and prevent us from challenging the dominant narratives in our societies that are reflected in and often supported by our practice.

The chapter will start by exploring work that has questioned the assumptions behind the theoretical underpinnings and the early practices of telecollaboration and go on to explore the major contributions offering a critical perspective. The term critical is also used to refer to practices in online intercultural language education which draw on critical pedagogy and enshrine a belief in the transformative potential of learning and teaching (Norton and Toohey 2004) and/or address issues of social, cultural, and political relevance to learners. Adopting a critical approach is certainly no easy task as the section on problems and difficulties highlights, for it entails “self-reflexivity” (Pennycook 2001) and the constant questioning and also critiquing of our own practices. The chapter closes with a vision of “preferred futures” for critical approaches to the practice and research of online intercultural language education.

Early Developments

Questioning the Theoretical Basis

Cognitive theories of second language acquisition (SLA) and socio-cognitive and sociocultural theories of language and of learning provide the theoretical foundations for telecollaboration. While interaction is key to both theories, the latter perspectives are derived from a questioning of the assumptions of interactionist SLA (Kern and Warschauer 2000; Kramsch 2000; Lantolf 2000), in particular the conceptualization of linguistic forms and functions as stable and neutral and the view of communication as being essentially referential in nature (Block 2002). Sociocultural and socio-cognitive theories view cognitive development as interdependent with social activity and are based on a view of learning as a culturally and historically situated social process (Thorne 2003, 2006). Network technologies are said to have contributed to this pedagogical shift (Kramsch and Thorne 2002), which led to contextual and collaborative approaches to language development with a greater interest in developing pragmatic knowledge and meaning (Kinginger and Belz 2005) and in addressing culture (Furstenberg et al. 2001). The “social turn,” as Belz (2002) wrote, saw language learners as “agents in sociocultural contexts” as well as input “processing devices” (p. 60). From a sociocultural perspective, telecollaboration was seen to offer not only opportunities to negotiate transactional meaning and develop linguistic competence but also to foster intercultural communicative competence (as defined by Byram 1997) and electronic literacies (Warschauer 1996, 1999).

A Political Slant

Online intercultural language education developed around a critical perspective on the “traditional” foreign language classroom, which was seen to offer learners limited opportunities for interaction and for learning. Global education networks were one of the initial stimuli for telecollaboration projects as they opened up opportunities for interactions outside the classroom. Margaret Riel, who set up the (still running) Learning Circles project in the 1980s, saw a major limitation in educational practices at the time as being the isolation of teachers from peers and learning opportunities, which was then reflected in their view of learning as an individual process: “It is difficult to imagine how teachers working alone in their classrooms are going to be able to provide students with a worldwide perspective in a rapidly changing world” (1993, p. 222). She saw a need for educational reform to find ways to strengthen teachers’ links to world events and to global issues, and in her view computer networking offered an opportunity for this.

Cummins and Sayers (1995) also saw the most appealing aspect of global learning networks as being their potential in challenging what they described as top-down control over learning which dominates most societies. They saw electronic networks as key tools for worldwide problem solving as they offered opportunities to

increase intercultural communications and cooperation and presented a powerful alternative to the directions that educational reform in the United States was taking at the time they were writing. As the title of their book suggested, *Brave New Schools: Challenging Cultural Illiteracy Through Global Learning Networks*, their stance was explicitly political, and they saw online intercultural collaborations as deriving their impact not from technology but from “a vision of how education can enact, in microcosm, a radical restructuring of power relations both in domestic and global arenas” (1995, p. 8). The approach they endorsed was built on transformative pedagogy and centered around collaborative critical inquiry in which students are encouraged to reflect critically on experiential and social issues.

This political slant was not so explicit in the E-Tandem approach to online intercultural language education, though as Brammerts (1996) pointed out, E-Tandem was a development of face-to-face tandem which had become an important focus in language learning in Europe due to political developments after World War II and the attempt to unite states in a multicultural and multilingual Europe. E-Tandem was based on the assumption that learners needed to be embedded in authentic sociocultural contexts where they could engage in direct exchange with target language speakers and challenged the separation between *learning* and *using* a language which characterized many classrooms that were (and still are), as Schwienhorst writes (2003), far from being communities of practice that offer learners opportunities to develop L2 identities and actually use a language.

In his early work *Electronic Literacies*, Warschauer (1999) highlighted the social nature and power struggles that influence literacy practices and uses of new technologies. He examined the relation between new literacies, pedagogical practices, and struggles for equality and power by exploring the use of technologies in four different classrooms. He concluded by highlighting the need for students to have the “chances to read, write, and think about issues of cultural and social relevance for their lives, as they work together with others near and far to tackle authentic complex problems collaboratively. If we as educators join with our students to help create these opportunities, together we can strive for a digital era that is more free, more just, and more equal than the print era we may one day leave behind” (1999, p. 177).

Major Contributions

In this section of the chapter, the main contributions to critical approaches to online intercultural language education will be outlined around the major assumptions they have challenged.

Assumption 1: Intercultural Contact Leads to Understanding and Fosters Equality

The assumption that intercultural learning would automatically result from the contact and interaction with distant “others” has been challenged from the outset

in telecollaboration research, as Lamy and Goodfellow (2010) point out, with practitioners and researchers readily identifying difficulties, tensions, and failure in telecollaboration projects. There have been many self-reflexive studies regarding this issue. In her study of a project between students in Germany and in the United States, Belz (2002) reported that connectivity did not necessarily translate into perceived learning for all the students and attributed this both to issues of structure and agency and differences in discourse styles. Kramsch and Thorne (2002) found telecollaboration is inherently at risk of dissonances and ambiguities. The different discourse styles of the speakers as they seek to request and exchange information, the ambiguity of the roles/identities of their partners, and their lack of expertise could lead to misunderstandings.

O'Dowd and Ritter (2006) identified four levels at which factors can contribute to "failed communication": the individual, classroom, socio-institutional, and interaction levels. They point out that it is usually a combination of interconnected factors that lead to failure. The level that seems to have received the most attention in the research is the socio-institutional level, which regards the mediating technologies and their design, the general organization of the students' courses of study, and the recognition of student participation. However, much attention has also been paid to the interactional level, on which O'Dowd and Ritter identify cultural differences in communication styles and behaviors, such as different attitudes to directness, non-verbal communication, use of humor, and irony. Perhaps the area which has led to most persistent questioning and reflection is the difficulty in getting students to engage in deeper levels of interaction so they move beyond the "assumption of similarity" and manage to take a critical, intercultural stance (Ware 2005; Ware and Kramsch 2005).

Ortega and Zyzik question "euphoric views of L2 tech-based interactions as inherently promoting egalitarian participation and optimal L2 production" (2008, p. 333) and maintain that online interactions do not necessarily neutralize unequal power relations but, on the contrary, can perpetuate them, as some studies on participation patterns have shown. They also problematize the equation of language production with engagement with L2 and SLA, for these views are based on the Western-centric assumptions that value participation over silence.

Assumption 2: The Native Speaker Is the Ideal Interlocutor

One of the major tenets of online intercultural language education has been that the ideal interlocutor is the "native speaker" of the "target language," which is conceptualized as a "national standard language." While these notions have been challenged in various fields of applied linguistics (Davies 2003; Rampton 1990), the monolingual mind-set, "native speaker" ideologies, and "standards" of national languages are still dominant in the discourses of foreign language teaching (FLT) and, indeed, online intercultural language education.

Train (2006) argues that the ideology of national standard language (NSL) and the related native speaker (NS) ideology have marginalized and devalued the identity

positioning of the language learner who is conceptualized as *non*-native speaker, with the implication that they are a “deficient” communicator of the language who commits “errors” and needs “correction.” He sees this ideology as particularly vividly encapsulated in SLA-informed approaches to telecollaboration which view online exchange as offering opportunities for interaction where negotiation of meaning can take place, and students can focus on form, with no or scant attention paid to cultural aspects of communication.

Approaches based on sociocultural views of language as situated social practice are more in line with Train’s view of online intercultural language education, as they conceptualize language as social practice and are concerned not only with the linguistic context but also and above all the intercultural exchange between interactants. Yet the notion of standardization has also pervaded the conceptualization of interactants within these approaches as they tend to be discursively constructed in terms of national languages, identities, and cultures, and the construction of nativeness is closely intertwined with an ideology of essentialism. Train argues for a critical take on standardization which problematizes “the assumption of one-nation-one-culture-one-self as the only desirable model of community, language, culture and identity” (p. 257).

This position has been echoed by other researchers, for example, Ortega and Zyzik (2008, p. 341), who highlight the persistent identification of a fixed culture with “so-called native speakers as a homogeneous group.” In their view, part of the problem is the non-questioning of the meaning of “culture” in the models of intercultural competence (Kramsch 2001) that telecollaboration practitioners have drawn upon. They point to the ongoing debates in other strands of applied linguistic theory around the limitations of homogeneous, essentialized, and static conceptualizations of culture. Ortega and Zyzik also question the focus on *international exchanges*, because by making international dispersion a defining feature of this practice, we “unwittingly reinforce the invisibility of immigrant communities living in the united States, who are speakers of the target languages in question and who are often regarded as being less than native, as it were, perhaps because their multi-competence is hastily misunderstood as incompetence” (2008, p. 341). The point Ortega and Zyzik make highlights the social divisions that the practice of telecollaboration may be serving to perpetuate. They see it as an ethical imperative and an opportunity for L2 researchers who work with technology to examine critically the images of interlocutors and learners that are privileged in L2 research on computer-mediated interactions. This is an issue that has also been raised by researchers who have focused on critical approaches and identity in language learning, such as Norton and Toohey (2004, 2011).

Assumption 3: We Should Aim to Foster Communicative and Sociocultural Competence

The communicative competence models on which much of foreign language teaching (FLT) and also telecollaboration are based have been called into question by

Schneider and von der Emde (2006) who highlight the “conceptual blind spots” within the communicative language teaching (CLT) paradigm and their implications for intercultural interactions. Some of the sociocultural strategies embodied in this model, particularly those for avoiding conflict, and the notion of effective or successful communication are seen as representing a form of cultural imperialism. Schneider and von der Emde take issue in particular with Savignon and Sysoyev’s “sociocultural strategy for maintaining a dialogue of cultures” (2002), which is based on the assumption that “mutual understanding” will take place in a “spirit of peace” if one of the interlocutors suppresses their points of view. This “strategy,” they point out, implicitly requires learners to “adopt questionable NS standards and forego their privileges as NNSs” (Schneider and von der Emde 2006, p. 181). The findings of other researchers support this stance. Ware (2005) for example found that in order to avert miscommunication, that is, misunderstandings or tensions in communication with their peers, students used avoidance strategies which could lead to “missed” communication, that is, missed opportunities for meaningful intercultural learning (Ware 2005, p. 66).

Drawing on the work of Bakhtin on dialogue and the conceptualization of language as a site of struggle, Schneider and von der Emde (2006) argue that it is more important to help students feel comfortable with conflict than to encourage them to deny their own cultural approaches to disagreement or rush to find common ground, for almost inevitably it is the dominant culture which establishes what ground is common. They propose a dialogic approach as this type of approach posits conflict not only as an inherent feature of intercultural exchange but also as a value. Dialogue allows for the existence of differences without trying to overcome or “tame” them. After pointing out some of the conceptual differences between dialogic and communicative approaches to online interactions, they propose a course and curriculum based on “teaching the conflicts,” citing their example of an exchange between students in the United States and in Germany in which the topic chosen was a controversial and sensitive one for both partners, namely, high school shootings. They report how insistence in the face of silence or lack of suitable responses rather than polite withdrawal (which sociocultural competence would have demanded) led to a gain in knowledge and an improved understanding of their peers.

Schneider and von der Emde’s (2006) conceptualization of online intercultural education as a “site for struggle” has much in common with Ortega and Zyzik’s (2008) emphasis on the need to conceptualize computer-mediated interactions as “complex and contested sites for intercultural negotiation and reconstruction” rather than as “inherently productive moments for bringing about intercultural understanding” (p. 338).

Assumption 4: Technology Is a Neutral Medium

The limited attention paid in much of the literature to the design and ideologies behind the Internet communication technologies used in online intercultural language education suggests that there is an assumption that the media used to bring students together are considered neutral. Taking for granted the existence of “the

Internet” and seeking to understand “its” effects on intercultural communication or linguistic development, however, have been criticized for being reductionist and failing to take into account the multiple forms of online-mediated activity; the contexts of their creation, development, uses, and transformations; and their mediating effect. Kramsch and Thorne (2002) raise the issue as they ask the extent to which the medium changes the parameters of communication and the nature of language use and stress the need to consider digital spaces as social places that do not evade the inequalities of the “physical” world.

In his 2003 article, “Artifacts and Cultures-Of-Use in Intercultural Communication”, Thorne takes a cultural-historical perspective of human communication and cognition and focuses on the concept of mediation, with specific regard to Internet communication tools and their influence on intercultural foreign language communication. Thorne uses three case studies to demonstrate the critical role of the “mediational means” and its cultural-historical significance for users on the initiation of communication and the development of interpersonal relationships. His first case study shows how the ongoing construction of Internet communication tools as distinctive cultural artifacts can differ interculturally in much the same way as pragmatics, communicative genres, and institutional contexts can; hence, they need to be taken into account in a shared orientation to activity if substantive intercultural communication is to be fostered. However, as his third case study also shows, while cultures of use can both mitigate and facilitate, they are also dynamic and will evolve in relation to the object of individual or group activities. Thorne highlights how “cultural artifacts are *produced by* and *productive of* socio-historically located subjects. Such artifacts take their functional form and significance from the human activities they mediate and the meanings that communities create through them” (2003, p. 58; Thorne 2016). Helm and Guth (2010) explore how not only the tools but also the concepts and ideologies behind Web 2.0 can be used in telecollaboration by teachers and learners to promote the development of language, intercultural awareness, and also online literacies. Drawing on the work of the new online literacy scholars Lankshear and Knobel (2006), they present a framework to foster the development of these three domains on three levels: the operational, the cultural, and the critical.

Work in Progress

Challenging the Native Speaker Paradigm Through “Lingua Franca” Exchanges

Recently, online intercultural exchanges whereby participants use a foreign language common to all of them, what has been described as “lingua franca” use, rather than communicating with native speakers, have been gaining ground (Guth et al. 2012). It has been suggested that the move toward English as a lingua franca (ELF) projects may be partly due to the increase in projects involving multiple partners (Lewis et al. 2011), and it may also reflect the fact that English language teachers in particular recognize that their students are more likely to communicate with “non-native” than

with “native” speakers. Lingua franca exchanges offer alternative identities for the students who are no longer “deficient communicators” of the target language but become, like their interactants, users of the language who are seeking to create shared meanings.

From a critical perspective, while lingua franca exchanges challenge the native speaker paradigm, and can contribute to the redressing of power inequities in interaction, there is a risk that ELF telecollaboration projects come to be a hegemonizing force (Train 2006), in much the same way as English as a medium of instruction has done in higher education (Phillipson 2015). This would be detrimental to the promotion of plurilingualism and foreign language study across the globe. There is hence a need for these practices to be accompanied by critical research which takes into consideration the implications of lingua franca exchanges on the broader social, political, and linguistic context.

Ecologies of Learning

The mediating role of technology in online intercultural exchange has returned to the attention of researchers, particularly as telecollaboration sites become more complex and involve multiple modes of communication. Kern, for example, reminds us of the strong interrelations between the technological and the social and calls for a “relational pedagogy” that looks at the many kinds of relationships that the design of meaning entails and aims “to foster a reflective consciousness of how acts of reading, writing, and storytelling *mediate* and *transform* meanings, not merely transfer them from one individual or group to another” (2015, p. 234). Malinowski and Kramsch (2014, p. 160) point to the “disjunctures in the flow of space and time” which “profoundly affect the possibilities for heteroglossic language learning” in synchronous, multimodal intercultural exchanges. Messina Dahlberg and Bagga-Gupta consider the virtual learning site as a sociocultural cognitive system where participants, “in concert with the tools they have at hand” (2015, p. 262), perform specific actions. They suggest that exploring how digital technologies frame participants’ interaction will provide clues on the ways in which students and teachers negotiate their positions at the boundaries of the physical and virtual communities. Thorne et al. (2015) explore the many different identity positions that digital contexts – both within telecollaboration projects and in preexisting digital environments – offer. They highlight the need for students to become “semiotically agile” to be able to perform identities and share and co-construct meanings with others.

Problems and Difficulties

Although 20 years have passed since Cummins and Sayers’ optimistic prediction that networked learning would be a part of all schools’ activities, online intercultural exchange is still a practice which is very much on the periphery of FL pedagogy, the domain of dedicated practitioners rather than a recognized and valued educational

practice (O'Dowd 2011). It is perhaps because of this marginalization that the emphasis of practitioners and researchers has at times focused on the positive, productive potential of telecollaboration to the detriment of a more critical approach. Many educators, students, and certainly educational policy makers would likely find a conceptualization of telecollaboration as a "site of struggle" threatening, intimidating, or at best unappealing. Perhaps when, or rather if, online intercultural language education becomes more mainstream, the need for more critical approaches and conceptualizations will be more strongly felt.

The explicitly political stance of critical applied linguistics and the addressing of social justice and transformation in critical pedagogy are not always well received, and the same goes for critical approaches to online intercultural language education. The beliefs of educators and their willingness to engage in a critical approach are an important factor, as is their preparedness to take on such an endeavor. If the role of the FL teacher is to "prepare students to deal with global communicative practices that require far more than local communicative competence" (Kramsch and Thorne 2002, p.100), then we are placing great demands on FL instructors and may be failing to take into account the social realities and institutional constraints that many language teachers face (Akbari 2008). The unpredictability of the interactions that unfold, the perceived risk of losing control and of conflict reaching levels of hostility and offensiveness, and the risk of negative evaluations from students which could jeopardize a teacher's career certainly hold many teachers back from adopting a critical approach in their practice. A recent survey on telecollaboration in Europe included questions regarding teachers' views on including controversial topics in their exchanges. There were very mixed feelings on this issue, with almost equal numbers of teachers saying they would favor their inclusion and those not, and a high number of respondents saying they were not sure (Guth et al. 2012; Helm 2015). The findings of Ware (2005) and other researchers pointed to the need for both instructors to be prepared to not only identify "missed" communication but to have the skills to facilitate communication when there is misunderstanding. Language teachers might argue that "conflict resolution" is not part of their skill set and they would be more comfortable with noncontroversial topics.

Finally, a major difficulty in adopting a critical approach is in *constantly* maintaining a critical stance, as Starfield (2004) writes, guarding "against the complacency that may come with even partial entry into the establishment" (p. 138). Online intercultural exchange projects need not only to be integrated into school curricula but to be recognized as promoting critical inquiry and student empowerment as Cummins and Sayers (1995) point out, or they risk being trivialized as just another educational fad.

Preferred Futures

Pennycook (2001) uses the term "preferred futures" as a restrained and plural view of where we might want to head because he finds that emphasizing the "transformative" mission of critical work's potential for change through awareness and

emancipation is perhaps too grandiose. It is important, however, that these preferred futures be grounded in ethical arguments for alternative possibilities.

It is not difficult to find ethical arguments for promoting practices which foster greater understanding of “other” perspectives and which address social and political issues in a world that seems to be increasingly polarized and characterized by conflicts and migrations, inequalities, and injustices, a world where identities are eroded.

Kramsch (2014) argues that globalization has altered the contexts and conditions under which foreign languages are taught and learned and that these changes “call for a more reflective, interpretive, historically grounded, and politically engaged pedagogy than was called for by the communicative language teaching of the eighties” (p. 296). While teachers should not impose their own views of students, she says they are called upon to expose students to various perspectives, even controversial ones, and to help them discuss and understand the points of view and their motivations. Online intercultural exchange could play a role in this task, but it is important to remember that access to technologies is still limited in many parts of the world.

Cross-References

- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)
- ▶ [Online Intercultural Exchange and Language Education](#)

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Bonnie Norton: [Identity, Language Learning and Critical Pedagogies in Digital Times](#). In Volume: Language Awareness and Multilingualism

Chantelle Warner: [Foreign Language Education in the Context of Institutional Globalization](#). In Volume: Second and Foreign Language Education

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Sociocultural Approaches to Technology Use in Language Education

Rémi A. van Compernelle

Abstract

This chapter examines the use of computer-mediated communication (CMC) technologies in second and foreign language education from the perspective of sociocultural theory. Drawing on the concept of *mediation* pervasive in Vygotskian psychology, research that has examined the way that CMC affords and constrains communicative activity and learning opportunities is presented. While early developments in the 1990s focused on some basic questions regarding new technologies' potential benefits for language learning, the major contribution of research conducted since the end of the twentieth century has been a focus on how CMC connects people across time and space. Current research, it is argued, reflects the normalization of CMC, which has become ubiquitous in most domains of everyday life. Thus, we no longer ask whether or not CMC should be used in language education but rather how and when it is the best tool for the job. This brings about a variety of challenges, but also important possibilities, regarding curricular goals and decisions about when and how to use different CMC technologies in order to meet learning objectives. Future directions for research that center on the nature and complexity of mediation in CMC and the relationship between CMC-mediated and non-CMC-mediated learning opportunities are discussed.

Keywords

Computer-mediated communication • Desktop videoconferencing • English language education • French • German • Google Chat • Kern's analysis • Multi-modal discourse analysis • Relational pedagogy • Sociocultural theory • Synchron-

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nous chat discussions • Telecollaboration • Theme analysis • Zone of proximal development (ZPD)

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Introduction

The proliferation of relatively low-cost and easily accessible networked communication technologies in the 1990s led many second/foreign language (L2) researcher to explore the ways in which such technologies, including centrally computer-mediated communication (CMC), could facilitate L2 learning processes within, and beyond, the traditional classroom. Much early work in this domain was driven by cognitivist L2 acquisition theories that emphasized the potential role of text-based communication in enhancing the qualities of L2 input, interaction (e.g., negotiation for meaning), and output (Ortega 2009). At the same time, researchers drawing on sociocultural theories of communication and learning were focusing on the use of CMC tools for creating collaborative learning spaces, for fostering self-expression and the authorship of texts, and for facilitating intercultural exchanges across national borders (Warschauer 1997).

This chapter will focus on the latter of these two themes, with focus on the ways in which communication technologies connect people across time and space, and how these communicative interactions may drive various aspects of L2 development in educational contexts. Here, I use the term “sociocultural theories” in an inclusive sense to mean theories of, or perspectives on, human interaction and development that particularize the social and cultural dimensions of teaching, learning, development, and so on. However, the main emphasis of this chapter is on research that has integrated, or is at least compatible with, Vygotskian sociocultural psychology.¹

¹Vygotskian sociocultural psychology (e.g., Vygotsky 1978, 1986), is often—if not normally—called “sociocultural theory” in applied linguistics (see Lantolf and Thorne 2006), but I will avoid the singular “theory” in preference for “psychology” in order to avoid ambiguity, as well as to better reflect the nature of the theory.

Early Developments

Warschauer's (1997) position paper published in the *Modern Language Journal* is the earliest attempt at synthesizing, and unifying, research on communication technologies in language education from "the sociocultural perspective" (p. 471) – which he defined as being associated with Vygotskian psychology – that I have been able to identify. In contrast to more psycholinguistic work on L2 acquisition with its emphasis on making L2 input and output more salient to language learners, Warschauer's focus was on the contribution of CMC for promoting collaborative learning as reported in a wide range of early work in this domain. Warschauer organized his review and argument around "five distinguishing features" (p. 472) of CMC: "(a) text-based and computer-mediated interaction, (b) many-to-many communication, (c) time-and place-independence, (d) long distance exchanges, and (e) hypermedia links" (ibid.). Here, I will provide a summary of Warschauer's take on the sociocultural perspective and the main themes that arose in his treatment of early research in this domain. The interested reader is referred to the original article for further details.

A first theme identified by Warschauer (1997) was CMC's potential to combine the advantages of written text with (nearly) real-time, or synchronous, interaction. Written text is less ephemeral than speech, and it can therefore more easily become an object of conscious reflection. At the same time, CMC maintains some of the features of spoken interaction (e.g., turn-taking in rapid succession). Accordingly, language learners have more time to reflect on what is being said and how it is being said because CMC is written, but the medium also allows them to use language interactionally and to organize themselves for interactionally mediated collaborative learning activities. Warschauer cited Kroonenberg (1994) as an early example of this. Synchronous chat discussions between high school students of French allowed students to gain experience interacting in real time, but they were able to pause and reflect on the language since a written record was being produced on their computer screens. In addition, many students seemed to be more verbose in the CMC environment than in face-to-face interaction. Importantly, Kroonenberg argued that in a follow-up in-class discussion, students were better prepared to participate, suggesting that the benefits of CMC extend beyond the qualities of language and interaction during the task and into the domain of fostering greater understanding and collaborative learning than would be the case in spoken interaction.

Warschauer (1997) also noted that CMC afforded a sort of democratization of many-to-many interaction. Whereas in classrooms some learners tend to talk more than others, CMC seems – for whatever reasons – to even the playing field. Kern (1995) and Warschauer (1996) are examples of research documenting increased participation among language learners in CMC as compared to classroom interaction. The conclusion drawn from this research is that CMC environments refocus attention away from teacher-centered multiparty interaction (e.g., the traditional *initiation, response, feedback*, or IRF, sequence ubiquitous in classroom) and encourage more egalitarian turn-taking procedures (e.g., self-selecting as next speaker without a teacher allocating the turn to a student). Some of this same research also reported

higher quality discourse than is typically found in classroom interaction (e.g., Chun 1994).

Some forms of CMC afford interactions that are time and place independent, including long distance communication. Warschauer (1997) argued that time and place independence benefits collaborative learning in two ways: “it allows more in-depth analysis and critical reflection” of interlocutors’ messages (e.g., email), and “it allows students to initiate communication with each other or with the teacher outside the classroom” (p. 474). Several studies carried out in the early 1990s showed that homework assignments could be collaborative rather than independent and that this improved the quality of students’ work as well as subsequent in-class discussions (e.g., Crotty and Brisbois 1995; Lloret 1995; Kroonenberg 1994; Janda 1995). Similarly, long-distance communication, or what we would now call tele-collaboration, can help learners improve their L2 abilities because they are able to interact with more capable speakers of the language (e.g., native speakers) who offer assistance in various ways (e.g., Kern 1996; St. John and Cash 1995).

A final feature of CMC discussed by Warschauer (1997) is the option of embedding hyperlinks in one’s communication. As he pointed out, links to one’s own work (e.g., web portfolios) can be sent to communicative partners for collaborative work (e.g., Barson and Debski 1996), but it is also possible to link authentic information from across the World Wide Web and share it with one’s interlocutors. Of course, sharing linked material with others is commonplace today (it is hard to image *not* sharing on Facebook or giving URLs in emails), but in mid-1990s, this was a somewhat revolutionary feature of communication.

Major Contributions

Early work on the use of CMC in language education from the sociocultural perspective pointed to the potential for communication technologies to foster collaborative learning in a variety of ways (Warschauer 1997). Subsequent work took up these ideas in a number of interesting directions. A particularly fruitful area of focus was on connecting L2 learners to native-speaker peers. The studies summarized below represent major contributions to the theoretical as well as the empirical underpinnings of the sociocultural perspective. Interestingly, the major contributions have all focused thematically on telecollaboration, which draws on CMC’s potential to encourage time-and-place-independent communication, especially in long-distance partnerships.

Kinginger (1998) reported on a teleconferencing exchange between US learners of French and French students in Brittany. Although not technically CMC, Kinginger’s study represents an important bridge between the early work outlined by Warschauer (1997) and subsequent work that incorporated Vygotskian psychology in an explicit way (and, as we will see later, teleconferencing has essentially been replaced by CMC technologies such as Skype and FaceTime). The study focused on the benefits and potential challenges of using teleconferencing in order to give learners access to authentic language. This is an important aspect of

communicative language teaching, as Kinginger points out, because learner textbooks and other pedagogical materials rarely – if ever – focus on sociolinguistic, pragmatic, and register variation. Drawing on Vygotsky's (1978) concept of the zone of proximal development (ZPD), Kinginger hypothesized that the learners' native-speaker interlocutors might be able to assist them in comprehending, and using, nonstandard – or nontextbook-like – linguistic and interactional features of French, thereby pushing the learners beyond their current capabilities.

Kinginger (1998) reported three principal findings. First, the US learners experienced “new forms of language classroom anxiety induced by the stress of public speaking in a networked or linked environment” (p. 510). This was because they were being pushed to interact with native speakers of the language but whose language use (i.e., every day, informal French) was relatively unfamiliar to the US students, on the one hand, and because the teleconferencing technology was unfamiliar, especially the half-second delay between what is seen on the screen and the audio. Second, much of the language used by the French native speakers was beyond the learners' ZPDs. They were not able to benefit from any peer assistance because the language was so different from the textbook French the learners were familiar with that it could not all be explained within the context of a single teleconference, and they were only able to interact in very limited ways. The third finding followed from this: Kinginger noted that the learners were able to benefit later in a subsequent teacher-led awareness-raising discussion of the differences between textbook French and the French the students' had been exposed to during the conference. The students examined a videorecording of the conference along with a transcription of the interaction, and in this way, Kinginger notes, “the activity of the class returned to the ZPD of its members, this time with the objective of forming an adequate concept of language variety, including the continuum between written and spoken forms” (p. 510). The major contribution of Kinginger's work to the sociocultural perspective on CMC is that the technology-enhanced task cannot be conducted in isolation from other, larger curricular goals. Rather, for learners to benefit from such experiences, it is often necessary for teachers or other more capable persons to engage them later in the ZPDs.

Belz and Kinginger's (2002) study of second-person pronoun development among US learners of German and French (i.e., *du* vs. *Sie* in German, and *tu* vs. *vous* in French) is probably the most widely cited CMC study carried out from the sociocultural perspective. The study involved telecollaborative partnerships between US learners and native-speaker peers in Germany and France. The German study involved synchronous chat, which occurred in real time, whereas the French study involved email exchanges. Drawing on Vygotsky's ZPD concept as well as the idea of microgenesis (i.e., development within a short timeframe), Belz and Kinginger traced the development of appropriate second-person pronoun use – namely, the *du* and *tu* of solidarity – in the learners' interactions with their telecollaborative partners.

The data analysis showed that the US learners seemingly randomly used second-person forms at the beginning of the exchanges. However, because such variation violated sociopragmatic norms, the German and French students drew the US

learners' attention to this and sometimes strongly requested that the more appropriate *du/tu* forms be used. For example, the exchange between Gabi (German) and Joe (American), excerpted below, included an inappropriate *Sie* form, *ier* 'your' (line 2), resulting in an explicit, and emphatic, request from Gabi to use the *du* of solidarity.

1. **Gabi:** Did you get my e-mail that I've sent you in our partner folders?
2. **Joe:** Iher Idee ueber 'First Love and how it affect prejudice.' . . .
'Your [Sie form] idea about . . .'.
3. **Gabi:** Joe BITTE nenne mich DU 'Joe PLEASE call me DU.'
(Belz and Kinginger 2002, p. 205)

Joe subsequently apologized for using *Sie*, excusing the infelicity as a "mental lapse." He then wrote "DEINE Idee ueber 'First Love and how it affects prejudice. . .' hat mir gefallen." ('I liked YOUR [T] idea about. . .') (p. 205) in a subsequent turn, which included the expected *du* form *deine* 'your'. Belz and Kinginger argued that "Joe experiences first-hand the social consequences of inappropriate [*Sie*] use in a way that is highly meaningful to him. . . and may come to realize that inappropriate [*Sie*] use can present a threat to his positive face" (pp. 205–206). This observation constitutes an important dimension of the sociocultural perspective that Warschauer (1997) highlighted: CMC has the potential not just to provide a space for practicing or reinforcing L2 forms (e.g., grammar) and discourse functions, but to connect people in personally meaningful social relationships that are shaped by, and shape, how language is used.

Thorne (2003) built on the sociocultural perspective by adding an important theoretical specification regarding the status of CMC technologies as cultural artifacts that mediate human behavior. Drawing on a larger telecollaboration study, Thorne examined how Internet communication technologies – namely, email, Instant Messenger, and synchronous chat – are not neutral artifacts but instead derive their significance from the activities that they mediate (i.e., communicative practices) in the everyday lives of social members, or what Thorne refers to as cultures-of-use. Put another way, CMC technologies are associated with particular practices and goals in the everyday world that may not always aligns with how teachers and researchers want to use them in educational contexts. In addition, different cultures-of-use can develop in different parts of the world, such that participants in intercultural communicative contexts (e.g., telecollaboration) may end up having divergent expectations for the use and purpose of CMC tools. Thorne presented three case studies of Americans using CMC technologies with partners in France. In the interest of space, I will describe only the first since it effectively illustrates the concept of cultures-of-use.

Thorne (2003) documented how American and French students oriented to email exchanges in dramatically different ways. Whereas the Americans appeared to expect the email exchanges to focus on social relationships and building mutual understanding of, and interest in, the lives of Americans and French people, the French students "used factual, impersonal, dispassionate genres of writing, including the use of examples (e.g., data) and argument building logical connectors ("for example,"

“however,” “moreover””)” (p. 45). Thorne argued that the difference was related to diverging cultures-of-use: the Americans reported using Internet communication technologies outside of class for three or more hours every day, while the French students had little access to the Internet outside of an academic setting. Thus, while the American students saw the exchange as an opportunity to move beyond traditional classroom-style or academic discourse because of their histories as CMC users in the everyday world, the French students maintained an academic stance since this was the principal – if not only – context in which they had experience using CMC technologies. The take-away point, and it is an important one, is that the same CMC tool mediates activity in different ways depending on people’s unique histories as CMC users. Prior history, or cultures-of-use, define expectations for tool use, and when these expectations are misaligned, miscommunication can result.

Belz and Vyatkina (2008) expanded the sociocultural perspective in a unique and fruitful way by integrating in-class teacher-led analysis of a learner corpus of American-German chat discourse as a pedagogical intervention, with focus on modal particles. As we saw earlier in Kinginger’s (1998) study, learners may not be able to benefit from such communicative arrangement without teacher intervention. In the Belz and Vyatkina study, American learners of German chatted several times with German learners of English. In between chat meetings, the teacher led the learners in lessons on the use of modal particles in German and helped the students to examine the discourse that they and their German partners had produced in previous conversations. This sets the study apart from other telecollaboration research (e.g., Belz and Kinginger 2002), which typically leaves learners to their own devices for figuring out pragmatics.

The analysis presented by Belz and Vyatkina (2008) showed that the American learners rarely used modal particles in a preintervention stage of the study. After the interventions began, the learners made progress in understanding modal particles, but they did not immediately incorporate them into their discourse. In fact, it was not until the final stage of the study that a sharp increase in the frequency of modal particles was observed in the students’ discourse: they in fact surpassed their native-speaker partners’ use of modal particles. The Belz and Vyatkina study is important for the SCT perspective because it ties language learning outcomes not only to technology as a context for development but to a larger pedagogical program that integrating intercultural communication via CMC with in-class, teacher-led instruction. Thus, while the technology mediated the intercultural exchanges, other aspects of the learners’ development (e.g., awareness of modal particle use) were mediated by related instructional activities. In this sense, while CMC created opportunities for development, instructional intervention on the part of the teacher was necessary to make the CMC-generated discourse accessible to, and beneficial for, language learners (i.e., to work within their ZPDs, cf. Kinginger 1998).

Kern (2014) offered an important update on the relationship between additional language learning, culture, and technologies that mediate intercultural communication, with specific focus on desktop videoconferencing. As Kinginger (1998) showed a decade and a half before, videoconferencing technologies mediate communication in particular ways that do not always align with our offline expectations. Kern’s

analysis showed how such seemingly insignificant aspects of technologies afford and constrain communicative behaviors while also adding some ambiguity to intercultural exchanges. For example, the fixed camera on an iMac cannot be repositioned, and so there is a relatively limited space that one must remain in in order to be seen by one's interlocutor. In addition, as Kern pointed out, body movement and gestures are exaggerated by webcams and mutual eye gaze is impossible to achieve since the camera and screen are in different locations. Kern also noted that because these technologies are familiar and every day to students (which was not the case a decade or more ago, cf., Thorne 2003), "foreignness" and "otherness" are somewhat limited. This is both good and bad: good, because students are familiar with how to use the technologies but it presents challenges for foreign culture learning because the communicative space may artificially reduce cultural differences that could lead to interesting and fruitful intercultural learning. Consequently, Kern called for a "relational pedagogy" (p. 352) in which communication mediums – whether technology-mediated or not – mediate interaction. The approach focuses on raising students' awareness of the ways in which mediums "contribute to the design of communication and embody values and fundamental ideas about what communication is" (p. 353). Kern concluded by writing:

By making it possible to textualize and recontextualize language use, technology holds the potential to defamiliarize the familiar, to itself induce a certain foreignness that can cause language learners to de-automatize their perceptions, leading them to new insights and understandings. (p. 354)

The idea here is the CMC-mediated learning opportunities can facilitate awareness-raising and thoughtful reflection not only in terms of metalinguistic knowledge but of discursive, interactional, and cultural dimensions of communication.

Work in Progress

The sociocultural perspective on CMC in language education is at present exploring a number of interesting areas. Of course, work expanding on telecollaboration has continued (e.g., Kern 2014, discussed above), and there has been some new emphasis on the use of CMC technologies to address other practical concerns of classroom language teaching. In some sense, this constitutes a normalization of CMC technologies, inasmuch as focus is not on using CMC as a "special" tool but rather as the one of many available tools that just happens to be the most appropriate one to use in order to achieve a specified pedagogical or curricular goal (see van Compernelle and Williams 2009).

A first example is found in Canale's (Canale [in preparation](#)) dissertation work. The backdrop of the study is a national English language education initiative sponsored by the Uruguayan government in collaboration with the British Council called *Plan Ceibal en Inglés* (see Banegas 2013). Initiated in 2012, *Plan Ceibal* aims to address a

shortage of qualified English language teachers across the country, particularly in rural areas, by using videoconferencing technologies to connect English teachers to classrooms. Canale's research involves two stages.

In the first, he is observing how the technological affordances are oriented to, and understood by, the participants (i.e., remote English teachers, local classroom teachers, and students). This involves an array of data (e.g., classroom observation, field notes, interviews, instructional artifacts) and analytic procedures (e.g., theme analysis, multimodal discourse analysis). What is interesting here is Canale's broad perspective on CMC technologies as a set of affordances that co-exist in the ecology of the classroom with other, non-CMC affordances, which together mediate the processes and products of *Plan Ceibal*. In a second stage, Canale plans to conduct an ethnographic project-based design intervention in order to support the primary actors in making the most of the multimodal affordances at their disposal.

A second example is found in the work of van Compernelle and Henery (van Compernelle and Henery 2014, forthcoming). Their research focuses on teaching L2 pragmatics through a Vygotskian approach to pedagogy known as concept-based instruction (see Lantolf and Poehner 2014). Accordingly, technology in general, and CMC in particular, is not the central aspect of the work. CMC comes into play because it happens to be the right tool for a particular set of learning activities (described below). In this sense, this research is not so much a sociocultural perspective on CMC as it is a sociocultural approach to pragmatics instruction, a part of which involves CMC.

Van Compernelle and Henery (van Compernelle and Henery 2014, forthcoming) designed a series of strategic interaction scenarios (Di Pietro 1987) as part of their pedagogical intervention. They decided to use Google Chat to mediate these scenarios (performed by pairs of students) for a number of reasons. First, because the learners were only in the second semester of French study, they believed text-based chat would provide the benefits of written language while also allowing students to practice rapid interaction (see Warschauer 1997). Second, the authors (one of whom was the teacher) wanted to be able to track learners' discourse in real time, which was possible since the Google Chat produced a real-time written record (i.e., a transcript). Third, using Google Chat rather than face-to-face interactions allowed all students to simultaneously engage in two scenarios each time such tasks were assigned in one class meeting. This would not have been possible in a classroom context. Research continuing in this line of work is exploring other CMC technologies that are appropriate for use within the concept of concept-based instruction.

While there are certainly more studies drawing on Vygotskian ideas, the two research threads highlighted above focus on the almost mundane nature of CMC nowadays. This is to say, it is more or less taken for granted that learners have experience with such technologies and have been socialized into relevant cultures-of-use (Thorne 2003). What is interesting and innovative here is how these technologies are being integrated into larger curricular and educational objectives that aim to mediate L2 development through the use of a variety of "old" and "new" technologies.

Problems and Difficulties

CMC offers many benefits in second language education. However, the use of such technologies comes with numerous challenges as well. Of course, we should be reminded that any tool – whether we consider it “hi-tech” or not – simultaneously affords and constrains our behavior (van Lier 2004). For instance, a fork affords a particularly efficient set of behaviors for delivering food to our mouths without getting our hands dirty or sticky at the dinner table, but its design also constrains our behavior: in order to use a fork appropriately, we have to shape our hand and fingers in particular ways and not others (cf. the kinds of operations needed to use chopsticks, a tool that accomplishes the same goal). So it is with CMC.

A particular challenge for the sociocultural perspective is understanding the ways in which different CMC technologies afford and constrain behaviors (i.e., mediate, cf. Kern 2014), and at the same time how different cultures-of-use (Thorne 2003) have developed around particular technologies. The challenge here is keeping up with technological advances – including the development of new web-based and app-based technologies as well as upgrades of existing technologies (e.g., Skype’s floating window, discussed by Kern 2014, which helped with maintaining visual communication cues) – and how people use them. In other words, it is not enough to understand the technology in isolation; instead, ethnographic, as well as interventive action (Canale *in preparation*), work is likely required. It should also be noted that cultures-of-use evolve over time, as Thorne (2003) pointed out, so they must be thought of as dynamic processes rather than static products. Therefore, as much as we need to understand ever-evolving tools, so too do we need to understand how tools mediate human behavior and how different communities develop practices around such tools.

Another challenge for the sociocultural perspective is the relationship between CMC and different domains and contexts of L2 development. As Kern (2014) reminds us, CMC has become commonplace in many domains of daily life; consequently, in language education, the question is not “whether to use technology or not” (p. 352) but instead when, and for what purposes, different technologies – both old and new – can and should be used (see van Compernelle and Williams 2009). One thread of such research has focused on developing learners’ digital literacies in order to enhance their access to, and participation in, authentic online communities (see, e.g., Abraham and Williams 2009 for a representative collection of papers). The focus here is on developing CMC-specific L2 competencies – for instance, understanding the discursive, pragmatic, sociolinguistic, and interactional practices that are expected in particular CMC environments. Another thread common in the sociocultural perspective sees CMC as a more general tool for developing L2 competencies that are not necessarily domain specific. For example, Belz and Vyatkina (2008) and Canale (*in preparation*) focus on L2 development in a more general sense (i.e., not CMC specific), and CMC just happens to be the relevant tool for mediating learning activity. Both goals are obviously worthy of attention. We certainly should want our students to become competent participants in authentic CMC environments since so much of daily life takes place through Internet-mediated communication, and we

certainly should also want our students to develop more general L2 capabilities that are relevant to CMC and non-CMC environments. The challenge for the sociocultural perspective lies in making educational and curricular decisions about the extent to which instructional resources and time can be devoted to each of these goals since teachers, coordinators, and other administrators all face logistical, curricular, and time constraints.

A final challenge for the sociocultural perspective regarding curricular decisions centers on the distinction between incidental and intentional learning in CMC. Incidental learning refers to learning that occurs without any particular instructional focus. For example in Belz and Kinginger's (2002) work on pragmatic development in telecollaboration, *tu/vous* and *du/Sie* development emerged as the focus because it happened to be a feature that the American learners' native-speaker interlocutors oriented to as important, thereby creating learning opportunities in the absence of an a priori curricular goal. By contrast, in Belz and Vyatkina (2008), German modal particles were intentionally selected as a pedagogical focus, and offline learning tasks were created in order to make German native speakers' patterns of use visible to the learners. The challenge is in making decisions about what to focus on intentionally and what can be left to learners to uncover on their own. In part, decisions need to be driven by the goals of CMC use – developing CMC-specific competencies or more general L2 abilities, as discussed above – as well as larger curricular objectives (e.g., grammatical, pragmatic, and cultural foci). Kern's (2014) proposal of a relational pedagogy, which aims to bring learners' conscious attention and reflection to both familiar and unfamiliar features of CMC discourse and interaction, appears to be one helpful way of guiding such decisions.

Future Directions

Future directions for the sociocultural perspective are numerous, but they center mainly around two issues: 1) qualities of tool mediation; and 2) transfer and transcendence of CMC-mediated development.

The first line of research has already been brought up earlier. Understanding the qualities of tool mediation – in this case, how different CMC technologies mediate communication in general and how they might mediate particular developmental processes in particular – is a research thread that is continuously in need of exploration. Technologies change constantly as do the cultures-of-use (Thorne 2003) that develop around them. Consequently, there is the constant need to understand how communication technologies mediate communication. In addition, future research should also explore how different technologies that can be used for similar curricular goals differentially mediate communication and development. For example, text-based chat and desktop videoconferencing (e.g., Skype) can both be used for telecollaboration, but given that they mediate communication in different ways, we should expect any educational outcomes to be different as well. It would also be worthwhile to explore how CMC and non-CMC environments mediate development in different ways. As noted above, the work of van Compernelle and Henery

(2014, *forthcoming*) used Google chat to mediate strategic interaction scenarios in part for logistical reasons but also because it was assumed that elementary-level French learners would not be able to sustain an oral interaction, especially at the beginning of the academic term. This reasoning goes back to Warschauer's (1997) observation that text-based CMC offers some degree of text permanency but at the same time rapid interaction. Thus, in the van Compernelle and Henery research, the tool was chosen in order to mediate an activity (i.e., scenario performance) that they would not have been able to accomplish in the same way or at all in an oral mode of communication. While some comparative work of this type (i.e., comparisons of different CMC tools, CMC vs. non-CMC tasks) exists in the cognitivist-interactionist literature (see Ortega 2009), the sociocultural perspective has not focused on it as much as it should.

Transfer and transcendence of CMC-mediated development is also an important area for future research. While it is certainly interesting and relevant to language education research and practice to explore development in CMC environments, transfer of such development to non-CMC environments is an under-researched phenomenon. From the sociocultural perspective, especially Vygotskian psychology (Vygotsky 1978), transfer is an important issue because it shows that capabilities that appear to develop in one context have been appropriated as one's own. Put another way, the recontextualization of an ability to a novel context shows that the learner can transcend to boundaries of a learning task and put the new ability to use in a novel environment or a more complex task. As a case in point, while Belz and Kinginger (2002) convincingly argued that the French and German learners they followed developed their control over *tu/vous* and *du/Sie* within the context of tele-collaboration with the same interlocutors, we have no evidence that the learners were able to recontextualize what they had learned beyond the specific context in which they had developed their abilities. In other words, sociocultural research should follow not only CMC-mediated development but how such abilities developed through CMC reappear in various, and potentially different, forms in other communicative environments.

We can think of these two broad themes for future research programmatically by asking the following questions:

- 1) What communication technologies are currently in use, and how do people use them in educational and noneducational environments?
- 2) When existing communication technologies are used for educational purposes, how, if at all, do learning objectives align with the cultures-of-use that participants have developed around such technologies in noneducational environments?
- 3) How do different technologies mediate communicative behaviors, including linguistic, interactional, and nonverbal features, and how does this afford and constrain different kinds of learning opportunities?
- 4) To what extent, if at all, do learners transfer CMC-mediated development into other domains of (non-CMC) communicative activity, and how, if at all, do these abilities differ in CMC and non-CMC environments?

These basic research questions can provide a guide to pushing our basic understandings of CMC use in language education from the sociocultural perspective, especially if the concept of mediation is given central importance (Kern 2014).

Cross-References

► [Sociolinguistic Insights into Digital Communication](#)

Related Articles in the Encyclopedia of Language and Education

Richard Kern, Paige Ware, and Mark Warschauer: [Network-based Language Teaching](#).

In Volume: Second and Foreign Language Education

Amy Ohta: [Sociocultural Theory and Second/Foreign Language Education](#).

In Volume: Second and Foreign Language Education

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Second Language Writing, New Media, and Co-Construction Pedagogies

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Abstract

Collaborative practices have become very common in second language learning contexts. In particular, collaborative writing has received a significant amount of attention in recent years. This is largely due to the technological innovations that offer teachers and learners a wide variety of potential opportunities to experiment with collaborative practices. As these tools have evolved, approaches to collaborative pedagogy and practices have evolved alongside them. Thus, collaborative writing is in a constant state of change. This entry will provide an overview of the initial and major contributions that have established collaborative writing practices. These contributions include collaborative practices that have been documented in research studies as well as more pedagogically inclined writings. Following these initial contributions, readers will find an overview of the works in progress. These works include examples from across a variety of language learning contexts, including formal and informal settings. Many of the considerations evident in these current practices are a reflection of the problems and difficulties associated with collaborative writing practices. These challenges will be discussed. Future directions, which are largely informed by these challenges as well as future technological innovations and associated social practices, will be discussed as the conclusion to this entry.

Keywords

Co-construction • Collaboration • Constructionism • Constructivism • New Media • Second language writing

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Introduction

Collaborative approaches to learning have become more common in language education.

Collaborative writing, in particular, has received significant attention in recent years. This increased attention is largely due to the socially engaging digital tools and environments that have become widely and easily available. These tools allow learners and instructors a diversity of opportunities to engage in collaborative practice. Prior to these technological innovations, collaborative writing was limited to pair work due to the constraints of sharing a paper writing space. The introduction of word processing allowed an author to save a file that could be shared with another author who could then edit the file and return it to the original author who could then continue the process. This method essentially mimicked the exchange of paper between writing partners. Web 2.0 technologies such as wikis, blogs, web-based word processing, and other social media tools now make it possible for multiple authors to contribute to a single collective document without needing to save and wait for a peer to finish. Thus, partners can be engaged in the writing process simultaneously. Further, these new tools allow for such collaborations to include more than two participants, which expands the potential for these practices. The contributions of each individual are identified so that a participant, or instructor, can distinguish the work of each individual as well how this functions within the overall process and document. Such observation is critical for addressing some of the challenges presented by collaborative writing, including accountability, equity, and assessment.

Early Developments and Initial Contributors

Collaborative writing is a fairly new practice in language instruction. Writing has not only been considered an individual and often isolating activity, but this perspective has also become entrenched in academic practices. With the introduction of communicative language learning approaches, many researchers and instructors began to recognize the value of creating a variety of social activities for language learning. Early collaborative writing studies were largely influenced by the theories of constructivism, particularly the work of Vygotsky (1978) and Bruner (1978) who argued

that learning is a social activity that can be supported by encouraging learners to contribute to the construction of knowledge. This perspective contributed to a variety of group work-based activities. Language teachers who employed collaborative writing practices early on were likely to have been influenced by the process approach to writing. This approach focuses upon the understanding that writing is a recursive activity that incorporates planning, idea generation, and revision at different stages throughout the writing process. As a result, the process approach involves a variety of prewriting activities, cyclic revision, and extensive use of teacher and peer feedback (Ferris and Hedgcock 2005). This use of peer feedback quickly evolved into practices constructed around greater reliance upon peers through the writing process.

As part of the process approach to writing, peer feedback has become a very common practice, particularly in English as a second language (ESL) and English as a foreign language (EFL) contexts. Such practice puts a heavy emphasis on student involvement and control over the writing process, including the generation of ideas and repeated opportunities for peers to exchange feedback while instructors serve as a guide rather than the focal point. These practices had a profound influence on early adopters of collaborative writing who recognized that they aligned well with the practice of students collaboratively constructing knowledge (Storch 2005). Further, additional benefits were observed, including enhanced brainstorming abilities, dynamic opportunities for shared negotiation of ideas, and immediate access to instructor and peer feedback (Storch 2013). Others have also noted that collaborative writing processes allow learners to have access to formative feedback throughout the text creation process (Hirvela 1999; Storch 2013). This access provides learners with suggestions for improvements or alternatives to the emerging text at a time when it is familiar and most salient. This is an important aspect that continues to guide much of the current research into collaborative writing since it is not always obvious how to increase the salience of feedback. However, we do know that raising students' awareness of their role within the writing process throughout the various steps prepares them to be more reflective, thoughtful, and self-correcting in their future writing (Ferris and Hedgcock 2005).

It is relevant to note that while researchers have observed an increased awareness on the part of students throughout the writing process when engaged in the process approach, it is very likely that learners and instructors who are not prepared to effectively participate in such activities will have less than desirable experiences. As Ferris (2003) observed, students who are not adequately prepared to participate in peer response are likely to "correct" sentences that are already correct or overlook errors that require attention. Thus, some have offered suggestions for specific approaches to training students for providing peer feedback (Hansen and Liu 2005). While collaborative writing has benefitted in a variety of ways from the early investigation into peer feedback and other aspects of the process approach, perhaps the most important contribution may be this recognition of a need to adequately and explicitly prepare instructors and learners. Such preparation can take on many forms, and it is not obvious which approach is ideal for any given learning context. It is also likely that we will continue to see these approaches

diversify. However, we can observe through studies that offer no preparation the importance of some form of collaborative writing instructor and learner preparation (Storch 2013).

There are a number of characteristics surrounding the collaborative writing process that have changed since the earliest interventions. These are generally the result of the dramatic influence that computers have had upon the production of text. We have benefitted from the increased functionality of word processing on computers in many ways, including the ability to save, copy, paste, and distribute text easily. With the introduction of networks and the Internet specifically, we are able to share texts easily and widely. In contrast, early collaborative writing projects were paper based, focused upon academic tasks, and generally limited to pair work, while the emerging trend is moving toward the use of Internet-based contexts that allow multiple users to simultaneously contribute to a single text or even to a single sentence within a text (Kessler et al. 2012). More recent studies have begun to address more global processes involved throughout the text production process as well as collaborative group behavior.

Major Contributions

With the growth of interest in collaborative writing in recent years, researchers have identified a variety of collaborative writing behaviors. Many of these have relied upon the work of Parks, et al. (2003, p. 40) who categorized collaborative writing behaviors according to four types:

1. Joint collaboration is “two or more writers working on the same text who assume equal responsibility for its production. . .although individual contributions to the finished product may vary.”
2. Parallel collaboration is “two or more writers who, although working on the same text, do not assume equal responsibility for its production. . .although again, individual contributions to the final product varied.”
3. Incidental collaboration is “generally brief, spur-of-the moment requests for help directly related to the writing task at hand.”
4. Covert collaboration is “getting information from documents or other linguistic or nonlinguistic sources during the process of producing a text.” These types of collaboration may not be apparent in all collaborative writing contexts.

This study, along with much of the early and ongoing collaborative writing research, has focused on language-related episodes (LREs) as the unit of measure. LREs, as defined by Swain and Lapkin (1995), include the language used by students to deliberate about their linguistic production as they attend to a task. LREs can take on many forms and are, therefore, difficult to operationalize. They can be a single turn or a lengthy interaction between one or more learners. They can be difficult to identify and isolate as well. Further, there is some disagreement about what to include as an LRE. While Swain and Lapkin’s description of LREs includes

self-repair, Fortune (2005) does not include such episodes since he argues they are not reflective of the collaborative process. However, recent research into the influence of collaborative writing upon individual writing may challenge this omission. While LREs have been defined by different researchers in different ways making direct comparisons between contexts and studies difficult, there are some general observations that we can claim. The opportunity to write collaboratively provides students with opportunities to communicate in meaningful ways that reflect a wide range of functions that are unlikely to be present in conventional writing classrooms where the teacher is the center of attention (Storch 2013). While students are not likely to attend to all LREs in a given text production circumstance, research indicates that they are likely to successfully correct most LREs when engaged in collaborative writing activity (Storch and Aldosari 2013). Some have observed that the success of attending to LREs may be influenced by any number of circumstances, including task type (Lee 2008), writing context (Kessler et al. 2012), and group composition (Kessler and Bikowski 2010). Further, students are not likely to attend to all LREs even when they are aware of their presence depending on their individual or partner's language levels (Storch 2005) or prioritization of errors (Kessler 2009). Many of these observations were conducted through collaborative dialogue, in which students engage in meta-discussion about their writing process (Swain 2000).

Storch (2013) has observed that collaborative dialogue during the collaborative writing process allows students to present initial ideas, suggest alternate ideas, and express concerns. Vocalizing these thoughts propels the collaborative writing process and elicits feedback from both peers and instructors. Studies that have focused upon learner talk while engaged in collaborative writing practice have observed that learners are likely to demonstrate increased attention to various aspects of writing, including idea generation, organization, coherence, cohesion, and accuracy. Observing student behavior while they are involved in these aspects of the process writing approach can be very informative.

A number of studies have focused more upon the nature of student behavior in collaborative writing contexts. Recently, the majority of these have taken place in wikis or tools that function much like wikis, including web-based word processing tools such as Google Docs. These studies have focused upon various aspects of student behavior, including their interaction with one another as well as their use of the tool or writing environment in question. These exist across a spectrum of learner language levels, learning contexts, academic tasks, and teacher involvement. For example, Kessler (2009) observed students' attention to form in the co-construction of a wiki defining the term "culture" completely autonomously as a single group of 40 students over a period of 15 weeks (with no teacher intervention), while Elola and Oskoz (2010) observed eight students working in pairs over the course of 15 days doing specific tasks that required intensive teacher intervention. Thus, it is difficult to generalize universal conclusions from the existing body of studies. But each study illustrates how collaborative writing can be employed in particular contexts while identifying potential future implementations. Increasingly, these studies are adopting a more ecological perspective and observing various

behaviors of students rather than solely focusing upon specific linguistic elements such as LREs.

These situated case studies have attempted to identify trends in collaborative writing practices that may inform practice in other contexts. For example, Kessler and Bikowski (2010) observed students as they developed their autonomous abilities while co-constructing a wiki over a 15-week period. They observed behavioral patterns across the entire group of 40 students and noticed that students collaborated extensively as they built the wiki entry only to reach a point where a handful of students began to dismantle significant portions. Then another small group reconstructed the entry in a manner that was much more thorough and thoughtful than the original. This observation of group behavior has been adopted by others in recent years as well. Many of these studies have found that students use tools in ways that demonstrate a variety of strategies (Kost 2011), to accomplish different goals (Kessler and Bikowski 2010), and in ways that are often unanticipated by instructors or researchers (Kessler 2009). Consequently, it is important to design instruction in a manner that allows for flexibility and emergence of new tools and practices. One consideration when selecting or designing a collaborative writing tool or context is the potential for it to foster a sense of community. Collaborative writing can provide students with a community within which they can feel compelled to write. When such a community is successful, students rely on one another for guidance and support.

Many have suggested that the immediacy of feedback in collaborative writing practices allows students to reflect upon and revise their texts in ways that would not be possible in individual, isolated writing (Storch 2005; Kessler 2009). While it is obvious that learners benefit from immediate feedback since it is likely salient and actionable, the extent of benefits resulting from this immediacy has yet to be fully explored. Future studies will likely be conducted to develop a better sense of this contribution. Others have observed that students are likely to contribute in ways that are not proportionately equal (Kessler and Bikowski 2010). However, different students are likely to attend to different aspects of a text and take responsibility for different stages of the writing process (Kessler et al. 2012). Consequently, it is important to create collaborative writing practices that allow students to contribute across a range of roles and responsibilities, allowing them to experiment with familiar and emerging language abilities. By allowing more flexibility and diversity in these practices, we can develop a better understanding of how these adjustments influence the collaborative writing process.

There have been a number of investigations comparing collaborative writing practices to individual writing. These studies have observed a number of advantages that collaborative writing offers over individual writing, including the opportunity to take on unique roles such as tutor, critical reader, and sounding board (Weissberg 2006). As a result, collaborative writing practices allow students to engage in a two-way interaction with feedback: giving and receiving. Further, the availability of feedback throughout the entirety of the writing process is very different from individual writing practices where feedback is likely to be provided only after the text creation is finished and turned in. Storch (2005) has observed that students

writing collaboratively produce more accurate texts than when they write individually. She attributes this to the fact that they can discuss, negotiate, and rely on partners as a sounding board when necessary. Elola and Oskoz (2010) observed that learners who engaged in collaborative writing demonstrated improvements in their subsequent individual writing and that they were more aware of structural concerns.

Collaborative writing in groups, larger than pairs, has received little attention. However, the few studies that have focused on this kind of practice have revealed a variety of opportunities and great potential. Kessler and Bikowski (2010) observed that group writing projects can promote learner autonomy and that the fluidity of collaborative text creation allows students to participate to the extent that they find meaningful. They also observed that students focused upon meaning often at the expense of accuracy. Kessler et al. (2012) observed that different small groups behaved in very different ways and that these behaviors influenced the writing process of the group. Groups that shared more responsibility for entire texts produce higher quality work and had a higher level of satisfaction with the overall experience. Groups that divided the writing task into sections and worked individually produced disjointed texts. In another study looking at group work, Dabao (2012) compared the quality of texts written individually to those written collaboratively in pairs and groups. She observed that students who wrote collaboratively focused more of their attention to language-related episodes (LREs) than those who wrote individually. Further, groups produced and resolved more LREs than pairs and, consequently, achieved greater accuracy in their final written product.

These observations of the potential for group collaborative writing suggest that we would benefit from more experimentation with a variety of group designs. There is also some evidence that groups (pairs, at least) that include members of varying L2 proficiency will likely result in predictable dominant/passive roles. Storch and Aldosari (2013), for example, observed that such relationships can be detrimental to the collaborative writing process and that students in such situations are likely to prefer writing individually. Group dynamics can be very complicated and difficult to fully understand, but the observant writing instructor can certainly develop a better sense of how these dynamics manifest in the classroom. Thus, it is important to be conscious of how we as instructors present and model collaborative writing activities and how we establish expectations for students. We can begin by attempting to create collaborative writing groups in a thoughtful and deliberate manner. Perhaps more extensive learner preparation regarding the expectations, practices, and benefits of the collaborative activity would help to alleviate some of these misgivings. Perhaps it would be beneficial to experiment with a variety of approaches to creating groups in order to identify successful group design. Perhaps assigning roles to students that are counter to their personalities would allow them to gain perspective on the usefulness of the task.

Learners may need to gain more experience with collaborative practices in order to truly value them and perform to the best of their ability within these new paradigms. This is true for instructors as well since these practices can be very different from traditional individual writing, particularly if an instructor is not already practicing the process approach. Further, since these practices are not likely

to be happening across a curricula or faculty, it is likely that when students do encounter them, they are perceived as something of a novelty. The true benefits of these practices can only be fully appreciated once these practices become familiar enough to both learners and instructors. Such expansion will also provide researchers with more opportunities to investigate the nature of these collaborative practices. Thus, we look forward to an increase not only in these kind of activities but also in the potential for research and its iterative contribution to continuing to develop more effective pedagogical models.

Work in Progress

Investigation into collaborative writing is progressing in a variety of directions. Along with the aforementioned shifts in research foci upon individual and group behavior while writing traditional expository writing pieces, there are some who are exploring writing that is taking place in less conventional contexts and genres that are not often associated with academic writing. This includes the increasing variation of collaborative writing that is now taking place in various web-based contexts and communities as well as social and new media contexts such as Facebook (Shukor and Noordin 2014), digital storytelling (Torres et al. 2012), and gaming (Kuhn 2014; Bado and Franklin 2014). These contexts are particularly interesting since they are ubiquitous in our social lives today, and consequently students associate this writing as a social activity rather than one of isolation. This perspective can compel students to contribute, participate, and provide feedback to others. It has been observed that students today are writing more extensively due to the opportunities that these contexts present (Purcell et al. 2013). This should certainly guide more instructional practice. We can also see that social media platforms provide plentiful opportunities for researchers to study the collaborative co-construction of knowledge in the form of online identities, shared communities, cultural values, and visions for change. We will certainly see more interest in the potential of these and many other writing contexts in the near future.

Recently there have been recommendations for embracing more diversity in genres in writing instruction. It has become fairly commonplace for digital storytelling and fan fiction to be accepted in academic composition classes. These new and emerging genres rely upon an array of emerging social and collaborative tools and contexts for writing, including Internet memes for providing lower-level students with a compelling reason to write and collaborative graduate-level research projects to engage academics at the highest levels. These are just examples of a rich body of potential new genres that students are likely to find much more engaging and interesting than many conventional academic genres (Thorne et al. 2015). While these practices offer great potential opportunities, it is the institutional conventions that are most likely to make them difficult to implement. The longstanding conventions of individual writing are a centerpiece of many institutional academic practices. In spite of these potential benefits, as Storch (2005) notes, the affordances of collaborative writing may require “a reconceptualization of classroom teaching”

(p. 169). This statement reflects a recognition of the dramatic differences collaborative writing practices present compared to the long-established and institutionally entrenched assumptions we associate with individualized writing. In particular, there are a number of problems and difficulties when introducing such radically different instructional practices.

Problems and Difficulties

A number of previous studies have identified other difficulties related to collaborative writing. These studies are largely informed by a conscious comparison with more traditional and familiar individual writing practices. Based on such previous educational experiences, students are likely to view writing as an individual and private act and consequently reject collaborative work (Murray 1992). Some have been concerned about assessment and find that it can be difficult to determine how to grade or evaluate each individual's contribution to a product that has been created collaboratively. Some suggest requiring equal contributions, but others argue that there can be a qualitative strength in brief contributions while lengthy contributions can be rambling or distracting (Kessler and Bikowski 2010). Accountability is often associated with this assessment challenge. It is not obvious how to maintain accountability when some students can simply let others take charge.

For many teachers and students, collaborative writing is still likely to be unfamiliar. As a result, there may be reluctance and even resistance to such practices. The results of the many investigations included in this entry should help to convince instructors, but it may be more difficult to convince students that these practices will be beneficial, particularly when so many have had negative or unimpressive experiences with poorly planned group work in the past (Zimmerman 2010). It may be extremely helpful to create experiences that utilize these new social contexts in order to engage students in these practices. Such implementation does not require that conventional academic writing practices be abandoned. As Elola and Oskoz (2010) suggest, individual and collaborative writing activities can be practiced together. In fact, establishing a balance may help students develop a broader set of abilities.

Students who have been successful individual writers previously are likely to be resistant to the introduction of these practices. It may be necessary to allow such students to take on roles in a group that cater to their unique strengths. Teachers who are new to collaborative learning are also likely to benefit from some guidance. While it is possible to create small and large group collaborations, typically groups are limited to pairs or triads. These smaller groups are easier to manage, maintain, and observe, but there may be times when larger group work is desirable (Kessler 2009).

Language learning anxiety can be debilitating for some learners and collaborative writing practices may increase anxiety for some students, but it is also possible that collaborative writing will help students to overcome these concerns. While there is a sense of accountability associated with writing as a member of a group, this can introduce potential for embarrassment. Under well-designed and -managed

circumstances, previous research has described approaches to guide students toward greater comfort with these practices.

There is also evidence that lack of experience, concerns of fairness, and conflict between individuals can threaten collaborative writing practices (Storch 2013). Similarly, Spigelman (2000) found that it is critical that students trust one another and embrace the willingness to share authorship. Such observations indicate that perceptions are evolving regarding these collaborative practices. However, as we have witnessed a growth in these practices, it is likely that we will see a change in these expectations. In fact, we are beginning to see evidence that students are developing an appreciation for these practices (Kessler et al. 2012).

In addition to the difficulties of implementing collaborative writing, there are a number of challenges associated with researching collaborative writing. Collaboratively written texts can be complex, making it difficult to truly identify each individual's contribution.

The fluidity of participation, particularly in contexts where students may interact with one another in a face-to-face context at one moment and online at another, makes it difficult to observe exactly what is being produced by each individual throughout the many iterations of a collaborative project. When we consider the four types of collaboration identified by Parks et al. (2003), we can see that covert acts only further complicate such attempts. Of course there are solutions to this, including conducting research in controlled environments where all behavior can be observed and recorded, but these are not likely to resemble authentic learning contexts, and, thus, the behavior is likely to be different. However, as we continue to become more comfortable with these collaborative practices in other domains, we are likely to embrace these practices more easily as well.

Future Directions

The future of collaborative writing in second language learning contexts is promising and exciting. It is also unpredictable in many ways. These collaborative tools have allowed us to “think collaboratively” as we construct and reconstruct our understanding with one another through the process of sharing, altering, and refining our collective awareness of the world around us. It should be no surprise that collaborative practices would be experiencing a dramatic growth since we are surrounded by the largely collaboratively constructed digital world. We should definitely anticipate wholly new tools and contexts that allow us to co-construct text in ways that may be difficult to imagine today. We can already use dictation software to rely on our voices as our means of writing which can be convenient when we are unable to attend to a keyboard. We can also produce text with gestures using tools like the Leap Motion Sensor[®]. Once these texts are created, there is no evidence of its origin, and it can be shared with anyone anywhere in the world as a potential collaborator. As instructors, we need to be aware that our students are

likely already producing texts using similar methods. In order to engage them in the writing process in a way that is meaningful and authentic, we should embrace new approaches to teaching writing.

We are likely to see collaborative writing that occurs within groups of various online communities. One example is the community that contributes to Wikipedia. Not only do contributors add, edit, and revise the text within each Wikipedia entry, they also engage in a rich, complex, and detailed meta-discussion around each topic. In many cases, these negotiations have continued for years with numerous engaged participants sharing their thoughts about various nuances. It is a fascinating perspective, and taking a look may provide some readers with a view into what they can expect from collaborative dialogue. Another example is the world of collaborative online gaming. Gamers who share a quest or goal and work together to accomplish tasks along the way are often writing in a very fast paced and determined manner. Thorne (2012) has observed that this collaborative game play results in writing that is extensive and complex, especially when we include player-produced game-external websites that focus on strategy, lore and backstory, and analyses of items and resources used in games. He also notes that players incorporate a variety of discourse genres that involve extending the writing experience beyond the game in the form of fan fiction and a variety of other cultural mashups. We can certainly anticipate seeing these practices integrated into more formal instruction.

We are also likely to see more investigation into the alignment of tasks and tools. As we have witnessed such dramatic and varied potential for collaborative tasks across tools and contexts, we need to develop a better understanding on the relationship between task and tool. With the limited research that has been conducted this far, it is impossible to predict how a new tool will best be implemented most effectively for a particular task and a particular group of learners. Lund and Rassmussen (2008) reflect upon the “complex relations that exist between agents, tasks, and tools” and offer suggestions for conducting research into the alignment of these variables modeled after the Vygotskian “double stimulation method” (p. 410). This method also presents another way to observe the relationship between group behavior and outcomes. It is also likely to guide many future instructors and researchers toward better task/tool alignment. Considering the wealth of tools released today and the hyper-collaborative participatory environment we are witnessing today, this is likely to be an increasingly valuable resource.

As has been previously noted, digital contexts have dramatically increased the number of genres and registers of written language, the possible processes and pedagogies for learning to write, and more generally, digital environments increasingly illustrate that texts are often co-constructed by multiple authors. Technological innovation has contributed so much to the changing nature of collaborative practices, and it is clear that technology and forms of written collaboration will continue to coevolve. We can anticipate that we will see many future innovations that continue to expand collaborative writing practices, both inside and outside of formal educational settings. We need to be responsive to these changes in order to keep instructional writing practice relevant.

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Technology and Second Language Teacher Professional Development

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Abstract

This chapter describes the research on technology integration in second language teacher education (SLTE). Using technology with pre- and in-service teachers has often been motivated by a desire to create a space where they can interact and ultimately learn with and from classmates, peers, language learners, and experts in the field. These interactions have been analyzed both from a cognitive and social perspective, for example, with a focus on critical thinking, collaboration, reflection, sense of community, and social-emotional support. In addition, the effectiveness of technology integration in SLTE has also been evaluated with regard to experiential learning to determine how the experience of using technology as learners affects pre- and in-service teachers' willingness and ability to use it in their own teaching. In addition to a review of this research (including primary research frameworks and methods), this chapter describes some of the difficulties in implementing and researching technology integration in SLTE. It concludes with some concrete suggestions for future research based on gaps in the existing literature and trends in teacher education research.

Keywords

Computer mediated communication • Second language teacher education • Community of inquiry • Preservice teachers • Identity • Collaboration • Experiential learning • Cognitive presence • Social presence

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Introduction

With technology becoming more accessible and more widely used in a variety of educational contexts and subject areas, it has also significantly shaped teacher education, including **second language teacher education (SLTE)**. This trend has been supported by increasing demands for online and hybrid courses and calls for systematic teacher preparation in the area of technology integration. Additionally, technology in SLTE has to be seen in light of developments in technology applications for second/foreign language learning, an area for which the general label computer-assisted language learning (CALL) is often used. SLTE has been trying to catch up with CALL while also seeking to both respond to and inform policy developments.

First and foremost, technology integration in SLTE has been motivated by a desire to harness its pedagogical potential. But it can also provide pre- and in-service teachers with opportunities to experience technology-enhanced learning *as learners* in order to eventually use it in their own language classrooms. There are multiple ways to organize the research in the area of technology in SLTE, such as by tool (e.g., blog, chat), participants (in-service vs. preservice teachers), task, research focus, or methodology. The overview below distinguishes three popular approaches to technology integration: intra-class, interclass, and collaborative projects with other stakeholder groups. This organization was chosen because these setups are inherently different from each other with regard to the quality of interactions and their intended learning outcomes.

Early Developments

Particularly early on, research on technology in SLTE was significantly influenced by work investigating pre- and in-service teachers of other subject areas. In fact, some of the most frequently cited studies did not focus on second/foreign language teachers (due to space limitations, these studies will not be discussed here). To a great extent, this was a function of the field's early developmental stage. Since then, the field SLTE has continued to look toward related work in teacher education and

educational technology. Such an interdisciplinary orientation is definitely a strength but only when research also accounts for the uniqueness of SLTE.

In the 1990s and early 2000s, research on technology in SLTE focused mostly on asynchronous computer-mediated communication (CMC), probably because it was more accessible than synchronous formats and was logistically easier to implement. A few early studies mirrored trends in research on CMC for second/foreign language learning, in particular what Blyth (2008) called the technological approach. With an emphasis on exploring the potential of new tools, this early developmental stage of research often compares technology with traditional teaching approaches. A parallel with this body of CALL research can be seen in some early SLTE studies in terms of research design, namely, the comparison of CMC and face-to-face interactions (Kamhi-Stein 2000; Nunan 1999). Furthermore, these and other early publications analyzed the same affective and participation features: in CMC in SLTE, some participants feel more comfortable to participate and take a more active role in shaping the discussion (e.g., Kamhi-Stein 1999; Nunan 1999; Son 2002). These few studies are noteworthy because of their connection to other CMC research but do not constitute a trend. SLTE research quickly focused on other topics that continue to serve as major trends to this date.

By far the largest of these research strands relies on transcript analysis to investigate the quality of pre- and in-service teachers' online discourse. In some early work, several topics came up that have received considerable attention since then. One of these is the degree of **interactivity**: Henri's frequently cited study (1991) reported that financial professionals in a distance learning context often engaged in monologues. While this study was not in SLTE, an early study working with future language teachers also reported limited interactivity (Johnson et al. 2001). Even more extensively investigated has been the social and cognitive nature of CMC in SLTE after early reports described benefits like social knowledge construction and community building (Kamhi-Stein 1999; Nunan 2002; Pawan et al. 2003).

Another influential early finding that continues to shape how technology is integrated and researched in SLTE is **experiential learning**: by experiencing computer-supported learning environments first hand as learners and reflecting on this experience, pre- and in-service teachers can gain the confidence and the skills needed to use computers with their own students. Hence, technology integration in SLTE can serve a dual function with immediate and long-term value. This early period was also marked by curricular discussions around the use of technology in SLTE. CALL placed new demands on language teacher education programs and therefore generated interest in detailed **curriculum** descriptions for preservice CALL courses, which often included rationales and informal evaluations of specific course features. While there is no longer the same need for such descriptive reports, language teacher educators have discussed larger curricular issues beyond this early period. This discussion has included several curricular models for giving preservice teachers the opportunity to experience technology in their studies and ultimately developing the professional skills to use CALL (Hubbard 2008; Wildner 1999).

In these curricular discussions, however, the potential benefits and shortcomings of online SLTE programs have received significantly less attention.

Major Contributions

Since the early 2000s, research on technology in SLTE has built on earlier, often more anecdotal work by systematically investigating how pre- and in-service teachers interact online and how this affects their professional development. As a place-independent mode of communication, CMC can increase class contact time or connect people that might otherwise not be able to meet. This feature provides unique opportunities to address some of the constraints of teacher education, especially by bringing together people from different stakeholder groups, with different backgrounds and in different contexts. To achieve this, teacher educators have worked with both synchronous CMC (SCMC; e.g., chat, virtual worlds, voice/video teleconferencing) and asynchronous tools (ACMC; e.g., discussion boards, blogs). Despite the fact that in many contexts bandwidth no longer imposes the same limitations, ACMC remains very popular in SLTE. This is in part because, without the need to coordinate participant' schedules (sometimes across time zones), ACMC is easier to implement. But its popularity is by no means a mere function of logistics – instead, ACMC offers powerful affective and cognitive benefits. In particular, the lag time that ACMC provides allows participants more time to process messages and compose their own. As a result, they are able to reflect, revise, and consult resources, often feeling less anxious or hesitant to participate (e.g., Belcher 1999; Arnold and Paulus 2010). Without visual cues, some also find it easier to critically engage with their peers' ideas (Yang 2009).

Research Frameworks

ACMC's ability to encourage **reflection** has been particularly welcome given SLTE's recent emphasis on **reflective practice** (Wright 2010), that is, the process of examining one's assumptions, strengths, and weaknesses to identify alternative actions for the future and stimulate professional growth. Furthermore, as interactive tools, both synchronous and asynchronous CMC can foster **collaboration** and **community**, both of which have also been key teacher education precepts. In fact, the topics of reflection, collaboration, and community have been central in the research on technology in SLTE, mirroring the general **sociocultural** orientation of SLTE.

Several theoretical frameworks have guided research on community and collaboration in SLTE CMC. Grounded in **situated learning**, Wenger's influential theory of Communities of Practice (1998) has been used in SLTE research in general and in SLTE CMC research in particular. Defined as a group of people that is passionate about and strives to develop expertise in an area, a coherent **Community of Practice** relies on mutual engagement, joint enterprise, and a shared repertoire. Wenger and

his associates as well as other researchers have posited that technology can support an established Community of Practice but might not work for a virtual group that relies mostly or even exclusively on online communication. As will be discussed further below, this issues has been a major focus in SLTE research.

Other community-related research has been based on the framework of **community of inquiry** (Garrison et al. 2001), which was specifically developed for text-based online learning contexts and defines three broad dimensions, **teaching presence, social presence, and cognitive presence**. Teaching and social presence, which include specific indicators such as self-disclosure, information exchange, and reciprocal exchanges, have been a valuable tool for deductive transcript analysis that can facilitate cross-study comparisons. In some cases, studies have only coded one type of presence to narrowly focus on cognitive or social behaviors. There is significant overlap between the theories of community of practice and community of inquiry. In fact, the latter has been used to analyze a virtual group as a community of practice (Arnold et al. 2007). Both theories reflect cognitive and social concepts on which SLTE has placed significant value, such as collaboration, group cohesion, critical analysis, social knowledge construction, and social-emotional support. As such, they can help capture the developmental trajectories of pre- and in-service teachers.

The Quality of Online Interactions in SLTE

Relying on **transcript analysis** (sometimes as part of a mixed methods approach), most research has investigated three major CMC approaches to SLTE: intra-class interaction, interclass interaction, and formats that connect pre- or in-service teachers with other stakeholder groups. Arguably the most basic is the intra-class, in which students enrolled in the same class interact with each other online. This setup can be used in the context of an online class (even a fully online program), a hybrid course, or a technology-enhanced class where online assignments supplement, but do not replace face-to-face contact hours. Generally on-task and interactive, such online discussions are often characterized by substantial brainstorming, sharing of ideas and opinions, and reflective engagement. What usually occurs much less frequently, if at all, is applying or assessing ideas, which involve more advanced cognitive processes. The integration of information can also be problematic: while some studies have reported significant levels of integration of information, others have found no evidence at all (e.g., McLoughlin and Mynard 2009; Pawan et al. 2003).

Capitalizing on CMC's ability to bring together people in different locations, interclass CMC projects involve two or more courses, usually at different institutions in the same or even a different country. Overall, the research findings on such cross-institutional or international collaborations have mirrored those of intra-class setups in many ways. Exchanges on discussion boards, blogs, Twitter, and text- and video-based synchronous platforms are typically on-task, but the level of interactivity has been mixed, with some studies reporting one-sided communication patterns (Lord and Lomicka 2008). Interclass projects are often marked by a strong social component, such as a sense of community, information sharing, and emotional support

(Arnold and Ducate 2006; Lord and Lomicka 2014). In terms of cognitive activity, participants frequently engage in higher-order thinking skills such as reflection and critical thinking. However, several studies have found only limited evidence of advanced cognitive processes or cognitive collaboration beyond information sharing. If participants do assess a solution or experience, it is often on their own. In other words, online communication can help pre- and in-service teachers construct deeper understandings, but this might not always be a result of direct collaboration (e.g., Arnold and Ducate 2006; Mangenot and Nissen 2006).

The third pedagogical format connects pre- or in-service teachers with other groups of stakeholders. One example is to utilize CMC's ability to bridge distance and time to provide virtual spaces for (future) teachers to engage with experts in the field. Such virtual guest visits have been examined using the socially oriented theories of learning discussed above (e.g., communities of practice), and similar results were found, such as participants displaying significant social presence and attempting to connect with and support one another. In terms of cognitive presence, the interactions were marked by exploration with significantly less integration and very few resolutions. Often based on telecollaboration (e.g., Belz and Müller-Hartmann 2003), a second and contrasting approach involves placing student-teachers in direct collaboration with language learners. This presents a fundamentally different context since student teachers need to step into the role of the teacher. Such experiences can form the basis for valuable reflection and ultimately trigger professional growth, both in terms of pedagogical competence and teacher identity (Doering and Beach 2002). Nevertheless, they are also often marked by tensions, as student teachers have to navigate discourse types, cultures, institutional cultures, rules, and expectations (Kitade 2014; Schocker-von Ditfurth and Legutke 2002).

As the above discussion has shown, CMC in SLTE can create a space for community building and social learning, particularly sharing, comparing, and exploring. Furthermore, studies indicate that CMC can help (future) language teachers align with the community of professional language educators as well as support their identity formation (Dooly and Sadler 2013; Farr and Riordan 2015; Riordan and Murray 2012). However, it is difficult to confidently identify generalizable trends. Theoretically, the use of similar analysis tools would allow for cross-study comparisons. In reality, however, this has been hampered by differences in the implementation of CMC. Multiple studies indicate that the quality of pre- and in-service teachers' online contributions is profoundly shaped by **task** design and instructor involvement (e.g., Arnold and Ducate 2006; McLoughlin and Mynard 2009; Pawan et al. 2002; Yang 2009). Moreover, the tool itself also plays a pivotal role by shaping user behavior directly or indirectly. Participants' attitudes have the potential to affect their engagement, and they seem to prefer synchronous modes (with the exception of virtual worlds like Second Life, whose implementation has been challenging). A more direct influence is exerted by specific tool characteristics, which seem to make blogs a good platform for reflection and narration, chat (and face-to-face) for community building, and forums for discussion. Dooly (2011) even argued that the mode of communications has a bigger impact than group composition.

Another CMC configuration, but one that has received very little attention so far, involves (future) teachers connecting with peers, mentors, and the larger professional community outside of formal training events or courses. Personal learning networks have been shown to play a very important role in helping teachers think about if, when, and how to use CALL (Kessler 2006; O'Dowd 2015). The same might be true for massively open online courses (MOOCs), which share some characteristics with formal coursework but still warrant investigation into how they support learning processes as well as outcomes.

Building Second Language Teachers' Professional Skills

In addition to the quality of online interactions, another way to assess the effectiveness of technology in SLTE is related to experiential learning methodology. There are indications that learning through experience can help (future) language teachers identify the possibilities and limitations of educational technology, get ideas for specific tasks, and gain confidence in their ability to use it in their own teaching. In each of the CMC configurations discussed above, the main purpose was to build participants' pedagogical knowledge, sometimes in combination with technological skills (e.g., through experiential learning). So far, few studies have addressed the issue of how CMC can promote development in the area of content knowledge, such as target language proficiency. The studies that have been carried out in this area indicate that CMC can provide valuable language practice and therefore help improve non-native speaking teachers' proficiency and lower their language anxiety (e.g., Lima 2015; Yang 2009). At the same time, the process of engaging in professional dialogue in a second language adds pressure and is time-consuming, making it more difficult for some student-teachers to fully participate. Therefore, it is important to carefully assess the linguistic, cognitive, and affective demands of a task.

Problems and Difficulties

Implementing Technology in SLTE

With regard to the practice of technology in SLTE, there are several significant implementation challenges. Uneven participation levels among participants, perceptions of forced or unnatural participation, and the time-consuming nature of engaged participation have all been documented in the literature. However, independently addressing one of these issues through task design might come at the expense of another. For example, one common strategy to balance participation levels has been explicit task requirements such as expecting a minimum number of posts from each participant. But this can in turn make the conversation feel forced, thereby affecting motivation and perhaps learning outcomes. Another challenge to SLTE involves the possible discrepancy between how the instructor envisioned the use of technology

and how participants actually end up using it. Learners **appropriate** technologies in sometimes unexpected and unintended ways, which can pose problems if it leads to a resistance to engage or when such appropriations limit the intended learning outcomes. Antoniadou (2011), for example, reported that some preservice teachers resisted using Second Life and resorted to other communication platforms. This can be particularly problematic for experiential learning tasks, where learners' experiences with technology-enhanced learning are supposed to help them develop the skills to use it later on as teachers. Inevitably, using a tool differently or not at all limits pre- and in-service teachers' in developing a conceptual understanding of its pedagogical value.

Cross-institutional/international projects or exchanges with other stakeholder groups are associated with a unique set of opportunities and challenges. They are logistically notoriously difficult and often involve the coordination of different academic calendars, academic cultures, expectations and norms for specific communication tools, etc. Just like in CALL contexts, there is the possibility of what O'Dowd and Ritter (2006) have called "failed communication," including tension between participants, indifference or negative attitudes toward the partner group, and even their broader national culture. Unfortunately, these and other potential difficulties can prevent the potentially powerful intercultural online exchange format from being implemented in the first place (O'Dowd 2011).

It is difficult to get a sense of how many SLTE programs include technology-mediated projects, but there seems to be considerable room for growth. Integration can be difficult due to a variety of constraints, but it also places considerable demands on second language teacher educators. It requires expertise in CALL and educational technology in general, in addition to the broad pedagogical knowledge necessary to teach methods courses.

Researching Technology in SLTE

Research on technology in SLTE has also encountered difficulties. Similar to other fields, one major problem has been the myriad of variables that come into play when technology is used with pre- and in-service teachers. Factors related to the larger institutional and cultural settings, the SLTE program and the specific course, its participants, tasks, etc., all have the potential to shape what happens online and what (future) teachers take away from this experience. It is therefore essential that research provide detailed descriptions of **context**. Only then can readers identify how a study's findings might transfer to other settings. For comparative studies, these extraneous variables pose a particular problem since it can be extremely challenging to control for them.

Looking at the research to date, a major research trend quickly becomes apparent: a reliance on transcript analysis. Transcript data, however, consist of externally verbalized behaviors and therefore provide only a partial view of the processes and outcomes of technology-mediated learning. As shown in Arnold and Paulus (2010) and elsewhere, vicarious interaction can not only help explain what happens

in CMC but also capture its hidden aspects. Simply reading the contributions of others, for example, can provide models for task completion and support community building. Thus, this invisible side of CMC constitutes a form of pedagogical lurking. Another limitation of transcript data is that it only captures the finalized product that a participant has chosen to post. Smith (2008) has shown for second/foreign language CMC that this data collection method misses important behaviors like self-repair that occur before a message is sent. Similarly, we might gain new understandings of CMC in SLTE by incorporating process-oriented data using screen-capturing, think-alouds, and/or observation.

The research on technology in SLTE has been characterized by another limited perspective as well. In the case of hybrid or face-to-face courses, it has usually focused only on the technology-mediated component of the course. We are therefore left with an incomplete picture that fails to account for how all the components of the course come together to form a learning experience with certain learning outcomes. Another fundamental problem in researching technology in SLTE has been one of generality. It is widely accepted that teaching second/foreign languages is unique from other subject areas. Consequently, SLTE is unique too, a perspective that is, however, not reflected in the questions most of the research has tried to answer. Future studies could, for example, connect the use of technology in SLTE to specific CALL-related teacher competencies, focus on culture learning, or investigate non-native-speaking teachers.

Future Direction

Given that technology in SLTE is a rather young field, many important questions deserve further attention. One such future direction for research relates to the setting in which CMC is implemented. To date, we do not understand yet how the process and outcomes of CMC are shaped by the type of course or program. Questions like the following will be central to determine how teacher educators can use technology appropriately and effectively: What does (future) second language teachers' online engagement look like in an online course and to what extent is that a function of the delivery method? (How) does it matter if it is part of a fully online program? How might participants' engagement be different in a hybrid or technology-enhanced course? This will also help us think about the potential of online SLTE programs, a crucial issue for our profession that deserves more attention and debate.

One way to investigate these questions is by focusing on the online-offline connection, specifically how the two communication modes work together or against each other with regard to social activity, knowledge construction, and professional development. There are, for example, indications that in technology-enhanced courses, preservice teachers sometimes remain focused on the face-to-face modality as the main context for learning, support, and bonding (e.g., McLoughlin and Mynard 2009). Similarly, further research is needed that analyzes how pre- and in-service teachers engage across different online modalities and how these all come together or build on each other to shape the learning experience. An example of such

a study is Lord and Lomicka (2008), which investigated a blended class for pre-service teachers by comparing the sense of community in its APMC, SPMC, and face-to-face components.

Two additional areas in which further research will move the field forward relate to the rationales for technology use in SLTE. Cross-institutional and international collaboration projects are often used to expose (future) teachers to different perspectives outside their own experience. Research has shown that online exchanges include many instances of information and idea sharing. What remains unclear is if this sharing actually contributes new perspectives that go beyond what participants already knew. And more importantly: How do participants incorporate this information into their personal belief and knowledge systems and ultimately their teaching practices? Along the same lines, more systematic evaluations of the effectiveness of using technology in SLTE for experiential learning are needed. Interviews and surveys have shown that from the perspective of the participants, this approach can be effective. An important question, however, is if and how this manifests itself in actual teaching practice.

When it comes to the online exchanges themselves, little attention has been paid to the role of the instructor. This is particularly surprising since his/her role is explicitly recognized in the teaching presence category of the community of inquiry model for online interactions, which has been widely used. Techniques like **modeling** and **scaffolding** should be particularly valuable, especially since research has shown that pre- and in-service teachers often do not reach advanced levels of cognitive activity in CMC or engage in evaluation and other forms of knowledge transformation in a rather solitary manner. A study by Yang (2009), for example, showed that instructors can help preservice teachers reflect critically. Instructor modeling and questioning pushed the future teachers to reflect more deeply and more critically, which subsequently they were able to do more often and more independently over time. The open question is if instructors can facilitate and teach other forms of higher-order thinking (e.g., evaluating, connecting ideas, proposing solutions) in a similar way. In general, any research that tracks development over time, of which there is rather little to date, will provide valuable insights for curriculum design.

A recent trend in teacher education research has been a focus on **identity** development. It recognizes that a large part of learning to become a teacher is developing a professional identity and thus reflects a holistic perspective of teacher education. It seems that CMC would be an ideal space not only to observe but also to support the professional **identity development** of novice teachers. After all, identities are enacted and negotiated through discursive practices. So far, identity has not received much attention with regard to technology in SLTE. A notable exception is Kitade's study (2014), in which preservice teachers engaged with language learners via CMC as part of a teaching practicum. It documented how the online interactions forced the practicum teachers to confront some contradictions that are inherent in the complex role of a language teacher. In fact, integrating CMC as part of a teaching **practicum** is a way to capitalize on some of the powerful benefits documented in research. Reflection, sense of community, risk-taking, and emotional support can all

help preservice teachers make the most of this often challenging experience. To date, only few studies exist that investigate CMC in a practicum setting.

As the above review has illustrated, research on the use of technology in SLTE has concentrated almost exclusively on CMC. But other technologies such as simulations and games also hold promise for preservice teachers who need to gain an understanding of the complex system of language classrooms. Furthermore, these newer technology environments might create a safe space where they can step into the teacher role and experiment with techniques and tasks.

In light of the current, often top-down push for online and hybrid courses in higher education, it is vital for language educators to understand how technology can support preservice teachers and what role factors like medium, task, and context play. More research is needed to achieve that. Additionally, the field should also respond to recent policy changes in teacher education by evaluating experiential learning in light of specific teacher standards such as the TESOL Technology Standards for Teachers (Healey et al. 2011).

As outlined in this review, in its short history, the SLTE field has established a solid research base particularly with regard to the quality of interactions (future) language teachers have via CMC in various pedagogical configurations. It seems that the field is ready to address questions that are more difficult to research but which will ultimately provide a holistic and in-depth understanding of the potential of technology in SLTE.

Cross-References

- ▶ [Second Language Writing, New Media, and Co-construction Pedagogies](#)

Related Articles in the Encyclopedia of Language and Education

Jasmine Luk and Ching Man: [Classroom Discourse and the Construction of Learner and Teacher Identities](#). In Volume: Discourse and Education

Richard Kern, Paige Ware, and Mark Warschauer: [Network-based Language Teaching](#). In Volume: Second and Foreign Language Education

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Digital Literacies in Teacher Preparation

Mirjam Hauck and Malgorzata Kurek

Abstract

Being literate today means being able to navigate between a multiplicity of voices, perspectives, cultures, and textualities in mostly technology-mediated contexts. Since learners' digital literacy skills do not necessarily align with academic literacy required in formal contexts, teachers and educators need to become key players in shaping their students' attitudes and practices through purposeful selection and use of technology-based tools, tasks, and environments. Therefore, it is paramount for teachers to, first, be digitally literate themselves and, second, be professionally prepared to assist learners in developing the multiple literacies needed to engage with others online in an informed and meaningful way. Considering the rapid pace of technological change, both endeavors involve a lifelong learning process. In this chapter, we describe the challenges for teacher training and professional development programs and propose tested methods for moving forward.

Keywords

Teacher education • Digital literacies • Online intercultural exchanges • Telecollaboration

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Introduction

This chapter argues that digital literacy skills development should be an integral part of pre- and in-service training programs for language teachers and that online intercultural exchange (OIE), also known as telecollaboration, provides the ideal setting for running such training.

The global shift from print to screen has had wide repercussions on how we communicate, create social bonds, and – unsurprisingly – also how we learn. In the wake of these changes, several technology-centered literacy models have emerged to address the increasingly diverse ways in which people use mediating technologies to make meaning and communicate (e.g., New London Group 1996; Cope and Kalantzis 2000; Pegrum 2009a). The current conceptualization of digital literacy covers a range of literacies emerging between technology and its users. It has been defined very broadly as “capabilities which fit an individual for living, learning and working in a digital society” (Joint Information Systems Committee (JISC) 2014). Being technologically competent in this sense has been accepted as a transversal skill which enables learners to acquire other key competences such as languages, economics, or learning to learn and ensures their active participation in society (e.g., European Commission: <http://is.jrc.ec.europa.eu/pages/EAP/DIGCOMP.html>). While acknowledgement of the need for digital literacy training is clear, the answer to the question of how teachers in general and language teachers in particular can best be supported in facilitating the learning of digital literacy remains a desideratum. Technology-enhanced second language (L2) learning and teaching, which is by default mediated twice – by the technology used and by the L2 – seems to be in a prime position to raise awareness for the mediating effect of technologies and thus for digital literacy skills development.

The broader the concept of (digital) literacy or literacies, the more elusive and difficult it becomes to grasp and teach though (Thorne and Reinhardt 2008). Unlike conventional teaching resources, contemporary *textualities* (Pegrum 2009b) represent a dynamic body of raw semiotic materials that, if it is to be educationally explored, needs to be first identified and subsequently pedagogically addressed. To

meet these challenges, teachers need to be agentic in an increasingly complex blend of technical, pedagogical, and content competencies (see, e.g., Hampel and Stickler 2005; Desjardins and Peters 2007; Hubbard 2008; Guichon 2009). The remainder of this chapter focuses on (1) the concept of digital literacy and its pedagogical implications, (2) teacher preparation for technology-mediated learning and teaching of languages, and (3) OIE or telecollaborative exchanges as the recommended training context.

Early Developments: Digital Literacy and Pedagogy

The massive scale of the changes in the teaching and learning of languages and cultures caused by technology has shifted the focus onto mediational channels and has highlighted technologies' transformative role in relation to meaning making and expression. As Kern (2014) reminds us, literacies are multiple not only in relation to their cultural, historical, and linguistic dimensions but also in relation to the demands made by various media and multimodal communication practices. Since texts, understood here in the wider sense of any artifact produced with the help of representational resources, are increasingly multimodal, users need to be able to draw from various semiotic systems to interpret and generate meaning. For instance, multimodal online and mobile applications bring together a variety of modes including spoken and written language as well as visual resources such as images and icons and/or gestures in an "orchestration of meaning" (Kress and van Leeuwen 2001, p. 25). Multimodal competence then, which is "the ability to express ideas across a wide range of representational systems or modes" (Kress 2003, p. 21), becomes a central component of digital literacy. As Bezemer and Kress (2016) explain, the "sign-makers," or users, select from the available modes, with each mode offering specific affordances, i.e., distinct and different potentials for making meaning. Modes, in turn, have been defined as "semiotic resources which allow the simultaneous realisation of discourses and types of (inter)action" (Kress and van Leeuwen 2001, p. 22). In line with this, Kern (2014) draws attention to the "subtle mediational effects" of networking technologies directing our attention from the creative aspects of media and modes to the interpretative dimension of meaning making, communication, and (language) learning. However, the prominence of multimodality does not diminish the role of reading and writing in a traditional sense, which remain core competencies enabling access and contribution to today's participatory online cultures (Jenkins et al. 2006; Pegrum 2009a). Yet, acknowledging the relevance of modes broadens the set of semiotic resources that digitally literate users and also language learners in online or hybrid settings are expected to master.

Such a wider concept of digital literacies justifies a closer examination of its components and associated competencies. Pegrum (2009a) lists eight major literacies for successful functioning in an increasingly digital society with *print*, *search/information*, *participatory*, *remix*, and *intercultural* being the most prominent ones

and underpinned by other literacies such as *multimodal*, *personal*, and *code*. Dudeney et al. (2013) take a slightly broader perspective and break digital literacies down into four major areas encompassing *language*, *connections*, *information*, and *(re)-design*. Thorne (2013) highlights the dynamic character of digital literacies: “different systems of literacy can be seen to dynamically evolve in a wide variety of often interrelated semiotic modes, genres and cultural contexts” (p. 193). They also evolve in relation to the social and functional purposes they serve. Thus another prominent aspect of digital literacies is their interdependence with the social and cultural needs of their users. Well over a decade ago, Thorne (2003) introduced the term “cultures of use” to refer to the cultural preferences and expectations of “genre-specific communicative activity” (p. 200). “Becoming literate in a particular semiotic practice,” he explained, “involves the ability to interpret and generate meaningful signs within communities of practice” (p.194).

Jenkins et al. (2006) describe “participatory cultures” and the “set of cultural competencies and social skills that young people [sic!] need in the new media landscape” (p.4) and which are developed through collaboration and networking. One way of achieving this is to follow Thorne’s (2003) suggestion to move students “outside of the relative safety of explicitly educational interactions” (p. 201) and encourage them to participate in “non-educationally oriented online communities.” This, Thorne posits, can lead to acquiring culturally responsive and productive uses of technology. In other words, enriching formal instruction with authentic participation in exogenous-to-education communities can assist both language learners, and arguably also student teachers, with direct experience in the use of multiple semiotic resources, modes, codes, and registers, and importantly, as described by Canagarajah (2006), for the purposeful *shuttling* between various social-textual conventions. As we will see, OIEs, when designed to facilitate the acquisition of the aforementioned competencies, are a first step in this direction.

Major Contributions

The Teaching of Digital Literacies

Accepting the transversal nature of digital literacy inevitably brings pedagogical considerations to the fore. The New London Group (1996) suggested structuring “multiliteracies” instruction around four major stages in which learners (1) recognize their available designs, (2) learn the specific discourses and required technical competence, (3) interpret and reflect on their practices, and (4) are prompted to transfer their knowledge to new contexts and discourses. Thorne and Reinhardt (2008) suggest “bridging activities,” involving the collecting, exploration of, and analysis of digital texts selected by the student to match their vernacular interests. In this pedagogical approach, the next phase is that students are guided to author their own contributions to their digital community or context of choice. The aim is to foster learner awareness of communicative practices and their discursive framing across various media and modalities and, in this way, to help learners gain a better

understanding of the multiple dimensions of contemporary language use, and – we would add – use of modes.

It is in this spirit that Kurek and Hauck (2014) offer a three-tiered framework that calls for a conscious structuring of (language) students' digital experience. In their understanding, learners should be assisted in moving along a continuum from *informed reception* of technology-mediated multimodal input, via *thoughtful participation* in opinion-generating activities through to *creative multimodal contribution*, each of the stages being further attended to on the cognitive, social, discursive, and operational levels. This form of scaffolding, they assert, will help learners mature in their roles as informed digitally literate users.

Stein (2004) advocates “multimodal pedagogies” (p. 95), challenging the hegemony of written language in ESL classrooms. In her words, the paradigm shift in language pedagogy from language to mode should lead to the exploration of what modes are and how they can be used to maximize learning” (p. 105). Considering technology-mediated language education, Hampel and Hauck (2006) pick up the baton and explore how the challenges arising from Stein's pedagogical reconceptualization could be met through task design. They draw on Hampel (2006), who reminds us that we cannot simply assume that learners are familiar with the new media, aware of the affordances, and able to use them constructively in a multimodally informed way (Kurek and Hauck 2014). They also follow Salaberry (2000, p. 28) who suggests that “materials designers need to assess critically (. . .) the features that characterize a potentially new type of literacy,” examining closely the modes and their affordances of audio-graphic conferencing and thus critically assessing its “technological capabilities.” Hampel and Hauck (2006) show that this approach has significant implications for the way we teach and affects areas such as task design, assessment, and tutor training (see also Hampel 2006; Hampel and Stickler 2005). Hampel and Hauck (2006) explain that the varying degrees of embeddedness of modes in new media make new demands on communication and learning in general and language learning in technology-enhanced environments in particular. “Language learners,” they conclude, will have to become competent in both switching linguistic codes and switching semiotic modes and to do so consciously” (p. 12). Hauck (2010b) and Fuchs et al. (2012) follow the approach suggested by Lamy and Hampel (2007) “to start by identifying the modes involved in making up a multimodal environment” and “then to consider the possibilities that they afford the learner, both as single and as combined modes” (p. 47) for meaning making, communication, and interaction. Similarly, prospective language teachers need to be sensitized to the pedagogical affordances of online tools and applications.

In addition to developing multimodal competence, there is a need to make learners aware of new types of social agency based on online community involvement. With software and applications becoming increasingly social, the literacy shift is moving from the acquisition and interpretation of multimodal content to its production and related *participatory literacy* (Jenkins et al. 2006; Pegrum 2009a). As digital mediation enables users to engage in communicative encounters across geographical borders, there is a growing urgency to prepare learners for multiple culturally grounded and technology-mediated linguistic codes and semiotic modes.

The content and outcome of any digital literacy training should therefore be tightly linked to socially and (inter)culturally authentic contexts in which the learners, teacher trainees being no exception, will be able to question and explore their beliefs about technology mediation, communication, and the content under study and reconsider them in the light of others' contribution.

Training (Language) Teachers for Technology Integration

An ongoing challenge is how teacher training programs can better prepare prospective teachers to assist learners in their encounters with the rapidly changing and “infinite variability of different forms of meaning making in relation to the cultures, the subcultures, or the layers of an individual's identity that these forms serve” (New London Group 1996, p. 88). As Hampel and Hauck (2006) have pointed out, to make meaning using a variety of modes should be a learning objective in its own right, which requires teachers to be trained in the design of activities that make efficient use of multiple modalities.

Today, there is consensus among language educators that only the full integration of multimodal technology and pedagogy through entire teacher preparation programs can bring lasting changes (Desjardins and Peters 2007; Hubbard 2008). To that effect, teacher trainees need to have hands-on experience with the media and, above all, be personally engaged in virtual communities of practice. As Guikema and Menke (2014) put it: “Teachers who have experienced collaborative digital communities are less likely to use technology as an instructional tool and instead view it as an object of instruction” (p. 267). The authors also point to the need of shaping trainees' beliefs and values and, through reflective practice, assisting them in developing their teaching identities. The latter, as they explain, are best developed when teacher students can combine their dual experiences as technology users and instructors. Kurek and Turula (2014), in their study of digitally autonomous teacher practices, observe that only the multiliterate teacher can recognize the affordances of tools and applications and can consciously navigate between the pedagogical options at hand. Lack of adequate preparation leads to pedagogically uninformed technology use which, in turn, can fossilize teacher centeredness and transmission models of pedagogy.

From our literature review, we understand efficient teacher training programs informed by digital literacies to be:

- Infused throughout the entire teaching program rather than serving as a one-off course
- Integrating technology and pedagogy rather than teaching particular tools
- Using the available technologies as a means to an end
- Based on modelling and experiential learning rather than on instructive teaching
- Immersing participants in a community of practice
- Based on team teaching and collaborative instruction
- Fostering the questioning of attitudes and beliefs through reflective practice.

As we argue, all these criteria can be met if teacher training is delivered as an online intercultural exchange.

Work in Progress

Telecollaborative Teacher Training

Telecollaborative exchanges, now increasingly referred to as online intercultural exchanges (OIE), were originally defined as the use of “Internet communication tools such as e-mail, synchronous chat, threaded discussion, and MOOs (as well as other forms of electronically mediated communication), to support social interaction, dialogue, debate, and intercultural exchange” (Belz 2003, p. 2) among language learners from different parts of the globe through structured tasks. Today, however, they extend to include exchanges based on the use of a lingua franca, between participants who are language learners and language teacher trainees, language learners preparing for a study abroad period and learners from other subject areas. This wider understanding of OIE is captured by Guth and Helm’s (2010) concept of “telecollaboration 2.0” and based on what networked technologies such as forums, blogs, wikis, and video sharing websites allow learners to do, namely, generating and sharing content and becoming part of online communities. To participate, learners have to be digitally literate or, as Pegrum (2009a) asserts, possess the “skillssets necessary to engage effectively in contemporary communication” (p. 36). Consequently, as Hauck (2010a) argues, collaborative online learning emerges as the means and the end of the educational challenge highlighted by Pegrum (2009a). Telecollaboration 2.0 then, seems to provide the ideal setup to meet the challenge and acquire the skills and competencies in question as it is by definition based on the use of networked technologies and, thus, affords exchange partners “on-the-job” training in digital literacy skills (Hauck 2010a; Helm 2014).

OIEs also enjoy increasing popularity in teacher education (e.g., Hubbard and Levy 2006; Müller-Hartmann 2006). When collaborating online with colleagues and students representing other cultures and educational systems, teacher trainees can first discover, then experience, and finally reflect on the multilayered aspects of their own techno-pedagogy (Desjardins and Peters 2007) in authentic linguistic and intercultural contexts. In such communities of practice (Arnold et al. 2007; Lave and Wenger 1991), the mutual responsibility of team members for shared learning outcomes allows for the articulation and reformulation of beliefs about teaching and is conducive to the development of what Kurek and Turula (2014) have termed “digital teacher autonomy.”

Despite inevitable tensions, OIEs tend to create a positive social online experience and provide teacher trainees with a viable pedagogical model in which digital literacy both supports their online activity and is shaped through it. In this way, OIEs offer the participants a lens through which to interpret different forms of mediation, their pedagogical relevance and potential, as well as confront one’s views and beliefs with those of trainees representing different educational systems and traditions. By

allowing teacher trainees to experience digital literacy as situated practice, OIEs can assist teacher students in the appropriation and repurposing of technologies to match educational objectives (for an overview of pedagogical benefits of OIEs, see O'Dowd 2007; Guth and Helm 2010).

An example of a successful integration of digital literacy and teacher training is a three-way telecollaborative exchange in which Hauck (2010a) and Fuchs et al. (2012) pioneered tasks designed to raise the participants' awareness of modes and meaning making online. They took the interrelationship between multimodal communicative competence, digital literacy, and autonomy as their starting point and set out to explore the competencies that (future) language teachers require to develop first their own and then their learners' autonomy in online and blended settings. Their data suggest that OIEs can support language teachers – both in the role of learners and instructors – in finding out about modes, meaning making, and online communication and to become familiar with the mediating role of Web 2.0 tools and environments. This approach, they explain, can also contribute to autonomy as defined by Palfreyman: the informed use of a range of interacting resources in context (2006). Their results show that task design for this context should follow a certain sequence: First, tasks should focus on gaining an understanding of the digital literacy skills required when working with tools such as forums, wikis, and social bookmarking sites for language learning and teaching purposes. Ideally, this understanding should enable teachers to provide a rationale for using bespoke tools. Next, tasks should raise their awareness of a tool's specific affordances, i.e., the constraints and possibilities of the modes available for meaning making and communication (Hampel and Hauck 2006). This will allow the teachers to move to the next level of Hampel and Stickler's (2005) skills pyramid by fostering their multimodal communicative competence and thus their professional literacy. These steps are a precondition for the subsequent phase in which teachers themselves design tasks with the goal of fostering, in turn, their learners' multimodal competence and autonomy. Finally, they propose that this approach should become a learning goal itself both in pre- and in-service teacher training and formal language instruction. Then, while becoming gradually more versed in multimodality and digital literacy, teachers as learners can take more control over and self-direct their learning in online environments, thus becoming more autonomous and gradually gaining the competence to design tasks that also enhance their learners' autonomy.

Problems and Challenges

As we have seen, the breadth and scope of digital literacy present challenges to educators. Despite attempts at the pedagogical implementation of digital literacy skills development, students' vernacular practices are distributed across heterogeneous sectors of the Internet and, as such, can be odds with the predominantly

print-based practices valued in traditional education. Thus, the gap between the two continues to widen: on one hand learners see little correspondence between formal education and their daily digital literacy practices and on the other hand any digital skills they acquire informally “within a dynamic interplay of personal and social collective experiences” (Thorne 2013, p. 194) remain educationally unrecognized and unlikely to transfer to more formal educational contexts (Hubbard 2004; Littlejohn et al. 2013). Moreover, student teachers’ personal beliefs about the educational uses of technology tend to be uninformed and thus inadequate, even if they perceive themselves as digitally savvy (Kurek and Turula 2014).

Kern (2014) reminds us that one of the major challenges arising from the rapid technological and literacy changes is the unpredictability of the literacy requirements of today’s school children at the time of their university graduation. Hence, it is almost impossible to know how best to prepare them for tomorrow’s world. While we would like to believe with Pegrum (2009a) in the great opportunities for youth and the potential for a “semiotic democracy” where everybody can contribute to the stories of our own times, we are also acutely aware that young learners’ digital proficiency tends to remain superficial and does not readily transfer across domains (Hubbard 2004; Littlejohn et al. 2013). Since students’ digital practices are by and large characterized by textual variety and fragmentation across semiotic genres, modes, and cultural contexts, (McKenna and Hughes 2013; Thorne 2013), training teachers in today’s’ literacies means preparing them for how to handle diversity, unpredictability, and change and, importantly, how to recognize pedagogical affordances amidst a growing array of digital spaces and practices “A central challenge at the moment,” Bezemer and Kress (2016) conclude, “is to understand both the affordances, the facilities, and the constraints of contemporary media, in all aspects of social action; and the affordances of the modes which appear there” (p. 12).

The institutional approach to the teaching of digital literacy also needs to be addressed. Paradoxically, one of the main issues is the ongoing normalization and institutionalization of technology-oriented curricula. They tend to be informed by fixed and regularized “competency frameworks” which provide instructors with more or less explicit checklists of technical skills to teach and assess (Littlejohn et al. 2013). Such institutional standards fail to accommodate the highly individualized and often idiosyncratic nature of students’ digital practices. Moreover, since they are used for assessment, they are mostly disliked by the students. A real challenge is therefore for universities and teacher training programs to reconsider the requirements underpinning their curricula so that they can embrace evolving literacy standards. Neglecting to do so may further broaden the gap between informal and educationally accepted digital discourses.

Yet another challenge is the need to address the divide between technocratic and digitally autonomous uses of technologies in educational contexts. When it comes to the former, they seem to be rooted in a misconception of technology as

pedagogically efficient in itself and result in inadequate, decontextualized training. Kurek and Turula (2014) show qualitative mismatch between teachers' high digital self-esteem and their actual teaching activities which in fact fail to embrace the "diversity and plurality (. . .) of resources, opinions, contexts, communication and semiotic modes" (p.124), which arguably is the main educational value of today's technology.

Future Directions

The argument proposed in this chapter is that the developing dimensions of digital literacy require a fundamental reconsideration of teacher preparation with much greater focus on digital literacy as a contextualized social practice than on technical mastery per se. Additionally, it is important for teacher training curricula to come up with mechanisms that recognize and attribute formal academic value to informal, interpersonal, multimodal, and multiauthored digital contributions. Questions that need to be addressed in this context include the issue of assessment: How can or should learners' fragmented contributions produced within diverse communities of practice be assessed? Should they be given the same weight as what continues to be perceived as "proper" academic discourse? How can we prepare teachers for dealing with assessment challenges in the context of practices with which they themselves still need to experiment and which are in a constant state of flux? And, finally, how can we instill in teachers the readiness to reformulate their teaching identities to adapt to learners' needs and to evolve over time in relationship with ever changing uses of and genres of technologies?

The systematic integration of digital literacy into the daily practices of discipline-specific academic instruction will be a crucial step in the right direction. Although many academics do use technology as a research tool, few are familiar with creating technology-rich and pedagogically sound learning environments (McKenna and Hughes 2013). Therefore, student teachers have limited opportunity to develop digital literacy as situated knowledge practice modelled by their instructors.

OIEs, which align well with the principles of efficient teacher training, provide a learning context with a potential to soften the barriers between the actual uses of technology and technology approached as content matter. With the theoretical and practical ground for IOEs already well developed (e.g., O'Dowd 2007; Guth and Helm 2010), the real challenge rests in making this teaching method universally available across higher education institutions. As Helm (2014) specifies, lack of institutional recognition may lead to reluctance on the part of the participating students, even if they are awarded academic credit. Making OIE projects with teacher trainees from culturally diverse educational backgrounds, a compulsory component of teacher education would therefore be an important move toward what the New London Group described as "reclaiming the public space of school citizenship for diverse communities and discourses" (1996, p. 19).

Cross-References

- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Online Intercultural Exchange and Language Education](#)
- ▶ [Technology and Second Language Teacher Professional Development](#)

Related Articles in the Encyclopedia of Language and Education

Chantelle Warner: [Foreign Language Education in the Context of Institutional Globalization](#). In Volume: [Second and Foreign Language Education](#)

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History and Key Developments in Intelligent Computer-Assisted Language Learning (ICALL)

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Abstract

This chapter provides an overview of Intelligent Computer-Assisted Language Learning (ICALL) technologies for written learner language: spell checkers, grammar checkers including systems for automatic writing evaluation, and Intelligent Language Tutoring Systems (ILTSs). After discussing the goals and challenges of processing written learner language more generally, the chapter provides an overview of the developments of these distinct technologies by focusing on applications that specifically address the difficulties of evaluating learner language. The chapter concludes with a brief discussion that situates these distinct ICALL technologies within Second Language Acquisition theory.

Keywords

Intelligent Computer-Assisted Language Learning (ICALL) • Intelligent Language Tutoring Systems (ILTSs) • Spell checkers • Grammar checkers • Parsers • Automated essay evaluation (AWE) • Natural language processing (NLP)

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Introduction

Intelligent Computer Assisted Language Learning (ICALL) is a field within Computer Assisted Language Learning (CALL) that applies concepts, techniques, algorithms, and technologies from artificial intelligence to CALL (Gamper and Knapp 2002; Heift and Schulze 2007; Nerbonne 2003; Schulze 2008). Artificial intelligence (AI) describes the science and engineering of making intelligent machines. This includes work in robotics, intelligent agents, and computer vision. One of the branches of AI most relevant to CALL is research in Natural Language Processing (NLP). NLP studies the problems of automated understanding and generation of natural human languages. In natural language understanding, the computer takes written or spoken language input and turns it into a formal representation that captures phonological, graphological, grammatical, semantic, and pragmatic features. In contrast, natural language generation is the reverse process of going from a formal representation to natural language output.

Natural language understanding faces many challenges whereby each language often presents its unique problems. For instance, some written languages like Japanese, Chinese, or Thai do not have single-word boundaries. However, any significant automated text segmentation and analysis requires the identification of word boundaries thus posing difficulties for NLP systems designed for those languages. Language can also be highly ambiguous (e.g., lexically, syntactically) which is extremely challenging for automated text and speech processing.

The challenges that NLP faces are compounded when it comes to imperfect or irregular input, commonly found with learner language. In language learning, errors occur, not because the student's knowledge is a strict subset of the expert knowledge, but because the learner possesses knowledge potentially different from the expert in quantity and quality.

This chapter provides an overview of ICALL systems that evaluate written learner language. Unlike Intelligent Tutoring Systems (ILTSs), which often focus on a subset of learner errors and/or restrict learner input to the sentence level by emphasizing feedback and individualized instruction, spell checkers, grammar checkers, and systems for automatic essay scoring evaluate L2 learners' production of entire texts. The following sections discuss these ICALL systems with respect to their goals and challenges by highlighting applications that have been specifically designed to address the difficulties that center around written learner language. The chapter concludes with a brief discussion that situates these distinct ICALL technologies within Second Language Acquisition (SLA) theory.

Evaluating Written Learner Language

In ICALL, the treatment of grammatical errors has received most attention (Nerbonne 2003). Identifying and describing errors in written learner language have played an essential role in research and development albeit often in a purely computational framework by designing computational tools and algorithms that can process erroneous language input. This focus meant that some ICALL researchers (e.g., Schuster 1986), in their practical pursuit of error diagnosis, relied on a theoretical framework, such as that of Contrastive Analysis (CA) or Error Analysis (EA). The advent of electronic learner corpora coupled with the need for elaborate error data in ICALL research has also recently sparked renewed interest in the methodologies employed by EA.

When analyzing learner language, it is useful to make a distinction between text as a process and text as a product. The former refers to an understanding of text production processes during which communicative goals are modified, specified, and finally met by searching for, selecting, connecting, and uttering appropriate linguistic signs such as words, phrases, and sentences. If verbalized, some of these processes can be observed in spontaneous spoken speech. It is much more difficult to detect traces of the preceding processes in the written result, the text as product. If an utterance in such a text adheres to all orthographic, grammatical, stylistic, and pragmatic norms of the L2 as judged by a native speaker, then it is very difficult to determine whether language learners have internalized the linguistic constraints of the L2 or whether they applied normative knowledge from outside the L2 system and coincidentally produced a well-formed utterance. Errors, on the other hand, provide an excellent window into text production processes because they deviate from the L2 norms. Most often, the errors made by language learners reflect hypotheses of linguistic norms that learners form about the L2. Insights into the process of second language acquisition and the de-emphasizing of the notion of errors as failures are clearly benefits of the application of error analysis in language learning software (Chanier et al. 1992).

The two main components required for evaluating written learner language with NLP are a parser and a grammar. A parser is one of the components in an interpreter which checks for correct syntax and builds a data structure implicit in the input tokens that the user provided. Most modern parsers are at least partly statistical, that is, they rely on a corpus of training data which has already been annotated, that is, parsed manually. This approach allows the system to gather information about the frequency with which various constructions occur in specific contexts. The parser often uses a separate lexical analyzer to create tokens from the sequence of input characters. In addition, an ICALL system generally consists of a grammar that defines the valid sentences in a language. Finally, a semantic component is required to analyze the meaning of words or the sentence. These components then allow ICALL systems to evaluate learner language by also employing AI methods and techniques (e.g., learner models) that predefine

information about the learner and/or the task thereby resulting in a unique set of system responses and interactions.

Spell Checkers

The use of word processors is an integral part of the language learning classroom and spell checkers, in particular, are a highly desirable tool for both native and nonnative writers (see Rimrott and Heift 2005). With little controversy, spell checkers are praised for their effectiveness in treating spelling mistakes. However, generic spell checkers are based on the assumption that their users are competent speakers of the language who primarily make accidental typographical mistakes (e.g., as in the misspelling **langauge* for *language*). For this reason, they are best at correcting single typographical errors of letter addition, omission, substitution, and transposition. A number of studies (e.g., Burston 1998), however, have indicated that spell checkers are less successful in dealing with errors made by writers with spelling deficits or nonnative speakers. Nonnative writers, for example, are just as likely to make accidental typographical mistakes as native writers are, but they also make errors that are due to their insufficient command of the foreign language. These errors tend to deviate from the correct spellings in more substantial but also somewhat predictable ways. Allerton et al. (2005:36), for example, state that “[a]s learners’ errors often do not correspond to typical typing mistakes, the algorithms used by spell che[ck]ers are of relatively little help in this situation. What is needed to detect this type of variation and generate appropriate feedback is an algorithm (coupled with a database) designed to deal specifically with learner language.”

In an attempt to address the shortcomings of generic spell checkers in the language learning context, a few researchers have designed programs that assist nonnative writers with their spelling problems. Fallman (2002), for example, presents a descriptive spell checker that uses the Internet as a database to retrieve the number of hits of a given string. The number of hits for different possible spellings of a word can be compared to determine the correct spelling (i.e., the alternative with the most hits is most likely the correct spelling). Ndiaye and Vandeventer (2003) have developed a spell checker for learners of French that is geared toward the correction of both typographical and phonologically motivated spelling errors. It also includes an ad hoc method for treating a specific type of morphological spelling error (the incorrect plural formation of words ending in *-al* and *-ail*).

While these programs are all geared toward nonnative misspellings, they are generally not based on an extensive empirical analysis of L2 spelling errors. This said, many researchers (see, e.g., Cowan et al. 2003; Ndiaye and Vandeventer 2003; Allerton et al. 2005) recognize the need to consider authentic learner errors in the design of useful language learning programs. For example, Cowan et al. (2003, p. 455) state that “[b]asing the selection of errors to be targeted for correction research on empirical data [. . .] provides us with many examples of error types that can be built into the CALL program.”

Rimrott and Heift (2005) conducted a study on nonnative German spelling errors and evaluated the performance of the generic spell checker part of MS Word that is not specifically designed for second language learners. One of the study goals was to determine the frequencies and kinds of errors it can successfully correct. In classifying the spelling errors, they made a primary distinction between competence and performance errors. Within the category of competence errors, they further distinguished errors according to language influence (interlingual vs. intralingual) and linguistic subsystem (lexical, morphological, phonological, and orthographic). Performance errors were subdivided into single letter violations (additions, omissions, substitutions, and transpositions), multiple letter violations, and word boundary violations. Frequency counts indicated that 80% of the errors were competence-based, while 20% were random accidental typographical mistakes. In the competence category, intralingual errors were much more frequent than interlingual misspellings. In addition, phonological and lexical errors were more prevalent than morphological or orthographic errors. Performance errors were largely comprised of single letter violations. Multiple letter violations and word boundary errors constituted the minority.

In assessing to what extent the *MS Word 2003* spell checker can successfully correct their misspellings, Rimrott and Heift (2005) found that, contrary to claims with respect to L1 misspellings, only 52% of their nonnative misspellings were corrected. However, the spell checker was much more successful in treating performance errors than competence-based misspellings. Competence errors tend to deviate more substantially from the target words than performance errors. This difference in degree of deviation makes it harder for a spell checker to suggest the target words. Furthermore, within the competence category, lexical misspellings were most frequently not corrected, followed by morphological, and finally phonological misspellings. Again, greater target deviation is the principal explanation: on average, lexical misspellings evidence greater target deviation than morphological misspellings which in turn deviate more from the target words than phonological misspellings. Their results confirm that the spell checker is effectively serving its primary purpose: correcting performance-based single letter violations. However, their error data also demonstrate quite clearly that the spell checker's task is different in foreign language writing where most misspellings are competence-based and thus, most commonly, involve greater target deviations. Along the lines of Tschichold's (1999) strategies for improving foreign language grammar checking, they propose two main strategies to overcome the shortcomings of generic spell checkers in the CALL classroom by increasing the spell checker's effectiveness in treating nonnative misspellings, and/or decreasing the language learners' dependence on the spell checker.

Grammar Checkers

There is a genuine need for evaluating grammar errors in written learner language. Learners certainly perceive the correctness of second language utterances to be

important in written and oral communication. Language learning often has phases of form-focused activities (Long 1991) in which students shift away from the negotiation of meaning in a communicative setting to concentrate on the surface form of their utterances. The thorough proofreading for errors of a text is such an activity. For these form-focused activities, grammar checkers can be very useful tools, if they function adequately. However, the shortcomings of commercially available grammar checkers used by language learners have been discussed widely (Granger and Meunier 1994; Wei and Davies 1997; Tschichold 1999). Evaluations of these grammar checkers usually indicate that, for grammar checkers to be useful, they need to be adapted to use by language learners. More linguistic rules are also needed to avoid simplistic pattern and keyword matching.

In an attempt to address learner language more effectively, Knutsson et al. (2003), for instance, adapted and tested *Granska*, a grammar checker for learners of Swedish as a foreign language, which originally had been developed for Swedish native speakers. They reported that *Granska* “detected about 35% of all errors” (n.p.). Students noted that they had difficulties using the program because of a lack of advanced computer training and due to the high number of false alarms the program generated. Later *Granska* became the main language technology component of *Grim* (Karlström et al. 2007), a tool for learners of Swedish. *Grim* combines the grammar checker *Granska* with a surface syntactic parser, a concordance interface to the Swedish version part of the Parole corpus, a dictionary, and an interface to a tool for automatic word inflection (Knutsson et al. 2007).

Some commercially available grammar checkers are specifically designed for nonnative writers. For French, for example, there are programs such as Antidote and Le Correcteur. “Antidote Prisme” is a suite of software reference tools for writing French. It has an advanced grammar checker which now corrects the whole text at once instead of one sentence at a time. It has five great tools that integrate directly and seamlessly into most major word processors and email programs. It was designed as a tool for native French speakers and the grammar checker now has a setting for nonnative French speakers.” (Taken from *The World of Reading*, <http://www.wor.com/shopping/products.asp?id=179>, accessed June 1, 2015.)

Automatic Writing Evaluation

Another area in ICALL that deals with written learner language and one that has received increased interest more recently is that of automated essay scoring or writing evaluation (AWE) (Hegelheimer et al. 2016; Coniam 2009; Cotos 2011; Ware and Warschauer 2006; Warschauer and Grimes 2008; Warschauer and Ware 2006). Lonsdale and Strong-Krause (2003), for instance, present a parser-based essay rater for beginning learners of English as a foreign or second language, which achieved an inter-annotator agreement with human raters of 62.1–69.5%. The authors conclude that a “purely syntactic parse does not always assure appropriate ratings” (ibid.). They identified possible improvements to the linguistic processing and argued that

“the output from a non-traditional syntactic parser can be used to grade ESL essays. With a robust enough parser, reasonable results can be achieved, even for highly ungrammatical text” (ibid.).

Coniam (2009) evaluates the Bayesian Essay Test Scoring System (BETSY) with ESL examination essays from Hong Kong students. BETSY’s scores correlated highly with those given by human raters and thus Coniam concludes that essay scoring software is an efficient tool for the evaluation of word-processed essays. His focus on automated essay scoring for assessment purposes is complemented by studies by Warschauer and colleagues (Warschauer and Grimes 2008; Warschauer and Ware 2006) who focus on the feedback capabilities of such systems and their use in the language classroom. Warschauer and Grimes (2008) investigated the in-class use of two systems, *Criterion* and *My Access*, in secondary schools. In their study, the teachers’ highly positive perception of the benefits of AES in the classroom was contradicted by their limited and infrequent use of the systems in class. Although students clearly benefitted in a number of ways from their work with the two systems, “almost all of the revisions that students made were narrow in scope” (p. 29). Warschauer and Ware (2006) summarize their findings as follows:

We believe that both of the above-described potentials – technology that empowers by providing instant evaluation and feedback, and technology that dehumanizes by eliminating the human element – exist in automated writing evaluation software. Where on the continuum between these two outcomes AWE [Automated Writing Evaluation] might fall depends on how such software is used in specific teaching and learning contexts, a matter subject to empirical investigation. (p. 20)

Similarly, Li et al. (2014) conducted a study on the usefulness of holistic scores for classroom purposes using *Criterion*. The authors investigated the correlation between *Criterion*’s holistic scores and instructors’ numeric grades and analytic ratings on two course assignments in three ESL writing courses. Their findings indicate a low-to-moderate positive correlation whereby students also made efforts to revise their work in order to obtain a higher score. The authors highlight the usefulness of Automated Writing Evaluation (AWE) programs and provide justification for AWE’s classroom-based formative assessment.

As for evaluating AWE programs with regard to SLA theories, Cotos (2011) situates her study of IADE, a system that provides feedback on discourse moves in academic texts (Pendar and Cotos 2008), within the interactional framework of SLA. She states that IADE has “the potential to trigger noticing and focus on discourse form [and will thus] enhance learning” (p. 444). Like IADE, TechWriter (Napolitano and Stent 2009) provides assistance for specialized text genres, in this case, technical writing. It relies on the public part of the American National Corpus and is tagged for parts of speech. Learner texts are then checked against n-gram sequences of stemmed words and part-of-speech tags. Their relative and absolute frequencies in the corpus are then compared to the respective frequencies in the student text. Differences signal the probable occurrence of an error. Feedback is provided through offering alternative n-gram sequences from the corpus data. Although the system has not yet been evaluated formally, it is used by students at Stony Brook University.

Intelligent Language Tutoring Systems

In contrast to grammar checkers that target written learner language in texts of any length, ILTSs are primarily designed to support form-focused instruction by identifying ill-formed grammatical construction in learner output (see e.g., Schulze 2008) commonly limited to the sentence level. However, after 30 years of development and research of ILTSs (for a chronology of ICALL systems, see Heift and Schulze 2007), these systems nowadays are rarely limited to form-focused instruction but, instead and due to their sophisticated underlying technologies, allow for more diverse learning environments. For instance, Dickinson et al. (2008) designed an ILTS that is embedded in a synchronous computer-mediated communication (CMC) environment. The system provides feedback on particle usage for first-year L2 Korean learners while they chat in CMC. Moreover, Harbusch et al. (2008) designed a virtual writing environment for German for elementary-school children, *The Sentence Fairy*, which deploys natural language generation technology to evaluate and improve the grammatical quality of student output. Most other ICALL systems provide a combination of form-focused and meaning-focused instruction. For instance, the activity types in *E-Tutor* (Heift 2010a) allow for grammar practice as well as reading comprehension and/or cultural knowledge. In addition, *E-Tutor* also supports discovery learning in the form of exploration of learner language. For this, user submissions over five years were compiled and from those a common learner corpus was constructed that allows students to explore learner language according to various parameters. Accordingly, learners can examine interlanguage or task-specific phenomena by, at the same time, allowing language instructors and/or researchers to examine the design of language learning material in addition to a wide range of additional research topics (e.g., use of help options, interlanguage studies).

Learner Feedback

The main advantage of ILTSs over more traditional CALL environments lies in the error-specific feedback that an ILTS can provide in response to learner output. Traditional CALL programs are generally based on string matching algorithms, that is, the student response is compared letter for letter against an answer key. In contrast, and due to sophisticated NLP technologies, an ILTS identifies and interprets errors as well as correct constructions in learner input and generates appropriate, informative learner feedback accordingly.

Over the past decades, research has sought evidence that feedback in CALL makes a difference in language development, and more specifically, what kinds of feedback make what sorts of differences to the developmental processes of learners. One of the early studies investigating different feedback types for Japanese grammar instruction found that “intelligent” feedback (with a metalinguistic explanation) was more effective than binary knowledge-of-result feedback (e.g., *wrong, try again!*) (Nagata 1996). A number of studies followed (see e.g., Bowles 2005; Heift 2004; Heift and Rimrott 2008; Pujolà 2001; Rosa and Leow 2004) and the results generally

support the claim that students benefit from the more explicit feedback because they subsequently perform better on particular target language structures and/or because students' grammatical awareness is subsequently raised.

A few studies have also considered learner strategies with respect to corrective feedback in CALL rather than focusing on learning outcomes solely. For instance, Brandl (1995), studying L2 learners of German, found that the learners' language skills influence their preference for a particular feedback type in CALL programs. More specifically, results indicate that lower-performance learners have a more limited set of strategies for processing feedback than learners of higher proficiency levels.

Evidence for effects of computer-generated feedback has also been sought in studies examining learner error correction behavior, referred to as learner uptake, in response to distinct feedback types. This body of research (see e.g., Lyster 2007) proposes that successful uptake is the biggest predictor of learning, and even in instances where no learning takes place at a particular moment, it suggests that learners notice the feedback and thus process it. As a result, researchers tend to view learner uptake as facilitative of L2 acquisition. Findings from studies with ILTSs report significantly more learner uptake for the feedback type that provides detailed corrections (see e.g., Heift 2010b).

Individualized Instruction

Research in second language acquisition (SLA) has investigated learner variability, or interlanguage (IL) variation, by examining linguistic, psycholinguistic, and sociolinguistic constraints with the goal to explain why speakers choose, consciously or subconsciously, their forms of speech. This body of research has provided evidence of extensive variability in learner language that can be attributed to individual differences, task variables, as well as external variables (e.g., Gass et al. 1989). All of these are said to affect learners' learning processes.

An ILTS can adapt and tailor instructional materials and content to its users with AI techniques that are used to model the individualized learning experience and guide pedagogical decision-making. The goal here is to create learning programs that come closer to natural language interaction between humans than has been the case in traditional CALL. For this, the ILTS constructs a so-called learner model, which is a description of the learner's current skill level along with the student's learning styles and preferences relative to the learning task. Commonly, these models make some assumptions about the learner by determining the current knowledge state of a learner, which requires the ILTS to observe and record the learner's interaction with the learning system. Measuring learner knowledge, however, is a highly complex task due to a number of variables that have to be considered in assessing and capturing the individual differences that warrant individualization at any given point in time (Heift and Schulze 2007). A number of learner models have been described and implemented and, most commonly, they are used to generate individualized feedback and unique learning paths for each learner (see e.g., Amaral and Meurers 2007; Bull 2000).

Conclusion and Future Directions

The ICALL applications to evaluate written learner language discussed above are excellent examples of theory-based ICALL. Their functionalities, in particular those of ILTSs, are grounded in relevant SLA theories. The researchers/developers are cognizant of the importance of focus on form (Long 1991), interaction (Gass 1997; Long 1996) and the noticing of linguistic features (Schmidt 1990). They conceptualize the mediating role of technology by relying on an understanding of Activity Theory (Lantolf and Thorne 2006) that can depict both language learning processes as well as human computer interaction. Moreover, in interpreting “interaction” not only in the context of SLA but also in terms of human computer interaction, it becomes apparent that ICALL systems provide many different types and levels of feedback, spanning from sentential input to the handling of large texts. Thus ICALL systems have engaged or at least have the potential to engage language learners in a wide variety of interactions. For a number of ICALL systems, such interactions happen in the well-defined context of a communicative, language-learning task that can also be supported by an increasing focus on individualized instruction.

Cross-References

- ▶ [Complexity Approaches to Computer-Assisted Language Learning](#)
- ▶ [Computer-Assisted Language Assessment](#)
- ▶ [Learner Corpora in Foreign Language Education](#)
- ▶ [Technology and the Study of Awareness](#)

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Complexity Approaches to Computer-Assisted Language Learning

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Abstract

Complexity-theoretical approaches in Applied Linguistics are relatively new, but they hold great promise as an integrative (meta-)theory, provide new ways of hypothesizing about and conceptualizing the complex phenomena of language use and (second) language development, and also require different data gathering and analytical methods. This chapter sketches first the main tenets of a theory of complex adaptive systems (CAS) as it applies to technology-mediated language learning. The investigation of complex adaptive systems in computer-assisted language learning (CALL) is in its infancy; a selection of representative CAS studies in CALL will be discussed. As will become apparent, the main challenge for future research in this area is the design and application of robust commensurate research methods. General facets of a CAS methodology in CALL will be outlined and a general direction for future investigation will be given.

Keywords

Complex adaptive systems • Dynamic systems theory • Computer-assisted language learning (CALL) • Nonlinearity

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Introduction: A Complexity-Theoretical Perspective

Language use, second-language development (SLD), and computer-assisted language learning (CALL) are not only interwoven and interdependent processes, these complex processes are also embedded in a rich context. A number of actors (e.g., learners, instructors, and L1 speakers) and components (e.g., computational hardware and software) participate in them. In their context, the actors and components interact with one another and with a broader community, such as parents and policy makers, and multiple external components, such as other learning materials, linguistic artifacts, and educational institutions. In these interactions, both process-internal and process-external variables keep changing. To capture the interaction and interdependency of the variables of such processes and their contexts systematically, we describe them as complex adaptive systems (CAS). It is important to note that when we say CAS or just system, we mean the learning – not the learner; we mean the second-language development – not a structure of acquired and applied knowledge; we mean the learner–computer interaction – not the software nor the computer; and we mean the online gaming – not the digital game. Due to their complexity and fluidity, CAS are not completely deterministic. Thus, we cannot always establish causal relationships between subprocesses and their outcomes. Yet, we can trace back the change that occurred to its probable initial conditions (see the “butterfly effect” in Lorenz 1963, 1993) and other influential factors. So, the predictive power of the theory of complex systems is limited, but its explanatory power is considerable.

Such complexity-theoretical approaches have not yet been widely adopted in CALL, although they have contributed to and influenced our understanding of SLD since the early 2000s. Empirical CALL research still shows a preponderance of pretest/posttest studies focusing on isolated variables and thus often yields decontextualized results. Other CALL studies – particularly, those using ethnographic or design-based research approaches – provide a qualitative analysis of individual processes in context, but often lack the systematicity necessary for replication, transfer to other contexts, and application in pedagogy. We argue that when studying CALL activities, such as collaborative writing online or digital gaming in the foreign language, the complex processes of language use, SLD, and technology mediation are facets of a CAS, which have to be studied over time and in interaction and context to be able to identify and explain change at the level of the individual and across groups.

Language Use and Development, Mediation, and Complexity

For research on CAS in CALL, we assume that (1) language is emergent (Langacker 2008) and consists of linguistic constructions (Tomasello 2003) and (2) second-language use and development are in a dialectical relationship. On the one hand, an individual’s SLD is a complex process which is embedded in and influenced by sociohistorical and cultural processes, and on the other, each individual participates in the coconstruction of social, historical, and cultural processes through his or her

second-language use (Lantolf and Thorne 2006; Swain et al. 2011). Therefore, usage-based grammar is “epiphenomenal, a by-product of a communication process. It is not a collection of rules and target forms to be acquired by language learners” (Larsen-Freeman 2002, p. 42). When it comes to understanding SLD, we can say that, although nonlinear subprocesses, such as developmental spurts, backsliding, and fossilization, have been the research focus of second-language acquisition research, they have often been treated as an anomaly and exception to the (linear) rule. However, such processes are evidence that an L2 is being acquired at varying speeds, which, of course, results in nonlinear developmental trajectories of individuals. Due to individual language-learner differences, this diachronic variation is compounded by the synchronic variability within groups of language learners.

Language development and use in CALL is mediated by computational technologies. In computer-mediated communication (Kelsey and St. Amant 2008), learners interact with other learners, instructors, and L1 speakers *via* digital artifacts; in tutorial CALL (Heift and Schulze 2015), learners interact directly *with* socially, culturally, and cognitively imbued digital artifacts, which are central components of the CAS. In CALL, digital components are “added” to the complexity of language use and SLD. This results in increased levels of complexity, but also facilitates the unobtrusive recording of structured process data through tracking learner behavior in online environments and documenting learning outcomes over time, both of which offer windows onto the complex processes of technology-mediated language learning.

From that perspective, it is surprising that thus far we have not seen more uptake of complexity-theoretical approaches in CALL. Already since the late 1980s, we have witnessed a proliferation of research approaches, concepts, and metaphors of complexity that extend well beyond mathematics and the natural sciences, from where they originated. Books like Gleick’s (1987) *Chaos: Making a New Science* popularized research on complex and (ostensibly) chaotic systems and made it accessible also for scholars in the social sciences and humanities. A decade later, Larsen-Freeman (1997) introduced CAS to researchers in Applied Linguistics.

CAS have the following main characteristics (de Bot and Larsen-Freeman 2011, p. 9):

- (i) Sensitive dependence on initial conditions
- (ii) Complete interconnectedness
- (iii) Nonlinearity in development
- (iv) Change through internal reorganization and interaction with the environment
- (v) Dependence on internal and external resources
- (vi) Attractor states
- (vii) Iteration
- (viii) Emergent properties

The *sensitive dependence on initial conditions* explains that small influences on CAS must not be neglected because often they cause noticeable effects. “[For our research . . . we need to have detailed information on the initial conditions if we want to be able to explain differences and similarities in learning outcomes]” (de Bot and

Larsen-Freeman 2011, p. 10). For example, phonological awareness and L1 literacy are known to be initial conditions in SLD (de Bot et al. 2007), but the quality and scope of their impact emerges in their interaction with the many other variables of the CAS and its context over time; so they are being reflexively altered as the system changes (Larsen-Freeman and Cameron 2008a). Therefore, we cannot rely on the initial conditions alone to explain change at all times. However, since a CAS goes through many iterations and each potentially impacts an initial variable, a small change in initial conditions has a disproportionate effect on later or final states of the CAS.

It is not just the initial-condition variables, which are interconnected with other system-internal and contextual variables. A CAS is *completely interconnected*; the various components which “participate in” the system – the actors, the linguistic, cognitive, and digital artifacts – and the factors that determine or influence it are connected to one another; if one changes, the others will be impacted to at least some degree and the whole CAS changes through the interconnectedness of its variables and components. This also means that after changing a variable through a teaching intervention or the introduction of a technology in the classroom, we cannot predict the outcome with reasonable certainty. Instead, we must continue observing the CAS as its variables go on to coadapt and induce development through iterative interventions in which the same or other variables are changed. For example, in a study by Penner and Schulze (2010), a change to group grades for student projects in a language course impacted the perception of group collaboration, which in turn changed how some students, depending on their initial conditions, perceived the computer-mediated communication tools used in class.

The complete interconnectedness of a CAS is closely linked to the *nonlinearity* of its development. For example, an affordance in a digital learning environment, such as access to online lexical resources and the provision of corrective metalinguistic feedback for the learner, will not result in the same quality and quantity of change for each learner; nor will its use at different times and in different contexts result in the same change. Since “there is no goal or direction in development; there is only change” (de Bot and Larsen-Freeman 2011, p. 13), we should not expect a proportionate change in a certain direction, but be prepared to continue to observe the CAS. In empirical CALL research, this necessitates longitudinal studies because studies with two or three data-gathering points – pre, post, and delayed posttest – rest on the conceptualization of linear development with proportionate cause–effect relationships, which are rarely found in social environments.

Different segments of a developmental trajectory display slopes of different magnitude and speed of change (nonmonotone) and they are not exact repetitions at regular intervals (nonperiodic). However, these trajectory curves can be fractal. “Fractals are typically sets with infinitely complex structure and usually possess some measure of self-similarity, whereby any part of the set contains within it a scaled-down version of the whole set” (Nicholson 2014). For example, in tutorial CALL, answering a linguistic quiz item is self-similar to answering the entire practice quiz. Fractality in the CAS helps us to identify patterns at different scales in these nonlinear trajectories.

In CALL, CAS goes through many small process *iterations*, such as pressing a particular button, making a lexical choice or a grammatical well-formedness decision, and requesting learning help by clicking a hyperlink. A thought experiment based on Lorenz (1963, 1993) illustrates the power of iterations best: We build two sequences of numbers, where the current number is always the square of its predecessor. For the first sequence, we set the first number (our initial condition) as 1.1; and use 1.1001 as a slightly different start for the second sequence. Comparing the numbers in the two sequences after each iteration, we see that differences remain miniscule after the first few iterations. Yet, after eight iterations, it is 2326 and continues to grow exponentially thereafter. Taking the example of language practice (de Keyser 2007) in tutorial CALL, each of the small iterative steps taken by the learner – conjugate a verb, insert a preposition, manipulate a sentence – only introduces a small change, yet the result is significant change in the CAS after many iterations.

During the iterative, nonlinear development of a CAS and through the interconnection of its actors, components, and variables, the system will *reorganize internally and interact with its environment*. Context becomes “the landscape over which the system moves, and the movement of the system transforms the context” (Larsen-Freeman and Cameron 2008a, p. 68). Here, coadaptation is fundamental. In the context of digital gaming in education, Gee (2006) argues that the “proactive production by players of story elements, a visual-motoric-auditory-decision-making symphony, and a unique real-virtual story produces a new form of performance art coproduced by players and game designers” (p. 61).

It is the *internal and external resources* of a CAS that construct and maintain the system. Internal resources are within the language learner (de Bot and Larsen-Freeman 2011). For example, motivation, time to learn, and the ability to solve problems effectively or to use a computer. External resources can include the spatial environment being explored or the material and digital artifacts with which the learner interacts (*ibid.*). For example, in online games, interaction between non-playing characters and other live players are examples of external resources that the learner can utilize when playing the game in the foreign language. Thus, CAS are open systems in that they do not come to a rest at an equilibrium as long as external “energy” continually enters. For example, instructional sequences in online learning environments affect change in the CAS, as long as the learner does not preclude them from “entering” the learning process.

With external and internal resources impacting the iterative, nonlinear developmental trajectories, the ostensibly chaotic nature of a CAS can make it difficult for the researcher to understand the system. Here, *attractor states*, which are “landscapes, states, or particular modes of behaviors, that the system ‘prefers’” (Larsen-Freeman and Cameron 2008a, p. 49), can provide useful confines within which a system can be analyzed, as well as allowing a brief respite in order to determine at least one result of the system, thereby providing some transparency to the otherwise profound complexity. This “preference” of the CAS could be due to any number of reasons, such as the state being relatively easy to reach or the subsequent state being challenging to develop. A CAS in an attractor state continues to change; only the

degree to which the system is changing is not (yet) sufficient to transition the system out of the attractor state. For example, in working with computers in language learning, the reliance on glosses, subtitles, or other L1 cues can act as an attractor, being both useful currently and (potentially) hindering the learner's progression at a later state (see Sockett 2013).

At the opposite end of the continuum, there are CAS states which appear to be possible, but they have never been observed. These state spaces are often labeled repellors. In designing and analyzing learner-computer interactions, repellors are important, in that they enable both the designer and the researcher to significantly limit the search space for design solutions (e.g., help options such as glosses, which were never requested, might not have to be implemented) or analytical algorithms (compare the immense search spaces in computationally parsing learner texts in ICALL; see Heift and Schulze 2007).

Through the iterations, interconnectedness, and self-organization of the CAS, its *properties emerge*. Emergence refers to processes in which larger patterns and regularities arise from the interaction of smaller and simpler entities. “[L]anguage and culture are emergent phenomena of an increasingly complex social existence” (Beckner et al. 2009, p. 3). Consequently, SLD captures the intertwined complex processes of the emergence of a second language both at the individual plane and in groups. We argue here that CALL research needs to aim to investigate the role of technologies in SLD and can contribute to a deeper understanding of CAS in Applied Linguistics as a whole.

Major Contributions: CAS Studies in Call

A number of CALL scholars have argued that CAS approaches are appropriate and important in CALL research, but there is a scarcity of such studies in CALL, even when conceived broadly. Chappelle (2009), discussing the relationship between second language acquisition theories and CALL in the three decades prior, makes a short reference to CAS research: “Whereas the ideas behind complex systems theory are relatively new and not fully developed, its promise for [second language acquisition] theory within the larger systems of learning make it worthy of attention” (p. 748). Similarly, Colpaert (2013) argues for an ecological paradigm shift in CALL (which is similar to a shift towards CAS), emphasizing that any single technology alone cannot be responsible for language learning, but rather, SLD emerges from the various actors, components, and factors that interact with one another. Marek and Wu (2014) also position their research within CALL instructional design, declaring that a CAS theoretical approach should be used. Taking into account as many factors as possible, which could influence teaching and learning English as a foreign language, they conceptualize a CALL ecology model and conclude that “technology used for CALL is not an end in itself, but a means to an end that is based on fully understanding the educational ecology” (p. 571). Since their conceptual article is mainly based on a literature review and a thought experiment in broad strokes, their conclusion remains rather vague. Similarly, disappointing (and not always fully supported) conclusions appear in a few of the early CAS studies in CALL. In a

study of the two groups using the different learning platforms Moodle and TelEduc, Souza (2013) describes the quality of the texts in these virtual learning environments, after the course had been completed. The coarse-grained analysis leads the author to conclude that students can achieve similar outcomes in both platforms. Braga (2013) invokes the concept of fractality, interprets it very loosely, and applies it to a description of online group work.

Liou (2012) conceptualizes the interactions in the virtual world *Second Life* as a CAS to understand how learners interact with the environment and its many tools. Twenty five EFL students were instructed to perform specific tasks within *Second Life*, such as orienting themselves to the environment and doing peer review. The author claims that, although the game environment was identical for each student, the external resources of the system impacted the developmental potential of certain students, leading to communication breakdowns and the inability to complete tasks. It is disappointing, however, that when investigating the language-learning affordances of *Second Life*, Liou mainly focuses on student perception data rather than presenting an analysis of the students' behavior in the virtual environment.

Relying on a systematic and comprehensive corpus analysis, Thorne et al. (2012) investigate the role that texts in online multiplayer games have in forming, what they refer to as, complex semiotic ecologies. The authors analyzed the linguistic complexity of texts in *World of Warcraft* (WoW) and in relevant external resources, such as discussion boards and wikis about the game. Thorne et al. conclude that "external websites function as keystone species within *WoW*'s broader semiotic ecology" (p. 296). They note the validity of analyzing such online gaming as CAS stating that "the reading of texts and the associated action sequences of players form complex and adaptive systems that reorganize themselves based on the contingencies of the immediate goal-directed activity at hand" (p. 298).

In an ongoing study also on *WoW*, Scholz (2017), Scholz and Schulze (2017), and Schulze and Scholz (2016) investigate learners' SLD trajectories when gaming. A heterogeneous group of 14 Canadian students volunteered to play *WoW* in German on their own time over four months. Their data set consists of comprehensive game logs, an entrance questionnaire, an exit interview, and transcripts of three monthly face-to-face group conversations. The questionnaire elicited information about four initial conditions: gaming experience, computer literacy, language-learning experience, and rationale for learning German. These four collective variables were operationalized and the answer values were recorded as binary numbers. This enabled them to correlate and cluster the individual students' profiles of initial conditions as well as the collective variables of their gaming and linguistic behavior. This clustering was the basis for an iterative pairwise comparison of participants. The participants in pairs – each with a high correlation of initial condition values, behavioral traits in game, or both – are compared paying equal attention to commonalities and differences, then different pairs are compared with one another. In this mixed-method analysis, they are able to trace different developmental trajectories from their outcomes back to the (initial) factors that induced this change. SLD is operationalized as the students' ability to transfer linguistic constructions encountered in game to the face-to-face conversations about the game. Their study provides insight into the complex role of online gaming in the foreign language on an

individual's SLD by conceptualizing both digital gaming and SLD as CAS and by paying particular attention to the interaction of the two systems.

Bertin and Narcy-Combes (2012), investigating the role of online tutoring in distance education, reconceptualize their earlier understanding of online tutoring in the light of emergentism. To begin their explanation of the complex processes in an online learning environment, they state that, in order to explain complex phenomena, "three basic approaches have been adopted: to reduce them to the sum of their components, to study them as a global whole and to study them as complex systems" (p. 112). Upon reflection, they reject reductionist and holistic approaches (see also Larsen-Freeman 1997; Larsen-Freeman and Cameron 2008a, b). To develop a CAS conceptualization, they deconstruct their own Didactic Ergonomics Model (pp. 118–120) by taking into consideration its evolution in language learning processes. They note that in their model, both the teacher-centered and learner-centered subsystems undergo constant and often independent and unpredictable change. This distance between the subsystems "reveals the discontinuity between the teaching and learning actions and consequently generates a greater need for monitoring to regulate both the tasks and the environment" (p. 125). Through continuous monitoring and subsequently regulating components of the system by the designers of the online course, they aim to adapt the complex technological artifact "to the demands of the context(s)" (ibid.). Bertin and Narcy-Combes convincingly show that a CAS analysis – mainly as a thought experiment based on a wealth of theoretical, empirical, and practical insight carried out over an extended period of time – provides a solid basis for modeling complex educational processes and can inform instructional design decisions in online language learning and beyond.

In one of the most comprehensive analyses of a CAS, Sockett (2013) observed a group of nine students learning English online informally over the course of three months. Analyzing a 35,000-word corpus, which was derived from their introspective writing, he purports that the English-language learners' strategies – learning strategies are at the center of his investigation – can be connected to the characteristics of a CAS (de Bot and Larsen-Freeman 2011, p. 9). Sockett and Toffoli (2012) highlighted four of these eight CAS characteristics, which are particularly relevant to extramural online language learning: sensitive dependence on initial conditions, attractor states, coadaptation as a result of the internal reorganization of the system, and nonlinear development. In this study, they situate language learning with social technologies as a CAS, moving away from a model of technocratic learner autonomy to one that considers the social roles other members of the online communities play. The informal learning that occurs while university students browsed the internet in their spare time is understood to be emergent in nature. Listening, reading, written interaction, and vocabulary building were all in focus as elements of SLD and they were enhanced by participating in informal online environments, but the development gains of each participant varied immensely due to the frequency and types of interaction that emerged within the various online environments.

As is evident from the review of the still rare CAS studies in CALL, we need to identify and consider appropriate methods in CAS research. The main goal of CAS

analyses in CALL is identifying, describing, and explaining change in the SLD of learners. Change refers here to both the variation of one or more variables or components of the system because of their interdependence and interaction and the change depicted in the developmental trajectories of individual learners in their groups.

Challenges and Future Directions: Establishing Methods in CAS Research

Two guiding principles are particularly important to the selection and application of appropriate methods: (1) longitudinal, multivariate analyses of language learning processes in CALL are necessary; neither reductionist snap shots in cross-sectional quantitative studies nor isolated qualitative case studies are sufficient to investigate developmental change; (2) the complexity of CAS and, consequently, the difficulty with and the low likelihood of predicting their future states accurately means that we need to identify (qualitative) retrodictive methods of analysis (Dörnyei 2014). Retrodictive methods – an adjective neologism that denotes the opposite perspective of “predictive” – reverse the process of analysis such that the outcomes of the CAS are considered first, and then their development is traced back to determine which components and variables induced or caused change. Essentially, all analysis of CAS is an analysis of their change over time. This means that a research design of experimental and control group is seldom necessary. Instead, the different states of an individual process are compared iteratively. Commonalities and differences matter in that both provide clues about from where and how the change originated and was influenced.

In each investigation, we first and foremost identify the instantiations of the eight CAS characteristics (de Bot and Larsen-Freeman 2011, p. 9) for the system:

- (a) What are the initial conditions for this CALL activity? What aspects of *change* in the activity showed sensitivity to or depended on these conditions?
- (b) What collective variables, actors, artefacts, and other components induced, influenced, and sustained *change* and development of which aspects of the CALL activity? In which way are the variables, actors, artefacts, and components connected with each other?
- (c) What are the process trajectories of the CALL activity as a whole and of (research-relevant) variables specifically? Which (fractal) patterns of *change* can be identified in the trajectory of an individual and across individuals?
- (d) What *change* occurred during the CALL activity? What were the processes and outcomes of the corresponding self-organization of the CAS and of its interaction with the environment?
- (e) Which internal and external resources led to this *change* and how?
- (f) What is the general nature of the *change* in the CAS? Which attractor and repeller states can be identified? What can these phase spaces tell us about the nature of the CAS?

- (g) What are important iterative subprocesses in the CALL activity? How does a particular set of iterations introduce *change* into system?
- (h) What properties of the CAS emerge in its evolution and how do they *change*?

As CAS are interconnected with their contexts, pondering these eight question complexes requires the definition, description, and systematic analysis of the actors, components, and properties of the system and its environment. For want of a better word, we call the facets of these properties variables (but also see the argument about the death of the variable in complexity-theoretical research in Applied Linguistics in Larsen-Freeman and Cameron 2008b). CAS-essential and research-relevant variables have to be defined and operationalized, if their change is to be observed and measured over time. Of course, a large number of variables make their continuous observation as well as their analysis very challenging. To reduce the high number of degrees of freedom of a CAS (see e.g., Larsen-Freeman and Cameron 2008a), we adopt a technique from molecular dynamics: collective variables. “It is frequently the case that the progress of some . . . process can be followed by following the evolution of a small subset of generalized coordinates in a system. When generalized coordinates are used in this manner, they are typically referred to as reaction coordinates, *collective variables*, or order parameters, often depending on the context and type of system” (Tuckerman 2008, my emphasis). Collective variables, such as proficiency and motivation, are thus dynamic configurations of smaller variables and are essential to describing the developmental change in a CAS. Yet, only three CAS studies in CALL rely on an investigation of a well-defined collective variable in context: Sockett (2013) on language learning strategies, Thorne et al. (2012) on textual complexity, and Bertin and Narcy-Combes (2012) on online tutoring.

In response to the aforementioned research problems and challenges, Larsen-Freeman and Cameron (2008b) suggest incorporating modified or adapted forms of the following methodological approaches for use in CAS research:

- Ethnography
- Formative and design experiments, including action research
- Longitudinal, case study, time series approaches
- Microdevelopment
- Computer modeling
- Brain imaging
- Combinations of discourse analysis and corpus linguistics, second language acquisition and corpus linguistics, second language acquisition and corpus linguistics.

With the exception of brain imaging, the methodological approaches suggested by Larsen-Freeman and Cameron (2008b) have begun to be utilized in CALL research. This said, most existing studies that espouse a CAS framework suffer from a reductionist focus on decontextualized variables, an unsystematic descriptive perspective, or the frequently set goal of establishing linear (causal) relationships, all of which suggest that such research is not commensurable with the essential tenets of complexity theory. What is necessary for CAS-informed CALL research to move

forward is a systematic investigation of language learning processes in technology-rich contexts that respects their complexity (nonreductionist), accommodates and acknowledges the probability of nonlinear development and constant change (non-static), and which considers complex phenomena and processes in their context. From an analytical and pedagogical standpoint, CAS implies a shift away from affirmative stances of expecting things to happen to embracing the uncertainty in what might happen (Davis and Simmt 2003).

Cross-References

- ▶ [Computer-Assisted Language Assessment](#)
- ▶ [History and Key Developments in Intelligent Computer-Assisted Language Learning \(ICALL\)](#)
- ▶ [Learner Corpora in Foreign Language Education](#)
- ▶ [Technology and the Study of Awareness](#)

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Computer-Assisted Language Assessment

Paula M. Winke and Daniel R. Isbell

Abstract

Computer-assisted language assessment (CALA) employs the use of technology to facilitate, contextualize, and enhance the assessment of linguistic abilities. CALA is becoming normalized, concomitant with advances in technology and its propagation in language learning contexts. Within CALA, though, most attention has been devoted to technology in language tests (computer-assisted language testing or CALT). Early CALT developments reviewed include initial forays into performance tests, comparisons between paper-and-pencil tests and CALT, and explorations into computer-adaptive tests (CATs). Major contributions to CALA have included foundational book-length treatments of CALT, published in the 1990s and 2000s, as well as more recent review articles. Work describing washback in CALA from the same period has provided lasting guidance for researchers and practitioners. Large CALA projects are currently underway in a number of universities and governmental organizations, including efforts to develop computer-delivered tests for a wide variety of languages, create holistic e-portfolios, employ computers in placement and achievement testing in K-16 contexts, expand computer-mediated performance testing, and provide rater training. CALA, as a young and dynamic field, grapples with how technological advances and adoption filter into language learning and assessment, challenging conceptualizations of CALA itself as well as language ability constructs. Exemplifying the latter, two contended language constructs are highlighted: listening (with or without visual context) and computerized writing assessment. In the future, research related to computerized writing assessment (and scoring), CALA feasibility and fairness for underserved populations, and

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forms of assessment which uniquely utilize technology is expected, and encouraged, to thrive.

Keywords

Computer-assisted language testing • Assessment • Testing • Computer-assisted language learning • Computer-adaptive testing • Language testing

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Introduction

Computer-based tests with streaming video, oral-response-recording options, automated (or human-generated) feedback mechanisms, and dynamic or enhanced input (such as hyperlinked text, answer choices, or interactive objects that provide glosses, help, or feedback to aid comprehension or test completion) have expanded the testing field and have triggered washback effects that have influenced the second and foreign language classroom. In addition, alternative computer-based assessments, including electronic portfolios (e-portfolios) and online self-assessment systems, promote self-regulation and provide qualitative and longitudinal documentation of growth. Advantages of doing any type of assessment with computer technology include greater authenticity, expedient delivery, digital record-keeping options, and automatic, objective scoring possibilities.

Computers, multimedia, online gaming, tablets, smartphones, apps, and social media have immeasurably changed the landscape of language learning over the years (Godwin-Jones 2011). Concomitantly, technology use within language learning has affected (or should affect) language testing because test-taking tasks should mirror the classroom-learning tasks that are the basis of instruction (Norris 2009). Three circumstances have widened this oncoming *normalization* (see Chambers and Bax 2006) of tech-infused language assessment. First, advances in technology are making it possible to have more sophisticated yet low-cost computerized testing programs that go beyond online multiple-choice testing. Second, commercial software packages for making online assessments are (or can be) embedded into popular learning management systems (LMS) like

Blackboard, Moodle, and Desire2Learn. With such tools, teachers can make short e-quizzes for students to take at home before they come into the classroom so that teachers know what to focus on most in their teaching (as in *flipped* classrooms; see Spino and Trego 2015). Third, the generation of language learners typically found in the classroom has grown up with computers, tablets, and smart phones. Earlier impediments that centered on computer access and familiarity are less concerning for mainstream test takers (older adolescent and adult learners), and major testing operations have shifted almost exclusively to computer delivery. Thus, the field of computer-assisted language testing (CALT) has not just expanded, it has moved heavily toward normalization.

Early and Recent Developments

Early on, computer-based tests of foreign language learning involved item types that were easily scored by a computer. Item types included multiple choice, multiple select, drag and drop, and short-answer response and were presented linearly as they were on their paper-and-pencil counterparts. This led to many comparison studies between computerized and paper-and-pencil versions of the same test. Eventually, computer-assisted testing changed. Instead of relying solely on discrete item types, test takers were asked to respond to tasks that were more like real-world tasks. In addition, they were asked to produce open-ended responses. The challenge has been in scoring such items, both in terms of developing the criteria for scoring and in developing programs to help with scoring, and research along this line continues to flourish, especially in the area of computerized tests of writing ability (Dikli and Bleyl 2014; Link et al. 2014; Ware 2011; Weigle, 2013), as discussed next.

Performance-Based CALT

The popularity of performance-based testing (in contrast to discrete-point testing), as well as integrated-skill and task-based testing has resulted in the need to score an enormous amount of student writing and speech, all recorded and submitted through technological means. The sheer quantity of open-ended responses has funneled much research and resources into automated scoring systems. In 2010, there was a special issue of *Language Testing* devoted to automated scoring and feedback systems for language assessment and learning, and another special issue on the automated scoring of writing appeared in 2013 (see Elliot and Williamson 2013). The editor of the *Language Testing* issue, Xi, explained that validity arguments for automated scoring are to be carefully constructed (as elaborated on by Chapelle and Chung 2010), and the arguments will be influenced heavily by whether automated scoring is the sole criterion or if automated scoring is combined with human scoring (2010, p. 293). Xi warned that “the current limitations of NLP and speech technologies. . . call for responsible and cautious use of them

and call into question the appropriateness of using them alone in scoring assessments for high-stakes decisions” (2010, p. 297–298).

As a field, language testing is further ahead in the automatic scoring of writing than in speaking. The technology for scoring writing is rather advanced and robust (see Ware 2011; Weigle 2013) and is used in many large-scale testing programs. One automated essay scoring (AES) system is *e-Rater*, produced by Educational Testing Service (ETS, www.ets.org/erater/about), which is based on natural language processing (NLP). It is used alongside human ratings to judge the quality of TOEFL test-takers’ writings. The *e-Rater* system is also used to evaluate essays submitted to Criterion (www.ets.org/criterion), a commercially-available, web-based essay-scoring system to which teachers or institutions can subscribe (and which has been evaluated as effective for providing certain types of feedback, see Lim and Kahng 2012). Other programs include *Intelligent Essay Assessor* (IEA, part of the suite of automated scoring systems at Pearson Assessment, see www.pearsonassessments.com/) and RANGE (downloadable from www.victoria.ac.nz/lals/about/staff/paul-nation), a program that assesses lexical frequency that was developed by Paul Nation.

AESs have not been without criticism. Deane (2013) noted a high agreement between AES systems and expert human raters, which explains the proliferation of AES in language tests spanning a number of L2s. But he cautioned that AES may lead to different test-taking behaviors and writing processes. He noted that automated scoring may ignore the aspects of essay production that are important for crafting a good written argument. Additionally, there has been much backlash in the popular media over automated scoring. One question is, can AES systems be gamed? Perelman has suggested that they can be (see Winerip 2012). In a 2014 commentary in *Assessing Writing*, Perelman wrote that AES systems overly rely on essay length and may “encourage teachers to emphasize bloated and vapid prose” (110). Researchers such as McNamara et al. (2015) recognized these limitations and suggested that AES systems can and should be considered as a useful “intelligent tutor” (54). McNamara et al. suggested that researchers should investigate how AES algorithms might align with individual differences. They suggested this because current algorithms do not take into account the social nature of writing nor have they been studied in relation to writers’ backgrounds.

There has been much work on the computerized scoring of speaking ability as well, and tools for automated speech scoring are on the market. For example, Versant English (<http://www.versanttest.com/>) provides automatic scoring of L2 speech tasks that require short responses to questions and brief story retellings, with high reported reliabilities; however, it does not automatically score open-ended tasks (Jamieson et al. 2013). Efforts to apply automated speech scoring to longer, open-ended responses are beginning to show some promise, with much research stemming from Educational Testing Service, which is working toward a system for automatically scoring spontaneous, non-native English speech (e.g., Zechner et al. 2009) and Pearson Knowledge Technologies, which is doing the same (see Bernstein et al. 2010). But such systems have not yet become operational in high-stakes contexts. On a smaller scale, computer-delivered and automatically scored elicited imitation

tasks are being researched to see if they are psycholinguistically valid estimates of pronunciation or grammatical knowledge (see Cox and Davies 2012; Sarandi 2015). The language testing field will benefit from more research along these lines. But most certainly, criticisms of automated speech scoring will surface, as they have in relation to AES. Researchers will need to justify the uses of scores from automated scoring systems. Arguments for automated scoring that are based on convenience and cost-savings may not withstand public scrutiny when the stakes are extremely high.

Comparison Studies

As we mentioned above, when computerized tests were first introduced, it was important to establish that they were equal to, or improved upon, their paper-and-pencil counterparts. Research focused on whether paper- and computer-administered tests were equivalent in terms of scores (Choi et al. 2003), test-taker attitude (Kenyon and Malabonga 2001), and motivation (García and Arias 2000). Investigations also explored other test features, such as the feedback types involved in paper-and-pencil versus computer-administered tests (Delmonte 2002) and the ways in which raters might differentially assign scores based on the mode of the response item (i.e., typed or handwritten) (Russell and Haney 1997; Lee 2004; Breland et al. 2005). Results generally found differences, but overall the reports found that computer-based tests shortened administration time, had high validity, and were in some cases more motivating than paper-and-pencil based tests.

Computer Adaptive Tests (CATs)

Computer-adaptive tests (CATs) are technologically advanced assessment measures (Dunkel 1999) that have been used in L2 testing since the 1980s. They use sophisticated algorithms to move examinees from one item to the next based on the examinee's performance on the last item (Sets or blocks of items used for adaptive purposes are called testlets, and CATs that use them are called semi-adaptive tests). Brown (1997, p. 46) outlined CAT advantages as such: "(a) the items are selected and fitted to the individual students involved, (b) the test is ended when the student's ability level is located, and, as a consequence, (c) computer-adaptive tests are usually relatively short in terms of the number of items involved and the time needed." These advantages help with large-scale administrations and keep test takers from being overburdened by too items that are too easy or difficult. But, CATs have not taken over the assessment arena as one might have expected them to.

The main arguments against building CATs are that they are time consuming to build and costly to maintain (see Ockey 2009). CAT test developers need to (a) understand how to use guidelines and blueprints in designing CATs, (b) use the appropriate IRT model and algorithm for item or testlet selection and for test completion rules, and (c) field-test the items to obtain statistical information on each item's calibration and performance (Dunkel 1999). Even with semi-adaptive

tests, large databanks of items are needed, and items within those databanks need to be revisited and refreshed on a regular basis. Fulcher (2005), while pointing out that the 2005 version of the Test of English as a Foreign Language (TOEFL, see www.ets.org) is no longer adaptive, but rather has returned to a linear format, declared that “the era of adaptivity in mass international language testing is dead,” mainly because in such contexts, item pools cannot be large enough to thwart test-security breaches (a point also argued by Ockey 2009). But the concept of test adaptivity is alive and well. Mislevy et al. (2008) offered an expanded framework of adaptivity, including adaptivity of test claims (construct and interpretations) and control locus (i.e., who controls adaptations of the test form). CATs and semi-adaptive tests are still often used (and appropriately so) in institutional language-placement-test contexts. And to that end, commercially available test software, such as QuestionMark, Perception for Web, OWL, and Qualtrics, which can be integrated into LMSs, offer adaptive functions and templates that are easy to use and do not require sophisticated computer-programming knowledge. Such programs are helping smaller institutions and language programs afford the development of CATs for smaller test-taker populations.

Major Contributions

Several books have been published on the specific issues in computerized L2 testing (Dunkel 1990; Chalhoub-Deville 1999; Chapelle 2001; Chapelle and Douglas 2006); other books have contributed to the development of computerized L2 testing by reporting on education and educational measurement issues that concern online testing and CATs (Wainer 2000; Howell and Hricko 2006). Several books and papers on task-based learning and assessment have described how technology can be implemented during task work and within the procedures for measuring the outcomes of tasks (Long 2015; Thomas and Reinders 2010). In addition, major CALT contributors have recently produced excellent overview articles on CALT in general, such as Ockey (2009) and Chapelle (2010).

Taylor (2004, p. 143) wrote that both washback (the effect the test has on classroom curriculum) and impact (the consequences the test may have on test takers, test score recipients, and society) from high-stakes tests must be measured and monitored and stated that “interests in this area is likely to grow as the range and use of high-stakes tests increase worldwide and the consequences of test use, especially the valid and ethical use of test scores, come under greater scrutiny in the public domain.” Taylor’s cautions related to test security proved oracular, as there has been a series of cheating scandals in relation to high-stakes, computer-based tests, and there has been a global boom in test-prep centers. In response to cheating, technology-enhanced security measures have been introduced by CALT providers such as ETS (photographic and video records), Pearson (biometrics) and Duolingo (video records). Such security measures are likely to become more widespread.

Work in Progress

Several CALA projects currently underway demonstrate the field's direction and depth and show how CALA is changing the way in which we test foreign and second languages. For example, the Assessment and Evaluation Language Research Center (AELRC) at Georgetown University and the Center for Applied Linguistics in Washington DC is developing short, online assessments (C-tests) to measure foreign language proficiency for research purposes. The language C-tests under development are in Arabic, Japanese, Russian, Portuguese, and Turkish, with plans for more C-test language tests in the works. The Center for Applied Second Language Studies (CASLS) at the University of Oregon partners with institutions to create e-portfolio systems based on LinguaFolio Online (<https://linguafolio.uoregon.edu/>). The Center for Language Education and Research (CLEAR) at Michigan State University continues to develop and host Rich Internet Applications (RIAs) for language teachers. The RIAs are online tools (such as the oral recording apps Conversations and Video Dropbox) that teachers can use for online formative and summative evaluation of students' language learning progress.

Lancaster University is now hosting the extremely successful and often studied DIALANG tests (tests in 14 European languages; see www.lancaster.ac.uk/researchenterprise/dialang/about for more information). These online tests are intended to provide feedback to learners and to give them suggestions for strategy use and/or ways in which to improve their L2 ability, but researchers use them too to estimate their participants' proficiency levels.

The American Council on the Teaching of Foreign Languages (ACTFL, www.actfl.org) is currently expanding its suite of foreign language tests (for placement testing, proficiency testing, and/or for selection purposes) at the novice through superior level. Recently developed are reading and listening tests of Arabic, Mandarin Chinese, Japanese, and Korean. The semi-adaptive functions of the tests allow for a single user to take the test more than once throughout his or her foreign language learning process; the items the Novice-level test taker is presented with are different from those at the intermediate or advanced level. The same is true of ACTFL's online Oral Proficiency Interview by Computer (OPIc), although for the OPIc, currently test takers must self-select the level of test that they will take, which can be problematic if test takers have a poor idea of their proficiency.

Similarly, a computer-assisted screening tool (CAST), whose framework is the result of a five-institution collaboration (ACTFL, Brigham Young University, CAL, the Defense Language Institute, and San Diego State University), is currently available for assessing speaking proficiency in nine languages, including Spanish, French, Chinese, Japanese, Filipino (Tagalog), Arabic (Modern Standard), Iraqi Dialect, Persian (Farsi), and English as a second language. All CASTs are stored on the Language Acquisition Resource Center (LARC) server at San Diego State University (<https://larc.sdsu.edu/>). Like the ACTFL tests, the CASTs can be registered for and completed online.

CAL offers a computer-based speaking and listening test for adult English-language learners, the Basic English Skills Test Plus (BEST Plus; www.cal.org/bestplus).

A paper-based BEST Literacy test assesses reading and writing skills. The BEST Plus is unique in that the test administrator uses a laptop to show prompts to the test taker, then swivels the laptop around to enter scores. In this way, the test is computer-based in every way, yet the test taker needs no computer skills. CAL has developed BEST Plus administration training materials and is working on a newer version of the test, the BEST Plus 2.0.

The Center for Applied Second Language Studies (CASLS, www.casls.uoregon.edu) at the University of Oregon developed a CAT called the Standards-based Measurement of Proficiency (STAMP), currently managed by Avant Assessments (www.avantassessment.com/stamp4s.html). The test assesses the reading, writing, and speaking of novice-low to intermediate-mid learners (based on the ACTFL scale). STAMP tests are available for assessing Arabic, Chinese (Mandarin and Cantonese), English, French, Hebrew, Japanese, Spanish, German, and Italian. STAMP is used by institutions for program evaluation and placement, as well as for general proficiency testing. Hindi, Italian, Swahili, and Yoruba versions are currently being developed and will add significantly to the small cadre of criterion-referenced LCTL tests for grades 7 through 12 and at postsecondary levels.

As evidenced by CALA works-in-progress, CALA does not only encompass the direct testing of learners. The field of CALA extends to other areas of the assessment realm, such as rater training. At the University of Auckland, an online training program for essay raters was created as part of the Diagnostic English Language Needs Assessment (DELNA) project (see www.delna.auckland.ac.nz/en.html), a test battery with listening, reading, and academic writing skills assessment. Other computerized rater training programs currently in existence include CAL's Multimedia Rater Training Programs (MRTP, www.cal.org/mrtp/index.html), which are CD-ROM-based rater training programs that train raters how to score the CAL Simulated or Computerized Oral Proficiency Instruments.

Problems and Difficulties

One of the interesting problems in computer-assisted language assessment is defining it succinctly given the large realm that it encompasses today. Computer-assisted language assessment has been defined as “any test delivered via a computer or a mobile device” (Suvorov and Hegelheimer 2014, p. 2). But this definition might be ready to be put aside as it may leave out assessment types that are not, technically, “*delivered*.” With the push in learning-oriented (formative) and task-based assessments, language performances are often created and stored (in the case of wikis, blogs, Google docs, videos, or podcasts) online. The assessment may be iterative, with multiple versions of it contributing to a tracking of the student's growth over time. The notion that a single assessment event is *delivered* might be outmoded. For example, Long (2015) explained that in a task-based language teaching, task-based performance tests will not evaluate language as an object, rather, the tests will assess a student's ability to perform a task. He suggested that students should not be asked to fill in missing words in a set of directions (for example, street directions or how to

find the bathroom in a large building) if the ability to follow directions is the task to be assessed. Nor should students be asked if a set of given directions is right or wrong. Rather, the test taker may be given a digital recording (on an iPad or smart phone) of real directions. The student might be instructed to start at a certain point and then follow the directions. The student's performance will be evaluated on whether he or she followed the directions correctly and if he or she ended up at the right destination. Long went on to describe that if logistics mandate it, the assessment could be moved to a computer-game format. The gist is that tests and testing systems are no longer *just* computer-assisted. Rather, they are technology-infused. And assessment is not always a single event but rather it may be a string of related events serving multiple purposes.

A debate in the field is the impact of video-based listening tests and how the construct of listening can or should be defined in light of the added (visual) stimuli. Wagner's (2008, 2010) research has been influential and groundbreaking in fueling this ongoing debate. The larger issue may be a divide between theorists who see language as involving four, separate skills (reading, listening, writing, and speaking) that can and should be tested separately, and theorists who view language as an integration of multiple, intertwined modalities, including the interpretation of the social context, which involves reading visuals such as gestures, facial expressions, laughter, and body language.

Another major concern is the *construct validity* underlying computerized writing tests. First, Gruba (2014) warned that new media (such as wikis, vodcasts, and blogs) are widely used by language teachers in the development of students' writing skills (and cultural and content knowledge), but that language assessments using the same new media lag far behind. His concerns are real, as reviews of recent CALL applications (see Garrett 2009) including collaborative, academic web-based writing projects (Kessler et al. 2012), wikis (Rott and Weber 2013) and blogs (Arslan and Sahin-Kizil 2010), showed that CALL researchers tend to not mention how such teaching tools and collaborative writing projects contribute to the language program's overall assessment plan. Second, writing on the computer is a cognitive process that differs greatly from the cognitive process of writing on paper, and this distinction has been a major concern among CALT researchers for some time. This problem is more pronounced when the language being learned has a writing system that is very different from the students' native-language writing system. For example, Chinese character writing (by hand) is a process that is as much of a memorized motor skill as it is a complex cognitive skill. On the other hand, the process of typing Chinese on a computer involves a step that uses the Romanized alphabet system to locate and select the appropriate characters. Understanding how the cognitive construct of writing is changed when the mode of test administration is changed is an important endeavor. It is also important to ensure that the way writing is tested matches the way writing is instructed in the language classroom. Testing companies currently wrestle with how to put foreign language tests of writing online if potential test takers may not have yet learned how to write in the language digitally.

As tests for foreign languages *are* moved online, applied linguists will need investigate whether the testing mode interacts with any individual differences and

whether that interaction contributes to construct-validity issues (see Chen et al. 2011, who found computer-based writing tests disadvantaged certain subgroups, such as the economically disadvantaged). Recently, research on CALT validity has been conducted on different populations of language-test-takers, such as young children. For example, Ballard and Lee found that online oral tests for children ages 7–10 that had countdown timers on screen were exorbitantly stressful for some of the children. The unfamiliarity of the computer-based exam format also contributed to construct validity issues. Porter (2015), writing for the *Wall Street Journal*, commented on the negative washback effects of computer-based testing in the elementary grades of schools. She noted that low socioeconomic status and low computer familiarity impede the accurate online assessment of young learners. More CALT validation studies are needed on child and adult populations with learning disabilities (see Huang et al. 2011), physical disabilities (e.g., visual and auditory impairments; see Hansen et al. 2005), low computer literacy (see Kpolovie et al. 2014), and socio-economic disadvantages (see Hubbard 2013). These populations need to be studied because as CALT becomes normalized, subgroups that before did *not* take CALTs are now being mandated to do. The field needs research to assure that CALT is valid for such subgroups.

Future Directions

The world of CALT will continue to develop, and this is seen “as a natural evolution in assessment practice” (Dunkel 1999, p. 77). Tech-infused assessment planning is a logical step. But a system of checks and balances is needed to assure that computerized tests are increasing our ability to efficiently make valid inferences about language learners’ abilities and weaknesses. We must ensure computerized tests contribute overall to L2 programs and L2 learning. Computerized tests should not just increase the efficiency of test administration and scoring but should also accurately reflect the ways in which L2s are learned and should appropriately take advantage of advances in technology to make for better testing conditions not just different ones (Chapelle and Douglas 2006). A promising, though relatively young, form of CALT that explicitly promotes L2 learning is computerized dynamic assessment (C-DA). C-DA measures ability, like traditional tests, but adds mediation and a focus on how learners respond to it (Poehner and Lantolf 2013). For example, Teo (2012) used the Viewlet Quiz 3 platform in a classroom setting to provide students with C-DA supporting inferential reading skills, leading to skill growth and metacognitive strategy development. Continued efforts in C-DA should yield language learning insights and inform classroom practices.

The scoring of essays (and soon, extended speech) will continue to be an issue in the CALT environment for some time. However, as mentioned above, research has shown promise in the use of computers for rating essays, especially when the computer-generated scores are used as part of tutoring or in conjunction with human-produced scores. The next steps in CALT will involve making computer-infused tests more feasible and valid for all populations, including learners of

languages that have differing scripts (e.g., French-speaking learners of Nepali), young-child language learners, and computer-illiterate adults.

Cross-References

- ▶ [Distance Education for Second and Foreign Language Learning](#)
- ▶ [History and Key Developments in Intelligent Computer-Assisted Language Learning \(ICALL\)](#)

Related Articles in the Encyclopedia of Language and Education

Margaret E. Malone: [Developing Instructor Proficiency in \(Oral\) Language Assessment](#). In Volume: Second and Foreign Language Education

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Part IV

Gaming, Virtual Worlds, and Social Network Sites for Language Learning

Digital Games and Second Language Learning

Hayo Reinders

Abstract

As interactive, multimodal, immersive, and extremely popular environments, digital games have received increasing interest from educators in recent years for their potential to enhance the language learning experience, both inside and outside the classroom. Review studies from general education have confirmed that “playing computer games is linked to a range of perceptual, cognitive, behavioral, affective and motivational impacts and outcomes” (Connolly et al. *Computers & Education* 59(2):661–686, 2012) although this depends on the subject matter (Young et al. *Review of Educational Research* 82(1):61–89, 2012). Early studies in the area of language acquisition have demonstrated positive effects of game play on motivation, willingness to communicate, language socialization, and a range of other factors involved in the language learning process. As a relatively new field, however, there are significant gaps in the available literature, and many worthwhile areas remain yet to be explored. In this article, I will describe how research into digital games relates to earlier research on game-based learning, primarily with younger learners, before discussing the key areas in which studies have been carried out and their most important findings. The following sections discuss some of the challenges faced by the field and suggest future directions for research and development in this field.

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Keywords

 Digital gaming • Game-based language learning

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Introduction

As interactive, multimodal, immersive, and extremely popular environments, digital games have received increasing interest from educators in recent years for their potential to enhance the language learning experience, both inside and outside the classroom. Review studies from general education have confirmed that “playing computer games is linked to a range of perceptual, cognitive, behavioural, affective and motivational impacts and outcomes” (Connolly et al. 2012: 661), although this depends on the subject matter (Young et al. 2012). Early studies in the area of language acquisition have demonstrated positive effects of game play on motivation, willingness to communicate, language socialization, and a range of other factors involved in the language learning process. As a relatively new field, however, there are significant gaps in the available literature, and many worthwhile areas remain yet to be explored. In this article, I will describe how research into digital games relates to earlier research on game-based learning, primarily with younger learners, before discussing the key areas in which studies have been carried out and their most important findings. The following sections discuss some of the challenges faced by the field and suggest future directions for research and development in this field.

Early Developments
Game-Based Learning

Research in digital game-based language learning and teaching (DGBLLT) is linked to a much older interest in the role of play in language learning and in education in general. Before describing research on DGBLLT then, it is important to understand what is meant by “play” and how game play impacts development and language learning.

Play is a natural process of learning whereby children develop physically, cognitively, emotionally, and socially through problem-solving and perseverance. In an influential early study, Bruner (1972) showed that children who had opportunities to play with objects achieved similar to higher problem-solving skills than children who had not but also that they developed greater tolerance in trying to solve problems and, in dealing with difficulties in doing so, were more creative and had more positive attitudes. In addition to helping children's general cognitive and social development, play also has an important role in the development of L1 language skills. Vygotsky's work has been particularly important in recognizing how play allows children to make meaning based on resources (real or imagined) in their immediate context to express feelings and to share intentions and ideas with other children, even in the absence of fully developed language ability. For example, where a gap in children's interlanguage exists, the use of physical objects or movement can make up for this. This not only allows for meaning to be expressed but for collaborative construction and scaffolding of language to occur (Weininger and Daniel 1992). As Widdowson (2001, p. 137) notes, "the playground culture is almost exclusively oral," and this oral aspect requires children to seek ways to express themselves verbally. A good example of an oral play activity is a narrative, which, Seach (2007) argues, provides two key elements in children's language development: context and meaningful communication. Play partners facilitate children to share their play experience with each other and implicitly acquire vital pragmalinguistic knowledge. Play activities allow children to transfer skills and knowledge to solve problems, discover, and analyze ongoing processes to develop language skills and strategies. Frost et al. (2001) show how children use metalinguistic ability when talking about their play. Language assists children in structuring and understanding the meaning of their experiences and emotions and recognizing and making sense of their sensory faculties; in other words, play, language use, language development, and children's wider cognitive and social development are closely linked.

The use of games in foreign language teaching goes back many decades (Lee 1979; Rixon 1981), both for younger learners as well as adults, with some going so far as to see a vital role for games in the language classroom: "If it is accepted that games can provide intense and meaningful practice of language, then they must be regarded as central to a teacher's repertoire. They are thus not for use solely on wet days and at the end of term!" (Wright et al. 1984, p. 1). The fact that non-digital games are still popular can be seen from the fact that the latter book is now in its third edition (2005) and from the many websites dedicated to ideas for language games for teachers. The role of physical games in second language acquisition also continues to be explored (Tomlinson and Masuhara 2009).

The advent of gaming consoles and games designed for personal computers certainly increased interest in game play by people of all ages and hence by educators in general. As a result, games are now no longer seen as only appropriate for children or in private settings but incorporate the wide range of genres found in adult forms of communication, including ones unique to the gaming environment. However, despite vast differences between games, they share a number of characteristics. Prensky (2001) argues that most games involve the following:

1. Rules
2. Goals and objectives
3. Outcome and feedback
4. Conflict, competition, challenge, and opposition
5. Interaction
6. The representation of a story.

These are also characteristics of many successful language teaching environments and indeed (perhaps with the exception of the “representation of a story”) of task-based language teaching, in particular as related to the use of technology (see Thomas and Reinders 2010, for a collection of papers on technology in task-based language teaching).

Another characteristic of many commercially produced recreational digital games is their complexity, with many games including extremely elaborate story lines, multiple characters, complex problems to solve, and plot twists. This complexity was initially not found in games designed for use in education (sometimes referred to as “edutainment”). Often limited to simple vocabulary exercises with the addition of a points system, many such games do not meet the criteria proposed by Prensky and others.

As for the theoretical underpinnings of DGBLLT, sociocultural theory has played a particularly important role in the implementation of games in education (Ma et al. 2011) and specifically in the area of language education (Lantolf and Thorne 2006; Thorne 2008). In particular, collaborative games such as massively multiplayer online role-playing games (MMORPGs), in which people play with and against others online, and simulation games, in which players create and communicate in virtual worlds, create many opportunities for collaboration and competition and rich opportunities for exposure to L2 input as well as opportunities for L2 output and interaction, all of which have rich theoretical bases in second language acquisition research (e.g., Krashen on L2 input, 1982; Swain on output, 1985; Long 1981). Another aspect of games in education is the additional control they give learners over the learning process (Butler et al. 2014), for example, by allowing players to choose different levels, avatars, scenes, and so on. Such control has been linked to (the development of) learner autonomy, which in turn has been linked to language acquisition (Benson 2013). A final theoretical basis comes from the fields of embodied and grounded cognition (Clark 2001; Gibbs 2006), which highlight the importance of our body, either virtual or real, in cognition. New developments in virtual reality are likely to increase interest in this area in the future.

Major Contributions and Work in Progress

The Affordances of Digital Games

In order to understand the benefits of digital games in language learning and teaching, it is helpful to consider existing research in terms of the ways in which it attempts to draw on the affordances (or: context-dependent potential benefits

(Van Lier 2004) that digital games offer. In Gee's view, digital games are "problem solving spaces that use continual learning and provide pathways to mastery through entertainment and pleasure" (Gee 2009, p. 65). Gee (2003) argues that good digital games incorporate learning principles and have a variety of design features that "are particularly relevant to language learning" (Gee 2012, p. xiii). In his 2003 book, the list of 36 of these principles, including, to name a few, "the active, critical learning principle," which argues that all aspects of the learning environment are set up to encourage active and critical, not passive, learning, and the "psychosocial moratorium," which describes an environment in which learners can take risk and where real-world consequences are lowered. The "practice principle" holds that learners get a great deal of practice in a context where that practice is not boring. Gee found these and other principles to be common in most of the digital games he looked at, and they provide a helpful lens to investigate the potential benefits of games.

Reinhardt and Sykes (Reinhardt and Sykes 2012; Sykes and Reinhardt 2012) propose a framework for understanding the different roles that games can play in language research and practice, as game-enhanced, game-based, or game-informed, where the former uses games designed for entertainment purposes, game-based involves the use of educational games, and game-informed uses game play principles only. Each of these may raise different learning and teaching questions, such as how game-enhanced learning happens in informal language learning or how certain game designs afford particular learning behaviors (see also Reinhardt and Thorne 2016).

Whitton distinguishes between eight roles for games, i.e., learning with entertainment games, learning with educational games, learning inspired by games, learning within games, learning about games, learning from games, learning through game creation, and learning within game communities (2014, p.4–5). Another distinction can be made between studies that investigate primarily the effects of game (-enhanced, -based, -informed) learning on either L2 acquisition or on affective factors involved in L2 learning. We use this broad distinction below to report on some of the key studies in the field.

Research on the Effects of DGBLLT: Language Acquisition

Studies on the effects of game play on language acquisition are somewhat limited. One of the reasons is that the use of digital games is usually a complement to existing courses, and as such, it is difficult to control for all the variables that can have an effect on learning outcomes. Most studies attempting to investigate acquisition have instead (at least in part) focused on opportunities that games afford for exposure to and interaction in the target language, on the assumption that these underlie language acquisition. For example, a pilot study by Rankin et al. (2006) investigated interaction between four ESL students in the MMORPG "EverQuest II" in an attempt to determine if participation in the game could foster students' English language proficiency and knowledge of new vocabulary. In this study, students participated in eight gaming sessions held over a period of 4 weeks. The findings demonstrated

that students increased target language vocabulary output by 40% as a result of interaction with non-player characters and produced a remarkable 100% increase in target language chat messages during social interaction between players. The social interaction among players in *EverQuest II* was further examined by Rankin et al. (2009). The authors took a closer look at the in-game dialogues between eight native and 18 non-native speakers and language socialization in MMORPGs. The findings revealed that ESL students significantly increased their target language output by interacting with their native speaker interlocutors. The findings also suggested that *EverQuest II*, and possibly MMORPGs in general, encouraged L2 interaction as the players must be active learners and engage with other learners within the environment.

These findings were partly borne out by a recent study by Scholz (2016), who used the popular MMORPG “*World of Warcraft*” in an extramural setting with 14 learners of German as a foreign language in Canada, to determine the impact of game play on language development. Data was derived from both in-game experiences and out-of-game conversations over a period of 4 months, without any instruction or intervention on the part of the researcher other than three focus-group meetings with other learners over this period, held in German. This is therefore one of the few studies that were carried out in an informal setting and that took place over a (relatively) long period of time. It was found that the game environment was beneficial to the participants’ language development and that in particular the process of transferring linguistics constructions encountered in the game environment to a non-game environment (during the focus-group sessions) played an important role in this.

Whether active engagement associated with gaming activity has downsides was one of the concerns of de Haan et al. (2010), who investigated the effect of using a music video game on vocabulary recall. In their study, 80 Japanese university undergraduates were paired with one student playing a music game for 20 min while the other simply observed. A vocabulary recall test and a measure of cognitive load, followed by a delayed vocabulary recall test 2 weeks later, showed that all participants had learned some of the targeted vocabulary but the players significantly less so than the observers. The authors attribute this to the greater cognitive load imposed on the players. A similar study by Mohsen (2016), however, found the opposite: players outperformed observers.

A feature of much game-based learning is that it takes place in out-of-class settings. Sundqvist and Sylvén have produced multiple studies describing the ways in which Swedish learners make use of various media and games in non-formal extramural settings and how this impacts on their acquisition of English vocabulary. The first of these studies (Sylvén 2004) was a longitudinal study into the effects of content and language integrated learning on vocabulary development among upper secondary school learners. One of the main factors found to affect acquisition was the use by students of digital texts and environments outside of school. To investigate what types of texts were most beneficial, a second study was conducted among secondary school learners (Sundqvist 2009, 2011). In this study, it was found that out of school activities were positively correlated with L2 acquisition

and that in particular, more “active” types of activities such as use of the internet and playing video games were more strongly correlated than more passive activities such as watching TV or listening to music. Boys were found to engage more in the former, girls more in the latter. A jointly authored third study focusing on 12-year-olds (Sylvén and Sundqvist 2012) confirmed these findings, and a fourth study with 10-year-olds showed broadly similar findings (Sundqvist and Sylvén 2014).

One way of enhancing participation is to involve the learners in the design of game-based activities. In this vein, Butler (2015) reports on a study that investigated the use of games with young learners. In her study, 82 learners of 11–12 years of age were asked first to identify vocabulary-learning elements in existing instructional games they found attractive and to then design story boards for computer games that could be used to teach vocabulary to their younger peers. Although this study did not investigate language acquisition per se, it does give insight into the process by which (young) learners identify useful features of games and the way they can incorporate them into building their own learning environments.

Research on the Effects of DGBLLT: Affective Factors

A meta-analysis of the effects of digital games in educational (but not language-learning-specific) contexts by Vogel et al. (2006) showed that its main benefits were in the affective realm. It is perhaps not surprising then that most studies in DGBLLT have investigated features such as student engagement, motivation, and anxiety. A further role has been identified in games helping to facilitate learners’ language socialization (e.g., Duff, 2007; Tarone 2007) and the development of their social identity in and through games (Thorne and Reinhardt 2008).

Anyaegbu et al. (2012) tested the above assumptions by investigating the effect of the game “Mingoville” on the motivation, engagement, and interest of young Chinese learners of English. The qualitative findings of the study indicated that the majority of the students were motivated to learn English with Mingoville because the game was fun for them and made them feel relaxed and avoided making them lose face. This was shown in the amount of collaboration the learners engaged in. However, there were some students who reported that the experience was demotivating because they either found playing the game boring or generally did not like games. This supports Whitton’s (2007, 2011) view that employing games for motivational purposes alone is not sufficient justification for their use because they might not be motivational for all students, particularly students in higher education.

Dalton and Devitt (2016) found a similarly positive attitude towards games in education with a group of 25 primary school learners of Irish. In their study, they developed a 3D game using the Open Sim platform that incorporated a number of collaborative storytelling tasks. An interesting finding from their study is that for these younger learners, goal orientation was one of the most important aspects of the experience, whereas many games (and in particular virtual worlds) give players a great deal of choice, the 9–11-year-old learners said they preferred more structure.

Taking a slightly different approach, and focusing on interaction in the L2, Peterson (2010, 2011) showed that the highly learner-centered nature of the interaction provided by network-based games, the anonymity and the reduced inhibition provided by personal avatars, and the reduction of paralinguistic cues in real-time chat are characteristics that may reduce anxiety and improve self-confidence. Subsequent studies by Peterson (2012a, b) focused specifically on learner interaction and attitudes in MMORPGs. In his qualitative study (Peterson 2012a) of the use of the MMORPG “NineRift,” six Japanese EFL university students participated in two gaming sessions, lasting approximately 90 min each, which were held 1 week apart. Peterson obtained data from learners’ chat messages exchanged during game play, researcher observations, filed notes, learner responses to pre- and post-study questionnaires, and interviews. The findings indicated that learners actively participated in the game, utilized different types of strategy to manage their interaction, undertook collaborative dialogues exclusively in the L2, and had positive attitudes, claiming that interaction in MMORPGs was engaging, motivating, and enjoyable and improved their fluency and discourse management practice. In a later study, Peterson (2012b) investigated the linguistic and social interaction and attitudes of four intermediate Japanese EFL university students in the MMORPG “Wonderland.” Participants were engaged in four sessions, lasting approximately 70 min each and held once a week over a period of 1 month. Similar to the findings from the earlier study, participants used a range of strategies and conducted their interaction exclusively in the target language. Moreover, participants provided largely positive feedback, claiming that interaction in MMORPGs, in combination with the anonymity provided by the use of pseudonyms and avatars, helped to reduce anxiety levels and encouraged opportunities for taking risks in using the target language and, thus, creative and extensive use of the language.

Zheng et al. (2009) investigated the role of the virtual environment “Quest Atlantis” in English language learning. The authors examined the interaction and collaborative construction of cultural and discourse practices between two native speakers and two non-native speakers of English. They were paired and were requested to work collaboratively over a 10-week period. Data was collected through participant observation, post-quest interviews, and an analysis of chat logs and emails. It was found that participation in the game allowed learners to engage in authentic and meaningful interaction with the native speakers while closely cooperating with each other to complete the quests, enabling them to gain knowledge from a more knowledgeable/experienced game player through action. That is, native speakers were able to share their linguistic knowledge with language learners, and language learners were able to share cultural information regarding the quests while chatting with the native speakers in the game. This interaction was conceptualized as negotiation for action and perceived as an extension of the concept of negotiation for meaning. The findings suggested that negotiation for action could contribute to the potential for greater cultural awareness as well as increased mutual collaboration and cultural identity as a means to successful quest completion. The learners who participated in this study recognized that negotiation of action was a type of interaction that was unavailable in their learning experiences in the language classroom.

Willingness to communicate (WTC), or individuals' "readiness to enter into discourse at a particular time with a specific person or persons, using a L2" (MacIntyre et al. 1998, p. 547) has received a great deal of attention in L2 research in recent years, and the effects of digital games on WTC have also been investigated. In a study of 30 Thai learners of English as a foreign language enrolled in a university language course, Reinders and Wattana (2016) took the "game-enhanced" approach one step by further by adopting a commercially available and very popular online role playing game called Ragnarok. The game was completed during six 90-min lessons playing Ragnarok. The game had been installed on a private server and was thus only available to participants in the study and modified to include special instructions or quests (missions that players are assigned to accomplish in order to get items and progress in the game) designed to encourage collaboration and communication. To gauge participants' WTC, a series of questionnaires was designed, adapted from MacIntyre et al.'s (2001) WTC scale and previous studies on language and communication anxiety (Horwitz et al. 1986; McCroskey and Richmond 1982) and perceived competence (Compton 2004; MacIntyre and Charos 1996). These asked respondents about their (own perceptions of their) willingness to use English, as well as their confidence, anxiety, and perceived communicative competence in communicating in English. The questionnaires were administered at the start of the course and again after six gaming sessions. Results on the first set of questionnaires showed that students had low confidence, high anxiety, low perceived competence, and low WTC. The second set of results showed a marked and significant improvement, with participants feeling more confident, less anxious, more competent, and more willing to communicate. The authors argue on the basis of these results that the careful construction of tasks that draw on the affordances of games can have a positive effect on the language learning process.

Problems and Difficulties

The research on DGBLLT faces a number of challenges, which can broadly be categorized as operational, pedagogical, and methodological. In the first category fall issues related to privacy, safety, and security, as well as concerns by parents and other stakeholders about the appropriateness of games in educational settings. These concerns are not to be underestimated as they have a major impact on how, or if, games are used.

Also in the category of operational challenges fall technical issues. Many teachers may not be familiar with game play and as such lack the skills and interest to play games, let alone coach others. A number of the studies described above involved some sort of manipulation of the game environment, which requires a level of technical skill that many teachers will not have. At a practical level, games can be expensive, either because they need to be purchased or licensed and also because some types of games (such as MMORPGs, or massively multiplayer online role playing game) require fast processors and graphics cards, headphones and microphones, etc.

In the second category fall pedagogical challenges. In most of the studies reported above, the researchers were also the teachers delivering the game-based instruction. For most teachers, who may not be as interested in DGBLLT, the use of games would be a significant learning experience and the integration of games into an existing curriculum a considerable challenge. Advocates of “gamification,” or the use of gaming principles in education, argue that many examples of the use of games are merely add-ons to existing classes that do not challenge current practice. The impact of these issues on the effects of DGBLLT has not yet been carefully documented.

Methodological challenges include ways in which researchers can control for the novelty factor of introducing games in the classroom. Although it could be argued that for most learners, games are not new, their use in an educational setting often is, and this in itself may give rise to a (temporary) excitement, which may translate in higher motivation and even greater learning outcomes.

Partly because of the operational and pedagogical issues described above, most studies on game play are relatively short. Although this is an argument that could be made against most of the research in language learning and teaching, in DGBLLT research, it is all the more important to conduct longitudinal studies that can minimize the novelty effect. In studies that look at game play in out-of-class settings, it is important to monitor the amount of time learners interact in the target language, as otherwise any benefits could be attributed simply to greater time-on-task rather than game play itself (although it could be argued that if game play causes learners to spend more time interacting in the target language, for example, because they enjoy such language use more than other forms, then this is a worthwhile benefit in and of itself).

A challenge with much research on DGBLLT is that it takes place (either entirely, or in part) outside of formal settings. This can make data collection difficult (both for practical as well as privacy reasons). At the same time, this challenge is one that needs to be taken up if language researchers are to get a full understanding of the entirety of the language learning process.

Finally, relatively little research has been carried out on the effects of DGBLLT on language acquisition. Most studies look at affective factors, such as motivation, engagement, and willingness to communicate. Although these are fruitful and important areas of inquiry, it is important ultimately to link these to better learning outcomes. Many studies are able to make tentative predictions at best. For example, Reinders and Wattana (2015) make the reasonable assumption, based on existing literature, that an increase in WTC will be beneficial to language acquisition and that because they were able to establish an impact of game play on an increase in participants WTC, games are likely to have a positive role in language acquisition; however, they did not prove this link. Similarly Turgut and İrgin (2009) showed increased strategy use from game play, and again, although there may well be a positive link between strategy use and language acquisition, this is not certain, and no direct benefit to learning could thus be established. A final example is offered by Lee and Gerber (2013), who conducted a digital ethnographic study in which interactions between one of the researchers and a Korean ESL learner on a study abroad program in the United States in the online role-playing game *World of Warcraft* were recorded over a period of 1 year, using transcripts of in-game chat

and screencast software. The researchers documented changes in the learners' use of language over this period. It was evident from the transcripts that many of the in-game situations prompted interest in and a need for developing certain types of language in order to successfully compete in the game. In this sense, the game provided an environment for genuine communication, and this motivated the learner to develop his language. However, it is difficult to attribute such changes to game play per se, in particular in a second language situation. Clearly, significant challenges lie ahead for the field.

Critical Appraisal and Future Directions for Research

The current state of the field allows us to draw some early, tentative conclusions about the possible role of DGBLLT in language education and – to a lesser extent – its impact on language acquisition. It is clear from the above selection of studies that games play a role in affective aspects of language learning that have, in turn, been shown to be related to language acquisition. Games have been demonstrated to increase motivation, lower anxiety, and to increase engagement and willingness to communicate.

However, the learning experience through digital games is not yet fully understood. A key challenge for future studies is to make strong links with what we already know about (language) learning and teaching and the (potential) role of digital games in this. Reichle (2012), for example, advocates building on studies of memory processes, Jackson et al. (2012) on research into strategy instruction, and Reinders and Wattana (2012) on studies of interaction and willingness to communicate. Other potentially fruitful areas include the role of teacher and peer feedback, the occurrence of focus on form in informal settings, and the quality and quantity of input and opportunities for extended output in game settings. As Scholz (2016, p. 268) argues, research that goes beyond learners' reflections and that instead looks directly at learners' experiences (including their linguistics experiences) is vital for a better understanding of the relationship between DGBLLT and acquisition.

Another challenge for the field is to better identify those aspects of games that influence the language learning process. As Garris et al. (2002) summarize: “there is little consensus on game features that support learning, the process by which games engage learners or the types of learning outcomes that can be achieved through game play” (p. 442). Wilson et al. (2009) argue:

Yet it is still under debate as to which particular aspects of a game lead to learning of any kind. Do the motivating aspects lead to active participation or does the active participation increase motivation? And what specific learning outcomes can be achieved? Without evaluation of the impact of games on specific learning outcomes, games will continue to be categorized largely as motivating and fun, but instructionally useless (p. 221).

Their call for a better understanding of the relationship between game attributes and learning outcomes has not yet been comprehensively taken up, at least not in the

area of language education. Similarly, for such an effort to be successful, multiple research approaches are likely to be necessary.

Despite these concerns, digital games offer a promising environment for language acquisition and deserve greater attention from researchers in the years to come. As games become more embedded in our lives, including those of teachers, their presence in the educational process is likely to grow. The challenge for teachers and researchers is to identify and build on the affordances they offer to best support the language learning process.

Cross-References

- ▶ [Dialogicality, Ecology, and Learning in Online Game Worlds](#)
- ▶ [Educationally Designed Game Environments and Feedback](#)
- ▶ [Virtual Worlds and Language Education](#)

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Dialogicality, Ecology, and Learning in Online Game Worlds

Dongping Zheng and Kristi Newgarden

Abstract

This chapter presents an action-oriented understanding of second language (L2) learning, occurring in play associated with massively multiplayer online games (MMOG), such as World of Warcraft (WoW) or EverQuest, and multiuser virtual environments, such as Second Life or Active World. In particular, we focus on research that represents what we term an ecological, dialogical, and distributed (EDD) perspective on language learning. The chapter emphasizes research that views language learning as embodied, situated, dynamic, and values-realizing, and is organized around the following questions: (1) how do studies of L2 learning with games and virtual environments treat context?, i.e., as input versus as sites with affordances for a range of action potentials; (2) what is the unit of analysis?, i.e., individual perception versus perception and action cycles or turn-by-turn utterances versus coacted communicative projects; (3) how is language theorized?, i.e., language seen as a code versus differentiation between real-time languaging (accounting for both language and actions) and prescriptive lexicogrammars and discourse-semantic regularities; (4) how is interactivity analyzed?, i.e., using transcription of utterances or text chat versus using transcriptions of language and actions from dynamic multimodal texts. We conclude with a discussion of future directions in EDD research.

Keywords

Ecological • Dialogical • Distributed perspective • Multiplayer online games • Multiuser virtual environments • Second language learning

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Introduction

From an ecological, dialogical, and distributed (EDD) perspective, language learning is embodied, situated, dynamic, and values-realizing. In tracing the development of EDD views applied to second language (L2) learning with technologies that afford avatar embodiment, this chapter promotes an action-oriented understanding of L2 learning, i.e., as it takes place in the dynamics of play in massively multiplayer online games (MMOG), such as World of Warcraft (WoW) or EverQuest, and multiuser virtual environments, such as Second Life or Active Worlds. Research taking an EDD view of language has investigated the educational potentials of multiplayer online environments, highlighting them in a way that a traditional lens could not. This is in part due to the EDD view that human values play a central role in language and cognition, grounding all aspects of perceiving and action that involve intra- and inter-bodily movements. The chapter centers on the following questions based on a review of the literature: (1) how do studies of L2 learning with games and virtual environments treat contexts: as input versus as sites with affordances for a range of action potentials; (2) what is the unit of analysis: individual perception versus perception and action cycles or turn-by-turn utterances versus coacted communicative projects; (3) how is language theorized: language understood a code versus differentiation between real-time languaging (accounting for both language and actions) and prescriptive lexicogrammars and discourse-semantic regularities; and (4) how is interactivity analyzed: using transcription of utterances or text chat versus using transcriptions of language and actions from dynamic multimodal texts. The latter sections of this chapter focus specifically on game and virtual environment research that elaborates and expands on the EDD approach.

Early Developments: Emergence of the Ecological View in Call Literature

Computer assisted language learning (CALL), a subfield of applied linguistics with a history of more than 50 years (Thorne and Smith 2011), has been influenced by the digital games and learning research of the past two decades. Interest in games and

learning has been generated by critiques of schools (e.g., Gee 2003, 2013; Prensky 2001, 2006; Brown and Adler 2008), work on new literacies (e.g., Gee 2003; Shetzer and Warschauer 2000), and studies of player participation in online game and fan-fiction communities (e.g., Steinkuehler and Duncan 2009; Thorne et al. 2009). Findings have pointed to high levels of player engagement, affordances for social coordination and interaction, the formation of communities of knowledge-producers (Squire 2012), and player-driven trajectories of learning that can influence and improve upon school learning.

Between 2006 and 2009, a number of CALL researchers examining virtual environments attributed L2 learning outcomes to social interaction, contextual, participatory, and experiential functions. Experimental and quasi-experimental studies measured learners' linguistic output, such as vocabulary gains and improvement of affective factors. Due to their limited relevance to the EDD perspective taken in this chapter, we will provide only a cursory review here (though see chapter "► [Virtual Worlds and Language Education](#)," by Sadler, this volume). Several influential studies, such as Rankin et al. (2008), Rankin et al. (2009), and Zheng et al. (2009), pointed to the value of social interactions between native speakers (NS) and nonnative speakers (NNS) in gameplay in contributing to measurable changes in L2 learners' skills and affect. However, these researchers did not explore the situated dynamics of learners' actions and language.

A theoretical shift toward ecological and dynamic views can be traced to the 2009 special issue on CALL in the *Modern Language Journal*. Introducing the issue, Lafford drew on the work of Lam and Kramsch (2003), Leather and Van Dam (2003), and van Lier (2004) to frame her review of CALL trends from an ecological perspective. While few studies had taken an ecological approach, Lafford mentioned van Lier (2003), who investigated the contextual factors that affect the efficacy of technology in project-based learning, Shin (2006), who examined how context is configured in students' language learning practices through computer-mediated communication (CMC), and Zheng et al. (2009), cited in the last section.

Leo van Lier deserves special mention for fully elaborating the ecological view of L2 learning for the field of second language teaching and learning (L2TL) in his 2004 book, *The Ecology and Semiotics of Language Learning*. He conceptualized L2 learning as a way of "relating more effectively to people and the world," adding a view of semiotics in which meaning-making is a dialogical process and the patterns of language are shaped by history and culture rather than governed by a fixed system of symbols and rules. In the ecological view van Lier (2004) delineated, contexts are defining, the quality of learning experiences matter, diversity and variability are acknowledged, and learning is activity in which movements, processes, and actions are key. Processes, activity, discourse, and linguistic actions came into focus in the following studies.

Reporting on a case study of WoW play by an American and a Ukrainian, Thorne (2008) described WoW as a site for engaging meaningful communicative activities and reported on players' plurilingual conversations, collaboratively assembled repair sequences, and distributed (alternating) opportunities for the performance of expert

roles. In their 2009 study, Piirainen-Marsh and Tainio used conversation analysis to illustrate how two teenaged L2 learners of English appropriated game resources such as being able to playfully repeat nonplaying character voices and dialogue during nonplaying segments of the online game *Final Fantasy*. The learners thereby attended to prosody, constructions, and vocabulary while experimenting with English-speaker identities. The authors looked at how learners used other-repetition as a resource to attend to the game and to display their linguistic and interactional competence.

Zheng et al. (2009), in a study of *Quest Atlantis* (QA) with Chinese middle school students, reported on interaction data using sociocultural and ecological perspectives and the perception and action cycle as the unit of analysis, concluding by identifying a new construct, negotiation for action (NfA). By diverging from a commonly used unit of analysis, i.e., sequential turns as in conversation analysis, Zheng et al. were able to look at the dynamic alternating patterns between novice and expert roles. With some similarity to Thorne's (2008) findings, participants negotiated content and identity in order to coordinate future movements. NfA is revolutionary when compared with "negotiation for meaning," which depends on the information transfer model in which meaning is carried by words and their forms and not necessarily by the content of game texts or activities, learners' sociocultural histories or their projected future actions.

The abovementioned studies explored L2 learners' dynamic interactions, but the analytical techniques adopted were limited by methodological constraints. The authors made sense of NS and NNS interaction data; however, their analysis was not yet fully ecological in accounting for action and context as part of meaning-making. Actions such as jumping with joy alongside others in your gameplay party, becoming invisible at a convenient moment, moving as a group through dangerous castles, caves, or dungeons, and keeping other allied players healthy and alive are emotional and make languaging in gameplay memorable and meaningful. This said, almost all of the studies reviewed above looked for evidence of language learning mainly by examining players' text chat. Both Thorne (2008) and Zheng et al. (2009) suggested the need for more "ecologically relevant participation frameworks" (Thorne 2008, p. 28), including consideration of avatar-embodied actions and temporal and spatial factors in future analyses.

Although van Lier's seminal book appeared in 2004, few CALL studies took up the ecological perspective as concepts such as "contexts are defining" were perhaps too forward thinking. Instead, in many studies contexts were often treated as containers, with environments as mere input, which limited what could be understood about the complex structure of a 3D space inhabited and co-constituted by those playing in it. But how can "contexts are defining" be applied in design of research and materials, including activities designed within 3D spaces? What kinds of data can capture the quality of learning experiences, learner variability, and diverse learning trajectories? What analytical techniques can help us unfold the learning process? These questions are in part answered in the contributions reviewed next.

Major Contributions

A new wave of research appeared around 2012, including a special issue on Digital Games for Language Learning in ReCALL (Cornillie et al. 2012). The studies aimed beyond the “proof” aspect of research to challenge both CALL and second language acquisition (SLA) through theoretical extension and methodological infusion of dialogical and distributed perspectives.

Theoretical Advancement

A major rethinking of research on gaming and virtual environments was supported by the distributed language (DL) movement. DL helped to expose the long-term effects of written language bias (Linell 2005) and the code view of language (Love 2004) on applied linguistics, namely the prioritization of rules and misconception that symbols and their meanings are disconnected from contexts. DL posits *first-order languaging* as the dynamic meshwork of here-now coordination of actions, language, and material artifacts that cannot be transcribed and analyzed only by using *second-order language* or the symbols and words of written language. Descriptive linguistics, such as lexicogrammar, and discourse-semantic regularities are considered as historically accumulated second-order language that can be appropriated for use during first-order languaging (Thibault 2011).

DL built on ecological psychological standpoints, providing a framework to look at dynamic action and interaction in terms of the synergistic activities of languaging and making use of second-order resources. Also under the umbrella of DL, Bert Hodges’s (Hodges 2007a, b, 2009) values-realizing theory strongly influenced the studies that best represent the current stage of EDD perspectives on L2 learning. Hodges’s (2009) theory of language as a perception, action, and caring system underlies the view that conversing is not transfer of information, but rather a means of way-finding and taking care of self and others, thus bringing in the critical ethical dimension at the heart of Gibson’s (1979) ecological psychology (Hodges and Baron 1992).

Methodological Advancement and Integration

Linell’s (2009) comprehensive work, *Rethinking Language, Mind and World Dialogically*, provided a new dynamic analytical framework for understanding communicative activities, namely *Communicative Project Theory* and *Communicative Activity Type (CAT) Analysis*. CAT recognizes the situative and socio-institutional boundaries of communication. As game rules of basketball differ from those of table tennis, the communicative norms of a courthouse differ from those of an emergency room. Thus communication is highly bound with socio-institutional norms, routines, and roles. Sociocultural resources bridge the gap between situations and traditions

(Linell 2009). Making uses of resources within and across CATs involves orienting to situation transcending practices (Linell 2009, p. 49). In CAT, the unit of analysis is the communicative project (CP). A CP is defined as a situated interaction that “involves an implicit or overt co-action between two or more parties” (p. 193, Linell 2009), established by a minimum of three interactants in the pattern ABA, where the initiator represents A and the responder(s) represents B.

The data-driven studies described next either took a descriptive approach or stemmed from hypothesis testing, but the common methodology was multimodal analysis using a transcription technique from Baldry and Thibault (2006). Game player verbalizations, avatar actions and movements, and material artifacts in the virtual environment are all transcribed as part of players’ meaning-making and values realizing. By situating analysis of play activities within CAT, which assumed certain game-specific grammars, and applying CP theory, the studies below were able to answer research questions that the early studies could not.

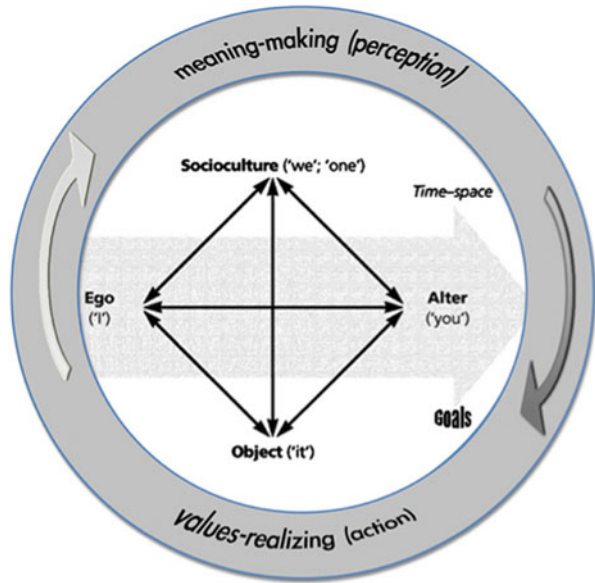
Full-Blown Ecological-Dialogical-Distributed Game Studies

An initial theoretical piece suggested a rethinking of language learning in virtual environments in dynamic EDD terms. To break free of computational concepts and the code view of language and to take full educational advantage of virtual environments for L2 learning, Zheng and Newgarden (2012) called on L2TL to reconceive four concepts at the core of widely held L2 theories, namely (1) from *transfer* to *coaction*, (2) from *input/output* to *affordances/languageing*, (3) from *tasks* to *learning environments*, and (4) from *learning about* to *learning to be/become*. These proposed concepts were contrasted with common Second Life (SL) pedagogies and dynamically operationalized with regard to SL features. Using existing practices in SL as examples, Zheng and Newgarden (2012) advanced the underlying assumption to EDD approaches that theory and practice are co-defining. Specific examples from EDD models and research are discussed below.

Reporting on a descriptive multimodal analysis of adult learners of Chinese as an L2 in a designed Chinese environment in SL, Zheng (2012) created the eco-dialogical framework (Fig. 1). The framework built upon Linell’s (2009) dialogical diamond-shaped model of semiotic activity, which extends C.S. Peirce’s triadic model to include “the silent we,” i.e., the shared historical and sociocultural understandings that shape and are shaped by communicative interactions. Zheng integrated the diamond with an outer model representing the main concepts from ecological psychology (Gibson 1979; Reed 1996; Hodges 2007a, b, 2009), i.e., cognition as ongoing perceiving and acting to realize values by an agent in relations with an environment.

Zheng (2012) also further developed Hodges’ (2007a) notion of language as a caring, values-realizing system, and using CP (Linell 2009) as a unit of analysis, described how multiscale dynamics of perception, action, and caring systems (Hodges 2007a, 2009) contributed to the skillful, rule-conforming languageing and identity development. This was the first empirical research taking an EDD

Fig. 1 The eco-dialogical model (Zheng 2012)



perspective that considered the holistic union of avatar action, verbal action, material artifacts, and sociocultural norms.

In related research, Zheng et al. (2012) used a recorded WoW gameplay episode from a semester-long course as data for a multimodal analysis of players' coordinated language and avatar actions. The authors utilized Transana (Woods and Fassnacht 2012) transcription and analysis software to generate visualizations of communicative activities using CP as the unit of analysis. Key actions captured by audio and video recordings were transcribed and coded with an abductive technique. Abductive coding follows the reasoning of abduction (Peirce 1982; Magnani 2004, 2006) such that coding begins with the visible results of the actions that are captured in transcription of both verbal utterances and avatar actions and movements. The transcript was parsed into CPs, which were each keyword coded. Keywords were not predefined but emerged from following the theoretical framework and observable communicative activities. Several ecological concepts, e.g., values realizing, languaging, and skilled linguistic action were introduced and applied in an effort to uncover WoW's affordances for situated, embodied, distributed L2 learning. Voice-enabled group play of WoW was found to provide a patterned periodicity of a range of communicative activities (e.g., coordinating, negotiating meaning, seeking help, expressing need, locating, apologizing) that developed as players coordinated prototypical WoW activities such as questing, traveling, and doing business in a city. Zheng et al. (2012) also found that players realized multiple values through joint communicative projects that were oriented to game culture, game goals and rules.

The studies described above (Zheng and Newgarden 2012; Zheng 2012; Zheng et al. 2012) helped to shape a trans-disciplinary, theoretically holistic, and ecologically valid research agenda. This research facilitated efforts to design 3D gamelike

spaces that support languaging and challenge educational models that were based on “learning about” to cater instead to learners’ problem-solving potential and agency. In van Lier’s terms, Zheng and her colleagues employed *prolepsis* in recognizing that learners’ prior L1 language and cultural background are critical and foundational resources for their future actions. This research also contributed to qualitatively understanding how L2 learners as players take advantages of what is offered in virtual spaces.

Building on the studies reviewed above, the next research project was the first attempt to test the eco-dialogical model using quantitative measures (Newgarden et al. 2015). The purpose was to look at the relationships between the eco-dialogical and distributed concepts of values realizing, languaging modality (verbalizing and/or acting via an avatar), and *skilled linguistic action*. Zheng and Newgarden, sometimes with colleagues and guidance from DL theorists, have collaboratively been developing an EDD view of L2 learning with a main goal of supporting L2 learners’ engagement in skilled linguistic action, which involves learners and practitioners “managing activity under material and cultural constraints. As they [L2 learners] do so, they link linguistic patterns (including ones shown in grammars and dictionaries) with affect, artifacts and social skills” (Cowley 2012, p. 13).

To illustrate the relationship between skilled linguistic action and values realizing manifested in a WoW gameplay episode, Newgarden et al. (2015) presented a quantitative study of three adult English L2 learners and their ESL teacher. Employing quantified categorical data from multimodal text transcription of voice and video recordings and multinomial logistic regression, the authors developed a statistical model for predicting the probability that players’ joint communicative projects, which they enacted as they coordinated in virtual world activities, would reflect wayfinding (getting information that helped them move forward in a positive direction), orienting to *we* (attuning to a shared socioculture such as WoW or the L2), or both of these values-realizing activities. The units of analysis were communicative projects (CPs) (N = 133 from a 47 min gameplay episode) which, as discussed above, are defined as a situated interaction involving implicit or overt coercion between two or more parties (Linell 2009). The use of CPs was important because each is a dialogically and ecologically accomplished project by at least two players, so the raw data was not individually based utterances or turns of talk, but co-established CPs. This treatment represents a move away from an individual-based unit of cognition to dialogically based co-established projects. In addition, by quantifying multimodal text data, the authors were able to test an updated theory of values-realizing based on Hodges’ ecological account and Linell’s (2009) dialogical orientation. The authors reported a reciprocal development between skilled linguistic action, multimodal languaging (when verbalizing and avatar actions were aligned), and values realizing. This development was attributed to agency that was distributed in the open-ended game environment by players’ common ground alignment (deploying language to orient jointly to objects or linguistic features in the game) and prospective coordination (inviting others to move forward together with a task). Multimodal languaging was found to predict communicative projects that realized both wayfinding and orienting to a common socioculture. The

authors suggested this was evidence that multimodal languaging enriched the experience of conversing for these L2 learners (Newgarden et al. 2015).

Drawing on ecological and dialogical perspectives on language and cognition, Zheng et al. (2015) showed how vocabulary learning took place in three distinct situated co-questing examples. Using Zheng's (2012) eco-dialogical model, they illustrated language learning as appropriation of resources and as the result of eco-dialogical embodiment. Through iterative multimodal analysis, vocabulary learning became salient in both chat and avatar action data. To respond to a special issue theme of "Embodied Cognition and Language Learning in Virtual Environments," the authors treated embodiment as coaction between player–avatar and player–player relations (Zheng and Newgarden 2012), as situative embodiment in a perceptually and narratively rich context (Barab and Herring, 2007), and as a dialogical achievement (Zheng 2012; Zheng et al. 2012).

Reflecting upon the findings of research undertaken over the past decade, we now know more about L2 learners' actions and interactivity in online games (and their gamelike play in virtual environments) and the ways in which learning and knowing are shaped. L2 learners are equipped with opportunities for a broad range of communicative activities and agentive use of second-order language in problem solving and coordination of gameplay. These empirical studies demonstrate the power and potential of online gaming environments, particularly World of Warcraft and similar multiplayer games, to augment, support, and in some cases, substitute for L2 learning in other "real world" contexts.

Recent Work

Recent work in progress in the EDD framework has expanded in the breadth and depth of investigations underway. In a study that was part of Newgarden's multiple manuscript dissertation completed in 2015, Newgarden and Zheng (2016) compared three WoW gameplay episodes spanning a semester-long college course. By coordinating recurrent prototypical WoW gameplay activities (questing, planning next moves, traveling, learning a skill, etc.), which afforded multiple iterations of pragmatic communicative activities, players learned to take more sophisticated skilled linguistic action, requiring higher-level cognitive and linguistic skills. For example, a recurrent languaging activity that became more salient was planning next moves, which required knowledge of the WoW environment, knowledge of one's skills and importantly, predicational language. In addition, frequent activities were mapped to Common European Framework of Reference (CEFR) speaking proficiency descriptors. Since CEFR descriptors often serve as the basis of L2 curricula, there was evidence that informal gameplay engages players in the varieties of communicative interactions that formal instruction seeks to facilitate.

In a second portion of her dissertation study that used the same WoW gameplay episodes of a single group of players, Newgarden (2015) adopted Steffensen's (2012) dialogical system framework, finding that the group's gameplay became more coordinated over the timeframe of a 15-week game-centered course as players

became more efficient at planning moves and completing more challenging quests. As they probed the affordances of dialogical arrays (Hodges 2009), players' co-agency and coactions meshed as a distributed cognitive system which balanced the values of facilitating gameplay, making meaning, taking care of others and having fun. Newgarden applied the linguistic style match metric (Gonzales et al. 2010) to test whether players' spoken language within and across gameplay episodes became more aligned as they coordinated gameplay activities. Linguistic alignment was found to be higher in episodes of play in which interactions were more smoothly coordinated. This finding lends support to Fusaroli and Tylen's (2012) argument that a dynamical framework can be applied in understanding how in situations of social coordination, global linguistic patterns emerge and stabilize through a process of local reciprocal linguistic alignment. This study also describes how designed features of a game-centered course, including guided discussion and comparative reflection on WoW culture and social values, opened affordances for conversational ease, development of a class community, sociocultural and intercultural attunement, and for L2 learners in particular, participation in multiple L2 communities of practice.

The following two studies stemmed from multimodal data of English learners from China and US learners of Chinese in co-building activities in the open-ended China World within the Atlantis Remixed (ARX) multiuser virtual environment. Zheng et al. (2017) addressed the confluence of design in relation to space-time, sociocultural places, activity, and virtual artifacts in a multiuser 3D virtual learning environment (3D VLE). The authors designed open-ended problem-solving spaces that encouraged meaning-making in situ, manipulation of virtual objects, and coordination among players. By using a design-based research method, the authors investigated how learners of Chinese and English coordinated on a project in which they collaboratively decorated a virtual living room. The findings suggest that socioculturally bounded places afford unique learning opportunities. Firstly, learning occurred through *referencing*, which is the mutual clarification of a virtual object's meaning, position, and function, in relatively stabilized places, such as a museum, and secondly, learning occurred through coordination between verbal instruction and object manipulation in more adaptive places, which the authors call eco-dialogical learning. The authors also found a strong relationship between translanguaging and object manipulation. The authors conclude the paper from the perspective of how the eco-dialogical model resulted in designs that promoted cognition and interactivity.

In other recent research, Zheng and Cowley (in preparation) used cognitive event analysis (Steffensen 2012) to trace pivotal moments and actions within a broader context and flow of activity in a single episode of a co-building session in Atlantis Remixed, analyzing the rise and use of opportunities for learning, as players coordinated to construe situations, identify problems, and probe for solutions. The study's new contribution to the EDD perspective was the concept of manipulative abduction. Similar to the aforementioned abductive technique for data coding, manipulative abduction gives rise to the manipulation of objects, in that tinkering, such as moving objects and avatar, or changing between first person and third person perspectives, can provide insightful thinking for problems that are not solvable

through verbal information only. This manipulation, if simultaneously coupled with verbal exchange and mixed language use, is called eco-dialogical translanguaging from EDD viewpoints (Zheng et al. 2017).

Attributing action potentials to the open-endedness of activity design and virtual environment technologies, the authors found that learners act as caretakers who draw on manipulative abduction and are “pushed” to make sense of events by way of translanguaging. Learning occurs as players create affordances, coact, and think creatively. This study also offers an explanation of how learners make sense of an activity, illustrating action-based learning in finer detail, with the implication that L2TL should focus on helping learners develop the ability to engage in skilled linguistic actions.

Problems and Difficulties

There are multiple obstacles preventing wider adoption of EDD research methods in exploring L2TL with online games and virtual environments. The utmost challenge is that many CALL studies follow classical SLA approaches, which are dominated by individual-centered views of cognition. CALL game studies have made progress in expanding the theoretical scope to consider social factors. However, many of these studies follow a deductive approach to inquiry in which finding a result is the end goal, or an inductive approach in which finding a pattern satisfies the curiosity prompted by the initial research question. For example, in information-processing approaches, participation in certain games and virtual environments led to gains in the size of a learners’ vocabulary (Rankin et al. 2008).

The dominant methods of deduction and induction divide the field of second language studies into those who discuss SLA and those who discuss second language use using either psycholinguistic or sociolinguistic explanations that locate language either in the brain or in a social domain. However, both approaches fall short of providing a means to reach a full understanding of an L2 learner’s participation in a social environment. The divisions in SLA between cognitive and social approaches, which itself is an arguably problematic distinction, forms an arena that may benefit from EDD methods and theoretical frames.

A second major obstacle for EDD research is the phenomenon that Linell (2005) called “written language bias” and Harris (1981) called the “language myth,” both of which continue to inform much L2LT research. The EDD view is that language is not a code, but a human coordination system allowing language to flow and function between people. A third obstacle is a lack of methodological advancement and diversity. The new affordance layouts of 3D virtual spaces are quite different from text-based or face-to-face interaction. 3D virtual spaces allow for person-to-person interactions with and within a multimodal text (Baldry and Thibault 2006). The complexity of virtual world technologies brings forth the need for new constructs and research questions, which call for new methods of investigations.

A fourth major obstacle lies in “technology.” The fact that CALL follows mainstream research is a rather controversial issue. Technology, in and of itself,

has historically been a leading force in changing human communication and interaction behaviors, and hence, following the point above, new or adaptive investigative methods are needed. A final obstacle to the adoption of online games and virtual worlds as language learning environments is an ethical one. Language learners have a variety of linguistic and cultural resources at their disposal, some of which emerge from engagement in online environments that have yet to be widely accepted as appropriate or valuable in instructed language learning settings.

Future Directions

In the era of prevalent technology and multilingual diversity, the field of language studies should respect L2 learners as whole beings with unique autobiographies, cultural identities, and cognitive idiosyncrasies. Western science, dominated by the Cartesian tradition of deductive reasoning, has been brought to task by those who were unsatisfied with the linearity and nonapplicable results of controlled research. From an EDD perspective, cognition depends on sense-saturated interactions (Steffensen 2012) inclusive of brain and body and distribution between bodies, challenging the mainstream view that takes the brain as the only organ of the mind. However, brain-based theories fail to explain the full educational benefits of gameplay and related (metagame) activities in game communities.

Theoretical advancement should be part of the CALL research agenda. There is a shared sentiment among leaders in CALL (Lafford 2009; Garrett 2009; Bax 2003; Thorne 2016; Thorne and Payne 2005; Zheng and Newgarden 2012) that an indicator of progress for the field will be when CALL is no longer considered a separate subfield, and instead, the suggestion is that technologies become a normalized part of the everyday practices of L2TL. Future research with the intention of advancing theory may focus on place-based learning, where learners can deploy both virtual and real-world resources, and researchers are currently exploring how cognition and communication are arrayed in these hybrid environments.

In a review article, Cowley and Zheng (2011) made a contribution to Linell's (2009) theory of dialogism by superimposing the philosophy of *Daoism* on the dynamic nature of language on the one hand and code-like representations of language on the other hand. The authors had no interest in taking sides or debating the value of competing theories of language as cognitive or social, but, rather, viewed the world as constantly unfolding from *yin* to *yang* and enfolding *yang* to *yin*, constituting the opposite characteristics of duality, e.g., cold-hot, water-mountain, moon-sun. Each characteristic gives rise to the other and both interact to achieve the greater whole of Dao. We foresee that future work will include more diverse perspectives in CALL game studies, especially those from non-Western perspectives.

The EDD analytical frameworks reviewed here seek to build on techniques such as multimodal text analysis (Baldry and Thibault 2006), use of a dialogical unit of analysis such as communicative projects (Linell 2009), and application of the logic of abductive reasoning (Magnani 2004, 2006). We raised new research questions

that challenge existing research models. This eclectic methodology can be applied to new research agendas, e.g., (1) to investigate the affordances of technologies that support embodiment in new ways, i.e., emerging virtual reality technologies and integration of touchable, moveable, and even olfactory features in games; (2) to look at processes of linguistic entrainment, coordination, and resonance (Hutchins 2000) in investigating L2 learning as a distributed process; and (3) to explore how L2 learners contribute to functional, successful dialogical systems in the play of games and virtual environments. Finally, EDD presents an ethical call to researchers and educators to reconsider their subjects, participants, or students as human beings living in socio-technologically entrenched worlds.

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Cross-References

- ▶ [Complexity Approaches to Computer-Assisted Language Learning](#)
- ▶ [Digital Games and Second Language Learning](#)
- ▶ [Educationally Designed Game Environments and Feedback](#)
- ▶ [Virtual Worlds and Language Education](#)

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Educationally Designed Game Environments and Feedback

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Abstract

This chapter addresses the potential of educationally designed game environments and in particular that of game-generated feedback for encouraging, through purposeful instructional design, learners' engagement in the process of developing skills in a second or foreign language (L2). By reviewing the existing research literature, it fleshes out the idea that gameful feedback may be a powerful design element for engendering participant engagement in instructed L2 learning. We define "engagement in game-based CALL" as learner behavior that is typified by the following characteristics: (1) it is driven by intrinsic motivation; (2) it is focused primarily on language meaning and communicative use; and (3) it involves attention to linguistic form. The chapter reviews pioneer studies on gameful engagement in CALL, describes recent research that addresses the role of feedback in relation to designed engagement in CALL, and examines trends in work in progress such as gamification, as well as problems in current research. We conclude with challenges and directions for future research.

Keywords

Feedback • Online games • Mini-games • Engagement • Motivation • Computer-assisted language learning (CALL)

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Introduction

Today, digital games keep a significant and increasingly diverse audience playfully engaged in activities that often involve interaction with and through language (e.g., Sykes et al. 2008). In recent years, applied linguists have documented language-mediated play in online, *off-the-shelf* games (i.e., games not designed for educational purposes) such as massively multiplayer online roleplaying games (MMORPGs) and other popular genres. Descriptive, predominantly qualitative studies have shown how such play induces language users and learners to meaningfully attend to and appropriate complex game texts in written interaction (e.g., Thorne et al. 2012) as well as in spoken interaction (e.g., Piirainen-Marsh and Tainio 2009), how play incentivizes the construction of scientific discourse (Steinkuehler and Duncan 2008), and how it engages second language (L2) learners in high-stakes communicative activity with other players, often in plurilingual settings (e.g., Thorne 2008; Zheng et al. 2012). Next to these descriptive studies, correlational empirical research shows that frequent gaming in an L2 is associated with (though not a proven catalyst for) L2 proficiency (Kuppens 2010; Sylvén and Sundqvist 2012). Thus, evidence is accumulating which suggests that engagement in an L2 in entertainment-focused, uninstructed digital game environments is a useful and potentially quite powerful avenue for naturalistic L2 development.

For language educators, a critical question is how the mechanics of digital games can be harnessed for inciting learner engagement in instructed L2 learning environments, particularly in institutionalized settings such as L2 classrooms, with a view to increasing the effectiveness of games for L2 learning. This question is in line with a rich tradition of research on instructional design in the field of Computer-Assisted Language Learning (CALL), which concentrates on “constructing environments purposefully such that learning does not occur by accident, but through an understanding of the key factors or variables that impact upon it” (Levy et al. 2015, pp. 3–4). Similarly, design-oriented studies on game-based L2 learning (Holden and Sykes 2011) focus on the purposeful and meticulous engineering and evaluation of playful spaces and conditions that are conducive to effective and efficient L2 learning. Inextricably bound to the effectiveness of game-based L2 environments is the question of how engagement can be heightened and/or sustained by careful instructional design.

This chapter addresses the potential of educationally designed game environments and in particular that of game-generated feedback for encouraging, through purposeful instructional design, learners' engagement in the process of developing skills in a second or foreign language (L2). The existing research literature fleshes out the idea that gameful feedback may be a powerful design element for engendering participant engagement in instructed L2 learning. We define "engagement in game-based CALL" as learner behavior that is typified by the following characteristics: (1) it is driven by intrinsic motivation in the broader game activity; (2) it is focused primarily on language meaning and communicative use; and (3) it involves attention to linguistic form. In the next section, we review pioneer studies on gameful engagement in CALL. Subsequently, we discuss more recent research that specifically addresses the role of feedback in relation to designed engagement in CALL. Next, we examine trends in work in progress as well as problems in current research. We conclude with challenges and directions for future research.

Early Developments

Over the past decade – especially due to the emergence of massively multiplayer online games – digital game-based language learning has received increasing interest in the CALL literature (e.g., Cornillie et al. 2012b; Peterson 2010; Reinhardt and Sykes 2014). In fact, the design of games for instructed language learning goes back to the early history of CALL. In 1987, for example, Phillips noted that the great majority of CALL programs developed at that time were designed according to a paradigm which he termed "the games model" (1987, pp. 276–280). According to Phillips, such CALL programs distinguish themselves from other language learning activities in that they are:

1. Intrinsically motivating or self-justifying (i.e., worth playing for their own sake, rather than for some external reason)
2. Involve some aspect of competition (leading to win or failure states)
3. Driven by a system of rules that constitutes the activity as a particular type of game and that regulates (i.e., reinforces and penalizes) the possible interactions

Early developments of game-based CALL programs include text adventure games such as the British Council's *London Adventure* (Phillips 1986), mini-games for discrete practice of vocabulary and letter recognition skills, such as *Hangman* (Stevens 1991), interactive participatory dramas like *Traci Talk* and *Who is Oscar Lake?* (Hubbard 2002), and text-based, scripted multi-user environments known as MUDs and MOOs (Multi-User Dungeon and MUD Object-Oriented, respectively), the predecessors of 3D virtual multi-user environments like *Second Life* (see Peterson 2010; Thorne 2000).

It is worth noting that in these early days of CALL games design, there was little empirical research that evaluated the usefulness of particular elements of gameful design, such as feedback, time pressure, or between-learner competition, in terms of

language learning processes, outcomes, or levels of learner engagement. In relation to the research on interactive participatory dramas, Phil Hubbard, a pioneering theorist, researcher, and practitioner in CALL, noted that the majority of studies from the mid-1980s until 2002 aimed at “demonstrating the validity of the general approach rather than specific elements of implementation” (Hubbard 2002, p. 211). Recent reviews of game-based CALL (Cornillie et al. 2012b; Peterson 2010) indicate that this claim may be extended beyond interactive participatory dramas to the majority of research on digital games for language learning. As a consequence of the lack of empirical (in particular experimental) studies on design elements of games, researchers and instructional designers today have a limited number of empirically based insights, guidelines, and principles specifically related to gaming environments that may inform the engineering of engaging spaces for language learning, instruction, and practice. Notable exceptions to this gap in the early empirical research on gameful engagement in CALL are three studies that focus on, respectively, learner control (Stevens 1984a, b), the negotiability of outcomes (Young 1988), and incidental vocabulary learning (Cheung and Harrison 1992). These three studies are worth examining more closely for insights they may offer for the design of game-mediated L2 learning spaces.

In an experimental study, Stevens (1984a, b) investigated the impact of learner control on learners’ engagement and on their learning of English verb complements (gerund vs. infinitive) in a CALL program designed for explicit language practice. One version of the system comprised game paddles, by which learners could vary the order of presentation of the practice materials, whereas the other version lacked this playful interface mechanic and in which the order of the materials was fixed. Thus, the version in which learners could control the presentation of the materials borrowed aspects of the design of “games and autotelic environments [i.e.] activities which contain their own goals and sources of motivation” (Stevens 1984a, p. 30), where the lack of game paddles was thought to resemble the delivery mode of more typical computer-based instruction and practice. In an experiment with 24 learners in which 35 min were spent on practice, this study found that control was beneficial: although no statistically significant differences were observed between the groups in terms of knowledge development (perhaps due to the short treatment period), the learners that had used the paddles were found to be engaged in more meaning-focused processing of the practice materials than the learners that had practiced the materials in a fixed order. In addition to eliciting more meaning-focused engagement, the paddles also instilled more favorable attitudes toward the practice tasks (Stevens 1984b). Although this was a small-scale study, its findings are noteworthy, as they are in keeping with a motivational model of video game engagement based on self-determination theory (Ryan et al. 2006), in which the player’s perception of control (autonomy) is a key factor.

Young (1988) examined the effects of the negotiability of outcomes in CALL materials. The starting point of this project was the observation that in computerized drill and practice, the outcomes of pedagogical activities are fixed (i.e., pre-determined by the computer), whereas role-plays, simulations, and games allow participants to negotiate the outcomes of the activities. Building on Wells’ (1981)

interactionist perspective on SLA, the study hypothesized that activities which involved a more open-ended, negotiable outcomes design would yield L2 discourse more relevant for L2 development. It compared the discourse of two classes of English L2 learners in, on the one hand, drill-and-practice activities and, on the other hand, the computer games *Fast Food* and *London Adventure* (both developed by the British Council). Analyses of the transcripts showed that the discourse spawned by engagement with the games involved less reading aloud, was more creative, and resembled the complexity of routine informal conversation.

A third empirical study relevant to the issue of gameful engagement in CALL is Cheung and Harrison's (1992) examination of incidental vocabulary learning in the entertainment-focused text adventure game *Colossal Adventure*. After playing the game in pairs for eight separate hours over a period of 2 weeks, 84 learners of English as an L2 filled out posttests designed to measure gains in knowledge of vocabulary included in the game. Analyses indicated that the students improved significantly on "program-specific" lexical items (i.e., words highly relevant to the game's narrative), but not on prepositions of place and conditionals, although the latter were frequent in the game text. In interpreting these results, the researchers surmised that "perhaps mastery of the definitions of lexical items, including program-specific lexical items, was a crucial vehicle for progressing in the game, while knowing prepositions and conditionals was not" (Cheung and Harrison 1992, p. 169). Thus, engagement with these particular lexical items, induced by the game quests, may have contributed to the specific learning outcomes that were documented.

From these early studies on gameful engagement in CALL, three lessons can be drawn for the design of instructed game-based language learning spaces. First, learner control enabled by playful interface mechanics may lead to more meaningful engagement with the L2 and more favorable attitudes to CALL. Second, open-ended, negotiable game outcomes may inspire more communicative engagement with the L2. And thirdly, instructional designers need to consider the relation of words that are to be taught with their function in a game's narrative, as learners may be more engaged with vocabulary that is central to a game's narrative, and as a result will acquire such words more rapidly. Thus, ludic engagement in the L2 may support effective instructed L2 learning. To our knowledge, however, it is not until recently that L2 engagement has been examined in relation to the type of feedback provided in the learning environment. This is the subject of the next section.

Major Contributions

This section provides the rationale for focusing on feedback in the design of instructed game-based L2 environments with a view to supporting learners' *engagement* in the learning process, defined as intrinsically motivated behavior in an L2 that primarily involves meaningful and communicative L2 use but also attention to linguistic form. We first formulate design considerations and then review descriptive research contributions to game-based CALL.

Design Considerations and Descriptive Research

In their influential paper on the design of digital games for L2 learning and teaching, Purushotma et al. (2009) argue that feedback should be a primary locus of attention. They start from the observation that in well-designed off-the-shelf games, players are typically stimulated to fail rather than to find “correct answers.” They further claim that spending thought on the design of such *failure states* in educational L2 games creates opportunities for providing developmentally useful as well as playful feedback that can support both learning and enjoyment.

In line with this paper, we argue that, as a design mechanic, feedback merits special attention for three reasons. First, it is an indispensable feature of game design that is hypothesized to support both players’ cognitive development and their motivation or engagement (Becker 2007). Secondly, numerous studies have shown that feedback can be developmentally useful, both in educational research (Hattie and Timperley 2007) and in a wide range of research on L2 learning that focuses specifically on corrective feedback (for reviews, see Li 2010; Lyster and Saito 2010; Mackey and Goo 2007). Thirdly, in educational games for L2 learning – as in other designed L2 learning environments that involve human-computer interaction and are known as *tutorial CALL* (e.g., Heift and Schulze 2015) – feedback can be provided much more systematically than is possible in classroom environments. This is promising for its effectiveness, as meta-analyses on L2 acquisition research have revealed significantly larger effect sizes for corrective feedback in more controlled environments (Li 2010; Mackey and Goo 2007), of which human-computer interaction is an exemplary case.

In L2 pedagogy, we often enter into lively debates on how corrective feedback should be given to learners, particularly because teachers have a plethora of feedback options available. One popular technique is known as *recasting* and involves the (relatively implicit) reformulation of a learner’s sentence that is ungrammatical or otherwise deviant from the conventions of a target language. Recasting is frequent in naturalistic (largely implicit) language learning, for instance, when parents correct children’s speech as well as in communicative interaction in the L2 classroom. In these situations, language teachers often prefer recasts to more explicit feedback interventions, as they disrupt the communicative flow to a minimal extent and potentially correlate with less frustration on the part of learners.

As a result of the predominance of recasting in communicative language learning situations, designers of instructed gameful L2 environments that aim to primarily engage learners in meaningful or communicative L2 use may be inclined to implement implicit corrective feedback strategies such as recasts, mimicking how feedback is typically given in naturalistic language learning environments. However, this tendency resembles what Larsen-Freeman has called *the reflex fallacy*, i.e., “the assumption that it is our job to re-create in our classrooms the natural conditions of acquisition present in the external environment” (2003, p. 20). While this design approach may protect gameful flow, the resulting problem is that the feedback may pass unnoticed and that the opportunity to recruit language awareness in an otherwise meaning-focused context is lost.

In a study with a game designed for the instruction of Spanish L2 pragmatics, Sykes (2009) found little improvement in learners' use of pragmatic strategies on posttests. One explanation given for this lack of significant improvement was that perhaps "the branching mechanism used to interact with NPCs [non-player characters] may not have been sufficiently explicit for the learners to notice pragmatic differences [...]. Had they taken full advantage of the branching mechanism by experimenting with different pragmatic choices and receiving varied reactions from the NPCs, perhaps the results would have been different, indicating greater awareness and acquisition of the L2 pragmatic norms" (Sykes 2009, p. 220). As an implication for design, Sykes further suggested that the integration of different types of feedback, ranging from implicit to explicit, is crucial for the effectiveness of CALL games, because such feedback can help learners to notice differences between their interlanguage and the L2.

This research suggests that instead of engaging in the reflex fallacy, such as emulating the conditions of naturalistic (game-based) L2 learning in registers of the L2 that are more central in formal education, educators might want to re-appropriate game features so that their instructional designs can "accelerate the actual rate of acquisition beyond what students could achieve on their own ... helping our students learn faster than they would on their own may well call for explicit teaching and learning to complement the implicit learning that they naturally do" (Larsen-Freeman 2003, p. 20).

One of the key mechanics by which acceleration of L2 learning may occur in educationally designed gaming environments is explicit corrective feedback, potentially accompanied by metalinguistic explanations. Although SLA research is not entirely conclusive on the effectiveness of explicit feedback, current findings suggest that explicit feedback, possibly accompanied by metalinguistic explanation, is likely to facilitate L2 development more than implicit corrective feedback (e.g., Ellis et al. 2006; Lyster and Saito 2010). Instructional designers of ludic L2 spaces may thus want to utilize the power of explicit feedback to create conditions for effective learning. Providing explicit feedback – where necessary and if the learners are developmentally ready for it – during the course of otherwise meaning-focused play may well accelerate natural (implicit) L2 learning.

Thorne (2008) and Cornillie et al. (2012a) provide empirical evidence that learners are willing to and do attend to explicit corrective feedback in game-based L2 environments and are at the same time playfully and meaningfully engaged. In a descriptive study on the MMORPG *World of Warcraft*, Thorne (2008) noted opportunities for L2 use and learning in communicative exchanges between a North American native speaker of English and a Ukrainian native speaker of Russian. He observed naturalistic in-game episodes of explicit feedback and instruction focused on problematic instances of L2 production, provided by the respective native speakers. These episodes show that explicit feedback may occur naturally in uninstructed contexts of game-based L2 learning when players take an interest in each other's native language and need to resolve communicative issues in order to attain nonlinguistic, task-based outcomes (i.e., quest completion).

Cornillie et al. (2012a) took a different approach to the examination of corrective feedback in relation to ludic engagement and implemented different computer-generated feedback strategies in an educationally repurposed commercial role-playing game that takes place in the *Divinity* universe created by game developer Larian Studios. The feedback included more implicit comments given by non-player game characters (accompanied by character animations such as gestures and facial expressions) as well as correct responses and metalinguistic explanations on pragmatic issues in English as a L2. Analyses of interviews and questionnaires taken from 83 Dutch-speaking learners show that learners considered the feedback embedded in the game-mediated experience useful for learning as well as for realizing transfer to contexts outside of the game. Moreover, the explicit, meta-pragmatic explanations given immediately in the game dialogues were generally found more useful for learning than, and preferred to, more implicit and communicative instances of corrective feedback provided by the game characters. Lastly, learners' perceptions of the explicit feedback were found to correlate with parameters related to learners' gameful engagement as measured by the questionnaires, namely, "game experience" (defined as the degree to which learners were immersed in the experience, felt captivated by its vividness, and felt generally good as the result of playing) and perceived competence. While no such relation was found for implicit corrective feedback, learners commented in the interviews that the latter feedback type absorbed them in the virtual world represented in the game, showed them the impact of their actions, and that a combination of explicit and implicit corrective feedback seemed best to them. The researchers concluded that corrective feedback need not necessarily get in the way of gameful engagement and that future studies "should distinguish by and large between, on the one hand, corrective feedback (and its different subcomponents) aimed at increasing a learner's understanding and, on the other hand, more 'game-like' feedback elements that can contribute to intrinsic motivation, namely, positive feedback (designed to increase a learner's sense of competence) and situational feedback adapted to the game's theme (which can increase a sense of immersion)" (Cornillie et al. 2012a, p. 274).

There is thus evidence that learners engaged in a game designed specifically for L2 learning do not find explicit corrective feedback and instruction disturbing, useless, or not worthy of attention. The study also contributes to an empirical basis upon which to inform the design of playful feedback that is "both unabashfully explicit, yet humorous and playful enough to actually have a positive impact on the learner's experience when they 'make mistakes'" (Purushotma et al. 2009).

Experimental Research

Informed by the design considerations and descriptive research discussed in the previous section, two experimental studies have been carried out that aimed to examine whether properties of game-generated feedback could also impact upon game-based engagement with an L2. The first of these studies addressed the effects of gameful feedback on intrinsic motivation; the second investigated the extent to

which corrective feedback and focus on linguistic form provided in a meaning-focused mini-game aided L2 development.

Cornillie and Desmet (2013) followed the suggestion of Purushotma et al. (2009) to focus on the design of *failure states* in the development of instructed game-based CALL and zeroed in on the affordances of a game design mechanic known as *positive failure feedback* for supporting learners' intrinsic motivation in game-based L2 practice. Drawing on literature in game studies, they defined positive failure feedback as a design element that signals failure to learners but does so in a vivid and engaging way so as to give learners the idea that they are agentively involved in the game environment. In a within-subjects experiment, 32 learners of English as a L2 played three different versions of a mini-game intended for explicit practice of dative alternation: one version comprised a game fantasy, namely, that of a detective interrogating witnesses as well as vivid corrective feedback that consisted of animations and sound effects; the second version included "plain" corrective feedback (i.e., without these vivid characteristics); and the third version lacked both vividness and the game narrative. All learners filled out questionnaires that were aimed at gauging intrinsic motivation in game-based environments, based on a model of video game engagement developed by Ryan et al. (2006). A selection of learners participated in follow-up group interviews. The results are somewhat inconsistent. On the one hand, statistical analyses of the questionnaire results indicated that the game fantasy and vivid feedback had increased the participants' sense of immersion in the environment. Further, in the interviews, one learner confided that he had repeatedly tried to respond incorrectly because he was curious about the feedback that would follow. This is consistent with reports of players who actively seek out failure in off-the-shelf games and can, in instructed contexts, create opportunities for learning from failing deliberately. On the other hand, learners commented that the feedback animations and sound effects distracted from the learning content – some even to the point of frustration. The researchers concluded that cognitive load needs to be considered in the design of positive failure feedback.

In a follow-up experiment, Cornillie et al. (2015) utilized a redesigned version of the mini-games in order to examine the impact of practice with metalinguistic error explanation integrated into the feedback on L2 learning. The mini-games differed from those in the earlier study in two respects: first, less salient gameful feedback was implemented, and second, the games were embedded in meaning-focused reading of a mystery story in class. Acknowledging that mini-games designed for language learning – currently popular on mobile devices and elsewhere – may simply be revamped drill-and-practice activities that do little more than focus learners' attention on linguistic forms, the design hypothesis was that "by interweaving the form-focused mini-games with meaning-focused reading and discussion activities, learners would be engaged in form-meaning processing during practice, promoting transfer of practice to more complex follow-up activities" (Cornillie et al. 2015, p. 216). One hundred twenty-five Dutch-speaking learners of L2 English participated in the experiment, half of which were presented with metalinguistic information during computerized practice. Analyses of the data of various types of posttests of L2 knowledge demonstrated that learners were able to

transfer knowledge gained during practice to both immediate follow-up tests and tests completed 1 month after practice. The effects were stronger for learners who had received metalinguistic explanation as well as on tasks in which learners could rely on explicit L2 knowledge. Additionally, the effects were more durable for grammatical constructions that learners engaged with in more meaningful ways during practice and reading. This study suggests that form focus (through feedback) can accelerate implicit L2 learning when it is cleverly integrated with meaning focus in the design of game-based L2 practice tasks.

Work in Progress

The preceding discussion of research on feedback design vis-à-vis ludic engagement in a L2 reveals an emphasis on issues such as noticing, corrective feedback, and explicit and implicit L2 learning. As this research indicates, the majority of studies in this area are informed by a cognitivist second language acquisition (SLA) perspective. Fewer studies have tackled feedback design in instructed L2 environments from a motivational point of view, utilizing the mechanics of games with a view toward (re-)engaging learners that suffer from low motivation. An exemplary study that focuses on motivation was carried out by Stanley (2014). Inspired by the literature on *gamification*, which refers to the use of game design techniques and elements to enhance non-game contexts such as L2 instruction, this case study used a combination of feedback strategies borrowed from game design such as experience points, badges, levels, and leader boards in an attempt to encourage young learners' writing fluency and enjoyment in English as a L2. The gamified feedback system was implemented by means of an interactive whiteboard and an online behavior management system called *Class Dojo*. In-class observations and interviews with teachers showed that the intervention stimulated the pupils to write more extensive texts and that they displayed more enthusiasm for the writing tasks. The researcher did observe that the effects were not equally strong for all learners and that overall the effects waned after a couple of months, which may potentially be due to a novelty effect. This finding suggests that (predominantly) extrinsic reward systems are no panacea for learners who suffer from amotivation.

Problems and Difficulties

Research on feedback and learner engagement in instructed game-based CALL struggles with both conceptual and methodological issues. First, the constructs that researchers in this area work with, like "game," "game-based feedback," and "learner engagement," are complex and often fuzzily defined. How, for instance, are game-based L2 environments different from L2 environments that are not considered game-based? What is it that turns a playful language learning experience into a good language learning game? The challenge of clearly delineating the concept of "language learning game" was noted in the literature more than two

decades ago (for discussion, see Cornillie et al. 2012b), but the massive diversification of gaming genres, technologies, and player audiences in recent years has only made this challenge more complex.

On a more detailed level, the concept of game-based feedback also requires more thorough definition. Just as SLA researchers have managed to disentangle the different constituents of corrective feedback, thereby uncovering the oversimplification in the distinction between “implicit” and “explicit” feedback which was rather unproductive for the advancement of knowledge (Lyster and Saito 2010), researchers working on game-based CALL will need to “recognize that feedback in CALL games is a multidimensional construct, which needs to be taken apart in order to experimentally examine the effects of its constituents on learners’ perceptions, motivation and learning outcomes” (Cornillie et al. 2012a, p. 274).

Considering the lack of conceptual clarity of terms such as “feedback” or “engagement,” it is critical that researchers look at such complex and often elusive issues from the perspective of established theories, both in SLA and in related fields, while remaining sensitive to the specificities of gaming environments. In the field of SLA, candidate theories for investigating “engagement” include involvement load theory (Laufer and Hulstijn 2001) and the willingness to communicate model (e.g., Reinders and Wattana 2014). Outside of SLA, an intriguing model of game engagement is the needs satisfaction model (Ryan et al. 2006), based on the widely known motivation model of self-determination theory.

A methodological problem inherent in the research on design elements in game-based CALL concerns the generalizability of experimental research. Hitherto, experimental studies have often involved prototypes of games rather than games that have proven their merit in ecologically valid settings. To the benefit of the ecological validity of research on design elements in game-based L2 learning, one approach is to use games that are based on theory, pedagogy, and thorough empirical research and which have proven themselves by being adopted by target audiences and having passed the test of successful marketability. This would provide the best guarantees for the generalizability of research findings on game-based L2 learning.

A second methodological problem is that current studies have relied on self-report data such as interviews or questionnaires in order to examine engagement, which may be prone to memory bias or may simply be inaccurate – students, for instance, may respond overly positively to please the researcher. In contrast, behavioral data may yield a more accurate or even different picture of how design elements impact upon learner engagement. Behavioral data sources include the measurement of frequency of play over longer periods of time and in relatively uncontrolled settings or perhaps psychophysiological indices of engagement such as blood pressure, perspiration, and heart rate (e.g., Ravaja et al. 2006).

Future Directions

We expect that despite currently being hyped in the media, games are here to stay in the field of language teaching and learning and that language educators and innovators will continue to develop an ever diversifying range of gaming environments

designed to incite learner engagement in processes leading to the development of L2 skills. These environments may include mini-games such as *DuoLingo* for focused practice, place-based games such as *Mentira* (Holden and Sykes 2011) for situated language learning, text-only games for reading practice, and fully immersive games for niche markets such as *Tactical Iraqi* (discussed in Peterson 2010). For research and practice, it is crucial that the (instructional) design of games is assessed in the light of accepted theories of L2 learning and evidence based L2 pedagogy. Moreover, this assessment should be based on the collection of empirical data on learning processes and outcomes. This approach provides a strong foundation for the successful integration of games into the L2 classroom.

Cross-References

- ▶ [Dialogicality, Ecology, and Learning in Online Game Worlds](#)
- ▶ [Digital Games and Second Language Learning](#)
- ▶ [Virtual Worlds and Language Education](#)

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Virtual Worlds and Language Education

Randall Sadler

Abstract

This chapter examines the state and upcoming developments of virtual worlds (VWs) in the field of language education. Beginning with an overview of their historical development, the chapter will continue with a discussion of how VWs evolved from purely text-based environments to two-dimensional spaces, ending with the 3D interactive worlds that exist today. A selection of VWs will be examined for the applicability to language teaching and independent language learning, followed by a discussion of current challenges and difficulties in using VWs for these purposes. The chapter concludes with upcoming developments that will bring these environments into the realm of true virtual reality.

Keywords

Virtual worlds (VWs) • Language learning • Pedagogy • Virtual reality (VR) • MUD • MOO

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Introduction

This chapter examines the state and upcoming developments of virtual worlds (VWs) in the field of language education. Beginning with an overview of their historical development, the chapter will continue with a discussion of how VWs evolved from purely text-based environments to two-dimensional spaces, ending with the 3D interactive worlds that exist today. A selection of VWs will be examined for the applicability to language teaching and independent language learning, followed by a discussion of current challenges and difficulties in using VWs for these purposes. The chapter concludes with upcoming developments that will bring these environments into the realm of true virtual reality (VR).

Virtual worlds (VWs) are a type of online environment that have a number of applications for language teachers and learners. The idea of a *virtual* environment (VE) is not new. Indeed, online VEs have existed since the very early days of online networks in the form of online message boards and multiplayer online text-based games (see below). VWs, as described by Sadler (2012), share the following characteristics and may be understood as an evolution of these earlier varieties:

- *Online 3D environment.* This may simulate the real world or exist solely as a unique online space.
- *Avatars.* These are the *in-world* characters representing their players.
- *Real-time interactivity.* Users interact with other individuals, via their avatars, in real time in the VW and with objects in that environment.
- *24-h accessibility.* When a user leaves a VW space, it continues to exist rather than turning off.
- *Persistence.* When a user logs out of a VW, their avatar, and the actions taken by that avatar, are not deleted.
- *Social space.* VWs vary greatly in terms of themes and appearance, but they all exist primarily for social interaction. This is a key difference between VWs and massively multiplayer online role-playing games (MMORPGs).
- *Numbers.* Many VWs have thousands, and sometimes hundreds of thousands, of users online at the same time.
- *Customizable appearance.* Most VWs allow users to customize their avatars.

In the following sections, this chapter will examine the early stages and current major developments in the field, followed by both challenges and future directions in the use of VWs for language education.

Early Developments

Computer-based VEs as we know them today began in the 1970s with the development of text-based games such as Will Crowther's *Colossal Cave Adventure* (CCA) in 1975 and *Zork* (created by Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling) in 1977. Will Crowther was both an experienced caver in real life and also a

```
PAUSE INIT DONE statement executed
To resume execution, type go. Other input will terminate the job.
go
Execution resumes after PAUSE.
WELCOME TO ADVENTURE!! WOULD YOU LIKE INSTRUCTIONS?

y
SOMEWHERE NEARBY IS COLOSSAL CAVE, WHERE OTHERS HAVE FOUND
FORTUNES IN TREASURE AND GOLD, THOUGH IT IS RUMORED
THAT SOME WHO ENTER ARE NEVER SEEN AGAIN. MAGIC IS SAID
TO WORK IN THE CAVE. I WILL BE YOUR EYES AND HANDS. DIRECT
ME WITH COMMANDS OF 1 OR 2 WORDS.
(ERRORS, SUGGESTIONS, COMPLAINTS TO CROWTHER)
(IF STUCK TYPE HELP FOR SOME HINTS)

YOU ARE STANDING AT THE END OF A ROAD BEFORE A SMALL BRICK
BUILDING. AROUND YOU IS A FOREST. A SMALL
STREAM FLOWS OUT OF THE BUILDING AND DOWN A GULLY.
```

Fig. 1 Colossal cave adventure opening screen

devoted player of *Dungeons & Dragons*, a desktop role-playing game in which players take on the persona of characters with a Dungeon Master, creating the setting for the adventure and controlling the path of the game. Crowther's experience exploring cave systems like Mammoth Cave in the USA led him to design CCA, where the computer program essentially took on the role of the Dungeon Master. This game was later expanded greatly by others. As seen in Fig. 1, CCA was purely text-based and allowed for only very limited commands from the user. As anyone who has played these early games can attest, it was very common to receive replies of "Sorry, I don't understand that" from the game due to the limited vocabulary integrated into the program. However, while limited it is important to note that CCA is the ancestor of virtually all computer gaming as we understand it today. Had it not been for Crowther's work, massively multiplayer online role-playing games (MMORPGs) like *World of Warcraft* or VW like *Second Life* (SL) (see below) might not exist today.

A critical next step in the development of VW took place in the 1970s, just as computer networks began to spread and then expanded greatly in the 1980s with the continuing growth of ARPANET. This development allowed for programs to expand the interaction from user-to-computer, as seen in Zork and CCA, to user-to-user via computer networks. Perhaps the earliest forms of these VW that took place online – though these began before "online" as we understand it today existed – were in the form of *MUDs*, commonly referred to as either multi-user domains or multi-user dungeons. *MUDs* "typically combine text instant message chat rooms and role-playing games" via users interacting "with other players and their surroundings by typing text commands" (Childress and Braswell 2006, p. 188). In 1978, only two years after the creation of CCA, Roy Trubshaw from the University of Essex created

a program he called *MUD* or multi-user dungeon. Two years later, Essex University connected to the ARPANET, and *MUD* became the first multiplayer “online” role-play game (Mulligan and Patrovsky 2003), and this game may still be played today on the British-Legends website (<http://www.british-legends.com/CMS/>). While the interface for the game appears quite similar to that of *CCA*, *MUD* added a critical element in the evolution of *VWs*: other players inhabiting the same game space. This meant that users were able to communicate, interact, and of course battle and defeat other players in the game.

A next critical step in the evolution of virtual spaces was the development of *MOOs* (*MUDs*, Object-Oriented) by Stephen White in 1990. While *MOOs* are still text-based environments, they added the ability to include object-oriented programming. This meant that the owner/administrator of the *MOO*, referred to as the *Wizard*, could more easily make changes in the environment, including adding new rooms and objects and could also assign a “builder” role to any player desired. In the 1990s and through the first decade of next century, *MOOs* were very popular for educators, and a number schools and universities joined existing *MOOs* or created their own. While a Ph.D. student at the University of Arizona, the author of this chapter joined the *Old Pueblo MOO*. This gave me my own room in the *MOO* (later a suite of rooms) and the ability for me to add objects into that room. I used the space on the *MOO* to have online office hours with my students, with the room acting as a chat room, and also used my expanded suite to have students engage in *MOO*-based peer review sessions. Sadly, very few *MOOs* still remain, but one exception that may still be found online is *SchMOOze University* (<http://schmooze.hunter.cuny.edu/>).

As the Internet continued to develop in the 1980s, though still largely unknown by most of the world, online *VW* as we know them today began to emerge with the creation of *Habitat*, produced by Lucasfilm (of *Star Wars* fame) in 1986 (See Fig. 2).

This *VE* still used text-based communication but for the first time it also included a graphical interface that – although primitive by today’s standard – is familiar to anyone who uses a modern *VW* or *MMORPG*. *Habitat* players took on the form of avatars in the world and could interact with other individuals and avatars and could explore 20,000 different regions (Fig. 2 shows one region). The creators of *Habitat*, Chip Morningstar and F. Randall Farmer, found that the ability for users to interact was essential:

At the core of our vision is the idea that cyberspace is necessarily a multiple-participant environment. It seems to us that the things that are important to the inhabitants of such an environment are the capabilities available to them, the characteristics of the other people they encounter there, and the ways these various participants can affect each other (Morningstar and Farmer 2001, pp. 173–174)

While games had existed for some time prior to 1986 with users controlling characters in the game, *Habitat* was the first massively multiplayer online 3D virtual environment allowing player-to-player interaction via a modern graphical interface.



Fig. 2 Habitat graphical interface

Major Contributions and Works in Progress

Modern Virtual Worlds

As discussed in the introduction of this chapter, VWs as we understand them today share a number of key features. The majority of these elements are illustrated in Fig. 3, which is a screenshot from the VW *Habbo* (See Sadler (2012) for a more thorough overview of various VWs and their features). As shown in the image taken, in one of the lounges of the Habbo Hotel Spain (there are Habbo versions for a number of different countries), this is a 3D environment that users may explore through their avatars. Each Habbo Hotel includes a number of different *rooms* (e.g., lobby, clubs, gardens, kitchen, individual rooms, etc.), with the primary function being the provision of social spaces for interaction and play. Avatars may engage in text chat with any other avatars in the same room (other VWs like SL also allow for oral communication), and multiple avatars can engage in simultaneous chat. Each avatar is given their own room in the hotel when they create an account, and this room is accessible at any time. They may also access any room in the hotel that has not been designated as private by the owner. As seen in the image, the avatars in the hotel often look quite different from one another, thereby establishing their own



Fig. 3 Habbo lounge

persona in the VW. A VW provides a persona, a home, and opportunities for interaction – all important elements for students who may wish to practice language.

As shown in Fig. 4, as of 2014 Habbo had almost 300 million users worldwide, ranking it as one of the most popular VWs for users in the 13–15 age range. There are currently in excess of one billion VW users and hundreds of different VW environments for a wide variety of user interests and age ranges (data from KZero 2015). As shown in the figure, VWs appeal to a wide assortment of ages, though the vast majority of users are 25 and under. This makes it quite likely that students currently studying language at any level from kindergarten through college may already have VW experience. When one considers that the top three VWs in the 10–15 age range have over 900 million users and that Club Penguin alone (the most popular in the 8–10 year old range) has almost one-quarter billion users, it quickly becomes apparent that these environments may already be the norm for many K-12 students.

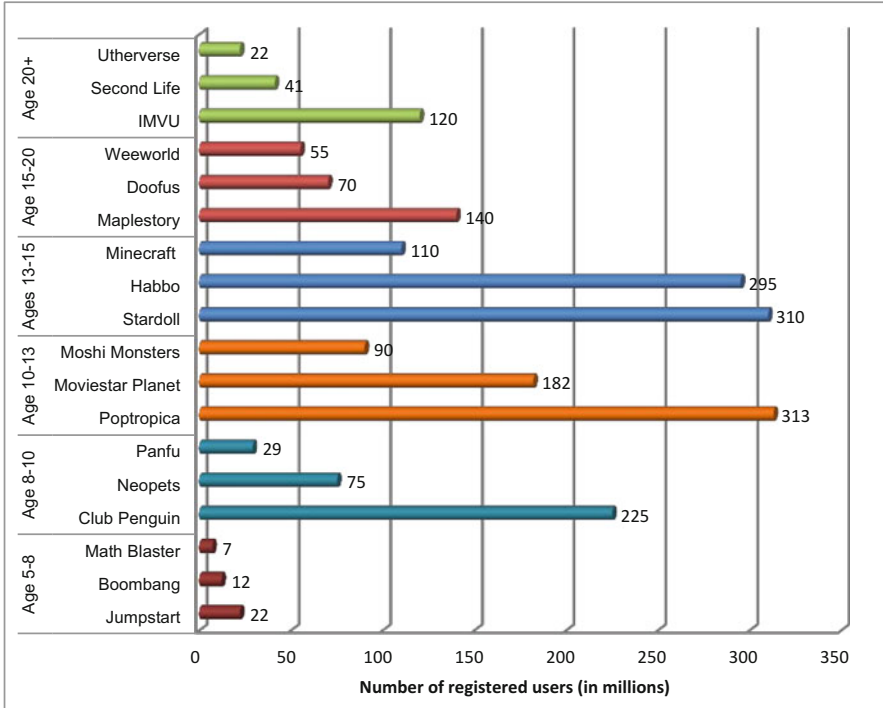


Fig. 4 Top virtual worlds by age (millions of users)

Theoretical Justification for VWs in Education

While a full examination of theoretical justification for the use of VWs in language teaching is beyond the purview of this entry, the work of three scholars – two of whom died long before the advent of VWs – may serve as an overview. John Dewey found fault with “. . .the ordinary schoolroom, its time-schedules, schemes of classification, of examination and promotion, and rules of order. . . (Dewey 1939, p. 2). He described *traditional classrooms* in much the same way that researchers still see them today, with the teacher being at the center and students gaining their knowledge largely from the teacher and textbooks. Dewey saw students in traditional classrooms as being largely passive, with knowledge trickling down from the teachers. He argued instead for a *progressive school* in which students learn by doing with the teacher’s role changing from “the position of external boss or dictator” to “that of leader of group activities” (p. 66). Dewey’s ideal was to get students out of the traditional classroom and into an environment that could instead provide them with expanded opportunities for interaction.

The work of Lev Vygotsky, and in particular *Mind in Society: The Development of Higher Mental Processes* (Vygotsky 1978), is very often cited in VW research.

Vygotsky's zone of proximal development (ZPD) is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky 1978, p. 86). Because Vygotsky argued that human learning was always social in nature, he maintained that there can be no significant learning without interaction. For both Dewey and Vygotsky, the role of play is also important. When children engage in play, this "teaches the child to guide her behavior not only by immediate perception of objects or by the situation immediately affecting her but also by the meaning of the situation" (p. 97). For learning language, play allows children to practice speech without specifically focusing on accuracy and historically established norms of usage.

David Kolb's *Experiential Learning* theory was influenced by both Dewey's earlier work and also by Jean Piaget's work on child development. Experiential learning, as proposed by Kolb (1984), is based on six key ideas:

- Learning is best conceived as a process, not in terms of outcomes.
- Learning is a continuous process grounded in experience.
- The process of learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world.
- Learning is a holistic process of adaptation to the world.
- Learning involves transactions between the person and the environment.
- Learning is the process of creating knowledge (pp. 26–38).

For Kolb, an integral part of the learning process is the importance of concrete experience because only by doing something can a learner then have the opportunity to reflect on those experiences. Learners must be active participants in the learning process rather than passive students sitting in a classroom. Following reflection on their experiences, a learner may begin to form generalizations, and then test those generalizations in new situations via new concrete experiences.

VWs can aid in both the development of Dewey's progressive school, Vygotsky's ZPD, and Kolb's experiential learning in several important ways. First, because they are primarily social in nature, student interactions in VWs are usually active and the role of the teacher as the "boss" is diminished. One of the most challenging aspects of the ZPD for language teachers is to find "more capable peers" with whom their students can practice language. VWs provide instant access to many millions of users around the world, including native speakers of almost any language that might be studied in schools. As discussed below, many individuals are already making use of VWs precisely to find more capable peers with whom to practice language.

Virtual Worlds Research

Although research into VW in their present 3D form is relatively new, with most of the published studies dating from 2000 to the present, it is also an area of very active

examination (see Sadler (2012) for a more thorough overview). The studies mentioned below illustrate three key findings that are consistent across VW research: lessening of anxiety, increases in collaboration, and a merging of reality and the virtual. Perhaps because the use of an avatar provides a user with something that functions like a mask in a masquerade party, researchers like Love et al. (2009) have found that learners may have reduced anxiety in a VW when learning a language because the use of an avatar helps them to “loosen. . . up a bit. . .” (p. 68). Wehner had similar results in her case study, finding that her two participants “felt more comfortable and confident using Spanish in Second Life when compared with other situations (e.g., classroom, travel, Facebook, or Skype)” (Wehner 2014, p. 146). An added explanation for this lowered anxiety may lie in the nature of VW communication. Since many VWs allow for both text and oral chat, some studies have found that students appreciate VWs because they may take time to formulate their ideas before communicating them in text chat (Childress and Braswell 2006).

Other researchers, such as Grant et al. (2013), have examined whether the technical challenges of a VW might actually result in higher anxiety. They examined students taking Introductory Chinese at an Australian University who engaged in lessons in a simulation of a Chinese town created for the study in SL. They found that not only did those students have a significantly lower level of foreign language anxiety compared to students studying in a real life classroom, but also “. . . that there was not a significant inherent level of technical related anxiety, nor did the technical aspects of interacting in the virtual environment present significant additional levels of technical anxiety” (p. 7). This finding was echoed by Mroz (2015) in her examination of students studying French in SL. Her participants found that “the quality and density of their social interactions had been enhanced by the decreased anxiety and self-awareness that the anonymity of their avatar afforded them” (p. 546).

The nature of social interactions in VWs requires some element of cooperation and collaboration amongst participants whether avatars are building something together, exploring a simulation (or “sim”) in a group, or engaging in role-play. Brown and Bell (2004) examined the VW *There* for a nine-month period and identified a number of features that were consistent in the environment. In addition to finding that chat was an integral part of the avatar experience, they also found that collaboration (and coordination) between avatars was a critical element and that *There* “supports a sense of activities being carried out together with others” (p. 357). This notion is echoed by Price and Rogers (2004), who found that these types of environments “can support more diverse forms of collaboration, between children and others” (p. 149). However, it is also important to note that the interaction as part of the language learning process in a VW may not only be advantageous, but also problematic. In their research, providing a direct comparison of the perceived effectiveness of face-to-face and VW instruction, Chen, Siau, and Nah’s students identified direct instruction (lecture) as less effective in VWs, but the identified interactive activities and instruction in VWs as being equally effective to similar activities in a traditional classroom (Chen et al. 2012). It is likely that the very nature of VWs encourages collaboration because this is one of the primary ways that new

users learn about the environment, how to do things there, and how to act. In keeping with Vygotsky's ZPD, this collaborative dynamic allows less experienced users to accomplish more than they would be able to do so alone. This idea was confirmed by Bystrom and Barfield (1999), who found that the participants in their VW educational research were able to complete tasks significantly better when working with a partner in comparison to working alone.

Another active research area is the merging of the VW with real life. As discussed above, a VW can lower the anxiety level of learners due to the ability of an avatar to provide a mask for the learner, but others have discussed the vital connection between the avatar and user and maintain that "the embodied 'self' via avatar is not the separation of real-world 'self'; instead, it is the link between the real 'self' mind/cognition and the virtual 'body' enabling immersion and learning" (Passfield-Neofitou et al. 2015, p. 723). In essence, the argument is that for the language learning process, the mind and the avatar become one. Grant et al. (2014) found that students studying Chinese in a VW setting appreciated the VW interactions in Chinese as they felt that they would more easily apply that language to real-life situations in the future. VWs may also be used to provide practice and/or experiences for students that might not otherwise be available. Roussou (2004) used a VW to expose participants to settings that simply no longer exist, such as the workshop of the Ancient Greek sculptor Phedias. Gu et al. (2009) took this focus on architecture one step further by creating an architectural studio in SL where students designed and built their own structures that were then judged.

One important question is whether individuals are actually making use of VWs to learn languages outside of research studies. Sadler (2012) surveyed 237 SL users and found that 78% of avatars surveyed used another language than their L1 when communicating in SL at least part of the time. Forty-eight percent of the participants maintained that using SL had "at least some positive effect" on their proficiency in a second languages, with approximately 27% responding that SL had helped to develop another language either "very much" or "some" (p. 94). The survey also found (see Fig. 5) that, amongst the 202 SL users who were using SL to improve their language skills, a wide variety of strategies were being utilized (see Fig. 5, below).

While Sadler's study examined strategies that individuals used to enhance their language learning, other research has shown that students engaged in VWs also engage in "incidental learning" even if they were not asked "to learn or remember anything" during their time in VW activities (Thomas 2013, p. 112).

Problems and Difficulties

As with any area of teaching practice, there are challenges related to teaching and learning in VW, particularly in the areas of technology and pedagogical practice. Two of the problems sometimes associated with the use of VWs relate to hardware issues and insufficient Internet bandwidth. Some VW programs such as SL have minimum recommendations for processors, RAM, and graphics cards. However,

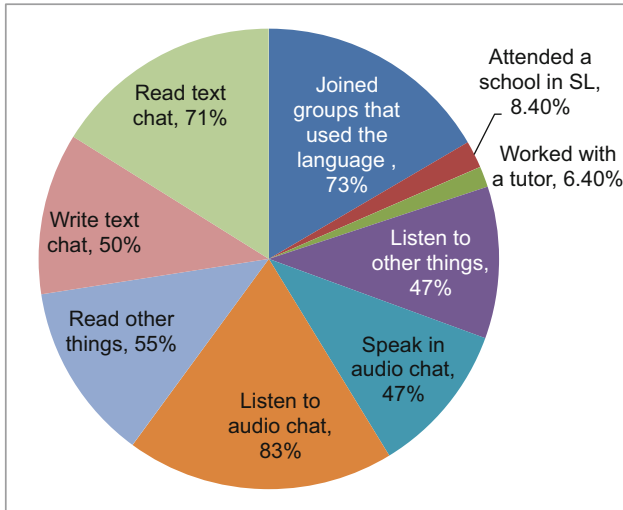


Fig. 5 Language learning methods in second life

these recommendations have actually decreased in scope over the last several years, with SL now recommending a minimum of 1GB of RAM – substantially less than the recommendations for Microsoft operating systems. The challenge of adequate Internet speeds can be a larger challenge depending on the choice of VW. Some VWs are graphically intensive and require a much larger rate of download and upload than others. For users with access to more advanced hardware and sufficient Internet speeds, VWs like SL or – when it is released – Project Sansar can offer a rich educational experience, including almost limitless customizability of the environment. However, for users with less advanced technology, there are other VWs, particularly those that are browser-based (e.g., Club Penguin, Habbo, etc.), that can still offer opportunities for language practice.

Another concern for teachers making use of VWs is the perception that there is a high learning curve in order to make best use of virtual settings. For example, users must practice how to move, go to new areas in a VW, use text or audio chat, share items, build things (in VWs that allow this), etc. However, even in advanced and highly customizable VWs, language practice activities may be designed that are integrated into this learning process so that groups of students form a learning community as they build their skills (language and VW-related) together. In addition, just as some VWs have lower technical requirements than others, the learning curve to enter and “live” in these worlds varies greatly in terms of complexity. Educators considering the use of a VW should explore a number of them to determine which one is the best fit for their educational purpose and audience.

A further concern with the use of VWs is the potential exposure of unwanted behavior to students in those environments. The threat of cyber predators and the possibility of exposing young users to bullying, inappropriate materials, or other unwanted behavior are certainly important. However, while these are all quite valid

issues, it is best to think of using a VW as taking a field trip to any one of the great cities in the world. Anyone who has been to New York, for example, can tell you that it can be a magnificent city for students and learning with great museums, theaters, restaurants, and sightseeing. However, there are also many areas in such a city where it would be very irresponsible to bring students. Once again, any educator seeking a VW to use with his students should do research on the environment ahead of time. In the case of young learners, restricted settings on a privately owned sim in a VW such as OpenSim can provide a very safe and secure environment, but that safety may come at the cost of creativity or access to a wider variety of resources.

Future Directions

Virtual worlds have now entered a stage where a shift is occurring towards *virtual reality* with the integration of VR headsets into a number of MMORPGs and VWs such as SL. The inclusion of these headsets is meant to shift the user perspective from looking at the screen to feeling that they are part of that scene. Wearing such a headset while interacting in SL (which now includes support for the Oculus Rift headset) would mean that a user would see anything their head is oriented to in that VW. Therefore, if a *user* turns her head and looks behind her in *real life*, her *avatar* will also turn her head in the *virtual environment* and see what is behind her in the VW. This type of technology provides a more fully immersive experience to learners, potentially allowing a language student to experience being in cities like Paris or Tokyo in a way that has never before been possible without actually being there.

Other VR headsets like the HTC Vive seek to take this experience even further by integrating a number of additional features, as seen in Fig. 6.

This VR package includes the traditional headset (center) but also four additional items: two handheld controllers (bottom) and two base station motion trackers. This combination of features is designed to allow VEs to track what a



Fig. 6 HTC Vive VR headset and equipment

user is doing in real life and translate it to an avatar. In other words, if a user points at a screen, the motion trackers will detect this motion and transfer that movement to the avatar in-world. At the time of this publication, no VWs were supporting Vive, but given that a rapidly increasing number of games are doing so, it is likely that this will happen in VWs as well. *Project Sansar*, a new VW environment currently being developed by Linden Labs, the creators of SL, has indicated that it will support Oculus Rift, HTC Vive, and potentially other VR headsets. While the depth of detail picked up by the HTC Vive is not yet clear, other systems such as the DepthSense cameras by SoftKinetic are designed to detect and track body movement as well as hand and even finger position and movement. As these systems become integrated into VW settings, this will allow learners to become fully integrated into the VR as they manipulate objects in-world via their real-life motions.

Cross-References

- ▶ [Dialogicality, Ecology, and Learning in Online Game Worlds](#)
- ▶ [Digital Games and Second Language Learning](#)
- ▶ [Educationally Designed Game Environments and Feedback](#)

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- In addition to these book, ReCALL, the Journal of the European Association for Computer Assisted Language Learning will have a special issue in 2018 on *Interactions for language learning in and around virtual worlds*.

Social Networking Sites and Language Education

Jonathon Reinhardt

Abstract

The use of social networking sites for second and foreign (L2) language learning and teaching has recently gained attention by practitioners and researchers of applied linguistics and L2 education. Informed by socially oriented theories of language learning and computer-assisted language learning (CALL) studies, researchers have examined L2 learning and its use in non-educational or vernacular sites like *Facebook*, L2 pedagogy using vernacular sites, and the use of commercial social networks designed specifically for language learning, like *livemocha*. Findings implicate the role of self-organized, autonomous learning processes, the development of socio-collaborative learning communities, and the challenges of balancing the learning benefits emergent from the user-driven agency of everyday use with the demands to meet formal curriculum-driven objectives. After a brief discussion of influences and definitions, this chapter examines, analyzes, and synthesizes selected research that illustrates these findings, concluding with problems and future directions.

Keywords

Computer-assisted language learning • Facebook • Social networking sites • Second language learning • Web 2.0

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Introduction

Since its inception, the Internet has facilitated the human behavior of social networking – engagement in social activity within a network defined by dyadic and group relationships. The activity we understand today as online social networking, typified by use of social networking sites and services (SNSs), like *Facebook* and *Twitter*, has diverse origins in proto-Internet technologies like Usenet and bulletin board systems, which supported asynchronous discussion and resource sharing, and graphical webpage software and hosts, which afforded the creation and hyperlinking of personal homepages. Early services like *America On Line* and *Compuserve* offered users a single interface for accessing newsgroups, sharing information, and interacting socially with other network users. Starting in the early 2000s, *Friendster*, *MySpace*, *LinkedIn*, and *Facebook* launched SNSs that allowed individuals to create profiles, to connect to profiles of other users they knew or wanted to know in real life, and to share content with them. Unlike that of previous technologies, the architecture of SNSs utilized Web 2.0 innovations like extensible markup language (XML) to facilitate user-driven production, evaluation, and resource sharing, stimulating new types of communicative, economic and learning activity. Over the last decade, with increasing accessibility to broadband and the rise of mobile technology, SNS use has become everyday linguistic and symbolic practice for billions around the world in scores of languages (*Facebook* supports over 70). The phenomenon has garnered increasing attention among applied linguists and second and foreign language (L2) learners and educators, who have sought to understand how this everyday activity might be leveraged for L2 teaching and learning (L2TL) purposes.

Early Developments, Influences, and Definitions

Delineating the object of study in a review of SNS research is challenging due to multifarious origins and nebulous distinctions among definitions of SNS, social media, Web 2.0, and computer-mediated communication (CMC). While others have taken broader interpretations (e.g., Lamy and Zourou 2013), the current review adheres as close as possible to Boyd and Ellison's (2007) definition of SNS as typified by user profile construction, connection traversing, and connection articulation and re-articulation – in *Facebook*, for example, this would involve updating, posting, or sharing on one's own profile, friending others and viewing their posts and profiles, and commenting on and liking others' posts. SNSs can be considered a type of social media, that is, any online media that involves the creation and/or sharing of

media content, for instance, through blogging (e.g., *Tumblr* or *Wordpress*), micro-blogging (*Twitter*), social gaming (*Farmville* or *Clash of Clans*), photo sharing (*Instagram*), reviewing (*Yelp* or *TripAdvisor*), or a host of other activities (see Solis 2015). Confusion arises because social media applications are increasingly integrated into SNS interfaces or enhanced with SNS features, and different SNSs emphasize certain features and configurations leading to different styles and cultures-of-use (Thorne 2003). Different SNSs are popular in different countries – for example, *Mixi* in Japan, *vKontakte* in Russia, and *RenRen* in China. In addition, there are a host of commercial SNSs designed specifically for language learning (SNSsLL), like *LiveMocha*, *Busuu*, or *Babbel*, each with its own design.

As SNS use has become global and mainstream, academia has taken interest. In a review of over 400 studies on *Facebook*, Wilson et al. (2012) identified five major areas of research focus: descriptive analysis of users, motivations for using *Facebook*, identity presentation, the role of *Facebook* in social interactions, and privacy and information disclosure. Education scholars (e.g., Selwyn 2008) have argued that SNSs can facilitate the development of collaborative and participatory learning communities, as well as opportunities for informal and unstructured learning. In line with social science and general education, L2TL researchers and practitioners have also explored SNS use in L2 education – both vernacular SNSs like *Facebook* and *Twitter* and SNSsLL like *Livemocha*. There has been a notable increase in publications and presentations on the topic, in both technology-oriented and more general language education and applied linguistics journals, as well as in special journal issues (e.g., Demaizière and Zourou 2012) and edited volumes (e.g., Lamy and Zourou 2013; Lomicka and Lord 2009). The research has diverse origins in, and influences from, CALL scholarship focused on the social and cultural qualities of formal and naturalistic online language use and interaction, especially computer-mediated collaborative learning (e.g., Warschauer and Kern 2000), intercultural communication, sociopragmatics, situated learning, and identity development and self-presentation (e.g., Lam 2000). Perhaps because of the obvious connection, the “social turn” in SLA has had considerable influence on SNS research, and theoretical approaches used in current L2TL research often originate in socially informed frameworks (e.g., Atkinson 2011). Commensurate with these frameworks, techniques and methods have ranged from attitudinal surveys and frequency analysis to CMC discourse analysis and ethnographic case studies. As has become the norm in CALL research on new technologies, initial work has tended to be theoretically agnostic, descriptive, and focused on potentials. However, as SNS technology has matured and become mainstream, researchers have begun to analyze its use and pedagogical application empirically, with more rigorous theoretical and methodological frameworks, often adapted from fields outside of traditional L2TL and applied linguistics.

Major Contributions

Research to date has had three general foci with complementary goals: L2 learning and use in vernacular SNS, SNS-mediated L2 pedagogy, and the use of commercial SNSsLL. The purpose of the first is not only to inform both SNS pedagogy and

SNSLL design but also to inform the study of autonomous and naturalistic L2 use and learning more broadly. The goal of research with the second focus is to leverage the motivational and situated nature of everyday SNS use for L2 learning purposes and to integrate SNSs into formalized pedagogical structures more effectively, as well as to inform the study of CALL pedagogy more broadly. Finally, research on SNSsLL seeks to understand how SNSsLL design integrates social network mechanics with pedagogical structures and how designs impact learner-user experiences.

L2 Learning and Use in Vernacular SNS

One common focus in the study of L2 learning and use in vernacular SNSs like *Facebook* is on the role of user agency and the diversity of user practices under what might seem to be common conditions, giving heed to Thorne's (2003) sociocultural notion of cultures-of-use or "the historically sedimented characteristics that accrue to a CMC tool from its everyday use" (p. 40). For example, Mitchell (2012) profiled the experiences of nine adult ESL learners who used *Facebook* over 4 weeks. Coming from a variety of L1s, proficiency levels, and education levels, her participants exhibited notable variety in how they used the SNS to meet diverse individual goals, which included establishing new and maintaining home relationships, gaining exposure to English, and learning about US culture. While some goals, like meeting new friends, proved difficult, the participants met others by utilizing site affordances, such as maintaining privacy and managing audiences through customized settings or compensating for linguistic proficiency by extensive use of visual media.

Related to agency, another emerging theme is recognition of SNSs as arenas for self-presentation and identity negotiation and the unique transcultural and hybrid qualities of these processes among L2 learners and multilingual users. Research with this theme often hearkens to Lam's work (e.g., 2000) on the online identity development of L1 Chinese immigrant teenagers. For example, Pasfield-Neofitou (2011), using a social realism lens that views "social action as shaped by an interplay of social and systemic phenomena" (p. 95), examined the long-term use of a variety of SNS tools by learners of Japanese and their individual networks. She found that language choice in different SNS contexts varied according to user perception of audience and cultural practice; for example, English was preferred in *Facebook*, while Japanese was preferred in *Mixi*. In a finding that supports transcultural, dynamic views of identity, participants were found to use their Japanese learner and English speaker identities as strategic affordances for learning and interaction (see also Klimanova and Dembovskaya 2013, below). Speaking to agency, the researcher also found that learners recognized the general benefits of virtual immersion and the affordances of different SNS and online tools for learning particular linguistic domains.

Another related theme is the capacity of SNSs as user-driven environments for socialization. To illustrate, Chen (2013) examined how two L1 Chinese students studying in the USA projected their identities in *Facebook* over 2 years through "deliberate choices and appropriations of language, discourse, social role, and

projection of cultural values and beliefs” (p. 145). Chen showed how one student’s increase in English language information sharing over time demonstrated a growing awareness of her audience and development of an expanded multilingual identity, while the other student’s increase in status updates in Chinese demonstrated her growing reliance on home relationships for social interaction.

While not focused on L2 education, Androutsopoulos’ (2014) sociolinguistics work offers insight into the linguistic and interactional processes involved in SNS use. Using concepts from superdiversity and audience design theories, he shows that the multiple audiences facing an SNS user afford “context collapse,” resulting in multilingual and multimodal language style strategies that localize, maximize, and partition audiences. Implications are that online conversation norms vary considerably from offline norms and that language style and choice in SNS contexts may be shaped by the tension between needs for both intimacy and publicness in online interaction. Androutsopoulos’s study represents the sort of work to which researchers and practitioners of L2TL in SNS might turn for interdisciplinary cross-pollination, for example, as a framework for analysis of SNS-mediated L2 learner interaction.

SNS-Mediated L2 Pedagogy

The application of vernacular SNSs in L2 instruction may be due to teachers wishing to leverage the popularity of the latest technologies because they believe that quality alone motivates students. However, while novelty was perhaps sufficient a few decades ago, today there is sometimes resistance among students who may feel everyday technologies like SNSs are being wrongly co-opted for formal “high” purposes like academics (e.g., Reinhardt and Zander 2011). While some practitioners have recognized the opportunity to “bridge” out-of-school practices into awareness of language use as personally and socially relevant cultural practice (Thorne and Reinhardt 2008), learner familiarity with SNSs poses challenges that technology unique to language labs did not.

As per the norm, early work was exploratory and discussed potential benefits and drawbacks. For example, McBride (2009) discussed the pedagogical possibilities of SNSs, focusing on their potential to motivate younger “digital natives” and afford the developmental benefits of “writing/remixing the self” in a socio-communicative context. Predicting soon-to-appear work, she noted the potential of SNSs for the development of socio-pragmatic competence and as an environment for role-play through “fakebooking.” McBride also emphasized the challenge that forcing learners to friend one another and the teacher might de-authenticate the experience and negate the benefits deriving from learner-driven activity.

Notable work has also identified the potential of SNS to foster collaborative learning, develop socio-pragmatic competence, and afford intercultural learning and exchange. For example, Blattner and Fiori (Blattner and Fiori 2009) argued that L2 learners can develop a sense of belonging to a learning community through observation of, and participation in, authentic *Facebook* group discussions in the language of study, since those discussions may provide critical counterexamples to the academic or

invented language samples of textbooks. In a 2011 application of their assertion, Blattner and Fiori (Blattner and Fiori 2011) had L2 Spanish learners observe, document, and analyze various functions of Spanish use in authentic *Facebook* groups, specifically the variety of greetings and leave-takings, unique abbreviations, and cultural references in wall posts. Learners reported the development of cultural and metalinguistic awareness, particularly regarding pragmatic variance among CMC registers. The researchers also note the applicability and transferability of the literacies and analytic skills developed through such activities to other media and contexts.

Other research has implied that the SNS affordance for collaborative learning and learner community development may be due to its accessibility outside of formal contexts – an implication perhaps facilitated by the fact that the studies looked at *Twitter*, which was initially designed to be more mobile and “push” focused than *Facebook*. For example, Antenos-Conforti (2009) had L2 Italian learners use *Twitter* to interact with their classmates both in and outside of class. Learners used the tool not only for the assigned tasks but also to help one another and reported satisfaction at being able to use and interact in the L2 authentically in non-classroom domains. In a similar, more empirical study, Lomicka and Lord (2012) had L2 French learners use *Twitter* to interact with each other and with native speakers. The researchers analyzed the learners’ tweets for social presence and defined as “the degree to which the participants can present themselves, both socially and emotionally, as ‘real’ people in their online community” which is theorized to be prerequisite to development of a learning community (Garrison et al. 2000, in Lomicka and Lord 2012, p. 51). In their analysis of the learners’ tweets, they found evidence for the interaction, emotion, and self-disclosure that indicate some degree of social presence, as measured by markers of affect, interactivity, and cohesion. The native speakers did not take to *Twitter* as much as the learners, which the authors ascribe to the optional nature of the tasks for the French collaborators, suggesting a possible misalignment of curricula that is sometimes difficult to avoid in telecollaborative exchanges.

Like Lomicka and Lord, others have found in SNSs ideal spaces for telecollaborative intercultural exchange and learning. Findings are that learners may gain cultural understandings through processes of socialization that involve collaborative negotiation of community, agency, and identity, all the while balancing informal language use with formal learning demands. Work on SNS as sites for self-presentation are descendants of earlier work on CMC and identity (e.g., Lam 2000). For example, using Norton’s concept of identity investment, Klimanova and Dembovskaya (2013) examined how L2 Russian learners and native Russian speakers enacted various identities in the Russian SNS *Vkontakte*. Employing “digital wisdom” (Prensky 2009 in Klimanova and Dembovskaya 2013, p. 69), some participants were able to overcome the limitations of low proficiency by privileging particular sign systems, construing heritage and learner identities, and strategically investing in the “social enhancements” (p. 83) afforded by the SNS, including “various forms of discursive practices (e.g., status updates, profile wall postings, private messaging tools) and various semiotic modes of self-expression, such as photos, avatars, choice of language input, and use of punctuation marks to express emotions” (p. 81).

Liaw and English (2013) report on a telecollaboration project between English learners in Taiwan and France who completed formal exchange tasks of introduction and art commentary on an official school SNS. Independently, the participants then set up a *Facebook* group to informally socialize and learn about each other's culture. Using an innovative approach to analyze textual features quantitatively and to examine the systemic-functional field, tenor, and mode of learner production, the researchers found that language use in the informal *Facebook* group exhibited more interpersonal and textual features than language use in the official SNS, which tended towards higher complexity and lexical density, even the presumably interpersonal self-introductions. The authors suggest that it may have been the very unsanctioned quality of the informal SNS that afforded experiential cultural learning and the use, and ultimately learning, of vernacular, nonacademic domains. Implications from this study are to encourage and facilitate informal and organic connections, although perhaps in a "hands-off" manner.

Recognizing that the range of discourse types, registers, and genres inherent to vernacular SNS use is not easily accessed through traditional L2 pedagogy, other research-practitioners have used SNSs for role-play and situated learning activities. Integrating SNSs with global simulation and situated learning pedagogy principles, Mills (2011) developed and implemented *Facebook*-enhanced instruction for advanced French learners. Over a semester, students developed simulated characters and interacted through them online, thereby gaining awareness of genre, register, voice, and identity. Mills analyzes the learning as reflective of the joint enterprise, mutual engagement, and shared repertoire afforded by the interplay of the SNS and the situated, contextualized nature of the instruction.

Working with intermediate L2 Korean learners, Reinhardt and Ryu (2013) developed and implemented a series of bridging activities (Thorne and Reinhardt 2008) involving SNS-based alternate identity role-play, the purpose of which was to develop social-network-mediated literacy and language awareness as well as offer learners the opportunity to voice perspectives and use socio-grammatical structures they would not normally with their true first person identities. Learners first observed and analyzed snippets of expert *Facebook* interactions for samples of CMC register and socio-pragmatic lexico-grammar – for example, particles and tense uses that indexed relational status between author and addressee. In tasks designed to elicit newly learned language, learners then role-played invented characters interacting through *Facebook* posts. They then analyzed their classmates' role-played production and identified socio-pragmatic uses, discussing whether and why the language used was appropriate and whether it fit with the character's social status in relation to the addressee.

SNSs Designed for Language Learning

While many people are learning languages informally and perhaps formally with vernacular SNSs, many are also using SNSsLL – SNSs designed specifically for language learning purposes. Definitional issues again come to the fore with SNSsLL,

since most are combinations of self-study tutorials enhanced with social network features, and as commercial products, they evolve, impacting user-learner experiences. As of this writing, older SNSsLL like *Livemocha* and *Palabea* have gone defunct, but *Speaky* has just started. Regarding more established SNSsLL, *Lang-8* claims 750,000 members, *Babbel* claims 20 million, and *Busuu* claims 50 million. Most of these sites have yet to be examined objectively and empirically by L2LT researchers; the fact that *Livemocha* was the most researched but is now defunct illustrates why researchers may not want to commit resources to their analyses.

Findings from SNSsLL research mostly critique site design through usability testing and show that most users are often well aware of poor design and when social networking features do not afford L2 learning. For example, poor profile design may lead to the inability for other users to know whether a fellow user is truly qualified as an expert or if he is just looking for a good time (Stevenson and Liu 2010). Findings echo those of research on vernacular SNS-mediated L2 use, learning, and pedagogy – that SNSs may afford the practice of identity and agency and the development of socio-collaborative learning through the processes of socialization but with the added point that site design should actively support these activities as they relate to language learning. Implications speak to whether and to what degree independent, autonomous L2 learning within these sites can leverage the ecological affordances of informal vernacular SNS-mediated learning, while seamlessly incorporating more formal and potentially effective, instructional practices.

In a relatively early descriptive piece, Harrison and Thomas (2009) traced the experiences of six L2 learners who used *Livemocha*. Utilizing Boyd and Ellison's (2007) conceptualization of SNS identity, the researchers found that the site design supported self-presentation, network management, community participation, and ultimately L2 learning in ways that appealed to some but not all participants. The authors imply that socio-collaborative L2 learning can only emerge in SNSsLL if sites afford learners individualized means to cultivate, manage, and develop identities and networks over periods longer than a semester. Similarly, Clark and Gruba (2010) also evaluate *Livemocha* features but do so by describing their own experiences using the site to learn L2 Korean and Japanese. While some features led to motivation, like making friends or successful task completion, others led to frustration and demotivation, like boring and repetitive grammar-translation drills, usability issues, and a sense of doing busy work.

Another research strand has examined how resourceful learners may use SNSsLL successfully, perhaps in spite of site design. For example, framing development of sociopragmatic competence as a matter of language socialization, Gonzales (2013) uses conversation analysis to examine how an L2 Spanish learner manages rapport in *Livemocha*. While the site's chat tool includes supportive resources like a translator, a keyboard with non-English characters and emoticons, and a list of suggested topics, the learner did not use these and instead successfully established rapport with his interlocutor through humor, small talk, textualized paralinguage, and shared cultural reference.

Research on specific elements of SNSsLL design holds the most promise for truly informing improved iterations, especially when it correlates those elements directly

with activities key to L2 learning. For example, using a combination of quantitative and qualitative techniques, Zourou and Loiseau (2013) analyzed the design of the culture section of *Livemocha*, noting how the lack of, or poorly conceived, SNS features led to inconvenience and difficulty for the user and thwarted language-focused interaction and networking. Examining mechanics rather than particular site versions may also alleviate the issue of research becoming obsolete when sites change.

Problems and Difficulties

In brief, research on SNSs in L2 education has found evidence that L2 learners exercise considerable agency and diversity of linguistic and symbolic practice in informal SNS contexts, making strategic use of site affordances to self-present, to design identities, and to socialize and be socialized into the communities in which they find or imagine themselves – whether local, global, or “glocal.” In more formal pedagogical interventions, practitioners have demonstrated that SNSs can help to develop learner socio-pragmatic competence and raise metalinguistic and intercultural awareness. SNSsLL have shown some value for vocabulary memorization but suffer from design issues and have yet to take full advantage of the social interactional dynamics inherent to vernacular SNSs.

Challenges remain in both research and practice. Social media has become an object of discussion and analysis in both popular and academic circles – especially communication studies, education, sociology, political science, and economics – which L2TL professionals should continue to reference. In view of the mixed methodologies often employed, the vernacular, ubiquitous, and often ephemeral nature of SNS use poses challenges to researchers, especially in addressing privacy issues and gaining access to, collecting, and curating data. Research is also challenged by the moving nature of the target as sites evolve, merge, incorporate new features, commercialize, and fall in and out of fashion – or in some cases, are firewalled by governments.

Among US users, the 2014 Pew Internet report shows shifting trends, as *Facebook* growth has slowed to account for around three quarters of all SNS users. Other SNS platforms have gained users with about one quarter of SNS activity occurring on *LinkedIn*, *Pinterest*, *Instagram*, and *Twitter* combined. While *Facebook* is proportionally gaining older users, *Pinterest* trends towards women, over half of SNS users under age 30 are favoring *Instagram*, and over half of all SNS users participate on multiple platforms. Research opportunities abound if one asks why and how these trends have developed, what tensions and synergies they afford, and what they imply for L2TL – for example, *Instagram* favors images and visual expression that would seem to have great potential for culture learning but not the development of written fluency or interactional competence.

Designers and teachers of SNS-enhanced pedagogy and developers of SNSsLL should recognize that learners bring considerable experiences with, and diverse dispositions towards, social networking and L2 use and learning into formal and

informal learning contexts. The question of how to leverage the self-organized, autonomous learning activity seen in everyday SNS use for more structured learning purposes still remains largely unanswered, as user agency can be negated through curriculum-driven task design. Instructors should anticipate resistance and seek not only to mitigate it – for example, by not forcing a student to use their real profile, or by not requiring that tweets be sent over the weekend – but also to use it to raise awareness of the potentials of cognizant SNS use for autonomous and collaborative L2 learning. It makes sense to start by surveying students and matching their interests and experiences with learning objectives and the various affordances of different social media platforms.

SNSsLL are evolving into social network-enhanced commercial computer-assisted language learning sites and services (“SNECSs” perhaps), as they use social networking (and gamification) mechanics, like crowdsourcing, to enhance intelligent (or not so intelligent) CALL tutoring environments. SNSsLL designers are driven by commercial demands and, as long as new users and markets are available, do not really have incentive to offer materials that comprehensively treat all skills or are grounded in the best L2TL practices. SNSsLL should thus be used judiciously and subjected to continued scrutiny by consumers, teachers, and researchers, who should also look toward digital game-mediated L2TL and intelligent computer-adaptive learning for educational applications and theoretical and analytical frameworks.

Future Directions

One direction forward is to focus on where SNSs differ from previous Internet technologies and concomitant social paradigm shifts. Drawing from O’Reilly’s conceptualization of Web 2.0 as both technological and ideological (Musser et al. 2007; in Zourou 2012), Zourou maintains that the ethos emerging from new SNS-mediated socio-communicative interactions, social configurations, and socio-literacies deserve closer attention – an ethos of user participation focused on sharing and reuse, the open source ethos afforded by Web 2.0 architecture, and a new ethos of social value and capital emerging from network effects like virality and social network “echo chamber” effects. New social media-enhanced expressions of sociality, literacy, culture, ownership, authenticity, production, consumption, democracy, and civic participation require new understandings of language use as subject to mediatization (Lundby 2009). They, in turn, compel the need for evolving critical approaches to language education that recognize and forefront this ubiquitous and everyday way of interacting and making meaning as central to language use and learning.

Cross-References

- ▶ [Ecologies of Digital Literacies: Implications for Education](#)
- ▶ [Language and Identity on Facebook](#)

- ▶ [Language, Ideology, and Critical Digital Literacy](#)
- ▶ [Multilingualism and Multimodality in Language Use and Literacies in Digital Environments](#)
- ▶ [Multimodal Discourses Across the Curriculum](#)

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Twitter and Micro-Blogging and Language Education

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Abstract

Over the past decade, Twitter has grown significantly in its popularity and has also migrated into educational contexts. Although the use of Twitter and micro-blogging has risen steadily, research exploring its potential in L2 learning has been relatively limited. This chapter provides an overview of microblogging in L2 contexts, which began in 2009 (for a critical analysis of work done on Twitter from 2009 to 2016, please see Hattem and Lomicka, *E-Learning and Digital Media* (Sage Publications), 1–19, 2016). It also provides insight into the development of Twitter as well as the major contributions that Twitter has made to L2 contexts. L2 acquisition research has been varied in approach, task, and with different levels of learners, but to date, it has been largely inconclusive. Early studies primarily examined tweets at the surface level, including frequency and type. Subsequent studies have shown that Twitter enhanced student engagement and improved communication between teachers and students. More recently, research using Twitter in L2 contexts has tended to focus on the areas of student production of tweets and student analysis of tweets. While the production of tweets can increase students' L2 output, the analysis of tweets exposes students to L2 input. Research has also looked at the use of Twitter to facilitate community within the language classroom. As microblogging continues to emerge in education and is becoming more prevalent in language learning contexts, future work could focus on the use of hashtags, microfiction, and corpora use in Twitter. As the field is emerging, the focus should remain on how learning occurs in microblogging-enhanced environments, what specific factors affect the learning processes, and how to support effective learning in such environments.

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 Twitter • Microblogging • Language learning • Social media • Education • Tweets

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Introduction

Over the past decade, Twitter has grown significantly in its popularity and now ranks close to Facebook in terms of social media use. Smith (2015) estimates that 302 million active monthly users are on Twitter, which includes 100 million daily users. With the exponential growth of microblogging, it has also migrated into educational contexts. In fact, Shweiki media (2014) reports that 80% of college students use Twitter, which comes in just behind Facebook (95%). The use of Twitter is on the rise in academia, including among university professors, who, according to Rogers (2013), are increasingly using twitter in education as it contributes to a more engaging learning environment. Symmons (2013), for example, in a study conducted on how professors use Twitter, found that as a teaching tool, Twitter was not as popular as other social media tools in the classroom. She indicates that professors use Twitter more as a source for gaining knowledge, external information, and to stay up to date in their fields of study and expertise. However, Symmons also suggests that Twitter use in the classroom is steadily on the rise. The role of Twitter as a learning tool has shown potential in myriad ways over the last few years. For example, various studies have suggested that microblogging can provide ways for learning to take place out of the classroom, to serve as a tool for collaborating with experts (Lord and Lomicka 2014; Wesely 2013), for enabling access and mobility (Antenos-Conforti 2009), to support authenticity in learning (Lomicka and Lord 2012), for fostering student engagement and involvement (Raguseo 2010), to serve as a knowledge sharing tool (Dennen and Jiang 2012), and that Twitter is participatory, authentic, and immediate (Antenos-Conforti 2009).

Studies that have documented the role of Twitter in language learning have focused primarily on language production (Antenos-Conforti 2009; Castrillo de Larreta-Azelain 2013; Hattem 2014; Lomicka and Lord 2012), student perceptions of Twitter (Antenos-Conforti 2009; Lomicka and Lord 2012; Perifanou 2009), target language practice (Lomicka and Lord 2012; Fewell 2014), building second language (L2) vocabulary (Fornara 2015; Montero-Fleta et al. 2015), teacher education and

professional development (Lord and Lomicka 2014; Wesely 2013), community building (Fewell 2014; Lomicka and Lord 2012), instructor guidance (Hattem 2012; Fornara 2015), and analysis of tweets (Blatner et al. 2015a, b). The next sections will explore the multifaceted ways that Twitter has been used in the language learning process.

Early Developments

Although the use of Twitter and microblogging has risen steadily over the last few years, research exploring its potential in L2 learning has been limited. Early developments in microblogging in L2 settings date to 2009 (see also Hattem and Lomicka 2016) and have primarily examined tweets at the surface level, whether through frequency counts as a way to develop competence or through community building. The next section outlines some of the early contributions of Twitter to language learning.

In Twitter's early stages of development, the first contribution to microblogging in the L2 setting was a study conducted by Antenos-Conforti (2009), who looked at microblogging practices in an intermediate Italian classroom. In her innovative study, 22 students enrolled in university-level Intermediate Italian tweeted during one semester. Data were collected included tweets (documenting frequency and distribution), a Likert questionnaire, and a follow-up free-response questionnaire. Based on her results, Antenos-Conforti suggested that the incorporation of Twitter can extend the physical classroom as it provides a space encouraging participation and fostering a sense of community. In another early study, Perifanou (2009) conducted research using Edmodo (as a microblogging tool) in an Italian language class with 10 second year students. Tweets were analyzed for frequency counts and from a sociocultural perspective. Details of the coding and analysis were not provided. Results (primarily from the questionnaires) indicate that that student response was extremely positive and that microblogging increased collaboration, motivation, and participation and had a positive effect on learning outcomes. In a larger study, Borau et al. (2009) examined tweets from 90 ESL students enrolled in an online college course for a period of 7 weeks. In all, students produced 5580 tweets, which were analyzed for communicative and cultural competence by way of a questionnaire and content analysis. Details of the coding framework and analysis were not provided. Borau, Ullrich, Feng, and Shen claimed that students responded positively to Twitter, establishing its status as a suitable tool for developing communicative and cultural competence anytime, anywhere, without the need for face-to-face interaction.

In addition to serving as a tool to foster student language production, microblogging also has the potential to foster a sense of community within and beyond the walls of the classroom – to learn, share, reflect, and communicate. Kolowich (2011) cites the work of a professor who used Twitter to encourage students to talk with a class at a different institution: “students to talk about what’s going on in their lives in the moment, and share that with the other class” (para. 5). While the language professor specifically comments that Twitter does not replace traditional language

instruction in the classroom, she adds that it does help to build community and to extend learning outside of the classroom as it encourages students to use the target language more often. Finally, Dervin (2009) suggests the Twitter has the potential to aid in the development of reading, writing, listening, and speaking as well as to boost task-based learning, and promote intra- and intercultural discussion among students. While there was clearly an interest in using and conducting research with Twitter in the L2 setting in early work, this research shows minimal use of theoretical frameworks and methods regarding how to analyze Tweets and how to clearly and consistently report the data.

Major Contributions

Recent research using Twitter in L2 contexts has generally focused on the areas of student production of tweets and student analysis of tweets. While the production of tweets increases students' L2 output, the analysis of tweets exposes students to L2 input. Another area of research includes how Twitter can be used to facilitate community within the language classroom.

We will first look at the studies that focus on the production of tweets by L2 learners. As mentioned earlier, Antenos-Conforti (2009) was the first to conduct a study on the use of Twitter in the L2 setting. Her work set the path for future research as an example of how students could potentially facilitate acquisition by providing both input and output with an online audience. She notes that such exchange allows for opportunities for negotiation of meaning as well as "good interaction" (Chapelle 1998, p. 24) in that communication goes beyond simply that which is unidirectional (ibid, p. 24). While Antenos-Conforti's study primarily reports on student responses to the questionnaires, her work also provides basic data on both the frequency and distribution of tweets, which were either reply tweets or status updates. Although Antenos-Conforti did discuss some of the content in the tweets, a formal content analysis was not performed. Hattem (2012) also looks at input, output, and interaction through structured grammatical tasks to encourage noticing using the Twitter. Forty-nine students participated in the 7-week study. Over 3500 tweets were collected and analyzed with Corpus of Tweets. Additionally, questionnaires were administered on input, output, and interaction and on automaticity. Findings suggest that the use of Twitter helped to increase noticeability in input, output, and interaction; Hattem further reports that microblogging represented an appropriate forum for practice and memorization.

Another major contribution to microblogging research was a project conducted by Lomicka and Lord (2012); they explored the use of Twitter among intermediate level French learners, who used the tool to communicate with each other and with native speakers of French. In this study, students both produced tweets and read tweets produced by native speakers. Data were collected by way of surveys and tweets. While survey data elicited some noteworthy attitudinal trends, content analysis provided more compelling data (following Rourke et al. 2001). A framework used to code tweets for social presence (1004 indicators, such as humor, emotion,

agreement, and inclusive pronouns), which allowed the researchers to see whether Twitter might be an appropriate tool for building community in the L2 classroom. Researchers observed evidence of both cultural and linguistic gains and received positive feedback from students with regard to their reactions to the project. Results suggest that Twitter is capable of both building community and establishing social presence, which was demonstrated largely through affective and interactive indicators.

In a study by Castrillo de Larreta-Azelain (2013), who investigated learner attitudes toward using Twitter in collaborative writing in German classes, students produced tweets for writing practice. Using a mixed-methods study, Castrillo de Larreta-Azelain used various sources of data, including a pre- and postquestionnaire and tweets. Findings suggest that students were able to create a new learning community and the Twitter task allowed students to develop writing competence. While the researcher did perform a content analysis, coding procedures and frameworks were not mentioned explicitly in the study. Castrillo de Larreta-Azelain's work does affirm, however, that learners, who self-reported on their participation in the task, improved their German writing skills.

More recently, Fornara (2015) examined whether an instructor who models L2 usage might affect students' use of L2 on Twitter. Ninety-three students taking Italian 2 were included in control and experimental groups and tweeted during an academic semester. Tweets were tallied and analyzed via tweetdownload.net and pre- and postsurveys were administered. Results presented both the number of new vocabulary items and grammar structures used in tweets and results were not significant; however, students indicated that Twitter was a useful tool and that it provided them with additional opportunities to practice vocabulary and grammar. Results also found that the presence of a co-tweeting instructor did not significantly influence linguistic features used by students.

While prior contributions (Antenos-Conforti 2009; Lomicka and Lord 2012; Hattem 2014; Fornara 2015) have looked at the tweets written and produced by students, more recent work has looked at how students analyze tweets. For example, two studies by Blattner et al. (2015a, b) provide an analysis of how learners identify various lexical items such as abbreviations and of how English words are used differently in various tweets from different native speaker tweeters. This contribution also investigates students' use of Twitter at the beginning levels of language learning, unlike many previous studies where the focus was on the intermediate and advanced level. In the study by Blattner et al. (2015a), participants were asked to analyze authentic French tweets produced by well-known native speakers (NS). The analysis focused on two features of cross-cultural pragmatics: (a) the use of abbreviations and (b) nonce and established borrowings from English. Data were analyzed by the regular distribution of a questionnaire which targeted various pragmatic variables through a series of guided questions. Participants took screenshots of NS tweets and then analyzed the tweets. Results indicated that a number of breakdowns occurred in situations where students were able to identify but not contextually decipher high-frequency abbreviations and novel English borrowings. In addition to serving as a production-based tool, this study is significant in that it demonstrates that Twitter can

also be used as an effective and “appropriate venue to assist students in the comprehension of cross-cultural pragmatics and the development of digital literacy skills” (Blattner et al. 2015a, p. 227).

Blattner et al. (2015b) analyzed students’ understanding of 380 French tweets via a linguistic analysis; data were also collected by means of a pre and post survey. Students were enrolled in first and second semester university level French. As part of the linguistic analysis, students were asked to identify English borrowings in each tweet they analyzed. The task of identifying English in tweets caused students to realize how prevalent English is in social media and especially in French-speaking countries. Next, there were 19 unidentified English words among first-semester participants versus 30 among second-semester participants, revealing a higher tendency among more experienced French learners to interpret words presented in a French context as established French lexical items, rather than scanning each item for a counterpart in their native English. Finally, participants identified English words and expressions at similar rates, but in the case of false cognates, second-semester participants showed a greater tendency toward recognizing their language-specific values.

Aside from investigating input, output, and meaningful interaction, Hattem’s (2014) qualitative study is of particular importance as it looks at language play using Twitter in the L2 setting and uses a case study design. Hattem followed three participants who used Twitter as part of an intensive, ESL high advanced grammar course. Looking for examples of ludic language play in tweets, Hattem analyzed and coded tweets for characteristics of CMC coherence. He found that during the 7-week session, students did use language play (repetition, joking, insulting, improvisational word games, foreign words and references, imaginary worlds, and carnival language) and they created their own learning contexts. Hattem argues that the three participants did not just perform that task designed for them but rather co-constructed their own activities and as a result directed their educational and social goals, which he characterizes as “expansive learning” (p. 167).

The aforementioned contributions to research on Twitter in L2 contexts ranged from using tweets to facilitate input and output, build community, and assess student attitudes to student analysis of native speaker tweets and language play. These studies provide a solid foundation from which to design and carry out future work. While a variety of methodologies and interpretive frameworks were used, future research would benefit from stronger methodologies, including more examples of productive analytic approaches and coding procedures.

Work in Progress

Although research using Twitter is only in its beginning stages, Twitter has been used in a variety of innovative ways for students to produce language and thus facilitate participation, target language practice outside of the classroom, to build community, and to target specific grammar, vocabulary and/or pronunciation learning. Current

research has also used Twitter as a means for students to gain exposure to NS input and to analyze sociopragmatic elements of the target language.

There are a number of emerging projects that show potential for future micro-blogging research and that provide divergent avenues for creative activity in micro-blogging. First, similar to work done by Fornara (2015), in that the instructor distributes content related tweets, Mompean and Fouz-González (2016) examine the role of Twitter on students' participation and pronunciation. Sixteen EFL students from a language school in Spain participated in this project, which involved several steps: a pretest oral task with targeted stimuli and questionnaire, a battery of tweets (distributed by the instructor to the students during 27 days and targeting pronunciation), and a posttest interview and final questionnaire. Participants were also asked to confirm reading tweets by posting a short response. Specifically, the researchers attempted to facilitate active participation and to use Twitter to serve as a pronunciation tool for ELS lexical items that are commonly mispronounced. Empirical results (counts, content analysis) suggest that the use of Twitter did encourage participation (reading comment rate of 82.4%) and that there was a beneficial effect on students' pronunciation of the targeted lexical items (gain rate of 75.2%).

In addition to using Twitter as a tool to facilitate pronunciation, recent work explores ways of using microfictions with microblogging. While not unique to language learning, Twitter is being used as a platform for creating student-generated microfictions literacy projects where students publish 140 word (or less) literary narratives while engaging in real-time storytelling. As Ragueso clarifies, Twitter fiction comprises an "original, self-contained work of fiction in each tweet published by a Twitter user" (2010, n.p.). Fitzgerald (2013), in discussing Twitter fiction in a TedTalk, reminds the audience of the emergence of the first episodes on radio and then discusses how we can embrace new formats as we tell stories to today's audiences. In thinking about language specific contexts, students can create virtual spaces in language class for stories where feedback is immediate, and students can be pulled into stories, roles, and identities, leading to creative experimentation with new formats for storytelling. In addition to Twitter fiction, other literary projects such as Complete da Tweet (<https://twitter.com/CompleteDaTweet>) could be adapted to language specific tasks for students at varying levels of language learning. Short stories that were written with Twitter in mind, such as "Blackbox," provide examples of how Twitter can be successful with the distribution of serialized tweets. While to date there is a paucity of research that documents this trend in the language classroom, it does hold the potential for future pedagogical innovation and L2 research.

Finally, work on hashtags (#) is also in beginning to surface in the field. For example, Solmaz (in press) uses an ecological framework to explore the potential of hashtags, where hashtags are convention markers for annotating the content of tweets. Using an autoethnographic approach, he analyzes his own Twitter experiences in his target language during a 6-month period. He examines hashtags both qualitatively and quantitatively and suggests that they can create affiliation with target language speakers, allow students to better reach out to native speakers in their communities, and join in on authentic conversations. Blattner et al. (2016) investigate how French language learners in three different second and third year

French courses (intermediate and advanced levels) understand and interpret hashtags using Twitter. Their study sheds light on how microblogging may provide an authentic yet dynamic context that enhances the language learning experience while developing students' multiliteracy skills in a L2. Data from 18 students were examined, including 579 analyzed tweets, 171 of which contained hashtags. Results suggest that language learners tend to glance over the hashtags and make guesses based on the information contained in them. Emerging research on microblogging and pronunciation, twitter fiction, and hashtags hold the potential for interesting and creative work in future language research.

Problems and Difficulties

For most students today, the use of Twitter is ubiquitous; it is also on the radar of most educators. However, Twitter has not been without its share of challenges in the educational setting. While some criticize Twitter for being a distraction in education, the challenge is to ascertain whether Twitter can be used in meaningful ways in the classroom and if it can facilitate language learning and communication in the L2 context. Ideas for use of Twitter in language contexts continue to emerge and evolve. One challenge to the effective use of Twitter in the language classroom is finding tasks that are solid and pedagogically innovative for both smaller and larger classroom settings. For example, Professor of French Carolyn Shread integrates Twitter feeds into Moodle with students in advanced elementary and intermediate level French classes. To engage students in their viewing of 52 textbook videos, students are each given characters from the video series. Students then posted about their character's private thoughts, lives, and activities throughout the semester, which added a "playful and creative element to their learning" (Shread, 2015, cshread@mtholyoke.edu, personal e-mail communication). According to Shread, students find the task engaging and challenging. Marshall (2015), who teaches large lecture classes, finds ways to incorporate Twitter by using it as a way to facilitate starter questions at the beginning of class. This use of microblogging engages students to communicate both with the instructor and with each other during in-class face-to-face sessions. Both examples show ways that Twitter can be used effectively for teaching different types of classes and for diverse tasks. Another challenge for those using Twitter is finding an effective yet creative use of hashtags for both microblogging tasks and for research. Hashtags can be used in myriad ways, such as to help connect learners, to examine engagement rates of tweets, to model authenticity, and to promote communication. Tasks could ask students to follow and analyze how hashtags are being used by native speakers and delve into socio-pragmatic understanding of meaning in the tags. Little research in language learning (see Solmaz [in press](#); Blattner et al. 2016) has been conducted with hashtags on Twitter, and it would be interesting to see the number and types of hashtags that

learners can produce as well as learners' understandings of hashtags from following native speaker tweets.

As research involving microblogging in L2 settings is in its early stages, more studies are needed to highlight longitudinal uses of Twitter. For example, research could examine students' use of microblogging across various levels and semesters of language learning to help fill the current gap in literature associated with Twitter in the L2 classroom. Studies that investigate the use of Twitter in the K-12 setting also warrant further research. To date, Kim et al. (2011) document students' use of Twitter in grades 5, 7, and 10 in EFL classes. Forty-Five students participated in their research which looked at the purposes, patterns, and features of student tweets. Researchers noted a variety of patterns, purposes, and features and suggested that Twitter stimulates learners, promotes language output, and encourages them to socially interact with others.

A general trend in studies on Twitter indicates difficulty finding frameworks for analysis, challenges in selecting appropriate and affordable tools to analyze tweets, and a paucity of ways to analyze hashtags generated by students. While studies such as Lord and Lomicka (2012) have employed tested frameworks (such as Rourke et al. 2001), these frameworks measure nonlanguage-specific data and more language-sensitive approaches are needed, as well as examples of coding methodologies. As frameworks and coding procedures are more consistently employed, it is also essential to allow language researchers to easily download tweets in a variety of learner languages. Although numerous tools are available (BirdSong Analytics, Twitonomy, Tweetdownload, to name a few), researchers need access to one's own tweets as well as twitter searches by hashtag. A common critique has been that access to Twitter feeds (especially archives of tweets) is virtually inaccessible or only available at high costs.

Future Directions

With the breadth of research on Twitter that has been conducted in the last decade, the focus for the future should turn to depth and to further exploring the development potential of Twitter use in L2 contexts (see also Hattem and Lomicka 2016). Studies exploiting media coupled with tweets are just beginning to emerge (see Mompean and Fouz-González 2016). Mompean and Fouz-González call for more research addressing the types and content of tweets in order to exploit differences between tweets that include both text and audio or video/images. Following the research conducted by Mompean and Fouz-González (2016) and that of Fornara (2015), there is also a need for more investigation of microblogging that is both instructor-led with student responses where Twitter is used either to ask questions and/or provide information to students. Differences in acquisition rate of items that are sent in a single tweet and items that are sent in several tweets could also be examined as part of this work.

Additional avenues for research could expand upon work on communities of practice both with language learners and language teachers. For example Wesely (2013) and Lord and Lomicka (2014) both explore the microblogging sphere as a way to bring together language educator communities. Wesely (2013), from a sociocultural perspective, looks at an online community of world language teachers who used Twitter for professional development. The study suggested that Twitter facilitated a new form of learning and collaboration among teachers in virtual spaces. Similarly, Lord and Lomicka (2014) examine the role of Twitter in a graduate methodology course. Approximately 80 teachers in training in the USA and Canada tweeted reactions to and reflections of their experiences as new language teachers. Both content analysis and survey data revealed that the microblogging tasks allowed participants to form a virtual Community of Practice (Lave and Wenger 1991) in which they were able to learn, share, and reflect.

Twitter corpora studies also are beginning to appear that utilize tools that researchers to monitor and collect tweets and hashtags so that corpora can be built and investigated. To date, research has focused on various linguistic aspects, such as lexical, morpho-syntactic, or orthographic aspects of Twitter usage. Vilares et al. (2015) have begun to lay the groundwork for such studies as they examine tweets from a linguistic perspective and describe how language processing techniques could be adapted to deal with the informal register language often present in Twitter messages. Finally, longitudinal investigation using various methodologies could help to reveal insights about learners' experiences, particularly in the classroom context and also with the inclusion of other variables such as target language, language proficiency level, and gender (see Solmaz [in press](#)).

To conclude, microblogging continues to emerge in education and is becoming more prevalent in language learning contexts. Studies have shown that Twitter enhances student engagement and improves communication between teachers and students. L2 acquisition research has been varied in approach, task, and with different levels of learners, but to date, it has been largely inconclusive. As the field is emerging, the focus should remain on how learning occurs in microblogging-enhanced environments, what specific factors affect the learning processes, and how to support effective learning in such environments.

Cross-References

- ▶ [Second Language Writing, New Media, and Co-construction Pedagogies](#)
- ▶ [Technology and Second Language Teacher Professional Development](#)

Related Articles in the Encyclopedia of Language and Education

Richard Kern, Paige Ware, and Mark Warschauer: [Networked-Based Language Teachings](#). In Volume: Second and Foreign Language Education

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Part V

**Methods and Methodologies in Technology
and Language Education**

Computer-Mediated Communication and Conversation Analysis

Vincenza Tudini and Anthony J. Liddicoat

Abstract

An increasing number of researchers use conversation analysis (CA) methodology to investigate interactional dimensions of computer-mediated communication (CMC) and their impact on language and learning. While there is a significant body of CA research focusing on naturally occurring telephone and face-to-face conversation, researchers' attention since the late 1990s has shifted to new contexts where communication between human beings is mediated by computers. This chapter is focused on CA research in the educational sphere, where participants are using an additional or a foreign language. CA research on human interaction developed robust analytical tools to identify and understand the unique interactional resources which are available to users in technologically mediated contexts. In particular, researchers are able to draw on previous CA research on face-to-face and telephone interaction to explore affordances and constraints of new technologies for learning, and how users use language to adapt to new and evolving interactional contexts. This chapter will therefore provide a brief overview of early CMC and CA research on technologically mediated interaction. Following this overview, major contributions where CA is systematically applied to computer-mediated talk will be presented, focusing specifically on findings related to language and interaction in L2 educational settings.

Keywords

Conversation analysis • computer-mediated communication • second language learning • conversational repair • intercultural talk

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Introduction

An increasing number of researchers use conversation analysis (CA) methodology to investigate interactional dimensions of computer-mediated communication (CMC) and their impact on language and learning. While there is a significant body of CA research focusing on naturally occurring telephone and face-to-face conversation, researchers' attention since the late 1990s has shifted to new contexts where communication between human beings is mediated by computers. This chapter is focused on CA research in the educational sphere, where participants are using an additional or a foreign language. However, CA methodology was originally developed in sociology in the 1960s and since then has been applied to a range of social and institutional contexts, including educational. The introduction of CMC tools in foreign language programs to promote connectivity and interaction between L1 and L2 language speakers also led to research interest in how interaction unfolds in new, mediated forms of intercultural talk. CA research on human interaction developed robust analytical tools to identify and understand the unique interactional resources which are available to users in technologically mediated contexts. In particular, researchers are able to draw on previous CA research on face-to-face and telephone interaction to explore affordances and constraints of new technologies for learning, and how users use language to adapt to new and evolving interactional contexts. This chapter will therefore provide a brief overview of early CMC and CA research on technologically mediated interaction. Following this overview, major contributions where CA is systematically applied to computer-mediated talk will be presented, focusing specifically on findings related to language and interaction in L2 educational settings.

Early Developments

Though CA was initially conceived as an account of face-to-face interaction (Sacks 1992), technologically mediated human interaction was an investigative focus from the beginning in studies of telephone talk (Schegloff 1968, 1979). One significant aspect of Schegloff's work for understanding CMC was the observation that the technology itself was a constituent part of the interaction and not merely the channel

through which communication was conducted. In the case of telephone talk, Schegloff showed that the ringing of the telephone was a key element of the orderliness of such interactions and that telephone openings could not be properly understood without reference to it. Thus from the beginning CA has acknowledged that its main focus “talk” needs to be more broadly understood than simply referring to oral language use. Subsequent studies have also shown the saliency of technological systems for understanding CMC. For example, Liddicoat (2011a) has shown that CA takes the starting point that human action is orderly, and orderly at all levels, and seeks to understand how orderliness in interaction is achieved by participants through microanalysis of talk. In understanding orderliness in interaction, three key elements have come to hold a central place in CA accounts of language use: turn-taking (organizing participation of interlocutors in talk), sequence organization (organizing interlocutors’ turns into coherent actions), and repair (dealing with interactional problems as they occur) (Liddicoat 2011b). These elements are also relevant to the study of technologically mediated forms of communication including both spoken (e.g., voice chat) and written (e.g., text chat) forms of interaction. In videoconferencing, it is necessary to consider not only the spoken language but also written language and computer-generated language to understand how participation is established and enacted.

While technology permits users to talk across distances without being physically co-present, it has also created constraints in relation to key interactional resources such as eye gaze, facial expressions, gesture, and body movements which are accessible in face-to-face talk but unavailable or altered in mediated contexts. This is where CA researchers provided significant first insights on technologically mediated interaction which are also relevant to computer-mediated interactional contexts (see Schegloff 1968, 1979). One constraint that telephone and computer-mediated interaction have in common is that users cannot see one another. While they are temporally co-present, they are not physically co-present, which impacts on the “procedural infrastructure of interaction” (Schegloff 1991, p. 1338), including sequence organization, turn-taking, repair, and conversational openings. In the case of telephone conversation openings, specific practices are deployed by users to deal with the constraints imposed by the medium. For example, identification in telephone openings in English is done through voice recognition, through practices that provide voice samples to permit recognition and identification activities that show that recognition has been established. In other languages, and in institutional contexts in English, however, explicit self-identification practices have been adopted as part of telephone openings (e.g., Houtkoop-Steenstra 1991, for Dutch). In CMC, emoticons (emotion icons) have become an integral component of text chat, given the lack of access to prosody and facial expressions in written forms of interaction. Changes in telephone technology have introduced new possibilities for identification (such as caller recognition) but speakers continue to need practices that specifically attend to the consequences of technological mediation on social interaction (Arminen 2005; Arminen and Leinonen 2006). Interactional practices will therefore continue to need to adapt to the affordances of the media used.

Increased access and use of communication technologies in the 1990s led to numerous CA investigations on how users use language to adapt to and manage interaction in a variety of computer-mediated contexts. CA perspectives have provided insights on how interaction and language change according to specific interactional configurations created by different softwares. For example, interactional features change according to whether users can see or hear one another, or whether they are interacting with one person or in a group, as linguistic resources vary accordingly. Online text chat, a form of mediated real-time written interaction, was one of the first interactional contexts to be investigated from CA perspectives for a number of reasons. Firstly, it was one of the first synchronous forms of computer-mediated communication to become widely used in educational contexts, since its beginnings in 1970s at the University of Illinois, where it was known as *Talkomatic* (Grubbs 2004), and used both for professional and social purposes. Secondly, researchers became interested in chat's apparent similarity to spoken interaction (Beauvois 1992; Negretti 1999), despite the fact that users could neither see nor hear each other. The inability to hear one another in fact added a significant further constraint when compared to telephone interaction where talk was at least audible. This required users to interact without the interactional support of prosody and other nonverbal cues and rely entirely on the co-constructed written conversation to create meaning.

Since the late 1990s, CA researchers therefore began to investigate the nature of interaction in online text chat (e.g., Garcia and Jacobs 1999; Herring 1999; Hutchby 2001), to shed light on conversational resources which are available and deployed by users in a unique interactional environment. Garcia and Jacobs' (1999) ground-breaking study on turn-taking in group chat identified unique features of text chat, such as the quasi-synchronous nature of interaction whereby users' composition processes and systemic constraints delay the appearance of posts on screen. The features of the composition of language in chat had consequences for the orderliness of interactions, because users are unable to access composition processes and are technically unable to monitor for transition-relevance places (TRP) for the purpose of turn-taking, and posts may not appear where the user intended. Furthermore, the authors note that users treat each post on screen as a signal that a next post is due. This creates problems for understanding processes of next speaker selection which leads to increased addressivity in group chat where a post is intended for a specific user. This promotes understanding and avoids the creation of "phantom" adjacency pairs (Garcia and Jacobs 1999), where users construct adjacency pairs that are not intended as such.

Herring (1999) also observes that speakers' inability to control the placement of their turns in relation to those of others creates problems for sequence organization though the disruption of adjacency pairs such as question-answer pairs which in face-to-face conversation normally follow one another (Schegloff and Sacks 1973). Thus the sequence organizations of CMC are potentially different from those of spoken interaction, as adjacency pairs, which are defined in CA terms as turns "which are placed next to each in their basic minimal form" (Liddicoat 2011b, p. 139), can no longer be understood in such a way. In fact, adjacency has to be

reconstructed by participants in the interaction through reading processes (Zemel and Çakir 2009), rather than being a feature of its orderly design.

Despite its significant interactional constraints, text chat was one of the first technologies to attract the attention of teachers, especially language teachers, who began to explore possible uses and affordances of text chat for L2 teaching and learning through interaction. For example, L2 researchers suggested that chat could provide a bridge to face-to-face interaction (Beauvois 1992; Kern 1995; Negretti 1999) and greater equality of participation for shy learners (Kern 1995; Warschauer 1996). Text chat was also perceived by some L2 researchers as an optimal environment for second language acquisition (Pellettieri 2000; Smith 2003; Tudini 2007) due to its visual saliency and opportunities for negotiation of meaning, both linguistic and intercultural. The diffusion of text chat and other technologies in educational circles eventually lead to research interest in microanalysis of features, resources, and affordances for learning, and exploration of the unique interactional aspects of digital environments.

Major Contributions

Given the central objective of developing speaking skills and intercultural communicative competence in languages programs, it is unsurprising that teachers and researchers of second language acquisition began experimenting with possibilities for interaction and learning offered by CMC. Connectivity of language learners with expert speakers of the target language was an especially promising feature of CMC in countries that are geographically distant from the target language and culture. However, most CMC research to date has focused on what affordances are provided by CMC for language acquisition, and there is currently little work which examines the interactional features of online conversations, whether text, voice, or video, between L1 and L2 speakers. Kern and Liddicoat (2008) point out that language learners need opportunities to engage in interaction if they are to become participants in communities of use and develop their capacity to communicate in and through the target language. Technologically mediated interactions are clearly an opportunity for language use and participation in communities of use; however, they require further microanalytic investigation based on previous CA work on face-to-face interaction between L1 and L2 speakers (e.g., Kasper 2004; Markee 2000).

Over the last 15 years, CA has been applied to L2 contexts to “understand and explicate how language is used *as it is being acquired through interaction*” (Firth and Wagner 1997, p. 768). In addition to providing new insights on SLA processes in face-to-face contexts, Firth and Wagner’s (1997) critique provided a major impetus for the application of CA to a range of online L2 interaction contexts, including spoken, written, synchronous, or asynchronous modes. Unlike previous studies of online L2 learning, CA investigations adopt an *emic* or participant-relevant perspective (see Firth and Wagner 1997, for a detailed discussion) to understand how specific technological contexts shape interaction and language learning, as invoked by users during interaction.

One of the first CA studies of a technologically mediated interactional context is Negretti's (1999) study of text chat between native and nonnative speakers of English. While the author concludes that chat promotes oral proficiency, the focus of the study is on understanding differences between chat and face-to-face interaction. The study identified a number of interactional resources which users deployed within the text chat environment to ensure understanding, including sequence organization, turn-taking, and adjacency pairs. The study also showed that sequencing and timing were dealt with differently in chat, compared to face-to-face, with evidence of constantly disrupted or overlapping turns. While findings echo Garcia and Jacobs's (1999) study of group chat, Negretti's (1999) group chat study included both group and dyadic postings. Findings might have been different if group and dyadic interactions had been analyzed separately as interaction changes according to the type of technological tool used, number of users, and other factors. In other words, findings of online talk investigations cannot be generalized across platforms and contexts, despite identified interactional commonalities, as invoked by users within the ever-changing multiplicity of platforms and technologically mediated interactional configurations.

One of the first monographs on online intercultural interaction (Tudini 2010) focused exclusively on dyadic text chat. This major study investigated turn-taking, adjacency pairs, sequencing, and repair in dyadic text chat between native and nonnative speakers of Italian. However, a significant proportion of the analysis was dedicated to how different types of conversational repair are deployed by users. CA differentiates repair according to who initiates and resolves problems in understanding, which has implications for politeness and face. For example, in face-to-face conversation, if a listener has a problem in understanding a speaker's talk, they initiate repair but give the speaker the opportunity to resolve the repair. This is known as other-initiated self-repair, and has been shown to be preferred by speakers over other-initiated other-repair, also known as correction (Schegloff et al. 1977). Jefferson (1987) also showed that where correction does occur in face-to-face interaction, it is more likely to be embedded in the topical talk rather than exposed, without disrupting the flow of conversation and without drawing attention to the speaker's momentary lapse. Tudini's (2010) study instead found that exposed other-initiated other-repair was common in text chat where participants have differential language expertise, regardless of whether there was a problem in understanding. This was attributed to the permanency and reviewability of written conversation, as well as the expert-novice roles and power relationships invoked by users due to differential language expertise (see also Liddicoat and Tudini 2012).

Tudini's (2010) findings have implications regarding how nonnative speakers use and learn languages in online dyadic text chat, as it appears that an otherwise social environment can become a locus of language practice and pedagogical talk, which contributes to the hybridity of text chat as both social and pedagogical interaction. The study therefore suggests that though it is oriented to as a dispreferred action, as evidenced by use of mitigating actions such as emoticons and positive evaluations of learners' language, correction is perceived by users as a way to "do language learning" and pursue affiliation in written social conversation, which may otherwise be managed differently in the rapid fade of face-to-face conversation or voice chat.

A major CA study on spoken CMC is Jenks' (2014) investigation of multiparty voice conversations conducted via computer on Skype between three or more speakers of English as an additional language. By adopting a CA perspective, this study shows how users deploy various elements of voice as interactional resources to achieve understanding and promote learning. For example, there is evidence that they manage turn construction and transition through the production and coordination of vocal cues, including micro changes in intonation. It also shows how participants use pauses to deal with overlapping utterances, though prolonged spells of silence can lead to simultaneous talk. This leads the author to conclude that pauses in voice chat act both as an affordance and a constraint for learning. Jenks' comparison of turn-taking in both text and voice chat on the Skype platform also reveals numerous interactional differences between the two modes. For example, transition from one turn to the next occurs in one sequential location in text chat and in multiple locations in voice chat. Another significant finding is that background noises have interactional consequences for the management of voice chat, as they may halt ongoing conversations or force participants to reestablish mutual orientation. The study also identifies the specific interactional work that is accomplished to enter an ongoing conversation, such as knowing who to address and when to speak, an issue which is especially pertinent to multiparty interaction.

The implications of this study's findings are that specific interactional competencies are required to manage interaction in multiparty voice chat, which are different to those which are used in face-to-face or text chat contexts. This has consequences for task design in language programs, especially since modern day language learners would benefit from opportunities to engage with a variety of authentic interactional environments beyond the classroom, including familiar social media platforms.

In their CA study of videogame interaction, Piirainen-Marsh and Tainio (2009) also identified voice as a key interactional resource and affordance for learning, both of the game activity and English as L2. In particular, co-present Finnish videogame players' voice repetition of game characters' English utterances was found to be an important game and L2 learning resource through co-construction of collaborative play.

CA has also been usefully applied as single-case analysis which reflects the premise that "social action done through talk is organized and orderly not, or not only, as a matter of rule or as a statistical regularity, but on a case by case, action by action, basis" (Schegloff 1987, p. 102). For example, González-Lloret (2008) uses CA in a longitudinal case study of a Spanish L2 learner engaged in text chat interaction with a L1 Spanish speaker. This study found that repair was a key resource for participants to promote understanding of rules of addressivity in Spanish.

Work in Progress

While computer-mediated spoken interaction is becoming increasingly popular in language programs, the dominant form of social interaction globally is written interaction, with Facebook reported to be the leading social network as at August

2015 (Statista 2015). This platform offers users multiple interactional choices from a temporal perspective, with asynchronous interaction as the dominant mode for one to many multiparty communication, and quasi-synchronous for private one-to-one or small group chat. However, in these environments users no longer rely solely on text and emoticons to interact, as occurred in early forms of text chat described above. With the advent of Web 2.0, written interaction has become multimodal with a variety of embedded semiotic devices, including photos and YouTube videos, which have specific interactional functions according to recent CA research on Facebook in Italian (Farina *in press*). For example, in his study of sequential organization of Facebook wall threads, Farina (*in press*) found that first posts were designed by users to project multiple responses, including “likes” from “friends,” and that these posts may be composed with text, video, and photos, on their own or in combination. Friends in fact oriented to the first post in a thread as the first pair part of an adjacency pair, by responding with relevant second pair parts, and often ignored posts of other users in the thread. While this study does not specifically deal with affordances of multimodal interaction for learning, it has learning implications, especially for language programs, as it suggests that interactional features of Facebook are fundamentally different from face-to-face, and need to be integrated by teachers as a specific type of written interaction task, rather than a spoken conversational task. CA research on multimodal multilingual written interaction, where users are using an additional or foreign language, has barely started and is likely to have implications for learning.

Problems and Difficulties

The analysis of CMC using CA, in education or other settings, raises some key difficulties at both a conceptual and analytic level that need to inform thinking about the ways interaction is understood and analyzed.

A first key problem confronting the application of CA to CMC lies in the potential mismatch between the modalities of talk for which CA was developed and those on which it is applied. As CA is an analytic approach designed for the study of spoken interaction, the use of written and multimodal forms of language in online environments poses some problems for the direct application of CA concepts and methods. One key problem for using CA to understand interaction in written interactions is the idea of turn construction. In conventional CA understandings, turn construction and turn-taking are based on projections of possible completion, but in written environments, this is not such a useful way of thinking as turns are completed when posted (and so are actually rather than possibly complete). At the same time, an orientation to short posts as the norm in synchronous or quasi-synchronous online environments makes holding the floor for longer posts interactionally problematic as there is a need to avoid long gaps between contributions, suggesting that the interactional accomplishment of “incompleteness” may be a more significant interactional issue than that of completeness (see also Tudini 2014).

A second key issue for CA analyses of CMC is the role of the technology itself as a frame for the interaction and its effect on how interaction is conducted and understood. The computer brings distal participants into quasi-co-presence, especially when the technology uses a visual channel (e.g., Skype or videoconferencing). This creates a sense in which participants share a context, although the reality is that participants share only a part of their own contexts with each other – that mediated through the technology. This does not mean, however, that only that part of the context which is mediated is pertinent to understanding the interaction. Malinowski and Kramsch (2014) for example have argued that the computer screen “fixes the user in disembodied, spectatorial relation to a removed ‘scene’ on the other side” (p. 159). The question is whether a focus on this removed scene is the legitimate focus of analysis or whether it constrains analytic possibilities.

CA has usually focused on the interaction as it unfolds for the participants and has tended to consider features of interaction that are not available to all participants through talk as less relevant for understanding the nature of talk in interaction. In mediated contexts, and especially in contexts where education is a central concern, this would appear to be a problematic analytic starting point. In mediated interaction, there are observable elements of the interaction that are available only to one participant, such as the composition process and off-screen behaviors, which can be interactionally or acquisitionally salient (Suzuki 2013). Software is currently available that can record aspects of the interaction such as tracking key strokes, timing of contributions or capturing on-screen activity, and video recording of participants during interaction, which can provide further data. Some of this information is at least partially available to recipients with software showing that one’s interlocutor is currently composing a message. Understanding the composition process may provide significant information about how interaction is constructed, including how adjacency structures responses, even where adjacency itself may be split in the online representations of the talk, how self-repair processes work, and how participants bring external resources to bear on their language production that may be especially significant in understanding language acquisition and use. This is not simply a case of collecting information about interaction as developing an understanding of what information is salient for understanding interaction that problematizes the accepted CA dichotomy between participants’ and analysts’ categories.

The technology as frame for the interaction also has effects on the representation of the interaction that is mediated between participants. That is, the interaction on screen is not simply perceived by participants but is constructed for them in ways that may alter what is perceived. For example, in visually mediated interactions, eye gaze is potentially available as part of the representation, but the way that eye gaze is mediated is not actually a “true” representation. As the camera capturing the speakers’ image is not positioned at the focal point of gaze, the participants’ gaze is misrepresented. This means that eye gaze information is not available for participants in the same way that would be the case for co-present interlocutors. Goodwin (1980) has shown that eye gaze plays an important role for coordinating speakership and that participants deploy repair practices to secure appropriately gazing

participants. Research has not currently investigated the consequentiality of the disruption of eye gaze for the nature of interaction and the interactional practices that speakers' deploy as a result of the disruption.

Future Directions

The use of CA to study CMC is a relatively new area of scholarly activity and there remains much to be done.

One key area for future work will be to develop an understanding of the affordances and constraints created by the technological mediation of talk. These constraints and affordances exist at the interactional level and, in educational contexts, at the level of learning and there are complex interactions between each of the levels that as yet have been little researched. Moreover, there is a need to understand how CMC as language learning provides or limits interactional possibilities, which in turn influence learning experiences. For example, Balaman (2015) has used CA to show how the design of online tasks constructs interactional possibilities that create affordances for learning.

There is also a need to understand more about the interactional (re)construction of talk through CMC. In particular, there is a need for research on how users of written CMC construct sequentiality when sequentiality is not directly inferable from the ordering of contributions. In reconstructing sequences of interaction, users must orient to adjacency pairs to understand the interaction as a coherent activity, but we know little about how they draw on sequence organization as a resource for reconstructing coherence or the consequences the need to restore sequentiality has for language learners as users of CMCs.

A third area of future research would appear to relate to the complex interactions of on-screen and off-screen activities in the interactional processes involved in CMC. This would require a more critical engagement with the idea of CMC talk as interaction and a reconsideration of the saliency of "external" activities to talk. This involves more than simply studying off-screen activities, such as the composition process, to consider how such processes are implicated in and constituent of the interaction. This research is also relevant to understanding the interactional complexities and concurrent interplay of on-screen, off-screen, voice and text conversations with in-game actions of multilingual gamers, to understand affordances for language learning within ludic environments. The impact of mobility on talk-in-interaction, including embodied deixis during mobile augmented reality game play (Thorne et al. 2015), adds a further dimension which is ripe for microanalytical investigation.

Related Articles in the Encyclopedia of Language and Education

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Learner Corpora in Foreign Language Education

Sylviane Granger

Abstract

Analyzing learner language is a key component of second and foreign language education research and serves two main purposes: it helps researchers gain a better understanding of the mechanisms of second language acquisition (SLA) and it is a useful source of data for practitioners who are keen to design teaching and learning tools that target learners' attested difficulties. The learner corpus (LC) is a new resource that is currently bringing learner language back into focus and is enjoying growing interest from the language education community at large. It first emerged as a branch of corpus linguistics in the late 1980s but is only now beginning to attract significant attention from L2 theoreticians and practitioners. This chapter aims to highlight the relevance of learner corpora to the field of language education. The next section gives an overview of the main defining features of this new resource and some of the dimensions along which they can be classified. The section "[Work in Progress](#)" is devoted to methods of analysis: contrastive interlanguage analysis and automated analysis. "[Problems and Difficulties: Pedagogical Applications](#)" presents some of the main pedagogical applications of learner corpus research, and the final section suggests some possible avenues for future research.

Keywords

Corpus linguistics • Learner corpus • Learner corpora • Second language acquisition • Contrastive interlanguage analysis • Automated analysis

This chapter is an updated version of that included in the 2008 edition of the encyclopedia.

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Introduction

Analyzing learner language is a key component of second and foreign language education research and serves two main purposes: it helps researchers gain a better understanding of the mechanisms of second language acquisition (SLA) and it is a useful source of data for practitioners who are keen to design teaching and learning tools that target learners' attested difficulties.

Learner data types can be ranged along a continuum that reflects the degree of control exerted on language production. According to Ellis and Barkhuizen (2005), the less constrained types of production should be favored, since "they demonstrate how learners use the L2 when they are primarily engaged in message construction," unlike experimental data, which must be treated with circumspection, as it may contain artificial interlanguage forms. Researchers have traditionally shied away from the more natural data types, however, opting instead for experimentally elicited samples precisely because they are more constrained. This allows for tighter control of the many variables affecting learner output, thereby facilitating interpretation of the results. In addition, as it is difficult to subject a large number of learners to experimentation, SLA research has tended to be based on a relatively narrow empirical foundation, which raises questions about the generalizability of the results. Looking at the situation from a more pedagogical perspective, Mark (1998) deplors the relative lack of focus on the description of learner language, which contrasts sharply with the increased attention devoted to other aspects of mainstream language teaching, such as learner variables (motivation, learning styles, etc.) and the description of the target language.

The learner corpus (LC) is a new resource that is currently bringing learner language back into focus and is enjoying growing interest from the language education community at large. It first emerged as a branch of corpus linguistics in the late 1980s but is only now beginning to attract significant attention from L2 theoreticians and practitioners. This chapter aims to highlight the relevance of learner corpora to the field of language education. The next section gives an overview of the main defining features of this new resource and some of the

dimensions along which they can be classified. Section “[Work in Progress](#)” is devoted to methods of analysis: contrastive interlanguage analysis and automated analysis. Section “[Problems and Difficulties: Pedagogical Applications](#)” presents some of the main pedagogical applications of learner corpus research, and the final section suggests some possible avenues for future research.

Major Contributions

Learner corpora are electronic collections of natural or near-natural foreign or second language learner texts assembled according to explicit design criteria. Several aspects of this definition require clarification. The term *near-natural* is used to highlight the “need for data that reflects as closely as possible ‘natural’ language use (i.e., language that is situationally and interactionally authentic) while recognizing that the limitations facing the collection of such data often obligate researchers to resort to clinically elicited data (for example, by using pedagogic tasks)” (Ellis and Barkhuizen 2005, p. 7). In principle, learner corpora can contain data from both *foreign language (FL) learners*, who learn a language in a country where they have little exposure outside the classroom (e.g., learning English in Germany or Japan), and *second language (SL) learners*, who acquire a language in a country where that language is the predominant language of communication (e.g., learning English in the United States). The term *texts* highlights the fact that learner corpora contain continuous stretches of oral or written discourse rather than decontextualized sentences. This makes it possible to study a much wider range of interlanguage features than in previous SLA studies, which have tended to focus on more local features like grammatical morphemes. The requirement of *explicit design criteria* stems from the necessity to control the wide range of variables that affect learner language. As can be seen in Table 1, which lists the criteria governing the collection of the *International Corpus of Learner English (ICLE)* (Granger et al. 2009), some of these variables pertain to the language situation or task, while others relate to the learner.

It is this requirement that makes learner corpus collection such a laborious undertaking and yet it is a crucial requirement: the usefulness of a learner corpus

Table 1 ICLE design criteria

| Learner variables | Task variables |
|--------------------------------------|------------------------|
| Age | Medium |
| Learning context | Field |
| Proficiency level | Genre |
| Gender | Length |
| Mother tongue background | Topic |
| Region | Timing |
| Knowledge of other foreign languages | Exam |
| Amount of L2 exposure | Use of reference tools |

is directly proportional to the care that has been taken in designing it, and compromising the design stage inevitably leads to less solid results. If the variables are recorded and stored in a database, they can be used to compile homogeneous subcorpora. The interface of the *ICLE* makes it possible, for instance, to study gender differences, topic effects, the influence of timing, even to compare FL learners who have never spent any time in an English-speaking country with those who have done so for extended periods of time.

Learner corpora can be classified on the basis of the following features:

- *Target languages*: while English still has the lion's share, learner corpus collection is now active in a wide range of languages (Dutch, French, German, Italian, Norwegian, Spanish, and Swedish, inter alia) (for a survey, see the "Learner corpora around the world" webpage on the Louvain website: <http://www.uclouvain.be/en-cecl-icworld.html>). Most learner corpora cover only one target language, the MERLIN corpus (Abel et al. 2013) being a notable exception in this respect. Bilingual learner corpora like the German-English *Telekorp* corpus (Belz and Vyatkina 2005) are a promising development resulting from the growing use of telecollaborative communication in language education.
- *Mother tongue backgrounds*: learner corpora can contain data from learners of one and the same mother tongue background or from several mother tongue backgrounds. The latter are necessary if the purpose of the data collection is to produce generic pedagogical tools such as monolingual learners' dictionaries (see Section "Problems and Difficulties: Pedagogical Applications"). Most academic learner corpora contain data from only one language background, for example, Japanese learners of English in the case of the *NICT JLE Corpus* (Izumi et al. 2004), Chinese learners of English for the *Chinese Learner English Corpus* (Gui and Yang 2002), or Swedish learners of French for the *Interfra Corpus* (Bartning and Schlyter 2004). The *International Corpus of Learner English*, which covers 16 different mother tongue backgrounds, is a notable exception in this regard.
- *Medium*: corpora of learner writing were the first to be collected and are still the dominant type today. The supremacy of written corpora is primarily due to the difficulty of collecting and transcribing learner oral data. In spite of this difficulty, some oral learner corpora have been compiled. These include the *College English Learners' Spoken English Corpus*, which contains data from Chinese learners of English (Yang and Wei 2005), and the *Louvain International Database of Spoken English Interlanguage*, which contains data from learners with 11 different mother tongue backgrounds (cf. Gilquin et al. 2010). A new type, the multimodal (or multimedia) learner corpus, which contains learners' texts linked to audio-video recordings, is a recent and welcome addition that enables analysts to investigate nonverbal as well as verbal aspects of communication (Reder et al. 2003; Hashimoto and Takeuchi 2012).
- *Genre*: while some genres are well represented in current learner corpora, particularly essay writing and informal interviews, many are hardly covered at all, which makes it difficult to assess the influence of task on learner production. The *NICT JLE Corpus* (Izumi et al. 2004), which comprises three types of tasks –

picture description, role-playing, and story-telling, is exceptional in this respect. The collection of large multitask learner corpora is clearly one of the major desiderata for the future.

- *Time of collection*: learner corpora can be collected at a single point in time or at successive points over a period of time. Only the latter, which are much more difficult to collect and are therefore in the minority, allow for longitudinal studies of learner language and are a rich resource for describing stages of acquisition (for L2 French, see Bartning and Schlyter 2004).
- *Pedagogical use*: corpora for delayed pedagogical use sample a given learner population and are used to produce pedagogical tools that will subsequently benefit similar-type learners. The vast majority of learner corpora collected to date have been of this type. More recently, however, learner corpus collection has begun to be integrated into normal classroom activities: learner data is collected from a given learner population to inform pedagogical activities that involve, in the first instance, those same learners, while also allowing for subsequent use with similar-type learners. Learner corpora for immediate pedagogical use thus involve learners as both producers and users of the data.

Learner corpora differ in their degree of accessibility. Many are unfortunately not available outside the arena where they have been collected. However, a growing number are available for scientific research and/or can be consulted online.

Work in Progress

Contrastive Interlanguage Analysis

A learner corpus is a solid empirical base from which to uncover the linguistic features that characterize the interlanguage of foreign and second language learners at different stages of proficiency and/or in a range of language situations. The method that has mainly been used for that purpose is contrastive interlanguage analysis (CIA) (Granger 1996, 2015a). Unlike classic contrastive analysis, which compares different languages, CIA compares varieties of one and the same language and involves the following two types of comparison:

1. Comparisons of corpora of learner language and native (or expert) reference language
2. Comparisons of corpora representing different varieties of learner language

The first plays an important role in revealing or uncovering the distinguishing features of learner language, while the second makes it possible to assess the degree of generalizability of interlanguage features across learner populations and language situations. The latter type has never come in for any criticism from SLA specialists, unlike the former, which has been criticized for being guilty of the “comparative fallacy” (Bley-Vroman 1983), i.e., for comparing learner language to a native

speaker norm and thus failing to analyze interlanguage in its own right. Although it is important to stress the need to view interlanguage on its own terms, there are several arguments that can be invoked in defense of native/learner comparisons. First, the native speaker norm that is used in learner corpus studies is explicit and corpus-based (Mukherjee 2005) rather than implicit and intuition-based, as has usually been the case in SLA studies. Second, there is not just *one* reference corpus but several to choose from. In the case of English, for instance, analysts can choose between the many geographical varieties of English covered in the *International Corpus of English* (<http://www.ucl.ac.uk/english-usage/projects/ice.htm>), several of which are available in electronic format, or may opt for a corpus of expert L2 user data instead (Seidlhofer 2004). From a pedagogical point of view, comparisons of learner data to a native or expert reference corpus is even more obvious, as they help teachers identify the lexical, grammatical, and discourse features that differentiate learners' production from the targeted norm and may therefore be usefully integrated into the teaching program.

Automated Analysis

One important feature that distinguishes learner corpus data from traditional learner data is the fact that the texts are stored in electronic format. Once computerized, learner data can be examined with a variety of software tools that can radically change the way foreign/second language researchers set about analyzing learner language. Some degree of automation is arguably essential, as several learner corpora contain millions rather than hundreds or thousands of words. Automation contributes to a better analysis of learner language in three main ways: (1) it makes it possible to quantify learner language; (2) it helps discover interlanguage patterns of use; and (3) it makes it possible to enrich learner data with a wide range of linguistic annotations.

Frequency

One of the major contributions of automation is that it brings forth a wealth of quantitative information on learner language that had hitherto been unavailable. Text retrieval software tools like *WordSmith Tools (WST)* (Scott 2012) or *Antconc* (Anthony 2014) are language-independent programs that enable researchers to count and sort lexical items in text samples automatically. Using these tools, researchers have immediate access to frequency lists of all the single words or sequences of words in their corpora. One particularly useful function in *WST* allows researchers to compare these lists, highlight the significant differences between them, and draw up lists of words that display a significantly higher or lower frequency of use in learner data. This option plays an important role in identifying cases of over- and under-representation that, as already pointed by Levenston in

Table 2 Sample of significantly over- and underused lexical verbs in *ICLE*

| Overused verbs | Underused verbs |
|----------------|------------------|
| <i>Think</i> | <i>Describe</i> |
| <i>Get</i> | <i>Occur</i> |
| <i>Dream</i> | <i>Note</i> |
| <i>Want</i> | <i>Suggest</i> |
| <i>Watch</i> | <i>Require</i> |
| <i>Live</i> | <i>Contain</i> |
| <i>Ban</i> | <i>Obtain</i> |
| <i>Learn</i> | <i>Identify</i> |
| <i>Pay</i> | <i>Involve</i> |
| <i>Like</i> | <i>Assume</i> |
| <i>Go</i> | <i>Derive</i> |
| <i>Buy</i> | <i>Follow</i> |
| <i>Need</i> | <i>Include</i> |
| <i>Smoke</i> | <i>Record</i> |
| <i>Spend</i> | <i>Determine</i> |

1971, characterize learner language just as much as downright errors, especially at the more advanced proficiency levels. For example, Granger and Paquot (2009) used *WST* to compare the top 100 lexical verbs in the 3.7 million-word *ICLE corpus* of writing by higher intermediate to advanced EFL learners and a comparable native academic corpus (*ACAD*). As Table 2 indicates, the comparison shows that EFL learners tend to significantly overuse some lexical verbs and underuse others.

While some of the overused verbs are topic-dependent (e.g., *dream*, *ban*, or *smoke*), many are indicative of students' over-reliance on high-frequency verbs that are more typical of conversation than academic writing (e.g., *think*, *get*, or *want*). The underused verbs, however, are typical EAP verbs that merit focused pedagogical attention.

Patterns of Use

The quantitative benefits of computerized learner data should not obscure the equally impressive qualitative insights afforded by computer-aided methods. Corpus methods are very powerful heuristic devices for uncovering words' preferred lexical and grammatical company. The concordancing function in text retrieval software tools enables researchers to extract all occurrences of a given lexical item (single word or phrase) in a corpus and sort them in a variety of ways, thereby allowing typical patterns to emerge. Table 3 highlights some of the striking differences that emerge from the concordance of the word *as* in a corpus of essays written by native American-English students (*LOCNESS*) and EFL learners with Spanish, French, and German mother tongue backgrounds (*ICLE*).

While the figures reveal some degree of commonality between the three learner groups, such as the tendency to overuse *as far as* and underuse *as well as* and *as*

Table 3 Patterning of the word *as* in native and learner corpora (relative frequency per 200,000 words)

| Patterning of <i>as</i> | LOCNESS | ICLE-SP | ICLE-FR | ICLE-GE |
|---------------------------------|---------|---------|---------|---------|
| <i>as a conclusion</i> | 0 | 16.3 | 34.5 | 0 |
| <i>as far as</i> | 6.7 | 14.2 | 95.2 | 34.4 |
| <i>as far as X is concerned</i> | 1.3 | 11.2 | 87.9 | 15 |
| <i>as well as</i> | 108.2 | 34.6 | 46 | 61.9 |
| <i>as long as</i> | 57.4 | 2 | 16.7 | 23.8 |

As far as Billy Pilgrim is concerned, he is neither totally wrong nor totally right.
As far as the langage is concerned, both novelists make use of an easy style.
As far as de-dramatization is concerned, one main theme of the novel is war and death it involved.
People who really need T.V. cannot react against it anymore. This is, as far as I am concerned, the saddest and the most dangerous thing for these persons.
These two soldiers stand for the whole U.S. army as far as their age is concerned.
As far as the American soldiers are concerned, they are merely disappointing samples of the American Society.
As far as the future of the EC is concerned, nobody knows what it will be made of.
this first solution is likely to happen but is a negative solution as far as cultures and customs are concerned.
Europe 1992 will certainly be a nation as far as the economy is concerned
As far as the culture is concerned there are no fundamental changes between the north and the south.
As far as Mr Gould is concerned, he is an idealist.
As far as her relationship with the guests is concerned, she tries to achieve harmony
As far as the garden is concerned, it is divided into two parts

Fig. 1 Concordance excerpt of *as far as x is concerned* in ICLE-FR

long as, they also highlight varying patterns of use, such as overuse of *as a conclusion* by Spanish- and French-speaking but not German-speaking learners. As evidenced by several recent studies (e.g., Paquot 2013), this variability is often the result of transfer from the learners' mother tongue. For example, the striking predilection of French-speaking learners for the phrase *as far as x is concerned*, which emerges clearly from the concordance excerpt in Fig. 1, is modeled on the French phrase *en ce qui concerne*. Most of the examples show students' difficulty in introducing topics and could serve as useful prompts for rewriting exercises.

Typical collocations, i.e., pairs of words that have a strong tendency to co-occur within a few words of each other, can be extracted fully automatically using statistical association measures. Durrant and Schmitt (2009) employ this method to highlight differences in the patterning of adjective/noun + noun combinations in learner and native writing. Clusters, i.e., recurrent contiguous sequences of two or more words, can also easily be extracted from learner corpora. Applying this method to a corpus of EFL speech and a comparable native speaker corpus, De Cock (2004) shows that EFL learners significantly underuse discourse markers like *you know* or *I mean* and vagueness markers like *sort of* or *and things* and therefore prove to be lacking in routinized ways of interacting and building rapport with their interlocutors and weaving into their speech the right amount of imprecision and vagueness, both typical features of informal interactions.

Annotation

A learner corpus can also be annotated. In corpus linguistics terms, “annotation” refers to “the practice of adding interpretative (especially linguistic) information to an existing corpus of spoken and/or written language by some kind of coding attached to, or interspersed with, the electronic representation of the language material” (Leech 1993, p. 275). In learner corpus terms, this means that any information about the learner samples that the researcher wants to code can be inserted into the text. In a learner corpus, it is therefore not only words that are contextualized but also information about the words.

Although there is, in principle, no limit to the type of annotation that can be used to enrich a learner corpus, two types are by far the most common: morpho-syntactic annotation and error annotation. Part-of-speech (POS) taggers automatically attach a tag to each word in a corpus, indicating its word-class membership. These programs are particularly useful, as they help disambiguate the many words that belong to more than one part of speech. Only a POS-tagged learner corpus would allow researchers to attribute the over- or underuse of the word *to* to differences in frequency of use of the infinitive particle *to* or the preposition *to*. It is important to bear in mind, however, that morpho-syntactic annotation programs – whether lemmatisers, POS taggers, or parsers – have been trained on the basis of native-speaker corpora, and there is no guarantee that they will perform as accurately on learner data. While the success rate of POS taggers has been found to be quite good with advanced learner data, it has proved to be very sensitive to morpho-syntactic and orthographic errors (Van Rooy and Schäfer 2003), and the success rate will therefore tend to decrease as the number of these errors increases. To counter this weakness, a number of researchers prefer to use CHILDES (MacWhinney 1999), a suite of software tools that gives them a high degree of flexibility in the annotating process. Initially designed for L1 acquisition research, it was subsequently adapted for L2 data analysis (Myles and Mitchell 2004).

Although error analysis has fallen into disfavor in SLA, it remains a crucial aspect of learner language and one that in fact still lies at the heart of many SLA studies, hidden under labels such as negative transfer, fossilization, corrective feedback, measures of linguistic accuracy, and developmental sequences. Two methods are used in learner corpus research to chart attested learner errors: computer-aided detection and error annotation. In the former, it is the analyst who chooses the linguistic items on which to focus, using his/her intuition, pedagogical experience, or previous SLA studies. Once selected, the linguistic forms can be searched automatically in the learner corpus, then counted and sorted as described in section “Patterns of Use”. The study of overpassivization errors by Cowan et al. (2003) is a good illustration of this method. The problem is that this method presupposes that one knows what errors to look for, which is far from always being the case.

The only method that can ensure comprehensive error detection is error annotation, which is enjoying growing popularity, in spite of its difficulty and time-costliness, and several systems have now been developed (for a survey, see Díaz-Negrillo and Fernández- Domínguez 2006). In most of these, the error is coded for

error type (number, gender, tense, etc.), word category (noun, verb, etc.), and in some cases, error domain (spelling, grammar, lexis, etc.). When applied to a learner corpus that has been carefully compiled on the basis of strict design criteria (mother tongue background, level of proficiency, etc.), error annotation is a valuable resource that makes it possible to tailor pedagogical materials to the needs of a given learner population (cf. Granger 2003). However, error annotation will always contain an element of subjectivity, as the very notion of error is far from clear-cut. As rightly pointed out by Milton and Chowdhury (1994, p. 129), “Tagging a learner corpus allows us, at least and at most, to systematize our intuitions.” To cater for errors that can have more than one interpretation, some systems allow for the inclusion of several target hypotheses (Lüdeling and Hirschmann 2015). Whatever the system used, it is essential that annotators be provided with a comprehensive error-tagging manual and undergo rigorous training. It is also important to bear in mind that error annotation is a very time-consuming, hence costly, process. Limitations in manpower and/or budget may lead researchers to tag only part of their corpus or to limit the tagging to some specific error categories (morphological errors, preposition errors, article errors, etc.).

Problems and Difficulties: Pedagogical Applications

Among the many pedagogical applications that could potentially benefit from learner-corpus-informed insights, only a few can boast a number of concrete achievements: pedagogical lexicography, courseware, and language assessment.

The field in which advances have been quickest is **pedagogical lexicography**. Monolingual learners’ dictionaries like the *Macmillan English Dictionary for Advanced Learners* (2007), the *Longman Dictionary of Contemporary English* (2014), and the *Cambridge Advanced Learner’s Dictionary* (2013) contain error notes based on learner corpora, which are intended to help learners avoid common mistakes. These notes offer clear added value for dictionary users, as they draw their attention to very frequent errors, which in the case of advanced learners have often become fossilized (*accept* + infinitive, *persons* instead of *people*, *news* + plural, etc.). Although the selection of the errors is not always optimal (cf. De Cock and Granger 2005), this is a major first step that will undoubtedly be followed by others. While learner corpus data has begun to have a marked impact on EFL dictionaries, it has yet to find its way into EFL grammars. This is less surprising in light of the fact that even native corpus data was only integrated into grammars as recently as 1999, with the publication of the very first corpus-based grammar of English, *the Longman Grammar of Spoken and Written English* (Biber et al. 1999). However, it seems both inevitable and highly desirable that learner corpus data will become an essential component of grammar design in years to come. Pedagogical grammars would clearly benefit from corpus-attested information on the difficulty of grammatical categories and structures for learners in general or some L1-specific learner population. Recent initiatives such as the English Grammar Profile project (Harrison 2015) hold great promise in this regard.

While there may still be relatively little LC-informed **courseware** on the market, a fair number of teachers have used learner corpora to develop their own in-house teaching materials, which share a number of characteristics: (1) they tend to be based on learner corpora for immediate pedagogical use; (2) they are often L1-specific rather than generic; (3) they are designed with a clear teaching objective in a well-defined teaching context; and (4) they tend to be electronic rather than paper tools. This latter characteristic results from the fact that new technologies – web-based platforms, CALL authoring tools, e-mail – have brought the design of electronic pedagogical material within the reach of any computer-literate teacher/researcher and provide an ideal platform for the production and use of learner corpus data. The web-based writing environment of Wible et al. (2001) is the perfect example of a tool that facilitates the generation, annotation, and pedagogical exploitation of learner corpora. The environment contains a learner interface, where learners write their essays, send them to their teacher over the Internet, and revise them when they have been corrected by the teacher, as well as a teacher interface, where teachers correct the essays using their favorite comments (comma splice, article use, etc.) stored in a personal comment bank. This environment is extremely attractive both for learners, who get immediate feedback on their writing and have access to lists of errors they are prone to produce, and for teachers, who gradually and effortlessly build a large database of learner data from which they can draw to develop targeted exercises. Other researchers are using data resulting from computer-mediated written communication (Kung 2004; Belz and Vyatkina 2005) or oral tasks (Kindt and Wright 2001). Some pedagogical tools target LC-attested errors typical of a particular learner population. Chuang and Nesi (2007), for example, have developed *GrammarTalk*, an electronic resource focused on two of the most error-prone areas for Chinese learners, viz. articles and prepositions.

A third field in which “research from learner corpora has much to offer” (Purpura 2004, p. 272) is **language assessment**. When carefully analyzed, learner corpora can help practitioners select and rank testing material at a particular proficiency level (Barker et al. 2015). Combined with natural language processing techniques, they can also be used to draw up automatic profiles of learner proficiency. The *Direkt Profil* analyzer, for example, provides a grammatical profile for L2 French and can be used to assess learners’ grammatical level (Granfeldt et al. 2005). Learner corpora are also increasingly being used to develop and fine-tune **automated scoring** systems (Higgins et al. 2015).

All these applications show the tremendous potential of learner corpus data to inform pedagogical tools and methods. At this stage, however, LC-informed materials are still the exception rather than the rule, and there is scope for the development of a much wider range of applications in future.

Future Directions

Although learner corpora have not yet achieved a major breakthrough in the educational sector (Granger 2015b), the buzzing activity in the field and the number of learner-corpus-informed reference and teaching tools that have already been

produced or are currently being designed are a clear indication that they are here to stay. Efforts in the future should be directed towards collecting data representing a wider range of target languages and sampling more diversified learner populations in a wider range of language situations and tasks. Over and above data collection, the focus should be on interpreting the data in the light of SLA theory and incorporating the results into innovative pedagogical applications. Prime among these are electronic applications and, in particular, web-based environments that allow researchers to collect and exploit learner data within the same environment and customize instructional content to meet the needs of differentiated learner populations.

Cross-References

► [Data-Driven Learning and Language Pedagogy](#)

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Technology and the Study of Awareness

Cristina Sanz and Beatriz Lado

Abstract

Language awareness is an internal phenomenon that can be externally affected by consciousness-raising or attention-focusing techniques. The implementation of technology in the study of second language (L2) awareness is a recent development: The field caught full speed in the mid-1990s, becoming one of the most innovative areas in SLA research. Technology is used to address questions about external conditions leading to awareness, levels of awareness attained during input processing, the association between awareness and language development, and individual variables (such as cognitive capacity) that are posited to explain the differential effects that the same conditions have on the development of awareness. The range of technology used in this subfield of SLA research – which began with audio and video recordings and old-fashioned overhead transparencies – today includes computers that deliver multimedia treatments and tests, as well as recording performance (both accuracy and reaction time), and that are fast replacing paper-and-pencil materials. Computers are also used as tools to record verbal (think-aloud) protocols and to track performance (e.g., click behavior). Furthermore, more complex devices are now being adapted from cognitive psychology and neurolinguistics for use in research on second language awareness; the number of publications that rely on eye-tracking and neuroimaging techniques like functional magnetic resonance imaging (fMRI) and event-related potential (ERP) data is growing exponentially.

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Keywords

Language awareness • Second language acquisition • Feedback • Computer-assisted language learning (CALL) • Input • Explicit learning • Implicit learning

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Introduction

A concise, comprehensive and singular definition of language awareness in second language acquisition (SLA) is not easily found, nor constructed. Given the inclusive nature of the Encyclopedia, however, and for the purposes of this article, we accept the broadest definition possible to incorporate all knowledge of and about language. Language awareness is an internal phenomenon that can be externally affected by consciousness-raising or attention-focusing techniques.

The implementation of technology in the study of second language (L2) awareness is a recent development: The field caught full speed in the mid-1990s, becoming one of the most innovative areas in SLA research. Technology is used to address questions about external conditions leading to awareness, levels of awareness attained during input processing, the association between awareness and language development, and individual variables (such as cognitive capacity) that are posited to explain the differential effects that the same conditions have on the development of awareness. The range of technology used in this subfield of SLA research – which began with audio and video recordings and old-fashioned overhead transparencies – today includes computers that deliver multimedia treatments and tests, as well as recording performance (both accuracy and reaction time), and that are fast replacing paper-and-pencil materials. Computers are also used as tools to record verbal (think-aloud) protocols and to track performance (e.g., click behavior). Furthermore, more complex devices are now being adapted from cognitive psychology and neurolinguistics for use in research on second language awareness; the number of publications that rely on eye-tracking and neuroimaging techniques like functional magnetic resonance imaging (fMRI) and event-related potential (ERP) data is growing exponentially.

Computer-based research on language awareness can be classified into descriptive, question-generating designs, descriptions of procedures or best practices, and reviews of specific technology or software. However, the literature consists mainly of

quantitative, hypothesis-testing studies with designs borrowed from the fields of education and cognitive psychology.

Early Developments

Early studies involving technology and awareness are summarized in Levy (1997) and Chapelle (2001). Levy's volume is one of the first books devoted entirely to the field of computer-assisted language learning (CALL). It describes projects from the 1960s and 1970s (PLATO, TICCIT), as well as advances in the 1980s (Hypercard, The Athena Language Learning Project) and 1990s (The International Email Tandem Network, CAMILLE). The author discusses implications of the role of computers – either as a tool, as in CMC (computer-mediated communication), or as a tutor, as in CALL – in terms of learning environment, methodology, the role of teacher and learner, implementation in the curriculum, and evaluation. Chapelle (2001) goes back to the 1950s in evaluating different computer applications to the study of SLA, including research, language learning, and language testing. Her volume draws on different disciplines, such as Educational Technology and Computational Linguistics, and applies primary concerns in those fields to CALL in order to better address the question of how computers can improve language learning. A brief overview of the role of technology in L2 learning is provided by Blake (1998), who explains the changes the field had undergone during the previous 30 years with regard to the hardware base, the role of the learner, and presentation format.

Focusing on the use of computers for research, Hulstjin (1997) reviews 20 published studies that have used computers for input presentation, learning instructions, feedback, and the elicitation and registration of responses, with or without latency (reaction times). Hulstjin (2000) describes the various ways in which computers have been used to elicit L2 data, including grammaticality judgment tasks, the preferred technique for measuring metalinguistic awareness, and others, such as sentence matching tasks and word recognition. Research conducted by Hulstjin himself during the 1990s included computer-aided designs that investigated the use of electronic dictionaries and measured reaction times in word and sentence recognition to better understand incidental vocabulary learning.

Major Contributions

Major contributions to the field have appeared both in language acquisition journals (*Studies in Second Language Acquisition*, *Modern Language Journal*, *Language Learning*, *Applied Psycholinguistics*), usually focusing on awareness and its operationalization and measurement, as well as in technology journals (*CALICO*, *Language Learning & Technology*), usually focusing more on technological details. As opposed to a more descriptive approach in the earliest reviews, the field has

recently taken a more analytical point of view. Warschauer (2004) argues that the discipline started with a structuralist standpoint during the 1970s, then moved on to a more communicative position during the 1980s, and this eventually led to the present integrative content-based approach. However, Bax (2003) claims that Warschauer's classification is ambiguous and does not account for aspects such as the evolution of the software or the type of activities implemented in CALL. As a consequence, Bax proposes an alternative analysis in which he includes three approaches (restricted, open, and integrated) that incorporate, among other elements, the following: the type of task, the teacher's role, and the feedback offered to the student. Zhao's meta-analysis (2003) concludes that technology-based language instruction can be as effective as teacher-delivered instruction; curriculum and content development need to be addressed and empirical evaluations conducted.

Studies implementing computerized treatments in their designs have addressed a current concern in SLA, namely, whether language development is possible without attention or awareness during input processing (Schmidt 2001). Attention and awareness in relation to language development have been measured either online, with think-aloud protocols (Leow and Bowles 2005), or offline, with debriefing questionnaires (Robinson 1997b). Robinson (1997b) investigated whether different computerized treatments (i.e., implicit, incidental, and rule search) on simple and complex grammatical rules in English could lead to different levels of awareness (i.e., noticing, looking for rules, ability to verbalize rules). The results revealed that participants in the rule-search and instructed conditions looked for rules more than those in the implicit condition. Moreover, it was found that only awareness at the level of looking for rules and ability to verbalize the rules positively affected learners' accuracy. Rosa and Leow (2004) further investigated the role of awareness in L2 development by implementing verbal protocols. Participants were exposed to (+/- explicit) computerized treatments (LIBRA cards) to teach Spanish contrary-to-fact past conditional sentences. The study concluded that greater explicitness in learning conditions led to a higher level of reported awareness, and that higher levels of awareness were related to greater L2 development.

Technology has also been implemented in studies that attempt to investigate the roles of type of practice, feedback, and grammar instruction in L2 development under an attentional framework. Computer-assisted research has compared input-based and output-based practice (Morgan-Short and Bowden 2006; Nagata 1998). Implementing Authorware 5, Morgan-Short and Bowden (2006) observed that although there was no difference between groups on interpretation measures, the output-based group outperformed the input-based group on the production of Spanish pre-verbal direct-object pronouns. This difference, however, was short-lived.

Research on feedback includes various consciousness-raising or Focus on Form conditions (Nagata and Swisher 1995; Lado et al. 2014). Nagata and Swisher isolated the effects of more (with metalinguistic information) and less (without metalinguistic information) explicit written feedback. After four computer sessions of practice with a translation task, type of feedback had not affected production of verbal predicates, but metalinguistic information was beneficial for the production of particles.

Although the results in Nagata and Swisher seem to converge with the literature on the positive effects of explicit feedback on language development, studies such as Lado et al. (2014) showed that the advantage observed for the metalinguistic condition disappears in the long term, and that in fact the more implicit condition leads to faster processing and greater long-term accuracy gains.

Other studies have investigated a combination of feedback and grammar instruction (DeGraaff 1997; Sanz and Morgan-Short 2004). DeGraaff (1997) assessed the effects of explicit rule presentation when participants practiced target forms in eXperanto through interaction with a computer lesson developed using TAIGA (1987). Although the results revealed that explicit rule presentation was beneficial, the study is limited due to the nature of the practice and the lack of control over the amount of feedback. To avoid these problems, Sanz and Morgan-Short (2004) isolated the effects of explanation and feedback in their investigation of the acquisition of Spanish word order by comparing four groups combining (+/- explanation) and (+/- explicit feedback). All groups were exposed to meaningful structured input through practice tasks. The implementation of LIBRA allowed for provision of feedback that was immediate, individualized, and focused on the target form. Contrary to previous studies, results from Sanz and Morgan-Short showed no differences. The authors concluded that exposing L2 learners to structured input through task-essential practice was sufficient to promote acquisition, and that in such a context, providing rule explanation, feedback, or both, does not significantly add to the knowledge gained through practice.

The effects of rule presentation have also been studied without feedback (DeKeyser 1995; Ellis 1993; Morgan-Short et al. 2010). Ellis (1993) examined rule presentation of a grammar structure (Welsh soft mutations) with or without examples and concluded that provision of computerized explicit grammar with instances of the target form allowed for generalization at both explicit and implicit levels, thus facilitating language development. Likewise, DeKeyser (1995) showed that explicit rule presentation, as opposed to more implicit conditions, had beneficial effects for the acquisition of categorical rules, and that rules, in fact, were not acquired by the implicit group. In this study, computers were used to expose participants to combinations of written sentences in an artificial language and their corresponding pictures. Morgan-Short et al. (2010) used an artificial language paradigm to investigate the role of explicit and implicit instruction on neural and behavioral measures. Whereas the explicit condition included computer-delivered pre-practice grammar explanation, the implicit learning condition contained only practice. Behaviorally, the results revealed an advantage in performance for the explicit group only at low proficiency, which disappeared at high proficiency. Interestingly, ERP measures revealed that only implicit training led to a fully native-like brain activation pattern.

The role of feedback on L2 development is also being investigated extensively in CMC research, an area that has grown significantly in the last decade. Many of these studies are conducted under an interactionist perspective involving synchronous chat and asynchronous email and address issues such as the role of explicit and implicit feedback in fostering conscious processing and promoting L2 development during interaction (Sagarra and Abbuhl 2013; Sauro 2009). For example, Sauro (2009)

investigated the effect of providing CMC corrective feedback to 23 participants assigned to three groups (control, recast, and metalinguistic) on the development of the English zero article in abstract noncount nouns. The results revealed a significant advantage of the metalinguistic over the control group in immediate gains, a difference that disappeared with time. While feedback in Sauro (2009) was provided by a native speaker during task-based interaction in a text-chat environment, in Sagarra and Abbuhl (2013), the feedback was administered by the computer during practice exercises and was developed to foster error noticing and to promote linguistic accuracy in Spanish gender and number agreement. In this study, which also explored the role of working memory (WM) in the effects observed, participants were assigned to 1 of 4 groups (no feedback, utterance rejection, recasts, or enhanced recasts) both in written and oral mode. The results indicated that recast was more effective than either no feedback or utterance rejection. Additionally, oral enhanced recasts were more beneficial than oral unenhanced and written enhanced recasts. Recasts worked best for high working memory (WM) individuals.

Technology has also played a crucial role in research exploring multimedia annotations and incidental vocabulary learning. The studies conducted in the 1990s concluded that the use of electronic glosses had a positive effect on incidental vocabulary learning, and recent contributions have explored the cognitive processes involved. Bowles (2004) compared computerized with traditional paper-and-pen glosses. Analysis of verbal protocols did not identify differences in noticing, and no differences were identified regarding L2 vocabulary development. Yanguas (2009) used the same conceptual approach but included four computerized conditions (no gloss, text gloss, picture gloss, and text + picture gloss). Results indicated that all experimental groups noticed the words more than the control group, but these differences in processes were not reflected in gains on the production test. Using a different approach, Peters et al. (2009) investigated how the use of three potential computerized enhancement techniques increased online vocabulary use and word retention during and after reading an L2 text. The techniques included: (1) informing students that the reading task would be followed by a vocabulary test, (2) making students pay attention to unfamiliar words in the reading text by asking comprehension questions, and (3) requiring students to complete a vocabulary task after reading the text. The results indicated that only 1 and 2 made participants use the online dictionary more. Additionally, whereas 1 and 3 had a positive effect on a word recognition test, 2 and 3 had a positive effect on word retention in the recall posttests.

Corpus linguistics is leading to the development of linguistic theories that challenge existing orthodoxies in applied linguistics. It also raises a number of questions, such as how corpus data should be interpreted, and how it can be applied to areas in which applied linguistics is active, including language awareness. Hunston (2002) as well as Granger, Hung, and Petch-Tyson (2002), are accessible introductions to corpus linguistics and essential for anyone interested in corpora and its impact on applied linguistics. Finally, Jones and Haywood (2004) provide an example of research that incorporates corpus linguistics into the study of awareness. They found that the use of corpus-based tasks increased learner's awareness of formulaic

sequences, although this awareness did not transfer to more production of these phrases in their own writing.

Work in Progress

A substantial number of projects that implement technology in the study of language awareness are currently underway. Some use technology to enhance the development of awareness. For others, technology allows for the observation and measurement of awareness. More integrative projects combine both motivations to include technology, an example of which is *The Latin Project* (TLP). Designed by Sanz and then graduate students Bowden and Stafford in 2003, it is an investigation of the interaction between prior experience with language (bilingualism) and type of input (varying in degrees of explicitness) that includes cognitive variables (working memory and awareness) as moderating variables. The design is experimental with computer-delivered treatments and tests, including oral and written interpretation, grammaticality judgment, and production, combining old items (present in the treatment) and new items. Computers also administer a battery of working memory tests, debriefing questionnaires, and gather think-aloud data for the study of the role of awareness during online processing. The design consists of a web-based application combining Flash and ColdFusion programming tools that delivers oral and written input combined with images. The application also gathers reaction time and accuracy data and stores it in a database available online. Web delivery allows for data gathering wherever a personal computer can access a high-speed network. While the goal of the input-based treatments is to promote language development, in designing the tests the researchers strived to provide the most comprehensive picture of language knowledge and its degrees of automatization to include both explicit and implicit knowledge. *The Latin Project* has produced ten publications reporting empirical studies with college-age and older (60+) learners, monolinguals, and bilinguals of different proficiency levels. Results across studies show that *all learners* benefit from “doing something” with input that carries meaning, that has been manipulated to make it salient, that is frequent, and leads to error. In general, advantages for more explicit conditions tend to be lost over 2/3-week interval, but retention is observed when transfer of tasks is involved (from input-based practice to production tests) and for the most complex aspects of the structure (Stafford et al. 2012). However, TLP studies also show that explicit instruction helps and hinders depending on the learner’s background. For example, older adults can learn in the absence of explicit instruction, but when instruction is provided, the timing of explicit input makes a difference: During practice (as feedback) it is detrimental; prior to practice, it gives an advantage to aging bilinguals compared to aging monolinguals (Cox and Sanz 2015).

SLA researchers have begun to discover the potential contributions of new methods, including neuroimaging techniques to the study of SLA. Two such techniques are event-related potentials (ERPs) and functional magnetic resonance imaging (fMRI). ERPs measure the brain’s electrical activity and provide temporal

information that reflects the neural processing of an event. fMRI measures the brain's hemodynamic response to an event and provides information about what part of the brain is activated in response to an event. Eye-tracking data studies attention during online processing recording and calculating gaze direction and duration. Less expensive and more popular is Praat (Boersma and Weenink 2015), a software application for the analysis of speech in phonetics, and software like e-Prime that allows tracking reaction time (i.e., RT or Latency). RT refers to the amount of time (in milliseconds) between the presentation of a stimulus and the behavioral response of interest (i.e., making a decision and pressing a key). Generally, faster RTs are considered to reflect efficient, fast execution of the mental procedures involved, though there is still debate among some SLA researchers as to whether "faster" is also "more automatic" or is instead related to speeded-up control (explicit) procedures. Work in progress relies on ERPs (Faretta-Sttutenberg's dissertation out of Morgan-Short's lab), eye-tracking (Sagarra and Sanz), self-paced reading (Marijuan), Praat-processed data (Nagle et al. 2016), and latency (Grey et al. 2015) to understand the interplay between cognitive abilities and context of learning and to test new, frequency-based approaches to language development. Taken together, these studies are characterized by a multi-dimensional approach that assesses changes in linguistic abilities (overall proficiency, grammaticality judgments, accuracy in sentence processing, lexical access, pronunciation) and online processing (ERPs, latency, gaze) among intermediate and advanced learners of Spanish as a second language. Directly related to this entry, these studies are looking at the role of awareness in language development in the absence of explicit instruction, i.e., as a result of intensive exposure to the L2 input during study abroad, in the absence of classroom instruction focused on language, and therefore in the most implicit learning context possible.

The abovementioned research by Morgan-Short, Sanz, Marijuan and colleagues was presented in the year 2015 at the American Association for Applied Linguistics (AAAL), the *Second Language Research Forum* (SLRF), Eurosla, and the 10th International Symposium on Bilingualism (ISB), where most empirical studies on awareness in multilinguals are made public.

Problems and Difficulties

We began this article with the theoretical statement that there is not one definition of language awareness but many, and that, for the purposes of the article, we accepted the broadest definition possible to incorporate all knowledge of and about language. A narrower definition would include only conscious knowledge of the language, that is, knowledge of which the learner is aware. An even narrower use of awareness, linked to Schmidt's noticing hypotheses, distinguishes between language information that has been processed in working memory under attention, a required condition for input to become intake ready to feed the acquisition process, and that which has not. Confusion over terminology is a serious problem: awareness, consciousness, and explicitness are often used as synonyms. Sometimes they are applied to input

processing, to knowledge, to input, even to pedagogical techniques. Naturally, because constructs are hard to define, measurements will also be challenging.

In research on awareness it is often necessary to reformulate tests and revise coding procedures. Researchers have to make decisions about which technique to include in the design: Online measures, such as concurrent think-aloud protocols, might turn against the researcher by altering the very processes under investigation (i.e., reactivity). Offline measurements, like debriefing questionnaires and stimulated recalls, have problems of veridicality: Is the participant making up processes that never took place while completing the task? Whether online or offline, lack of verbalization does not mean lack of awareness: Absence of evidence is not evidence of absence. These problems in the study of awareness during processing parallel those in the study of explicit and implicit knowledge. Most acquisitionists hold that competence is equivalent to implicit knowledge, so the litmus test for effectiveness of a pedagogical technique is whether it positively affects implicit knowledge. The problem is how to determine that learners did not use their conscious knowledge of rules to monitor their responses. Finally, a common limitation that L2 researchers outside the cognitive approach associate with the studies reported here is that of validity. Often, researchers have to choose between a preference for naturalistic language behavior and controlled collection procedures that result in highly restricted, sentence-level data. In those studies that compare teacher-directed versus computer-assisted language instruction, the Hawthorne effect is almost unavoidable. And to conclude, as in most SLA research, the disparity of methods implemented and the lack of replication are a challenge for any scholar trying to draw general conclusions from the research (Sanz 1997).

Including multiple tests (interpretation, production, judgments), measures like latency (i.e., reaction time), and techniques such as eye-tracking and neuroimaging in the design are ways in which researchers are taking advantage of technology to avoid some of the limitations listed above, but they face practical challenges related to the availability of samples, hardware, software, and technical help. Compensation for participants, programmers, workshop attendance to learn the techniques, and equipment rental and acquisition make this research much more expensive than classic paper-and-pencil tests administered in the classroom. These conditions make the availability of institutional funding a determining factor. Further detail on challenges as perceived by researchers themselves can be read in Sanz et al. (2015).

Future Directions

In cognitive psychology, laboratory studies that utilize technology for data collection are the norm, as technology allows for tighter control of individual and environmental variables as well as finer measures of the effects of treatments. For example, response time, gaze (direction), time spent on particular portions of written input (eye-tracking), response tracking (mouse-tracking, clickers) for the analysis of speed (latency), frequency, and type of errors during treatment, in addition to classic accuracy scores, are all measurable thanks to the use of technology. Acquisitionists

nowadays are striving to adapt to the study of SLA techniques that are common in cognitive psychology, including new measurements of awareness.

Technology is rapidly replacing paper-and-pencil delivery, allowing for individual exposure to the treatment, facilitating randomization of participants, and control of key variables in the treatment, such as the amount and type of feedback or input frequency to which each participant is exposed, even to individually adapt treatments based on performance. Computers also make research more convenient: Instead of simultaneous use of an overhead projector, a VCR, TV sets, and multiple copies of the testing and treatment materials, all that is needed is a computer. If the application is web-based, as in *The Latin Project*, both data gathering and access to the database are possible in multiple sites around the clock. Other advantages are also important: Multimedia capabilities make the lesson far more attractive to the user and allow for provision of video and audio input simultaneously, thus accommodating different learning types and expectations among young learners.

To conclude, laboratory research on language awareness will continue to increase the implementation of technology in the design as more and larger laboratories become available, research institutions hire technicians, and software becomes more adaptive and affordable. Additionally, the field is rapidly moving beyond computers to make use of specialized devices such as eye-trackers, EEGs, and MRI units.

Cross-References

- ▶ [Data-Driven Learning and Language Pedagogy](#)
- ▶ [Eye-Tracking Research in Computer-Mediated Language Learning](#)
- ▶ [Learner Corpora in Foreign Language Education](#)

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Eye-Tracking Research in Computer-Mediated Language Learning

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Abstract

Though eye-tracking technology has been used in reading research for over 100 years, researchers have only recently begun to use it in studies of computer-assisted language learning (CALL). This chapter provides an overview of eye-tracking research to date, which is relevant to computer-mediated language learning contexts. We first examine some of the foundational work, basic assumptions and key constructs in eye-tracking research and then explore uses of eye-tracking in second language (L2) educational contexts. We then examine the modest but growing amount of research in CALL settings and illustrate the technique's facility for contributing to SLA-relevant CALL research. We touch on some of the known CALL-relevant eye-tracking research in progress and also discuss some of the challenges researchers are likely to encounter when employing eye-tracking techniques. We end with a discussion of possible future directions and developments for eye-tracking in CALL settings.

Keywords

Eye-tracking • Computer-assisted language learning (CALL) • Second language acquisition • Human-computer interaction (HCI) • Noticing • Awareness • Saccades • Task complexity

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Introduction

Research into eye movement behavior – commonly known as “eye-tracking” – is a fairly new methodology in second language acquisition (SLA) research (Winke et al. 2013) and educational literature (Lai et al. 2013; van Gog and Scheiter 2010). The technique, however, has been used for many decades in psycholinguistic studies looking at first language (L1) processing, research into Human-Computer-Interaction (HCI) and visual scene perception (Poole and Ball 2006; Rayner 2009). The basic assumption of eye-tracking is the existence of the “eye mind link” (Just and Carpenter 1980), that is, information that is in the focus of visual attention is also the focus of current cognitive processing. The most widely used measures of eye movement behavior are (a) fixations (a relatively stable eye movement focusing at a specific point, for example, a word on a screen) and (b) saccades (consecutive movements between fixations). A third measure (c) regressions (movements in the counter direction of reading) is commonly used in reading research as it indicates readers’ reinspection of earlier text. During fixations, people can extract information from the foveal area (central 2°) of their visual field. In contrast, during saccades and regressions, information encoding is thought to be impossible (Roberts and Siyanova-Chanturia 2013). Typically, proficient first language (L1) readers of English exhibit fixations of about 200–250 ms milliseconds while saccades comprise 7 to 9 letters (Rayner 2009). However, there is substantial variability both within and between readers, for example, some fixations may only last 100 ms, whereas others may be more than 500 ms. Longer fixations, more regressions, and shorter saccades can be seen as indicators of greater processing complexity and difficulty (Poole and Ball 2006; Rayner 2009; van Gog and Scheiter 2010).

Using eye-tracking methods is particularly useful in second language acquisition (L2) research because they allow for the study of moment-by-moment processing decisions during natural, uninterrupted comprehension without the need to rely on participants’ strategic or metalinguistic responses (Roberts and Siyanova-Chanturia 2013). It is therefore surprising that to date so little CALL research has made use of eye-tracking given that both CALL and eye-tracking research typically requires participants to work on a computer or other digital device which, in the modern era, constitute naturalistic settings with a high degree of ecological validity (O’Rourke 2008). Because scholarship using eye-tracking in CALL environments

is just emerging, we will first report on major findings from relevant L2 eye-tracking research in general. Eye-tracking research in computer-mediated communication (CMC) environments will be discussed under **major contributions** below.

Early Developments

Eye gaze studies in L2 research have received growing attention over the past two decades. The majority of earlier work focused on spoken word recognition by bilinguals in both their languages and differences between syntactic processes of L1 versus L2 speakers (Dussias 2010; Roberts and Siyanova-Chanturia 2013). However, eye-tracking techniques have recently been employed to examine specific constructs in SLA theory. For example, Sagarra and Ellis (2013) used eye-tracking to explore aspects of the associative learning theory, Godfroid and Uggen (2013) used eye-tracking in examining L2 learners' attention to verb morphology, and Winke (2013) used this technique to test the claim that input enhancement (Sharwood Smith 1993) is a relatively unobtrusive technique to promote learner attention to targeted linguistic forms. Thus, L2 eye-tracking studies have looked at various facets of instructed SLA theory such as attention and task-based cognitive processing as well other areas such as language testing (e.g., Bax 2013; Brunfaut and McCray 2015; Suvorov 2013) and video captioning (e.g., Montero Perez et al. 2015; Winke et al. 2013). Since one of the clearest potential uses for eye-tracking is its ability to provide rich learner process data, the following review will highlight a selection of studies that have explored L2 processing and language learning.

Godfroid et al. (2013) used eye fixation times as a measure of noticing unknown words during EFL reading. Noticing was defined as "a cognitive process in which the amount of attention paid to a new language element in the input exceeds a critical threshold, which causes the language element to enter working memory and become the object for further processing" (p. 493). It was operationalized as increased fixation duration on a target pseudo-word in comparison to fixation duration to a baseline known word. Results showed longer focal attention for target than control words. Crucially, gaze duration was positively related to the likelihood of word retention on a subsequent vocabulary test. The authors interpret this as evidence that eye-tracking metrics can measure noticing (see also Godfroid et al. 2010).

In another study of noticing, Kuhn (2012) focused on error detection in lengthier texts by EFL users. With self-built eye-tracking equipment, he established that noticing could be related to total fixation durations of an average duration of 400 to 500 ms. However, considerable individual differences existed in terms of exact lengths. In Kuhn's study, noticing was positively related to error correction by the EFL participants. Again, this work supports the use of eye-tracking techniques in investigating the construct of noticing.

More recently, Révész et al. (2014) applied eye gaze measures to task-based language pedagogy to objectively gauge the cognitive demands induced by low- and high-complexity versions of a structure-focused picture selection task targeting the

production of past counterfactuals (*if... then*-clauses). The eye-tracking data (total number and total duration of eye fixations) distinguished significantly between the two levels of designed task complexity. Similarly, Michel et al. (2015) sought independent evidence for their manipulation of task complexity (simple vs. complex) on three different types (narrative, map, decision making) of L2 speaking tasks. Their data showed limited relationships between the eye-tracking measures (eye fixation count and duration as well as saccade latencies) and degree of complexity in contrast to stimulated recall data and subjective as well as expert ratings (Révész et al. 2016b). Given the characteristics of their tasks (speaking based on a visual stimuli), Michel et al. (2015) conclude that our current measures of eye gaze behavior might not suffice as estimates for gauging L2 processing during multimodal perception and production tasks.

Recently, Montero Perez et al. (2015) looked at word form recognition after participants watched captioned videos for a class on French economics. Target words were either presented on their own (key word) or in context (sentence including key word). Before watching the captioned movie, participants were either informed (intentional group) or not informed (incidental group) about a follow-up vocabulary test. Results show that participants in the key-word caption group outperformed the full-sentence caption group. Those in the intentional-full-sentence group showed positive correlations of the word recognition scores with total fixation duration, indicating that noticing and learning are supported by intention.

In educational research related to CALL, that is, multimedia learning, eye gaze analyses have been employed (a) to support or reject explanations for well-documented effects in learning (e.g., split-attention effects); (b) to improve learning material as we gain a better understanding of the underlying processes; and (c) as an instructional tool in itself, for example, by replaying eye gaze recordings to learners (van Gog and Scheiter 2010).

To summarize, the earliest studies using eye-tracking methodology in fields related to CALL have provided evidence that eye gaze data can aid in our exploration of concepts relevant to instructed SLA theory. In the subfield of CALL itself, however, there is only limited work available. Most of these pioneering efforts tap into computer-mediated writing and, more specifically, written synchronous computer-mediated communication. The next section will review these studies.

Major Contributions

To date, only a handful of studies have been published that used eye-tracking in a CALL environment. These studies are mostly of a qualitative, small-scale, and explorative nature and focus on synchronous computer-mediated communication (SCMC or text chat). This is largely because the earliest CALL researchers to adopt eye-tracking technology did so as a way of providing more robust learner process data to describe SCMC phenomena. Until recently (and continuing on today, unfortunately) many SCMC studies relied solely on chat transcript logs – a very static approach to explaining an extremely dynamic process (e.g., O'Rourke 2008;

Smith 2010). In this line of argumentation, Smith (2010, 2012) argues that eye gaze data may help to inform some of the contentious debates in SLA (e.g., is noticing a prerequisite for learning?) and that the gaze tracking may be able to confirm or disconfirm other established but more intrusive methodologies (e.g., stimulated recall and think-alouds). Given their low number, each of these studies will be reviewed by highlighting their major insights.

The earliest published CALL study that employed eye-tracking technology is O'Rourke (2008). He used eye-tracking as a method of illustrating the insufficiency of relying on output chat logs alone. While examining just a very short extract (14 turns) of one native speaker chatting with an English L2 user of German he revealed illustrative behavioral patterns during SCMC. The tracking of eye movements revealed learner habits that could not have been detected using other sources. For example, participants displayed three different behaviors when reading their own output (a form of monitoring): (a) reading while drafting (simultaneous monitoring); (b) reading after drafting but before sending (presend monitoring); and (c) reading after sending (postsend monitoring).

O'Rourke (2012) extended his earlier analysis which revealed at least three types of information eye gaze data may provide. First, the author analyzed "fixation intervals, [defined as] the time that elapses between the end of one fixation and the start of another" (p. 321). Interpreting fixation intervals of 500 ms or longer as transitions between the screen and the keyboard, the author showed that the same speaker made more transitions and had shorter intervals in the L2 than in the L1. This pattern ties in with a view that more monitoring is needed when conversing in a language other than the mother tongue. Second, O'Rourke identified two different gaze behaviors when looking-back, that is, reading the on-screen transcript of the conversation. There is "target-focused scanning", fast reading to search for an item one recalls in order to inform one's own writing, for example, checking the correct spelling of a word used earlier. In addition, while waiting for the contribution of their partner writers "browsed" through the earlier turns, which seemed to function as a way to refresh and organize the recent discourse. Third, the gaze replay allowed one to reconstruct sequential aspects the individuals' chat experience. That is, the chat log alone does not show in what sequence an individual likely noticed salient information in the conversation, but the eye gaze record does.

Prendergast (2011) qualitatively analyzed discourse patterns, negotiation routines, and noticing during SCMC drawing on the eye gaze data of six English participants conversing in French with a native speaker tandem partner. The results reinforce many of the findings of O'Rourke's studies (e.g., individually sequenced experience). One additional outcome was that in the NNS-NS dyads, typos by the NS often resulted in longer/more fixations by the NNS and sometimes triggered language related episodes or uptake of the erroneous spelling.

Likewise, Örnberg Berglund (2012, 2013) reiterates O'Rourke's findings, specifically, how eye gaze data help to reconstruct the experienced conversation. Her data are based on a small-scale study among eight L2 users of English chatting with their teacher who provided corrective feedback. In addition to eye gaze recordings, she also collected keystroke logging data. Based on a qualitative analysis she argued that

participants often seemed to be focused on their own writing and read the teacher's contributions only once they had finished with their own composition and had hit the enter button. Still, all of the teacher's comments were seemingly noticed, though at times long (up to 2 minutes) after they were posted. Furthermore, Örnberg Berglund provides evidence that the feedback target needs to be understood by a learner before it triggers increased fixation counts and times.

The work of Smith is a major step forward in eye-tracking SCMC interactions. He takes a more quantitative approach to using eye gaze data in SCMC and introduces gaze data as a measure of noticing (cf. Godfroid et al. 2010). Smith (2010) investigated the visual behavior of eight L2 users of English conversing with a native speaker who provided recasts. This study targeted the following research questions: (a) Do learners notice intensive recasts; (b) Do some types of intensive recasts get noticed more than other types; and (c) Does noticing lead to target-like use of the recast item. Noticing was defined as a fixation of at least 500 ms. Findings revealed that learners attended to (i.e., noticed) roughly 60% of intensive recasts at this level. Furthermore, the data showed that lexical recasts were much easier than grammatical recasts for students to notice, retain, and produce more accurately on a written posttest. Finally, lexical recasts were used more productively in the subsequent chat interaction.

In a follow-up study, Smith (2012) targeted the noticing of recasts by 18 L2 users of English who were chatting with a native speaker. Noticing in the eye gaze data were established through coding of heat maps (and not a specific minimum fixation duration). Accordingly, items were coded as having been noticed when longer viewing times (i.e., "hotter" in the heat map) were visible relative to baseline viewing data. These "noticing events" in the eye gaze record were compared with those present in stimulated recall comments. Both noticing events were analyzed in relation to gains on immediate and delayed posttest scores on the recast items. Results showed that while both measures of noticing were able to predict posttest success, the eye fixations were slightly better indicators. Findings also revealed that learners engaged in similar amounts of viewing activity across recasts targeting various linguistic categories. Overall, semantic and syntactic targets were noticed more easily than morphological targets.

The study by Smith and Renaud (2013) extrapolated the above setup to Spanish and German as target languages. Sixteen learners interacted with their tutor receiving recasts on morphosyntax and semantics. This time, noticing was defined as any fixation longer than 200 ms. The analysis counted both the total duration of all fixations and the total number of fixations. Findings showed a positive relationship between increased "total" time of eye fixations on lexical and grammatical form and posttest success on previously unknown targets. Moreover, data tentatively suggested that recasts that were fixated on exactly three times were most successful in yielding correct posttest answers. Finally, the gaze data provided evidence that recasts were noticed about 72% of the time – an encouraging number.

Leaving the area of SCMC, Stickler and Shi (2015) employed eye gaze data and stimulated recall when researching what learners (N=10) attended to during multi-modal online Chinese Tutorials. Heat map analyses showed great variation (3% to

97%) in the use of Pinyin. That is, participants at lower levels (beginners to intermediate) did focus a lot on the Pinyin script, while more advanced learners spent most of the time on the Chinese characters. The eye gaze data also revealed some unexpected user behavior, for example, participants spent quite some time on the “social” areas of the screen which indicated who was currently acting in the online environment.

To summarize, the work so far using eye-tracking methodology in a CALL context has focused on SCMC. Most of these studies are exploratory in nature and helped to identify characteristics of learner attention. Most importantly, eye gaze data have provided evidence for different monitoring and reading patterns (e.g., scanning vs. browsing) and have lent support to the assumption that each chat partner experiences an individual chat conversation, in particular because contributions are perceived and noticed in a different sequence from which they appear in the chat log (O'Rourke 2012). The works of Smith (2010, 2012) and Smith and Renaud (2013), taking a more quantitative approach, have shown how eye fixation data can be related to noticing and language development. Their work represents a methodological step forward because they propose how to quantify the noticing of recasts during SCMC. Taken together, the work on eye-tracking and SCMC provides strong arguments for the perspective that CALL via text chat must not be studied by means of chat transcript analyses alone as these present impoverished data, which at a minimum underreport key aspects of the interaction. Eye-tracking methodology can help overcome this shortcoming. Finally, Stickler and Shi (2015) have made an important first move to use eye gaze data to understand learner's viewing behavior in an online tutorial environment. With growing numbers of online language classes, more work in this area is to be expected.

Work in Progress

With eye-tracking equipment becoming more affordable, a growing number of CALL researchers have now started to use eye-tracking methodology in their work. Recent CALL conferences have seen several papers presented that use eye gaze recordings. These studies investigate SLA constructs and hypotheses, provide glimpses into learner processing, and examine the viability of certain pedagogical tools in language education. For example, Boers et al. (2015) explore the question of which type of glosses for vocabulary items in a reading prompt (verbal, pictorial, or multimodal) most support productive post-reading communication. Gilabert and Vasylets (2015) created captioned movies where target formulaic sequences were input enhanced. Using a pretest posttest design, learning gains on the enhanced input were explored and related to eye fixation duration and count. Latimer (2015) is investigating what information L2 writers use when engaged in a computerized reading-into-writing test targeting academic writing. Her design includes eye gaze recordings, keystroke logging, and stimulated recall and attempts to triangulate these sources in order to understand the different processes of writing and reading. Similarly, Révész et al. (2016a) combine keystroke logging, stimulated recall, and

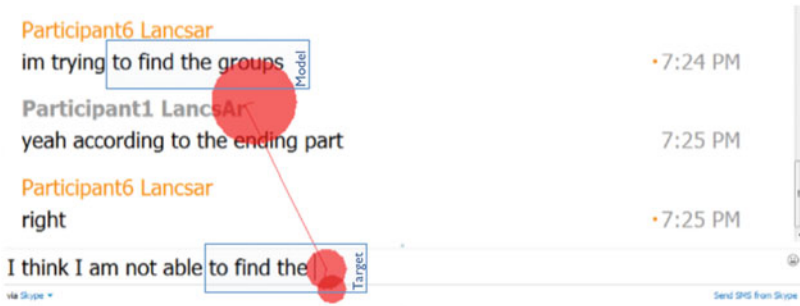


Fig. 1 Screen shot of an SCMC conversation with eye gaze indicators

eye movement recordings to explore the relationship between receptive and productive online text processing on the one hand, and the quality of the writing product, that is, the text produced, on the other hand. Finally, Michel and Smith (2017) are investigating alignment during task-based text chat interactions between L2 users. Where chat log analysis suggests convergence of SCMC partners at both the lexical and structural level, eye gaze data can confirm or reject attention to potential models. Figure 1, above shows a short stretch of conversation between two participants. Dots represent fixations and are larger the longer a fixation is. Lines represent saccades between those fixations. Here participant 1 consults the construction “to find the groups” of participant 6’s turn (Model) when writing “to find the groups” herself (Target).

Problems and Difficulties

Early adopters of eye-tracking techniques in CALL research seem to agree on both the benefits and challenges of this methodological approach. On the positive side, eye gaze recordings (and stimulated recall protocols based on eye gaze replay) provide exciting insights into L2 online processing millisecond by millisecond. As such, it allows us to investigate computer-mediated language learning using a dynamic tool that is sensitive to the dynamic processes of learning. Importantly, the method provides processing data in an ecologically valid environment without interfering with the aim of a pedagogical task.

One apparent drawback of eye-tracking methodology is the cost of the equipment. Even though relatively inexpensive options exist (e.g., <https://theyeyetribе.com/>; <http://www.mirametrix.com>), only the more established systems (e.g., Eyelink, SMI, Tobii) are equipped with user-friendly software that allows data collection, processing, and analysis without extensive programming knowledge. For these latter options, however, both the software and hardware are still very expensive.

A second and more important issue is that the data collection yields a quantity and richness of data that is sometimes intimidating. Many CALL researchers might feel

overwhelmed by the unwieldy amount of information one receives from gaze recordings. Taking decisions about what data to use and what to discard is an important interpretational step that requires the researcher to understand the concepts and psychological processes underlying eye movements and fixations. Much of the SLA-relevant eye-tracking research has looked at reading processes in a controlled laboratory setting where the target is an item that is presented at a predefined time and position, for example, words appearing at given X/Y coordinates of a screen at regular intervals.

In contrast, the nature of CALL data is that it includes multimodal and dynamic information, which often requires both receptive and productive language use. For example, in task-based SCMC, we do not know beforehand what will be written by a participant. Therefore, we cannot predefine what text will be typed, if and when text will be edited, deleted, revised, and so on. Most importantly, in SCMC what appears on the computer screen is dynamic rather than static. This poses a challenge because as soon as a chat participant hits the enter button, the information on the screen moves up. Also when scrolling through the previous chat conversation, the screen content changes position. As a result, any target area of interest (AoI) that was identified for analysis (most eye-tracking software requires identifying AoIs by means of X/Y coordinates) will have a new location. As such, the abbreviation SCMC could equally stand for data that is *Spontaneously Created and Moving Constantly*, a fact that complicates data analysis.

Similar dynamic characteristics are inherent to any form of computer-mediated behavior, for example, writing emails or text documents; reading, scrolling, and following a link while browsing the web; and changing between different tools by opening and closing windows. Consequently, typical CALL activities create a combination of rich and dynamic data, which requires demanding and laborious manual evaluation before any standard eye gaze metrics (fixations, saccades) provided by current software packages can be exported for statistical data analyses.

In addition, traditional measures are likely to be unsuitable for CALL data. For example, how long is a saccade that includes scrolling? How do we define reading in SCMC (O'Rourke 2012)? What are minimum and maximum thresholds for duration and number of fixations for noticing, in particular on text that has been revised or deleted (O'Rourke 2008; Smith 2010)?

Given these challenges, it is no wonder that to date most eye movement research into CALL has remained exploratory. Future work will need to address these issues so we can complement the valuable insights from earlier qualitative explorations with more quantitative and generalizable findings.

Future Directions

The future of eye-tracking methodology in CALL environments will be both exciting and enlightening given the fact that there is still so much to investigate. Its progress will largely depend on technological advances that (a) make the equipment available at lower costs; (b) allow less complex processing of the large amounts of

dynamic data inherent to CALL; and (c) enable gaze recordings on other devices, such as mobile phones and tablets. For the specific field of language learning in digitally mediated contexts, we could reiterate Lai et al.'s (2013) request for eye-tracking in education:

“[A]s far as the data analysis software is concerned, collaboration between software engineers and educational researchers could help to modulate existing data analysis programs, making them suitable for education studies while reducing the cost of software development. In short, it is possible to cut down the price of eye-tracking systems if we take into consideration the specific needs and features of educational research” (p.100).

Apart from collaborations with engineers, future work will benefit from combining eye gaze data with output from other tools (e.g., keystroke logging for writing; optical character recognition for screen replay information), research expertise (e.g., corpus linguistics, human-computer interaction, multi-media learning), and triangulation with other more established (offline) measures of SLA, such as stimulated recall, comprehension tests, and verbal protocols (Hyönä 2010).

In the near future, CALL researchers will need to develop standardized approaches for the analysis of eye movement data in a computer-mediated environment. Similarly, it is imperative that the field proposes and evaluates new standard measures to complement traditional metrics used in eye-tracking research that might not be appropriate for CALL. Further down the road, it is not unlikely that technological advances in the field of HCI will create gaze-based adaptive systems that create new and exciting avenues for CALL.

Cross-References

- ▶ [Computer-Assisted Language Assessment](#)
- ▶ [Learner Corpora in Foreign Language Education](#)
- ▶ [Technology and the Study of Awareness](#)

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