Ecologies of Digital Literacies: Implications for Education

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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.

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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, "messing 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

Related Articles in the Encyclopedia of Language and Education

Kevin Leader and Cynthia Lewis: Literacy and Internet Technologies. In Volume: Literacies and Language Education
Brian Street: New Literacies, New Times: Developments in Literacy Studies. In Volume: Literacies and Language Education

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