Chapter 8
Letting the Light Shine in: A Tapestry of Digital Literacies in Canadian Faculties of Education

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Abstract The fabric of digital literacy learning and the measurement of digital competence in Canadian faculties of education is multi-colored and multi-textured. The threads connecting these digital literacy practices and research are loosely stitched together into a national tapestry, full of holes and imperfections. Yet, just as Canadian singer/songwriter Leonard Cohen suggests, these cracks allow the light to shine through. By reviewing research from across the country, this chapter illuminates distinctive patterns in teaching, learning, and research into digital literacies and digital competencies in faculties of education. Singular threads reveal trends that enhance digital literacy learning and digital competency development. Research into digital readiness, a digital competence profile, and self-study scholarship reveals the patchy nature of measurement of digital literacies in Canadian faculties of education. This chapter concludes with insights into contextual factors that impact teaching and learning in faculties of education in Canada. This chapter illuminates limitations and barriers, the cracks in the development of digital literacies in teacher education programs, which allow individual lights of innovation to shine across this vast and diverse country.

Keywords Digital literacy · Digital competency · Faculties of education · Canadian · Research

8.1 Introduction

The threads woven into the fabric of digital literacies learning and measurement in Canadian faculties of education is multi-colored and multi-textured. This fabric, loosely stitched together into a national tapestry, is full of holes and imperfections. Yet, just as the famous Canadian singer/songwriter Leonard Cohen recorded, "there is a crack in everything, that's how the light gets in" (Leonard Cohen Lyrics "Anthem",

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Ł. Tomczyk and L. Fedeli (eds.), *Digital Literacy for Teachers*, Lecture Notes in Educational Technology, https://doi.org/10.1007/978-981-19-1738-7_8

2021), these national limitations allow individual lights of innovation to shine from across this vast and diverse country.

Since education is not a nationally mandated public service, a patchwork results as each of the ten individual provinces and three territories determine not only policy, but the funding and delivery of educational programs (Gallagher & Rowsell, 2017; Hoechsmann & DeWaard, 2015). This fabric is further fractured by the various ministerial levels and layers that govern and oversee kindergarten to grade twelve (K-12) and higher education (HE) programs. Each faculty of education, within the larger university context, is a unique swatch of fabric, providing support and service to the larger education sector found within individual provinces and territories. Additionally, in some locations, governing bodies (e.g., Ontario College of Teachers) determine the accreditation status of faculties of education, which adds to the profusion of threads and colors woven into the governance of teacher education in Canada.

Into this tapestry, the issue of digital literacy is often called for, yet remains a thread that is challenging to firmly weave into faculty of education programs (Hoechsmann & DeWaard, 2015; McLean & Rowsell, 2020) and is sporadically in evidence within the curriculum documents in the K-12 sector across the country (Gallagher & Rowsell, 2017). The *Canadian Council of Ministers of Education* and the *National Council of Teachers of English* have emphasized the need for enhanced literacy development in conjunction with technology competencies in education for all provincial education jurisdictions. The *Canadians for 21st Century Learning & Innovation* document Vision for twenty-first century learning in Canada (2012) identifies key skills and competencies learners should possess, which suggests that teachers, preservice teachers, and teacher educators should also possess these skills and competencies. Challenges also lie in the terminology and definitions used when referring to digital literacies (DL) or digital competencies (DC), as well as perceived intergenerational preferences when teaching and learning with technology (Hadziristic, 2017).

Research literature from across the Canadian faculty of education tapestry reveals isolated courses and initiatives modelling digital literacies (Hagerman & Coleman, 2017), yet measuring the outcomes of student or educator's digital literacies is scarce (Blayone, 2018). While the federal government provides direction and influence, it has no mandated control over how education is managed, resulting in frequent calls from business and industry for a national, cohesive digital literacy strategy (Hadziristic, 2017). There are national level collaborations and organizations such as the *Council of Ministers of Education* (CMEC) and the *Association of Canadian Deans of Education* (ACDE) yet there remains little co-ordination of initiatives or funding that could impact the overall delivery of digital literacy programs within faculties of education (FoE) or initial teacher education (ITE) programs (Education in the Digital Age, 2020). Faculties of education are reflections of the larger Canadian digital literacy tapestry in both higher education and K-12 education, as shaped by current political, contextual, historical, cultural, linguistic, and financial influences (Hoechsmann & DeWaard, 2015; McLean & Rowsell, 2020).

This lack of a national strategy for digital literacies development and measurement is compounded by the additional fracturing of service provisions in the education sector since K-12 education, where the pre-service teacher candidates (PTCs) need to learn the craft of teaching, since this level of education is governed by a different ministerial department than that of higher education, where faculties of education reside. Thus PTCs, teacher educators (TEds), and mentor teachers continually attempt to bridge the mandates and constraints between the digital literacies expected in the K-12 and higher education sectors. In terms of digital skill acquisition, this plays out in significant differences in the technologies applied to teaching and learning, whereby specific digital resources used in K-12 may not be available to the HE environments where the PTCs are learning. This confusion of threads across the Canadian fabric leaves digital literacies and competencies within faculties in education in a complex tangle.

Into this profusion of fabrics, threads, and colors, there is light to behold. By seeking to answer three key questions, this chapter will reveal the cracks where digital literacy light shines through. Research questions: What are the current trends and practices in Canadian FoE, as revealed in research, relating to digital literacy and/or digital competence (DL/DC) within their programs? How might the DL/DC relating to the digital dimensions of teaching practice be measured and compared? What are the issues and challenges revealed in the research that shapes the teaching and learning of DL/DC in the Canadian FoE educational systems?

First, theoretical frameworks that influence digital literacy instruction in faculties of education in Canada will be examined. The methodology will explore how threads and patches were pulled into the bigger picture of DL/DC in Canadian FoE. The resultant research literature will explore and examine three unique qualities discovered within the warp and weft of the Canadian FoE digital literacy tapestry. The discussion section will reveal unique patterns in the FoE tapestry design, as well as uncover how the whole of the national fabric becomes greater than the sum of its parts. The chapter concludes by revealing cracks in the fabric, those issues and imperfections as seen through the research, which illuminate the Canadian digital literacy tapestry, in order to 'let the light shine through'.

8.2 Theoretical and Conceptual Frameworks

Faculty of education programs in Canada are influenced by the socio-cultural and constructivist theories of learning originating from Dewey (Dewey, 1916) and Vygotsky (Lowenthal & Muth, 2009; Roth & Lee, 2007). As a result of this influence, digital literacies are grounded within a socially constructed and experientially integrated model of teaching and learning with a "focus on the knowledge building, problem solving, critical and creative thinking skills, ethics and responsibility, digital literacy, and ICT fluency" (Brown & Jacobsen, 2016, p. 439). This is foundational

in K-12 policy frameworks in education and within FoE as they prepare new educators to work within K-12 systems. Technology enables "teachers to work collaboratively and constructively in networked environments to build knowledge and ideas through inquiry" (Brown & Jacobsen, 2016, p. 431) and build connections to communities of other educators locally, provincially, nationally, and globally. From this socio-constructivist theoretical stance, digital literacies, and technology applications are more often infused into courses and curriculum. However, some Canadian FoE continue to offer stand-alone instructional courses with a focus on information and communication technologies (Martinovic & Zhang, 2012) and teaching with technologies (Bullock, 2013; Hagerman & Coleman, 2017; Hopper et al., 2018). As evident in the research presented in this chapter, Zhang's (2014) research calls for program-wide integration of technologies in order to prepare teacher candidates to develop mastery of technological, pedagogical, and content specific knowledge.

Conceptual frameworks that influence the understanding of digital competencies within FoE programs in Canada include theory/practice frameworks (Russell & Dillon, 2015; Russell et al., 2013), the community of inquiry (COI) model originating from Canadian researchers (Garrison, 2016; Garrison et al., 2000), and the technological pedagogical and content knowledge (TPACK) framework (Jaipal-Jamani & Figg, 2015; Koehler & Mishra, 2009).

Initial teacher education is challenged by the long-standing dichotomy between theory and practice, with both sides of this divide attempting to take precedence over the other (Goodnough et al., 2016; O'Connor et al., 2020; Russell et al., 2013). In most Canadian FoE, as evident by survey research conducted by Russell and Dillon (2015), there exists a push/pull between theory or practice, episteme or phronesis, knowledge or praxis. Russell et al. (2013) describe the difference in these conceptual frameworks as either a theory-into-practice or a practice-into-theory, while proposing the third option of a theory-and-practice approach. Russell et al. (2013) suggest there is an "epistemology of practice that takes fuller account of the competence practitioners sometimes display in situations of uncertainty, complexity, uniqueness, and conflict" (p. 15). Through the practice of reflection and 'teach-aloud' activities, the tacit knowledge implicit within patterns of action may reveal judgements, skills, and competencies (Russell et al., 2013). Case studies examples of Ontario FoE where theory-into-practice and theory-and-practice frameworks are applied reveal additional information about these frameworks (Russell et al., 2013). As an example of the practice-into-theory framework in Canada is seen in the teacher education programs in Quebec, where emphasis on practicum experiences highlight teacher competencies with an approach that is holistic, integrated, and global (Sterenberg et al., 2016). When considering the DL/DC within FoE, both course work *and* practicum placement experiences need to be considered. Goodnough et al. (2016) identify effective practices and program considerations to support the theory-and-practice approach. This includes the embedded practicum, the teaching and learning seminar, diverse assessments and pedagogical approaches within coursework, and embedding teacher reflection and inquiry practices. As evidenced in the research explored in this chapter, this theory-and-practice framework may break contested binary positions currently constraining the infusion of DL/DC within FoE.

The community of inquiry (COI) framework (Garrison et al., 2000) examines student interactions within a collaborative environment, both in person and online. The three interdependent elements are social, cognitive, and teaching presence (see Fig. 8.1). Garrison et al. (2000) explore categories and examples of indicators for each of these elements in their seminal research into computer conferencing in education. This framework "fuses personal reflection and shared discourse for a deep and meaningful learning experience" (Garrison, 2016, p. 53). Grounded in socio-constructive theory, COI enhances learning through a collaborative constructivist lens (Garrison, 2016). Key to this framework, from a DL/DC perspective, is the interplay between students, teachers, and subject matter content, while using and creating with technological tools and applications within an educational inquiry. The potential for deep learning requires restructuring content to focus on big ideas, providing time for meaningful engagement, reframing assessments for authenticity and recognition, and considering the cognitive and socio-emotional influences on learning and learners (Garrison, 2016). Fullan and Langworthy (2014) posit deep learning results when students and teachers become equal partners while gaining mastery of the learning process, leverages peer support, connects content to students' interests and goals, while continually analyzing learning progress and teaching strategies. In FoE, this COI framework underlies and is evident in much of the learning and research emerging from the past five years.

Similarly, the technological pedagogical content knowledge (TPACK) framework is evident in investigations, applications, and practices in Canadian FoE. This framework outlines the "complex interplay of three primary forms of knowledge" (Koehler, 2012, paragraph 2). This framework suggests that "effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts" (Koehler, 2012, paragraph 3). In their self-study of technology teacher educators, Figg and Jaipal-Jamini (2020) recognize four approaches to promote TPACK knowledge—learning-by-design, modeling, pedagogical reasoning

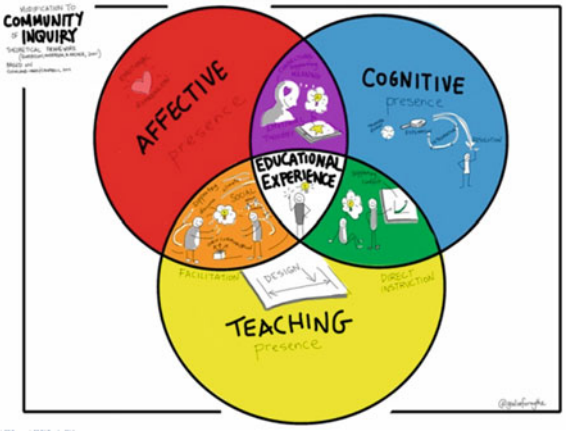

Fig. 8.1 COI Framework, CC-BY (Forsythe, 2014)

discussion, and reflective writing. The open sharing of stories of the lived experiences of technology affordances and challenges as part of teaching practice is seen as significant contributions to knowledge in the field of teacher education (Figg & Jaipal-Jamani, 2020). The TPACK framework can be applied to teaching and learning in any area of study within the FoE program but should include essential elements of DL/DC as part of the knowledge framework.

As a result of the COVID-19 global pandemic and the rapid deployment of online teaching and learning supported by video conferencing technology and learning management systems (LMS), the TPACK and COI frameworks have gained momentum as a means to establish understanding of how teacher education can integrate digital literacies and technology use, specifically within the design of digitally enabled, remote learning events.

While no standard definition for digital literacy and digital competency (DL/DC) exists within Canadian faculty of education contexts. Digital literacy frameworks such as the one presented by MediaSmarts Canada (Hoechsmann & DeWaard, 2015) support an understanding of how digital literacies can be applied within course designs in FoE. Digital literacies are framed by both the cognitive and social practices when using, understanding, and creating with digital technologies (Spante et al., 2018; Stordy, 2015). For this chapter, the digital literacies tapestry is composed with three main threads: "*the skills and ability to* use digital tools and applications; *the capacity to critically* understand digital media tools and content; and *the knowledge and expertise to* create and communicate with digital technology" (Hoeschsmann & DeWaard, 2015, p. 8, emphasis in original). These threads become evident in the research explored in this chapter.

Further to this, trends in research and teaching of digital literacies in Canadian FoE are grounded on multiliteracy perspectives posited by the New London Group (Collier & Rowsell, 2014; The New London Group, 1996) which includes situated practice, overt instruction, critical framing, and transformed practice. This is framed by critical literacy practices to develop skills, fluencies, competencies, and literacies in code breaking, meaning making, understanding and using, analyzing and creating, and developing digital identity (Hinrichsen & Coombs, 2013; Luke, 2012). The newly introduced conception of living literacies by Canadian and UK literacy researchers (Pahl et al., 2020) promises to enhance the development of digital literacy practices for years to come.

Digital competencies on the other hand are defined by the knowledge, skills, and attitudes necessary for purposeful and effective use of digital technologies (Ala-Mutka, 2011; Blayone, 2018). Through a systematic literature review, Spante et al. (2018) provide a distinction between digital literacies and digital competencies that is helpful in framing these concepts for this chapter. Digital competencies encompass the values, beliefs, attitudes, knowledge, and capacity to use technologies such as computer programs and the internet. In professional contexts such as FoE, this includes the effective pedagogical judgement for using technologies for learning, for both teacher candidates and teacher educators (Spante et al., 2018). As revealed later in this chapter, Blayone (2018) suggests that digital readiness is an additional factor that influences the development of digital competencies.

For my own work in teaching critical digital literacies in a Canadian FoE (DeWaard & Roberts, 2021; van Barneveld & DeWaard, 2022) I distinguish between the concepts of digital skills, fluencies, competencies, literacies, and citizenship that are necessary for pre-service teachers to know and show as they venture into the field of education as a teacher. While skills, fluencies, and citizenship should be considered important foundational components within and through which literacies and competencies emerge and connect, a fuller exploration of these concepts are beyond the scope of this chapter.

8.2.1 Methodology

Using references curated from my own research and work in the field of digital literacy in faculties of education as a starting point, I conducted a semi-structured review of the literature using the OMNI search tool available to Ontario universities and conducted full library catalogue searches through the University of British Columbia online library access portal. Since this review was not conducted in a structured format, as suggested by PRISMA protocols, the usual diagram outlining this literature review methodology is not included here. In this way, the gaps in this research literature may illuminate lights for future research inquiries.

For these searches, I consistently applied key words and truncations for "digital litera*", "digital competenc*", "facult* of education", "teacher education", and "Canad*". These terms were applied to searches of abstracts, titles, and key words. The parameter for studies between 2000 and 2021 was also stipulated. From these search results, articles were set aside if they were not explicitly relating to instruction or measuring digital literacies of teacher candidates or teacher educators. Subsequent to this initial search, the reference sections of many research articles were scanned for additional literature resources. Finally, open web searches were conducted for organizational reports and white papers relevant to Canadian digital literacies that had potential impact on the contexts of teaching and learning both in K-12 and HE. These additional resources provided some national and international perspectives, expanding on the limitations from provincial or institutional contexts found in much of the university or FoE based research.

The abstract and key words were reviewed for all articles, further eliminating those that were not specific to digital literacy practices of pre-service teachers or teacher educators. For articles that appeared relevant, the introduction and conclusion sections were scanned and key phrases captured. Over eighty documents were selected as having potential relevance to the research questions posed. The full reference list is available on my Step-by-Step website [https://stepbystep.hjdewaard.ca/blog/digital-literacy-in-faculties-of-education-a-research-inquiry/].

8.2.2 Results

Researching DL integration in Canadian FoE is complex and multifaceted. As noted earlier, Canadian FoE is under the jurisdictional control of the ten provinces and three territories, resulting in a fractured and scattered dispersion of digital literacy practices and approaches. This is compounded by TCs being exposed to differing technological applications in both their coursework within the faculty and while on placements in local K-12 school contexts. As a result of the research explored for this chapter, three patterns emerge in the tapestry of digital literacies in faculties of education across Canada. First, digital literacies and competencies are interwoven within other areas of endeavour. Second, singular threads can be pulled to reveal unique textures and colors that are often hidden in the larger design across the Canadian FoE tapestry. Third, a consistent measurement system for digital skills, fluencies, competencies, and literacies in Canadian FoE are patchy, with pockets of innovation emerging to respond to provincial and national calls for greater standardization and accountability.

Inter-weaving. Across the research literature focusing on digital literacies from Canadian faculties of education, there are interwoven threads from other areas of study. As Brown and Jacobsen (2016) discover in their examination of one Canadian FoE, students are encouraged to leverage media and digital literacies throughout their courses to communicate and represent their understanding through the use of a variety of technological applications. The research shows that these inter-weavings include: combinations with media and multiliteracies (Hoechsmann & DeWaard, 2015; Hoechsmann & Poyntz, 2017; Rennie, 2015); infused into literacy instruction and literacy methods courses (Kosnik & Dharamashi, 2016; Leslie, 2010); categorized with information communication technologies (ICT) and emerging technologies (Martinovic & Zhang, 2012; Morris, 2012); applied to equity, diversity, inclusion, and multicultural strategies (Passey, Shonfeld, Appleby, Judge, Saito & Smits, 2018; Taylor & Hoechsmann, 2011); and enhanced through open teaching (Couros, 2010) and open educational pedagogies and practices (DeWaard & Roberts, 2021; Paskevicius & Irvine, 2019).

Media Literacy and Multiliteracies. Narratives about multiliteracies are often woven into topics of DL/DC (DeWaard & Hoechsmann, 2021; Hoechsmann & DeWaard, 2015; Hoechsmann & Poyntz, 2017; Rennie, 2015). Media literacy, through analytic and production activities, is central to Canadian teaching practices (Hoechsmann & Poyntz, 2017). Based on the foundational thinking of Canadian media theorist Len Masterman, Canadian educators continue to emphasize "investigation in media education and media production with the aim of having students determine how meaning is constituted and circulated in popular culture" (Hoechsmann & Poyntz, 2017, p. 8). Thus, in FoE courses, popular culture often becomes the focus for lesson development, whereby pre-service teachers design learning activities and units around current and trending media topics.

To support this integration of media with digital literacies, MediaSmarts Canada provides supports for teachers in the analysis, use, and production of digital and media lessons, projects, games, and products. The *Digital literacy training program*

for Canadian educators: Implementation guide (MediaSmarts Canada, n.d.) provides guidelines for grade specific support, addresses some of the concerns of educators when considering DL/DC in the classroom, and provides links to media production tools and resources. This adds to the discourse in DL/DC as pre-service teachers in FoE make media, create and share digital products, and construct understanding with technology tools and applications.

Instruction in Literacy Methods. Courses in FoE are being transformed by the use of digital technologies (Darvin & Norton, 2017; Kosnik & Dharamashi, 2016; Leslie, 2010). This inter-weaving benefits the inclusionary practices of language learners from around the globe in Canadian classroom contexts since this infusion of DL/DC into literacy instruction supports the diverse needs of English language learners and immigrant learners, not only in FoE but in the K-12 classroom contexts into which these pre-service teachers will practice. These trans-literacy practices are helping teacher educators re-conceptualize the changing nature of literacy instruction and adjust teaching practices to incorporate digital technologies (Kosnik & Dharamshi, 2016). The influence of DL/DC on enhancing and enabling new forms of communication, social networking, participatory and collaborative practices, building authentic learning experiences, reframing issues, and bridging practice teaching with academic courses were noted in research results (Kosnik & Dharamshi, 2016). As a result of digital technologies being interwoven into literacy instructional practices, Kosnik and Dharamshi (2016) identify dynamic and recursive elements including gaining an international perspective, becoming part of an online learning community, creating products to consolidate learning, and authentic reflections of teaching and learning.

Information Communication Technologies (ICT) and Emerging Technologies. Issues in ICT, relating to the hardware and tools used to support teaching, are often co-mingled into discourses about DL/DC (Martinovic & Zhang, 2012; Morris, 2012; Zhang, 2014). Martinovic and Zhang (2012) surveyed pre-service teachers taking a *Computers in Education* course to determine levels of willingness and preparedness to use ICT in teaching. Self-reported skill levels improved during the course of study, with perceived importance and appreciation of ICT ranked high when learning to teach. Additionally, the results from Martinovic and Zhang's (2012) research echoed what Morris (2012) discovered, notably that the role of the teacher educator and mentor teachers in modelling technology use is crucial, and an understanding of the TPACK framework is important. Zhang (2014) indicates that knowledge and strategies for pre-service teachers' use of ICT in teaching and learning can be improved through an infusion of technologies into FoE courses and into teaching practice. Further to this, Zhang (2014) confirms the need for program-wide integration of ICTs into FoE courses in order for TCs to become proficient in understanding, using, and creating effective teaching events with the use of technology. Ensuring that ICT and emerging technologies effectively apply DL/DC into learning events in FoE courses and are authentically connected to the DL/DC teaching experiences in K-12 classrooms, would further solidify the acquisition of critical digital literacies for both pre-service teachers and teacher educators.

Equity, Diversity, and Inclusion (EDI). Issues of EDI within trans-literacy strategies are inter-woven into DL/DC topics (Passey et al., 2018; Zaidi & Rowsell, 2017). Through these inter-weavings, teachers and students in FoE negotiate their understandings of the places and spaces where artifacts, popular culture, and materiality of learning objects merge and converge (Zaidi & Rowsell, 2017). In efforts to bring issues of equity, diversity, inclusion, and multiculturalism to life in classrooms, some teachers use artifacts as objects of imagination, catalysts for stories, or materials to spur learning. While some become digital renderings, through which DL/DC become immersed in the making and sharing, others are experienced through traditional, culturally-responsive learning moments. As exemplified by the artifacts collected through the process of creating the Truth and Reconciliation Commissions' Calls to Action, artifacts create opportunities for "collective efforts to imagine critical pedagogies relevant to the 'stunningly diverse' students in our classroom today and for the critical work of reconciliation and renewal that is their present and future" (Honeyford, 2017, p. 132). Passey et al. (2018) suggests that the future of equity in education is in need of digital agency, "consisting of digital competence, digital confidence, and digital accountability—is the individual's ability to control and adapt to a digital world" (p. 426). For teacher education, this calls for greater awareness and an ability to empower self and others to adopt, adapt to, and use technologies wisely and responsibly. This notion merges with conceptions of digital literacies and that of digital citizenship. Further to this, Passey et al. (2018) suggests that digital agency emerges from learner agency, which is of great importance when considering equity and diversity in teaching and learning contexts. An interwoven thread can be pulled to reveal the connections between digital agency of diverse populations to such DL/DC topics as using, creating, understanding, and identity.

Open Teaching and Open Educational Pedagogies. Open teaching (Couros, 2006) and open educational pedagogies and practices (Harrison & DeVries, 2019; Paskevicius, 2018; Paskevicius & Irvine, 2019; Roberts et al., 2018; Veletsianos, 2015) are rife with connections and inter-weavings to DL/DC. Emerging from the creation of open-source technologies, Couros (2006) describes open teaching communities founded on principles of collaboration and sharing. Teachers involved in open teaching practices developed teaching materials and content, referenced as open educational resources (OER) which are published and openly available through open access web tools such as blogs and wikis (Couros, 2006). Out of this research emerged an image of the networked teacher, immersed in teaching with technologies (see Fig. 8.2). The open content created by teachers was framed as open educational resources (OER).

Through the creation, collaboration, and publication of these OER and digital resources, teachers gained ICT skills, shift their digitally competencies, and gain digital literacies. While OER application, production and dissemination can transform FoE course work, particularly when shared across institutional, provincial, and national boundaries, this "relies on individuals in educational settings to become open in the ways they produce and share knowledge, in the way they teach and assess students, and in collaborating with others" (*Digital Literacy Training Program for*

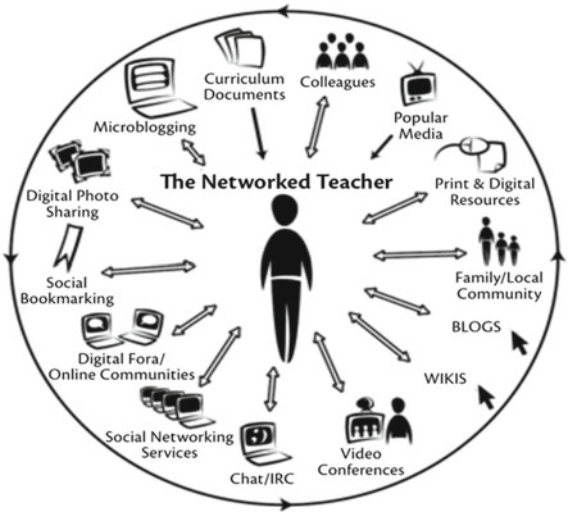

Fig. 8.2 The networked Teachers, CC-BY-SA-NC (Couros, 2006)

Canadian Educators: Implementation Guide, n.d.). This can lead to a shift in pedagogical praxis and result in open educational practices (DeWaard & Roberts, 2021; Paskevicius & Irvine, 2019; Roberts et al., 2018). Open educational practices (OEPr) in teacher education are interwoven yet remain relatively hidden within the overall DL/DC tapestry in Canada. Emergent visibility in FoE is evident in research, such as the Open Page Project (Stewart, 2020), and in the public profiles of teacher educators and pre-service teachers across the country. For some of these, review the supporting website at Digital Literacy in Faculties of Education: A Research Inquiry.

8.2.3 Pulling Threads

In FoE across Canada, there is evidence of singular threads that, when pulled together, reveal details of a rich and colorful tapestry of digital infusions into teacher education. These individual threads represent pedagogies, practices, locations, and applications, which support the development of DL/DC within teacher education. This includes research and application of the use of digital timelines (DeCoito, 2020); digital memory work (Strong-Wilson et al., 2014); wikis for poetry writing (Dymoke & Hughes, 2009); blogging as a form of authentic assessment in an open educational practice (DeWaard & Roberts, 2021); digital games and makerspaces (Hébert & Jenson, 2020; Hughes et al., 2020); the creation of digital or eportfolios (Brown & Jacobsen, 2016; Hagerman & Coleman, 2017; Hopper et al., 2018; Hughes, 2008; O'Connor et al., 2020; Paulson & Campbell, 2018) creating video in the form of digital story (Robertson, Hughes, & Smith, 2012; Watt, 2019) or "slowmation" (Vratulis, Clarke, Hoban, & Erickson, 2011); and the use of Twitter (Couros, 2009; Veletsianos & Kimmons, 2016).

Digital Timelines. The application of digital timelines was introduced into a science course design in one Ontario FoE to offer PTCs multiple sources and multimodal components to create representations of the "context-rich historical narrative of scientific discovery and invention" (DeCoito, 2020, p. 10). Through the acquisition of technology skills in the creation of digital timelines, while navigating affordances and constraints of timeline software, TCs reported experiencing "enhanced technology literacy in terms of learning about technology, software programs, and equipment" (DeCoito, 2020, p. 28). While this research reflects an increasing ability in digital skills and fluencies by TCs as a direct result of the application of digital timelines as an assignment in a FoE science course, this research could apply a critical application of DL/DC (Spante et al., 2018; Stordy, 2015).

Digital Memory Work. This teaching practice is based on the premise of remembering the past in order to change the future (Strong-Wilson et al., 2014). In Canadian FoE, this is necessary work in light of national reconciliation efforts with Indigenous peoples. In order to change the future, with support from DL/DC pedagogical practices in FoE, this digital memory work can explore individual and historical pasts to catalyze change in present and future teaching practices (Strong-Wilson et al., 2014). As with the digital timelines research, digital technologies are incorporated and infused into the actions and learning. Digital memory work can be conducted in a variety of subject matter, thus making it intersectional in nature. Strong-Wilson et al., (2014) apply digital memory work to examine how "teachers 'read' digital texts as well as produce digital texts" (p. 448). This research identifies the potential of creating a national archive of digital memory-work projects that not only highlight educational social justice issues that emerge from our collective remembering as educators but also deepen a national teacher identity. Creating a similar digital structure as the *Galileo Educational Network* (About, 2021) could build a pan-Canadian repository of learner and teacher centered resources and stories, as suggested by the *Association of Canadian Publishers* (Howell & O'Donnell, 2017). Strong-Wilson et al. (2014) mention the importance of "collective forgetting" which touches on the right to be forgotten, now referred to as the "right of erasure", seen as an essential digital citizenship practice. Similar to the digital timeline work already mentioned, this digital memory-work can be the impetus for deeper discourse and a catalyst for the development of DL/DC in FoE.

Wikis. Digital technology that allows for collaborative and shared writing, wikis were used in two locations, a UK and an Ontario FoE, to create an online community to "build collaborative knowledge about poetry among a group of pre-service English teachers" (Dymoke & Hughes, 2009, p. 91). This research mirrors the networked knowledge building spaces and knowledge building pedagogies studied by Canadian researchers Scardamalia and Bereiter (2002, 2007, 2014). While the intention of this research was focused on knowledge of poetry production, not the development of DL or DC, the application of using wiki technology for developing an online identity and creating digital productions including the use of webcams as mentioned in this research (Dymoke & Hughes, 2009), could be enriched with critical conversations linked to the development of DL/DC within teaching practices.

Blogging. The practice of using web publication software such as Wordpress or Blogger, this digital tool to support learning (Kosnik & Dharamashi, 2016) can be used as a form of authentic assessment in FoE educational practice (DeWaard & Roberts, 2021) and can expand the criticality of DL/DC. Blogging provides a "mechanism for explicit and open thinking about the topics and content" (DeWaard & Roberts, 2021, p. 315) that supports pre-service teacher's efforts to reflect not only through blogging, but on the process of blogging, with all its inherent affordances and issues. These digital productions can act as "distributed communication mechanisms" (Couros, 2009, p. 236). By applying a Freirean framework to their inquiry, DeWaard and Roberts (2021) explore how critical literacy can be illuminated through blogging practices in teacher education. They suggest that blogging can be a "mediating tool, providing learners with collaborative spaces for learning, helping them shape their understanding, knowledge building, and acquisition of skills" (DeWaard & Roberts, 2021, p. 320). Blogging is also a strategy used in S-STTEP approaches in Canadian FoE research whereby teacher educators, particularly those investigating their own growth in DL/DC, use blogging to openly share their explorations over time (Figg & Jaipal-Jamani, 2020).

Digital Games and Makerspaces. These digital technologies offer a catalyst for the infusion of DL/DC, as seen in these threads of endeavor by Canadian educational researchers (Becker & Jacobsen, 2021; Hébert & Jenson, 2020; Hughes et al., 2020). While digital is not a requirement when infusing games and makerspace pedagogies into FoE courses, there is an opportunity for collaborative engagements and the promotion of transformational change in teaching practice within these complex and dynamic learning environments (Becker & Jacobsen, 2021). Predominantly explored as part of Science, Technology, Engineering, Arts, and Mathematics (STEAM) areas of study, makerspace and gaming are driven by an inquiry-based approach (Hughes et al., 2020). The integration of makerspace and game-based learning events within a FoE course of study or practicum experience offers opportunities for both PTCs and TEds to enhance DL/DC through a design based pedagogical and research framework (Becker & Jacobsen, 2021). One hindering factor evident in the research is the lack of reliable and current technology infrastructures such as internet bandwidth and access to a variety of makerspace hardware such as robotics, mobile devices, and 3-D printers (Becker & Jacobsen, 2021). Hébert and Jacobsen (2020) discover in their research using Minecraft within open, guided/directed, and scaffolded teaching approaches, that pedagogical moves and teacher's decisions play important factors in whether DL/DC are developed.

Electronic Portfolios. Eportfolios can provide space and place for students to exhibit their knowledge, skills and competencies, foster phronesis (O'Connor et al., 2020), and gain practical wisdom. The intention is to bridge the gap between theory and practice that exists in FoE, by using pre-service teachers' practical experience as the base for reflection. Hopper et al. (2018) explore multiple potentials of digital technologies in their research within a FoE in British Columbia and describe eportfolios as a "living and emerging complex process serving multiple purposes and existing within a living learning system that is continually changing as it grows" (p.15). Applying digital software called Folioz, Hopper et al. (2018) outline the six

stages used to support eportfolio integration, with resultant themes emerging from PTCs and TEds interviews that mention identity building, holistic meta-learning, reflective processes, appreciative assessment, and networked peer learning (Hopper et al., 2018). While DL/DC were not explicit in the research design or results, Hopper et al. (2018) conclude that the eportfolio became more than a digital collection of artifacts.

Similar to other eportfolio designs, the digital hub approach applied within an Ontario FoE is described as a professional digital web publication (Hagerman & Coleman, 2017). This web site production provides pre-service teachers with an "authentic space for identity construction, technical skill development, and digital literacies learning" (Butler-Kisber, 2017, p. 11). By design, the digital hub approach fosters digital literacies by explicitly examining values, communication, privacy, identity, and critical decision-making (Hagerman & Coleman, 2017). Similarly, in their case study research into eportfolio use in an education program, Paulson and Campbell (2018) examined the driving and restraining forces that sway the systemic structural and cultural benefits and barriers to program-wide eportfolio implementation within an FoE in central Ontario. One barrier is the lack of technical skills and fluencies of students and faculty, and inconsistent implementation planning, as well as the lack of "buy-in and training to integrate ePortfolios into an established curriculum" (p. 10). Paulsen and Campbell (2018) suggest combining a community of practice and a scholarship of teaching and learning framework to support the infusion of eportfolios to enhance adoption.

Video Production. Creating videos in teacher education often take the form of digital story production or "slowmation" (Vratulis et al., 2011), as a mechanism to contribute to the construction of digital literacies and to encourage TCs to think critically about teaching and learning (Robertson et al., 2012). In their research with digital story production in an Ontario FoE language arts methods course, Robertson et al. (2012) conclude that pre-service teachers "provided ample evidence that they can use their early learning experiences as stepping stones to a transformed future classroom, one with multiple literacies, a differentiated and inclusive curriculum, and a safe space for learning" (p. 89). In their research on video production in teacher education in a British Columbia FoE, Vratulis et al. (2011) introduce the concept of 'slowmation' pedagogy, a combination of pedagogical inquiry incorporating stop-motion animation. Their research revealed issues for TCs such as uncertainty, support, implementation, and their shifting roles as teachers and learners that impacted their potential use of this technology. Vratulis et al. (2011) determine that introducing new technologies into FoE courses is not enough. It requires "appropriate theory and practical application in grade-specific examples" (p. 1186) with explicit modelling and active reflection to increase the possibilities of inclusion in future transformative teaching practices.

Twitter. This form of social media micro-blogging is integrated into teacher education (Couros, 2009) and scholarship (Veletsianos & Kimmons, 2016), thus shifting the conversations and discourse into new digital spaces. While Twitter discourse is sometimes described as more authentic but difficult to track, the social networking provides valuable learning experiences, while the transparency of web

communication models an openness that reaches beyond traditional learning management systems. For my own work with PTCs in critical digital media, I encourage awareness and an inquiring attitude toward the use of Twitter as part of a professional practice, where a professional learning community can support future directions into the field of education. The inclusion of Twitter in a FoE course of study can enhance critical digital literacies of TCs as they negotiate the issues and affordances of the software to manage privacy, permissions, safety, and security of their professional digital presence on the web.

By pulling these individual threads of research and practice into the light, it is evident that FoE across Canada are exploring DL and DC in unique and interesting ways. While this examination is by no means conclusive or complete, since many threads such as research into instructional design (Holden et al., 2021), integration of Facebook in teaching, and emerging technologies such as artificial intelligence, virtual reality, and augmented reality (Ivus et al., 2021) remain hidden in this DL/DC tapestry, this investigation does reveal the richness and color that shape this uniquely Canadian representation of FoE work to develop DL and DC in teaching and learning. What is not yet evident through this analysis is the presence of any substantial or sustainable mechanisms for the measurement of DL or DC in FoE in Canada, as there appears to be in European contexts with the DigCompEDU framework (Redecker, 2017). The measurement of DL/DC in Canadian FoE will be examined next.

8.3 Measuring

While Canada has a patchwork tapestry of fifty FoE programs across the country, the regulations and standards established for graduation from FoE programs by each of the ten provinces and three territories ensures quality measures for teacher accreditation across the country. Consistent with this collage of FoE, the measurement of DL/DC is found in patches, without explicit or consistent reporting of success in the DL/DC areas identified in the research literature. Starkey (2020) explores research of teacher preparation programs with a focus on digital competence, resulting in a framework for aligning digital competencies within FoE programs under the categories of generic digital competencies, digital teaching competencies, and professional digital competencies for both teacher educators and pre-service teachers. While Starkey's (2020) framework provides some program wide guidance for the review purposes, it fails to provide specific or measurable outcomes that can be targeted or tracked between students, teacher educators, courses, or between faculty programs. Research conducted by Cai and Gut (2020) examines the relationships between literacies and digital problem solving in teacher education across four countries, including Canada, the USA, Finland, and Japan, revealing that "educators' proficiency in literacy and digital problem-solving skills matters" (p. 185). This is not news to those in Canadian FoE who continue to find unique ways to infuse and attempt to measure DL/DC in teacher education, as evident in the research literature.

Here I will shed light on areas of measurement evident in the Canadian FoE contexts with some connections to DL/DC, specifically the digital readiness research by Blayone (2018) and van Oostveen et al., (2019), the digital competence profile compiled by Ally (2019) and the self-study scholarship of Baroud and Dharamshi (2020) and Figg and Jaipal-Jamani (2020).

Digital Readiness.

While recognizing the importance of measuring digital skills, attitudes, and competencies, Blayone (2018) provides insights into efforts to bridge the gap between digital competency research and the readiness factors required for digital competence to emerge. This research, being conducted in one Ontario university FoE, helps define, operationalize, and measure digital readiness of pre-service teachers in Canadian and globally situated FoE. The General Technology Competency and Use (GTCU) framework (Desjardins et al., 2001) and the online Digital Competency Profiler (DCP) application (Desjardins et al., 2015) attempt to measure the digital readiness as a factor of digital competence in online learning environments. At the individual student level, this readiness is determined by actors, attitudes, contexts, and outcomes (T. Blayone, 2018). The DCP, an incorporated and proprietary research instrument, measures the frequency, confidence, preferences, and abilities through online, self-reporting measures and the performance of fifteen digital activities by teachers and students (Blayone et al., 2018).

Van Oostveen et al. (2019) expand on this exploration of the digital readiness of pre-service teachers and teacher educators through their research applying a fully online learning community (FOLC) model, founded on the COI framework (Garrison et al., 2001). This research examines social and cognitive presence within digital spaces in order to operationalize and confirm the results of the GTCU framework. Results suggest that students who self-report feelings of digital competency on the DCP were able to complete authentic digital tasks to a high standard (van Oostveen et al., 2019). Interestingly, research into using the GTCU framework, the DCP measures, and the FOLC model shows how Canadian educational researchers are leveraging technologies to research digital-learning readiness (Blayone, 2018). While this research focuses on digital readiness for online learning, there is some merit in the potential of this measure to all Canadian FoE as a way to provide strategic support for students who may lack confidence in developing the skills, fluencies, and competencies required for digital integrations into their teaching and learning.

8.3.1 Competency Profile

In other Canadian research in the field of digital teaching and learning, Ally (2019) identifies a competency profile for future online instructors. While this is not specific to a Canadian FoE program, this research collected information through interviews, focus groups, and written responses from thirty-four selected experts based on their innovative use of technologies within their teaching practices. The resultant data revealed nine themes falling into 105 competencies. These themes and identified

number of competencies for each area include digital teacher competencies in developing digital learning resources (9), re-mixing learning resources (5), using technology (15), communicating with learners (4), facilitating learning (29), assessing learning (4), applying pedagogical strategies (12), personal characteristics (15), and general competencies (12) (Ally, 2019). The intention of this research is not specifically to measure for accountability purposes but to identify gaps within current digital teaching competencies in order to set goals for future teaching practices. The specific emerging technologies are artificial intelligence, robotics, and the internet of things; it is essential that teachers stay a-tuned to future trends (Ally, 2019). Using this competency profile as a self-reflective tool is a worthwhile exercise, in order to see how current DL/DC measures up to these identified digital competencies not only for teacher educators but for future teachers currently learning in FoE across Canada.

8.3.2 Self-Study Scholarship

The application of self-study scholarship can put the measurement of digital literacies and digital competencies in the hands of those doing the work, the teacher educators, and pre-service teachers in the FoE. In Canada, the sharing of self-study of teaching and teacher education practices (S-STTEP) particularly in the area of digital literacy development in FoE is providing information from such user generated digital literacy measures (Baroud & Dharamshi, 2020; Figg & Jaipal-Jamini, 2020). Since the aim of self-study is to activate, contest, and enlighten (Berry, 2020), the process of examining and sharing your own digital literacy practices can provide insights for others to conduct similar self-reflective analyses.

First, research by Baroud (2020) examines the teaching practices of two teacher educators in two different provinces teaching critical digital literacies, in order to explore emergent digital literacy practices. Baroud (2020) concludes that her understanding of critical digital literacy practices was developed through her experiences conducting research and teaching in multiple contexts. By self-reflecting on digital literacy in teaching and learning, Baroud (2020) discovered that "deliberate and thoughtful design of learning opportunities that address technical "know-how" and immerse students in experiencing digital technologies through a social, cultural, and ethical lens supports them … to develop critical and digital competence" (p. 227). While this research does not specifically follow a self-study methodology, it provides some insight into how digital literacies are understood from teacher educator and pre-service teacher's perspectives, and models a self-reflective practice.

Second, Baroud and Dharamshi (2020) conduct a self-study of DL from a critical stance in order to "carefully examine and integrate diverse narratives connected to language, knowledge, and power as a practice of responsible educational engagement. Critical stance acted as a stimulus for dialogue and analyses to open new possibilities of thinking and practice in digital literacy education" (p. 167). Through this self-study lens, they conclude that a "deliberate and thoughtful design of learning

opportunities that addressed technical 'know-how' and immersed teacher candidates in experiencing digital technologies through a social, cultural, and ethical lens supported them not only to develop digital competence but also begin developing and enacting pedagogies of critical literacies" (Baroud & Dharamshi, 2020, p. 179). This self-study provides insights for teacher educators across the country beyond that which may be gleaned from measures of DL/DC. The practice of self-study by teacher educators can be an important step toward critical reflection of teaching and learning practices with a focus on meaningful integration of DL/DC into FoE courses (Baroud & Dharamshi, 2020).

Third, Figg and Jaipal-Jamini (2020) share insights from a self-study into technology teacher educators' practices, since these individuals hold a unique place in FoE as supporting both their students and colleagues to develop and promote technology-enabled teaching and learning. They begin with an exploration of what technology teachers need to effectively address the affordances and constraints of technological tools and software, including a deep awareness of the TPACK framework as it applies to teacher education. They next identify strategies that support effective integration of TPACK into FoE courses, including (1) collaboratively designing lesson plans; (2) teaching tech-infused learning activities; (3) view and participate in modelled tech-enhanced instruction; and (4) infuse "demonstrations of teaching the technical skills using 'just-in-time' methods so that the focus was on the learning goals and not the tools" (Figg & Jaipal-Jamani, 2020 p. 994). The authors promote the use of self-study for its narrative quality to elicit stories of experiences, thus building a collection of examples and models that reveal significant contributions to the field of educational technology in FoE. Noticeably missing in the research literature are stories that describe "decisions, the findings and best practices that result from the rigor of self-studies that describe the trials and errors" including lessons learned (Figg & Jaipal-Jamani, 2020, p. 1008).

8.4 Discussion

The research into digital literacies in FoE in the Canadian context is diverse and complex. In this attempt to untangle these complexities while revealing interweavings and pulling threads into the light, it is worthy to note some underlying themes that color the DL/DC tapestry in Canadian FoE. The first is the impact and response to the legacy of colonialism, with specific action framed by the Truth and Reconciliation Commission's report (The Truth & Reconciliation Commission, 2015). Second is the complexity across Canadian contexts of diversity, distances, and the networking of people, places, and programs. Third is the use of DL/DC and technological innovations to push beyond borders—the borders that frame FoE within their larger HE environments, the borders that frame universities in Canada within provincial domains, and efforts to span the national borders that bind digital literacy practices in Canadian FoE thus restricting an understanding of how DL/DC are applied across the globe, as revealed in this particular text. It is through sharing

the DL/DC practices in FoE across the country and around the globe that DL in teacher education will truly be transformed.

8.4.1 Truth and Reconciliation and DL/DC

Canadian FoE are addressing issues of colonialism, as part of the broader Canadian contextual efforts to fulfil the Calls to Action identified by the Truth and Reconciliation Commission (2015). This includes a critical lens to ensure that DL/DC practices support efforts to decolonize and recognize the teaching and learning needs of Indigenous peoples, rather than further marginalizing Indigenous populations (Schmidt & Gagné, 2016). While this is not a uniquely Canadian issue, technology integration with a lens to DL/DC should recognize place-based and community-based initiatives, respect culturally sensitive information, and respond to issues of access and control (Saunders, 2012). One example is research conducted by Hildebrandt et al. (2016) in Saskatchewan, examining digital storytelling as mechanism to support mandatory treaty education. This resulted in a shift in students' awareness of dominant discourses surrounding Indigenous histories and calls for greater responsiveness toward complex, non-linear knowledge production (Hildebrandt et al., 2016). Another such example from a Canadian context is Beaton and Carpenter's (2016) research using a critical settler colonialism lens when identifying digital technologies in educational opportunities with Indigenous communities in Northern Ontario while exploring issues of control, accessibility, quality, and decolonization.

8.4.2 Complexity and DL/DC

Scardamalia and Bereiter (2018) identify three cultural changes evident in the current push for internationalization and technological innovation in education which twenty-first century skills listings fall short in addressing. These include growing pressures for knowledge creation, the need to "move intelligently between dealing with abstractions and dealing with the concrete realities to which those abstractions relate" (p. 82), and complexity. Scardamalia and Bereiter (2018) position knowledge building networks as a means to engage students in complex, reality based, knowledge construction through unique projects such as planning a trip to Mars or evaluating the water purity in a local stream. There is no doubt that teaching and learning are mired in complexity at both the individual and organizational levels (Anderson, 2016).

Learning to teach, particularly with digital tools and technologies can be guided by an understanding of the TPACK framework, yet this is insufficient to bootstrap DL/DC into becoming. Bootstrapping is described by Scardamalia and Bereiter (2018) as "processes whereby a complex system emerges by starting simply and, bit by bit, developing more complex capabilities on top of the simpler ones"

(p. 85). Managing the complexity of integrating digital technologies into teaching and learning requires just such bootstrapping where growth, change, and transformation occurs at the "edge of chaos" (Garrison, 2016, p. 39). Such is the case, as seen in the research literature relating to DL/DC in Canadian FoE. The current trends in research, practice, and applications build from that which has been tried, shared, rejected, or enhanced by others. By pulling threads and examining inter-weavings, the complexity of the DL/DC tapestry grows in both design and production.

While the complexity that has emerged as a result of the global COVID-19 pandemic is not the major focus of this chapter, it is worthy to note that the issues and impact of DL/DC cannot be ignored in the rapid pivot to physically distanced, digitally enabled, online instruction that occurred in March 2020. There was no time to bootstrap, let alone support this transition with meaningful engagement in DL/DC in the design and delivery of learning with electronic tools and technologies. Teaching and learning in Canadian FoE became infinitely more complex in revolving cycles of repetitiveness, feelings of loss, struggles with self-efficacy, challenges to manage pressures of family and schooling, and issues with technological preparedness (VanLeeuwen et al., 2021). Understanding that remote emergency teaching using online learning technologies during such complex times is radically different than the well designed and technologically supported learning experiences offered prior to the pandemic (Hodges et al., 2020). This became a clarion call across departments in higher education organizations, not just faculties of education, with renewed calls for improvements in DL/DC (Wong et al., 2021). Faculty members, learning designers, instructional designers, and learning technologists within FoE and higher education institutions across Canada continue to respond to complex challenges resulting from this pivot, with further research beginning to reveal the inter-woven threads in this complex tapestry across the Canadian FoE and higher education sectors (VanLeeuwen et al., 2021).

8.4.3 Beyond Borders with DL/DC

While each individual FoE in Canada offers unique programming options for their students, there is a recognized need for a national strategy for teaching digital literacy (McLean & Rowsell, 2020), a pan-Canadian approach to FoE collaboration (Brown & Jacobsen, 2016; Ivus et al., 2021), the creation and curation of curriculum resources (Howell & O'Donnell), and research and knowledge mobilization (Government of Canada, 2018). The Canadian Association for Teacher Education / L'Association canadienne pour la formation des enseignants (CATE/ACFE) provides opportunities for collaboration, discourse, and research dissemination focusing on teacher education across institutional boundaries (Welcome to CATE, 2021). The *Polygraph Book Series* and *Working Conference Publications* from this organization are evidence of active and current collaborations in research and practices (Publications, 2021). Within this association are special interest groups that focus conversations to specific topics and fields of endeavor including one for technology and teacher education

(TATE), with emerging research evidenced in the special issue of the *International Journal of E-Learning and Distance Education* (Vaughan & Cotnam-Kappel, 2020).

Reaching beyond institutional and provincial boundaries, Hagerman et al. (2020) promote the exploration of digital literacies in Canadian educational contexts through a newly formed digital literacy collective (What Is Chenine?, 2020) with a call for researchers of digital literacies "to invest in designs and research methods that centralize in-the-moment insights, embrace complexity". Hagerman et al. (2020) describe research into virtual retrospective think alouds, eye-tracking, and spy glasses video in educational contexts as examples of research in pan-Canadian contexts in order to introduce the Chenine network, described as "a national, interdisciplinary Canadian Centre with global impact and reach. It inquiries into, creates, and coordinates technological, pedagogical, and curriculum innovation in education" (What Is Chenine?, 2020).

Additionally, pan-Canadian organizations supporting the work of educators to build DL/DC into curricular areas are found across the country. While a full listing of all potential supportive organizations is not possible, a few are illuminated here: MediaSmarts Canada (https://mediasmarts.ca/); Taking-IT-Global (https://www.tigweb.org/); Callysto (https://www.callysto.ca/callysto/); Canadian Geographic for Kids (https://www.canadiangeographic.ca/); A Kids Guide to Canada (https://akgtcanada.com/); Kids Code Jeunesse (https://kidscodejeunesse.org/); and the Digital Human Library (https://www.digitalhumanlibrary.com/).

A pan-Canadian and international approach to technology in teaching is imperative according to many of the organizations that influence and review teacher education and the education sector in both K-12 and HE (Burns & Gottschalk, 2020; Canadian Association of Deans of Education, 2014; CMEC, 2020; Ivus et al., 2021). This imperative is echoed in a recent report from the *Organization for Economic Co-operation and Development* identifying lifelong learning as a key to success when facing "megatrends, such as increases in life expectancy, rapid technological changes, globalisation, migration, environmental changes and digitalisation, as well as sudden shocks such as the COVID-19 pandemic"(OECD, 2021, p. 23). When specifically examining the cross-sector implementation of DL/DC in all educational contexts, many challenges need to be faced, including "fear of failure; insufficient professional development opportunities for teachers, particularly in the formal education system; the need to iteratively update curriculum; and difficulty securing sustainable funding" (Huynh & Malli, 2018, p. 51). As the research in this chapter illuminates, there are gaps in the fabric of DL/DC education, but many small lights of innovation within the K-12 and HE education sectors are illuminating the tapestry with their efforts to bring digital literacy and competency to the forefront.

This further illuminates the notion of knowledge building networks, connecting to the foundational work of Canadian researchers Scardamalia and Bereiter (2014), as evidenced in their research on knowledge building networks in classrooms around the world. Conceptions of knowledge building networks continue to develop and inform how teacher education course design can infuse DL/DC, through the explicit construction of meaning, the integration of problem solving into teaching practices,

and networking beyond the confines of the courses within the faculty. By developing Canadian FoE can enhance the knowledge-creating society envisioned by Scardamalia and Bereiter (2018) to sustain ongoing learning for educators. This brings together the notion of communities of inquiry (Garrison et al., 2001) and professional knowledge building networks (Scardamalia & Bereiter, 2002). Much can be accomplished to transform pedagogical practices already evident in the DL/DC tapestry in Canadian FoE. The notion of living literacies posited by Huynh and Malli (2018, p. 51) can be extended and applied to the digital literacy development in FoE in Canada, with an eye to framing this within a more holistic conception.

8.5 Conclusion

If the words of Canadian thought leader Henry Giroux are taken to heart, the infusion of digital literacies and the measurement of the success of this infusion are vitally important to rethink not only "the relationship between education and democracy, but also the very nature of teaching, the role of teachers as engaged citizens and public intellectuals and the relationship between teaching and social responsibility" (Giroux, 2012, paragraph 1). Of particular importance to the infusion and measurement of DL/DC in teacher education programs is one caution Giroux (2012) presents that of "the commodification of knowledge and the privatizing of both the learning process and the spaces in which it takes place" (paragraph 6). It is essential, not only in Canadian FoE, but in FoE around the globe, to consider the human side of digital integration. It is through the criticality of thought emerging from the voices and choices of teacher educators and pre-service teachers that examination of DL/DC within courses and programs of study in FoE provide an "opportunity to engage in much needed self-critique regarding the nature and purpose of schooling, classroom teaching and the relationship between education and social change" (Giroux, 2012, para. 11).

Throughout the research into DC/DL in FoE in Canada, there lies an underlying thread of caution. With efforts to decolonize educational practices especially with the infusion of technology, policy makers, program developers, teacher educators, and students in teacher education programs need to be vigilant in how technologies can be used, infused, and refused within FoE programs. It is vitally important to "include the critical skills needed for students' to ethically and responsibly read digital texts from their particular subject positions, and compose content that diminishes inequities and/or seeks to solve community, regional, or national issues" (Baroud & Dharamshi, 2020, p. 165). This includes a critical lens on how measures of DC/DL in FoE enable deeper discourse into metacognition, digital citizenship, decolonization, the complexity of teaching, globalization, environmental sustainability, all while respecting the right to be included, the right to refuse, and the right to be forgotten. More specifically, the collective actions toward improving DC/DL from the knowledge builders and knowledge keepers in FoE in Canada should model and support systemic changes toward social justice, equity, access, and diversity. In

this way, the individual lights created by researchers, preservice teachers, teacher educators, and FoE leaders will shine through the diverse tapestry of DL/DC in Canadian FoE.

References

About. (2021). Galileo educational network: Inspiring a passionate commitment to learning. Retrieved from https://galileo.org/about/.

Ala-Mutka, K. (2011). *Mapping digital competence: Towards a conceptual understanding.* (JRC 67075). European Commission Joint Research Centre Institute for Prospective Technological Studies. Retrieved from http://www.dctest.org/uploads/6/8/7/0/68701431/jrc67075_tn.pdf.

Ally, M. (2019). Competency profile of the digital and online teacher in future education. *The International Review of Research in Open and Distributed Learning*, *20*(2). https://doi.org/10.19173/irrodl.v20i2.4206.

Anderson, T. (2016). Theories for learning with emerging technology. In G. Veletsianos (Ed.), *Emergence and Innovation in Online Learning*. Athabasca University Press.

Baroud, J. (2020). *Engaging the intersections of equity and technology in teacher education instruction, curriculum and pedagogies* [Ph.D. Disssertation, University of Ottawa]. Retrieved from https://ruor.uottawa.ca/bitstream/10393/41116/5/Baroud_Jamilee_2020_thesis.pdf.

Baroud, J., & Dharamshi, P. (2020). A collaborative self study of critical digital pedagogies in teacher education. *Studying Teacher Education, 16*(2), 164–182. https://doi.org/10.1080/17425964.2020.1739639

Beaton, B., & Carpenter, P. (2016). Digital technology innovations in education in remote first nations. *In Education, 22*(1), 42–60.

Becker, S., & Jacobsen, M. (2021). Possibilities and challenges: Designing for the makerspace as an approach to teacher learning. In J. Nickel & M. Jacobsen (Eds.), *Preparing Teachers as Curriculum Designers* (pp. 373–404). Canadian Association for Teacher Education/Canadian Society for Studies in Education. Retrieved from https://cate-acfe.ca/wp-content/uploads/2021/04/Preparing-Teachers-as-Curriculum-Designers_ebook_Final.pdf.

Berry, A. (2020). S-STTEP: Standing on the threshold of opportunity. In J. Kitchen, A. Berry, S. M. Bullock, A. Crowe, M. Taylor, H. Guojonsdottir, & L. Thomas (Eds.), *International Handbook of Self-Study of Teaching and Teacher Education Practices* (2nd ed., pp. 3–14). Springer.

Blayone, T. (2018). Reexamining digital-learning readiness in higher education: Positioning digital competencies as key factors and a profile application as a readiness tool. *International Journal on E-Learning*, *17*(2), 425–451. Retrieved from https://www.learntechlib.org/p/178285.

Blayone, T., Mykhailenko, O., vanOostveen, R., & Barber, W. (2018). Ready for digital learning? A mixed-methods exploration of surveyed technology competencies and authentic performance activity. *Education and Information Technologies, 23*(3), 1377–1402. https://doi.org/10.1007/s10639-017-9662-6

Brown, E., & Jacobsen, M. (2016). Teaching and learning with technology in participatory digital cultures: A review of policy and practices in Alberta and Manitoba. In M. Hirschkorn & J. Mueller (Eds.), *What Should Canada's Teachers Know? Teacher Capacities: Knowledge, Beliefs and Skills* (pp. 428–462). Canadian Association for Teacher Education. Retrieved from https://cate-acfe.ca/wp-content/uploads/2020/07/What-Should-Canadas-Teachers-Know-Hirschkorn-and-Mueller-Eds-December-2016.pdf.

Bullock, S. M. (2013). Using digital technologies to support self-directed learning for preservice teacher education. *The Curriculum Journal, 24*(1), 103–120. https://doi.org/10.1080/09585176.2012.744695

Burns, T., & Gottschalk, F. (Eds.). (2020). *Education in the digital age: Healthy and happy children*. Educational Research and Innovation, OECD Publishing, Paris. https://doi.org/10.1787/1209166a-en.

Butler-Kisber, L. (2017). Editorial. *Learning Landscapes, 11*(1), 7–12.

Cai, J., & Gut, D. (2020). Literacy and digital problem -solving skills in the 21st century: What PIAAC says about educators in the United States, Canada. *Finland and Japan Teaching Education, 31*(2), 177–208. https://doi.org/10.1080/10476210.2018.1516747

Canadian Association of Deans of Education. (2014). *Accord on the Internationalization of Education*. Retrieved from https://www.trentu.ca/education/sites/trentu.ca.education/files/ACDE%20Accord%20on%20the%20Internationalization%20of%20Education.pdf.

CMEC. (2020). *Pan-Canadian systems-level framework on global competencies: Literature review*. Council of Ministers of Education, Canada. Retrieved from https://www.cmec.ca/Publications/Lists/Publications/Attachments/402/Pan-Canadian%20framework%20on%20Global%20Competencies%20Literature%20Review_EN.pdf.

Collier, D., & Rowsell, J. (2014). A Room with a view: Revisiting the multiliteracies manifesto, twenty years on. *FLuL*, *43*. Retrieved from https://www.academia.edu/11090435/A_Room_with_a_View_Revisiting_the_Multiliteracies_Manifesto_Twenty_Years_On.

Couros, A. (2006). *Examining the open movement: Possibilities and implications for education* [Dissertation, University of Regina]. Retrieved from http://educationaltechnology.ca/publication_files/research/Dissertation-Couros-FINAL-06-WebVersion.pdf.

Couros, A. (2006). Networked teacher. [image]. https://flic.kr/p/wtmHv

Couros, A. (2009). Open, connected, social – implications for educational design. *Campus-Wide Information Systems, 26*(3), 232–239. https://doi.org/10.1108/10650740910967393

Couros, A. (2010). Developing personal learning networks for open and social learning. In G. Veletsianos (Ed.), *Emerging Technologies in Distance Education* (pp. 109–127). Athabasca University Press.

Darvin, R., & Norton, B. (2017). Investing in new literacies for a cosmopolitan future. In R. Zaidi & J. Rowsell (Eds.), *Literacy Lives in Transcultural Times* (pp. 89–101). Routledge.

DeCoito, I. (2020). The case for digital timelines in teaching and teacher education. *International Journal of E-Learning and Distance Education, 35*(1), 1–36.

Desjardins, F. J., Lacasse, R., & Belair, L. M. (2001). Toward a definition of four orders of competency for the use of information and communication technology (ICT) in education. Computers and Advanced Technology in Education, Banff, Alberta.

Desjardins, F. J., vanOostveen, R., Childs, E., & Blayone, T. (2015). *General technological competency and use*. Retrieved from https://eilab.ca/wp-content/uploads/2017/08/GTCU-poster.pdf.

DeWaard, H., & Hoechsmann, M. (2021). Landscape and terrain of digital literacy policy and practice: Canada in the twenty-first century. In D. Frau-Meigs, S. Kotilainen, M. Pathak-Shelat, M. Hoechsmann, & S. R. Poyntz (Eds.), *Handbook on Media Education Research: Contributions From an Evolving Field* (pp. 363–371). John Wiley & Sons, Inc. Retrieved from https://doi.org/10.1002/9781119166900.ch34.

DeWaard, H., & Roberts, V. (2021). Revisioning the potential of Freire's principles of assessment: Influences on the art of assessment in open and online learning through blogging. *Distance Education*. https://doi.org/10.1080/01587919.2021.1910494

Dewey, J. (1916). Chapter 7: The democratic conception in education. In *Democracy and Education* (pp. 85–104). Penn State.

Dymoke, S., & Hughes, J. (2009). Using a poetry wiki: How can the medium support pre-service teachers of English in their professional learning about writing poetry and teaching poetry writing in a digital age? *English Teaching: Practice and Critique, 8*(3), 91–106.

Education in the Digital Age: Healthy and Happy Children. (2020). OECD ILibrary. Retrieved from https://www.oecd-ilibrary.org/education/education-in-the-digital-age_1209166a-en.

Figg, C., & Jaipal-Jamani, K. (2020). Technology teacher educators: The role of self-study in supporting digital age technology in teacher education. In J. Kitchen, A. Berry, S. M. Bullock,

A. R. Crowe, M. Taylor, H. Guðjónsdóttir, & L. Thomas (Eds.), *International Handbook of Self-Study of Teaching and Teacher Education Practices* (pp. 985–1019). Springer. https://doi.org/10.1007/978-981-13-6880-6_33.

Forsythe, G. (2014). My suggested update to the community of inquiry venn diagram. [image]. https://flic.kr/p/nLbm3A

Fullan, M., & Langworthy, M. (2014). *A Rich Seam: How New Pedagogies Find Deep Learning*. Pearson. Retrieved from https://www.michaelfullan.ca/wp-content/uploads/2014/01/3897.Rich_Seam_web.pdf.

Gallagher, T., & Rowsell, J. (2017). Untangling binaries: Where Canada sits in the "21st century debate." *McGill Journal of Education, 52*(2), 383–407.

Garrison, D. R. (2016). *Thinking Collaboratively: Learning in a Community of Inquiry*. Routledge.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7–23. https://doi.org/10.1080/08923640109527071

Giroux, H. (2012). The war against teachers as public intellectuals in dark times. Op-ed. *Truthout*. Retrieved from https://truthout.org/articles/the-corporate-war-against-teachers-as-public-intellectuals-in-dark-times/.

Goodnough, K., Falkenberg, T., & MacDonald, R. (2016). Examining the nature of theory–practice relationships in initial teacher education: A canadian case study. *Canadian Journal of Education/Revue Canadienne de l'éducation*, *39*(1), 1–28. JSTOR.

Government of Canada. (2018). *Leveraging knowledge for 21st century teaching and learning: Insights and opportunities for knowledge mobilization and future research.* Social Sciences and Humanities Research Council. Retrieved from https://www.sshrc-crsh.gc.ca/society-societe/community-communite/ifca-iac/01-learning_report-apprentissage_rapport-eng.aspx.

Hadziristic, T. (2017). *The state of digital literacy in Canada: A literature review*. Brookfield Institute for Innovation + Entrepreneurship. Retrieved from https://brookfieldinstitute.ca/wp-content/uploads/BrookfieldInstitute_State-of-Digital-Literacy-in-Canada_Literature_WorkingPaper.pdf.

Hagerman, M., Beach, P., Cotnam-Kappel, M., & Hébert, C. (2020). Multiple perspectives on digital literacies research methods in Canada. *International Journal of E-Learning & Distance Education, 35*(1), 1–38.

Hagerman, M. S., & Coleman, J. (2017). Implementing a digital hub strategy: Preservice teacher and faculty perspectives. *LEARNing Landscapes*, *11*(1), 137–151. https://doi.org/10.36510/learnland.v11i1.928.

Harrison, M., & DeVries, I. (2019). Open educational practices advocacy: The instructional designer experience. *Canadian Journal of Learning and Technology*, *45*(3). Retrieved from https://www.cjlt.ca/index.php/cjlt/article/view/27881.

Hébert, C., & Jenson, J. (2020). Teaching with sandbox games: Minecraft, game-based learning, and 21st Century competencies. *Canadian Journal of Learning and Technology*, *46*(3). https://doi.org/10.21432/cjlt27990.

Hildebrandt, K., Lewis, P., Kreuger, C., Naytowhow, J., Tupper, J., Couros, A., & Montgomery, K. (2016). Digital storytelling for historical understanding: Treaty education for reconciliation. *JSSE-Journal of Social Science Education*, 17–26:2.79 MB. https://doi.org/10.4119/UNIBI/JSSE-V15-I1-1432.

Hinrichsen, J., & Coombs, A. (2013). The five resources of critical digital literacy: A framework for curriculum integration. *Research in Learning Technology, 21*. https://doi.org/10.3402/rlt.v21.21334.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*. Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning.

Hoechsmann, M., & DeWaard, H. (2015). *Mapping digital literacy policy and practice in the Canadian education landscape*. Media Smarts Canada. Retrieved from http://mediasmarts.ca/sites/mediasmarts/files/publication-report/full/mapping-digital-literacy.pdf.

Hoechsmann, M., & Poyntz, S. (2017). Learning and teaching media literacy in Canada: Embracing and transcending eclecticism. *Taboo: The Journal of Culture and Education*, *12*(1). https://doi.org/10.31390/taboo.12.1.04

Holden, M., Pepper, S., Morris, D., Turner, A., Martin, S., Ness, J., & Burns, A. (2021). Genuine collaboration and partnership: Creating a university-and board-led PLC for instructional design. In J. Nickel & M. Jacobsen (Eds.), *Preparing teachers as curriculum designers* (pp. 191–221). Canadian Association for Teacher Education/Canadian Society for Studies in Education. Retrieved from https://cate-acfe.ca/wp-content/uploads/2021/04/Preparing-Teachers-as-Curriculum.

Honeyford, M. A. (2017). Artifacts as catalysts for reimagining transcultural literacy pedagogies. In R. Zaidi & J. Rowsell (Eds.), *Literacy Lives in Transcultural Times* (pp. 117–135). Routledge.

Hopper, T., Fu, H., Sanford, K., & Monk, D. (2018). What is a digital electronic portfolio in teacher education? A case study of instructors' and students' enabling Insights on the electronic portfolio process. *Canadian Journal of Learning and Technology*, *44*(2).

Howell, S., & O'Donnell, B. (2017). *Digital trends and initiatives in education: The changing landscape for Canadian content*. The Association of Canadian Publishers (ACP). Retrieved from https://publishers.ca/wp-content/uploads/2019/03/DigitalTrendsandInitiativesinEducation.pdf.

Hughes, J. (2008). Exploring E-portfolios and Web logs as Learning Narratives in a Community of new Teachers. *Journal of the International Society for Teacher Education, 12*(1), 49–64.

Hughes, J., Morrison, L., & Robb, J. A. (2020). "Virtually" a maker: Making in an online. *International Journal on Innovations in Online Education*, *4*(4). https://doi.org/10.1615/IntJInnovOnlineEdu.2020037132.

Huynh, A., & Malli, N. (2018). *Levelling up: The quest for digital literacy*. Brookfield Institute for innovation + entrepreneurship. Retrieved from https://brookfieldinstitute.ca/wp-content/uploads/Level-Up-report-FINAL-online-1.pdf.

Ivus, M., Quan, T., & Snider, N. (2021). *21st Century digital skills: Competencies, innovations and curriculum in Canada.* The Information and Communications Technology Council (ICTC). Retrieved from https://www.ictc-ctic.ca/wp-content/uploads/2021/04/21st-century-digital-skills.pdf.

Jaipal-Jamani, K., & Figg, C. (2015). The framework of TPACK-in-practice: Designing content-centric technology professional learning contexts to develop teacher knowledge-enhanced teaching (TPACK). In C. Angeli & N. Valanides (Eds.), *Technological, pedagogical content knowledge: Exploring, developing and assessing TPCK* (pp. 137–163).

Koehler, M. (2012, September 24). *TPACK explained*. What Is TPACK. Retrieved from http://tpack.org/.

Koehler, M. J., & Mishra, P. (2009). What Is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, *9*(1). Retrieved from https://www.citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogicalcontent-knowledge.

Kosnik, C., & Dharamashi, P. (2016). Intertwining digital technology and literacy methods courses. In C. Kosnik, S. White, C. Beck, B. Marshall, A. L. Goodwin, & J. Murray (Eds.), *Building Bridges* (pp. 163–177). SensePublishers. https://doi.org/10.1007/978-94-6300-491-6_12.

Leonard Cohen lyrics "Anthem". (2021). AZLyrics. Retrieved from https://www.azlyrics.com/lyrics/leonardcohen/anthem.html.

Leslie, L. E. (2010). Becoming a literacy teacher: From teacher preparation through the first two years of literacy teaching. Ph.D. Thesis. Retrieved from http://knowledgecommons.lakeheadu.ca:7070/handle/2453/3955.

Lowenthal, P., & Muth, R. (2009). Constructivism. In E. F. Provenzo Jr. & A. B. Provenzo (Eds.), *Encyclopedia of the social and cultural foundations of education* (pp. 178–179). Sage Publishing. Retrieved from https://doi.org/10.4135/9781412963992.n86.

Luke, A. (2012). Critical literacy: Foundational notes. *Theory into Practice, 51*(4), 4–11. https://doi.org/10.1080/00405841.2012.636324

Martinovic, D., & Zhang, Z. (2012). Situating ICT in the teacher education program: Overcoming challenges, fulfilling expectations. *Teaching and Teacher Education, 28*(3), 461–469. https://doi.org/10.1016/j.tate.2011.12.001

McLean, C., & Rowsell, J. (2020). Digital literacies in Canada. In J. Lacina & R. Griffith (Eds.), *Preparing Globally Minded Literacy Teachers* (1st ed., pp. 177–198). Routledge. https://doi.org/10.4324/9780429397790-11.

Morris, N. (2012). Learning and teaching with emerging technologies: Preservice pedagogy and classroom realities. Masters Thesis University of Windsor, 182.

O'Connor, K., Sterenberg, G., & Vaughn, N. (2020). Portfolio and self-study: An epistemology of practice. In J. Kitchen, A. Berry, S. M. Bullock, A. Crowe, M. Taylor, H. Guojonsdottir, & L. Thomas (Eds.), *International Handbook of Self-Study of Teaching and Teacher Education Practices* (2nd ed., pp. 1135–1157). Springer.

OECD. (2021). OECD skills outlook 2021: Learning for life. *OECD Publishing*. https://doi.org/10.1787/0ae365b4-en

Pahl, J., Rowsell, J., Collier, D., Pool, S., Rasool, Z., & Trzecak, T. (2020). *Living Literacies: Literacy for Social Change*. MIT Press.

Paskevicius, M. (2018). *Exploring educators experiences implementing open educational practices* [Doctoral Dissertation, University of Victoria]. Retrieved from https://dspace.library.uvic.ca//handle/1828/10414, https://doi.org/10.5683/SP2/CA77BB.

Paskevicius, M., & Irvine, V. (2019). Open education and learning design: Open pedagogy in praxis. *Journal of Interactive Media in Education, 2019*(1), 10. https://doi.org/10.5334/jime.512

Passey, D., Shonfeld, M., Appleby, L., Judge, M., Saito, T., & Smits, A. (2018). Digital agency: Empowering equity in and through education. *Technology, Knowledge and Learning, 23*(3), 425–439. https://doi.org/10.1007/s10758-018-9384-x

Paulson, E. N., & Campbell, N. (2018). Collective approaches to ePortfolio adoption: Barriers and opportunities in a large Canadian university. *The Canadian Journal for the Scholarship of Teaching and Learning*, *9*(3). https://doi.org/10.5206/cjsotl-rcacea.2018.3.4.

Publications. (2021). Canadian Association for Teacher Education/L'Association Canadienne Pour La Formation Des Ensignants. Retrieved from https://cate-acfe.ca/publications/.

Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu (EUR-Scientific and Technical Research Reports EUR 28775 EN). Publications Office of the European Union. Retrieved from https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu.

Rennie, J. (2015). Making a scene: Producing media literacy narratives in Canada [Ph.D. dissertation]. Ontario Institute for Studies in Education, University of Toronto.

Roberts, V., Blomgren, C., Ishmael, K., Graham, L., & Ferdig, R. E. (2018). Open educational practices in K-12 online and blended learning environments. In K. Kennedy (Ed.), *Handbook of Research on K-12 Online and Blended Learning* (2nd ed., pp. 527–544). Carnegie Mellon University: ETC Press. Retrieved from https://kilthub.cmu.edu/articles/Handbook_of_Research_on_K-12_Online_and_Blended_Learning_Second_Edition_/6686813.

Robertson, L., Hughes, J., & Smith, S. (2012). "Thanks for the assignment": Digital stories as a form of reflective practice. *Language and LiteRacy, 14*(1), 78–90.

Roth, W.-M., & Lee, Y.-J. (2007). "Vygotsky's neglected legacy": Cultural-historical activity theory. *Review of Educational Research, 77*(2), 186–232. https://doi.org/10.3102/0034654306298273

Russell, T., & Dillon, D. (2015). The design of Canadian teacher education programs. In Falkenberg, T (Ed.), *Handbook of Canadian Research in Initial Teacher Education* (pp. 151–165). Canadian Association for Teacher Education. Retrieved from https://cate-acfe.ca/wp-content/uploads/2019/05/Handbook-of-Canadian-Research-in-ITE-2015-1.pdf.

Russell, T., Martin, A., O'Connor, K., Bullock, S., & Dillon, M. (2013). Comparing fundamental conceptual frameworks for teacher education in Canada. In L. Thomas (Ed.), *What is Canadian About Teacher Education in Canada? Multiple Perspectives on Canadian Teacher Education in the Twenty-First Century* (pp. 10–36). Canadian Association for Teacher Educators. Retrieved

from https://cate-acfe.ca/wp-content/uploads/2020/07/What-is-Canadian-about-Teacher-Education-in-Canada-1.pdf.

Saunders, A. (2012). Review of Indigenous teacher training using community-based adult education: Implications for technology and outsider educators. *Diaspora, Indigenous, and Minority Education, 6*(4), 230–241. https://doi.org/10.1080/15595692.2012.715102

Scardamalia, M., & Bereiter, C. (2002). Knowledge building. In J. W. Guthrie (Ed.), *Encyclopedia of Education* (2nd ed., Vol. 4, pp. 1370–1373). Macmillan Reference; Thomson Gale Document Number: CX3403200353. Retrieved from https://thelearningexchange.ca/wp-content/uploads/2014/11/Knowledge-Building_Scardamalia-Bereiter1.pdf.

Scardamalia, M., & Bereiter, C. (2007). Fostering communities of learners and knowledge building: An interrupted dialogue. In J. Campione, K. Metz, & A. S. Palinscar (Eds.), *Children's Learning in Laboratory and Classroom Contexts: Essays in Honor of Ann Brown* (1st ed.). Routledge. https://doi.org/10.4324/9780203826966.

Scardamalia, M., & Bereiter, C. (2014). Knowledge building and knowledge creation. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (pp. 397–417). Cambridge University Press. https://doi.org/10.1017/CBO9781139519526.025.

Scardamalia, M., & Bereiter, C. (2018). Fixing Humpty Dumpty: Putting higher-order skills and knowledge together again. In L. Kerslake & R. Wegerif (Eds.), *Theory of Teaching Thinking* (1st ed., pp. 73–88). Routledge. https://doi.org/10.4324/9781315098944.

Schmidt, C., & Gagné, A. (2016). En(gauging) criticality in teacher education: Assignments with a critical edge. In M. Hirschkorn & J. Mueller (Eds.), *What Should Canada's Teachers Know? Teacher Capacities: Knowledge, Beliefs and Skills*. Canadian Association for Teacher Education (CATE). Retrieved from https://cate-acfe.ca/wp-content/uploads/2020/07/What-Should-Canadas-Teachers-Know-Hirschkorn-and-Mueller-Eds-December-2016.pdf.

Spante, M., Sofkova Hashemi, S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*. https://doi.org/10.1080/2331186X.2018.1519143

Starkey, L. (2020). A review of research exploring teacher preparation for the digital age. *Cambridge Journal of Education, 50*(1), 37–56. https://doi.org/10.1080/0305764X.2019.1625867

Sterenberg, G., Dillon, D., & O'Connor, K. (2016). What should Canada's teachers know? Or is that "should be able to do?" In M. Hirschkorn & J. Mueller (Eds.), *What Should Canada's Teachers Know? Teacher Capacities: Knowledge, Beliefs and Skills* (pp. 378–401). Canadian Association for Teacher Education (CATE). Retrieved from https://cate-acfe.ca/wp-content/uploads/2020/07/What-Should-Canadas-Teachers-Know-Hirschkorn-and-Mueller-Eds-December-2016.pdf.

Stewart, B. (2020). The open page project: Putting digital learning principles into practice for preservice edducators. *Journal of Teaching and Learning*, *14*(1), 59–70. https://doi.org/10.22329/jtl.v14i1.6265.

Stordy, P. H. (2015). Taxonomy of literacies. *Journal of Documentation, 71*(3), 456–476. https://doi.org/10.1108/JD-10-2013-0128

Strong-Wilson, T., Mitchell, C., Morrison, C., Radford, L., & Pithouse-Morgan, K. (2014). Looking forward through looking back: Using digital memory-work in teaching for transformation. In L. Thomas (Ed.), *Becoming Teacher: Sites for Teacher Development in Canadian Teacher Education* (pp. 442–468). Canadian Association for Teacher Education. Retrieved from https://cate-acfe.ca/wp-content/uploads/2020/07/Becoming-teacher-sites-for-teacher-development-in-Canadian-Teacher-Education.pdf.

Taylor, L., & Hoechsmann, M. (2011). Beyond intellectual insularity: Multicultural literacy as a measure of respect. *Canadian Journal of Education, 34*(2), 219–238.

The New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, *66*(1), 60–93. https://doi.org/10.17763/haer.66.1.17370n67v22j160u.

The Truth and Reconciliation Commission. (2015). *Truth and Reconciliation Commission of Canada: Calls to Action.* Retrieved from https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/indigenous-people/aboriginal-peoples-documents/calls_to_action_english2.pdf.

van Barneveld, A., & DeWaard, H. (2022). Pre-class surveys to inform course design. In S. Hrastinski (Ed.), *Designing Courses with Digital Technologies: Insights and Examples from Higher Education.* Routledge.

VanLeeuwen, C. A., Veletsianos, G., Johnson, N., & Belikov, O. (2021). Never-ending repetitiveness, sadness, loss, and "juggling with a blindfold on:" Lived experiences of Canadian college and university faculty members during the COVID-19 pandemic. *British Journal of Educational Technology, 52*(4), 1306–1322. https://doi.org/10.1111/bjet.13065

van Oostveen, R., Barber, W., Childs, E., DiGiuseppe, M., & Colquhoun, K. (2019). Exploring the fully online learning community model: Comparing digital technology competence and observed performance on PBL tasks. In M. A. Herzog, Z. Kubincová, P. Han, & M. Temperini (Eds.), *Advances in Web-Based Learning–ICWL 2019* (pp. 348–351). Springer International Publishing. https://doi.org/10.1007/978-3-030-35758-0_36.

Vaughan, N., & Cotnam-Kappel, M. (2020). Editorial. *International Journal of E-Learning and Distance Education*, *35*(1). Retrieved from http://www.ijede.ca/index.php/jde/article/view/1188/1819.

Veletsianos, G. (2015). A case study of scholars' open and sharing practices. *Open Praxis, 7*(3), 199–209.

Veletsianos, G., & Kimmons, R. (2016). Scholars in an increasingly open and digital world: How do education professors and students use Twitter? *Internet and Higher Education, 30*, 1–10.

Vratulis, V., Clarke, T., Hoban, G., & Erickson, G. (2011). Additive and disruptive pedagogies: The use of slowmation as an example of digital technology implementation. *Teaching and Teacher Education, 27*(8), 1179–1188. https://doi.org/10.1016/j.tate.2011.06.004

Watt, D. (2019). Video production in elementary teacher education as a critical digital literacy practice. *Media and Communication*, *7*(2), 82–99. https://doi.org/10.17645/mac.v7i2.1967.

Welcome to CATE. (2021). Canadian Association for Teacher Education/L'Association Canadienne Pour La Formation Des Enseignants. Retrieved from https://cate-acfe.ca/.

What is Chenine? (2020). Chenine A Canadian Collaboratory. Retrieved from https://chenine.ca/en/home-2/

Wong, S., Laidlaw, L., & Liu, Y. (2021). Reimagining professional development for digital literacies: Old, new and pandemic. *Language and Literacy*, *23*(2), 49–60. https://doi.org/10.20360/langandlit29563.

Zaidi, R., & Rowsell, J. (Eds.). (2017). *Literacy Lives in Transcultural Times.* Routledge.

Zhang, Z. (2014). Teaching ICT to pre-service teachers: Experiences and reflections. *Learning Landscapes, 8*(1), 323–337.