



## Twenty-five years of digital literacies in CALL

*Richard Kern, University of California, Berkeley*

### Abstract

*This article begins with a brief overview of how digital literacies have evolved in the context of recent technological and social changes. It then discusses three major domains in which digital literacies have made important contributions to language learning during this period: (a) agency, autonomy, and identity; (b) creativity; and (c) new sociality and communities. It then discusses a range of pedagogical issues related to digital literacies and some frameworks that have been proposed to address those issues. The conclusion summarizes some of what we have learned over the past 25 years and what we still have yet to learn.*

**Keywords:** *Literacy, Multimodality, Identity, Virtual Communities*

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### Introduction

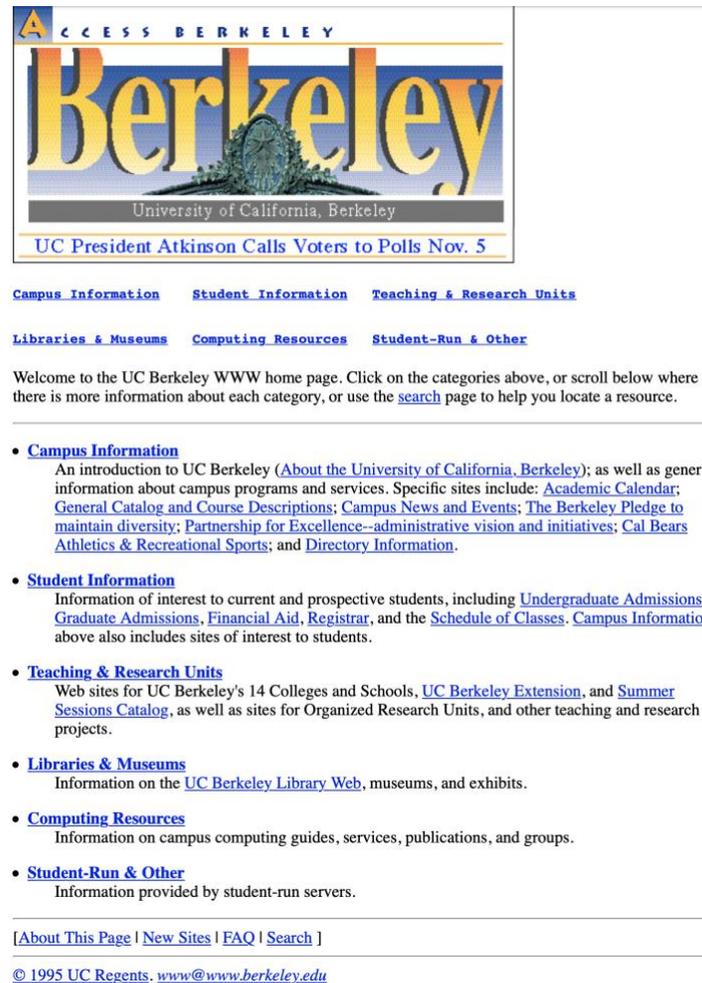
Twenty-five years ago, the World Wide Web was in its early years of public use, made accessible principally by Netscape, America Online, Prodigy, and CompuServe. During those early years, Mark Warschauer founded *Language Learning & Technology*, and wrote the following in his editor's introduction to the first issue in July 1997:

*Language Learning & Technology* features both a message and a medium. The message is that the use of computers and other new technologies has now moved to the mainstream of language education; research and theory are thus needed more than ever to ensure that new technologies are used wisely and effectively. (...) The medium is the World Wide Web. By publishing in this venue, we intend to disseminate research on this fast-developing field as broadly and as quickly as possible. We also hope, over time, to take increasing advantage of hypermedia capabilities of the web to provide better illustration of the concepts under discussion and to provide links to additional background information. (Warschauer, 1997, p. 1)

The “hypermedia capabilities” of the web were relatively rudimentary in those early years, and graphics and images were used primarily to decorate textual content (see, for example, [Figure 1](#)). Web users' sense of personal agency tended to be understood in terms of their freedom to explore hyperlinks to access boundless chains of textual information, rather than their ability to transform the form, substance, or framing of that information. Digital literacy at that time was thus largely a matter of knowing how to access web pages and to follow hyperlinks. Information was increasingly networked and distributed, but most people's general mode of using the Internet was principally consultative rather than creative.

**Figure 1**

*The Homepage of the UC Berkeley Website as of October 30, 1996*



In just a few years, however, the Internet became profoundly more personal, creative, and social in its content, its multimodality, and its connectivity. Whereas early Internet use largely meant connecting to static websites created by others, people soon came to create their own personal websites featuring their writing, photography, artwork, music, and other forms of self-expression. Web 2.0 ushered in a shift in emphasis from publishing to social participation, whereby people engaged one another by tagging, liking, friending, and posting on social media platforms.<sup>1</sup> Over time, massively popular sites such as Wikipedia, Facebook, Twitter, YouTube, and Instagram developed—and their entire content was dynamically produced by literally billions of individual users.<sup>2</sup> Not only was this the first time in history that widely-disseminated content had been generated by the masses, but also, and most importantly, it was the first time that ordinary individuals had the possibility of communicating with potentially hundreds, thousands, or even millions of people around the world. In educational contexts, teachers were no longer gatekeepers of information. Meanwhile, the balance of text versus image shifted, with people increasingly accessing visual images (static or animated) on the Internet, such that today more than 70% of mobile data traffic consists of video content (Williams, 2020). “Writing,” in this multimodal hypertextual environment, had become the more comprehensive activity called “authoring,” involving the use of design templates and

sometimes programming skills.

This thumbnail sketch gives us a sense of how digital literacy has evolved over the past 25 years. Most broadly, digital literacy is a constellation of symbolically mediated practices that involve various kinds of knowledge, predispositions, and skills to deal with texts in electronically-mediated environments. As these environments are often multimodal and multi-participatory (and sometimes multicultural), they require a complexified view of literacy that goes well beyond the skills of encoding and decoding print. Literacy is therefore frequently pluralized (*literacies*) to reflect the many different forms, functions, and goals of people's literacy practices in different social contexts. For example, sharing and commenting on images in Instagram or Flickr involves a different set of knowledge, skills, and practices than designing a personal website. Email, text messages, and tweets are all forms of electronic writing, but they each have their unique genre constraints, and their compositional features will vary with the intended audience and purpose. Because the knowledge, skills, and practices involved in digital literacies are so wide-ranging, no one is ever "digitally literate" in all possible ways.

Just as literacy has changed, the artifacts of literacy—texts—have also changed significantly over the past 25 years. Whereas print texts are fixed and bounded, electronic texts are often difficult to delimit in space and time because they are accessible via multiple points, and thus potentially amended, reshaped, resituated, and hypertextually linked to one another by multiple parties. They are further fluid in the sense that they may appear differently as they are displayed on different digital devices. This is important in the classroom, because students and teachers may think they are looking at the 'same' text, and yet they may in fact be seeing something different on their respective screens. Authorship can be blurred or indeterminate due to anonymity, identity play, collaboration, multimedia appropriation and remixing, all of which are part and parcel of contemporary online life. This raises questions tied to authenticity, originality, plagiarism, and other related notions in education. From a teacher's perspective, the recent blurring of such core notions raises new questions concerning how we should (re)define and evaluate learning, where we situate accountability, and how we foster in our students a sense of moral responsibility for their actions in digital environments.

These changes in literacy and technology have, of course, evolved dynamically with increasing globalization, new ways of working and entertaining ourselves, new ways of performing identity, and new ways of participating in local, national, and global communities. The proliferation of digital media, which are integrated, supported, and promoted through networks of human relationships, has contributed immensely to the global interconnectedness of people. In the process, however, it has also created the infrastructure for what Zuboff (2019) calls *surveillance capitalism*. Surveillance capitalism is based on behavioral data (our online actions, voices, interests, personalities, and emotions), and involves what Zuboff calls *behavioral surplus*, *behavioral predictions*, and *behavioral futures markets*. The proliferation of digital media has also facilitated mass dissemination of misinformation, international interference in elections, and symbolic inequality (through various types of digital divides). Dealing with these realities is an important dimension of literacy in the digital age. As Guikema and Williams (2014) point out,

Digital literacies are conceptualized as a way of being an engaged, responsible, reflective citizen in a 21st-century global community permeated by multimodal technologies. It is therefore critical that digital literacies be integrated throughout foreign/second language education, where multiple communities, identities, languages, and cultures converge. (p. 3)

Most recently, the COVID-19 pandemic has put digital literacies at the heart of *all* learning. With schools closed, travel and study abroad curtailed, policies of separation and enclosure enacted, digital technologies have allowed people to stay in touch, to learn from one another, and to keep abreast of what is happening in other parts of the world. Affecting some 1.6 billion students, the coronavirus pandemic has been described by United Nations Secretary-General Antonio Guterres as "a generational catastrophe that could waste untold human potential, undermine decades of progress, and exacerbate entrenched

inequalities”(CBS News, 2020). Guterres specifically called for investment in digital literacy and infrastructure to mitigate this catastrophe.

How have digital literacies affected language learning? Scholarship on this topic has been extensive, and interested readers should consult the many **books** (e.g., Barton & Lee, 2013; Carillo, 2019; Coiro et al., 2008; Cope & Kalantzis, 2000; Gillen, 2014; Gilster, 1997; Guikema & Williams, 2014; Hawisher & Selfe, 2000; Jones & Hafner, 2012; Kern, 2015; Kress, 2003; Lanham, 1993; Lankshear & Knobel, 2006, 2008; Oskoz & Elola, 2020; Reinking et al., 1998; Snyder, 1998; Warschauer, 1999), **review articles** (e.g., Gillen et al., 2010; Godwin-Jones, 2015; Lotherington & Jenson, 2011; Oskoz & Elola, 2016; Reinhardt & Thorne, 2019; Ware et al., 2016; Warschauer, 2010) and **special issues** (e.g., Early et al., 2015; Hafner et al., 2015; Meyers et al., 2013; Thomas & Peterson, 2014; Yi et al., 2020) that have been devoted to the topic. My intention here is not to provide yet another review of this area of research and pedagogy, but rather to highlight some of the significant novel contributions that the digital medium offers language learners, which I have grouped into three themes: (a) agency, autonomy, and identity; (b) creativity; and (c) new sociality and communities.

## Major Contributions to Language Learning

### New Opportunities to Develop Agency, Autonomy, and Express Identities

Lotherington and Ronda (2014) say it well:

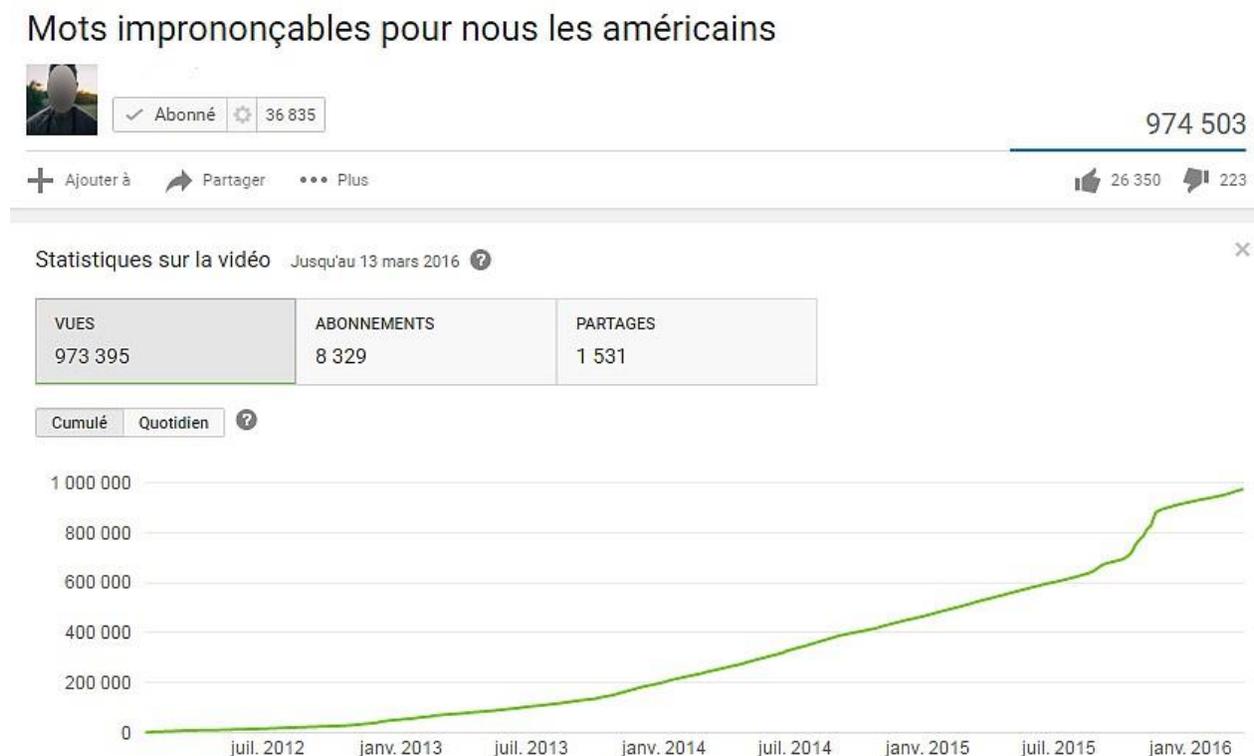
If language teaching is to borrow a page from the digital revolution, it is this: digital users are recast from novice to expert in the making. Learners are agentive in their own learning, not bereft of authority as in the analog classroom. (p. 19)

Rather than being dependent on the teacher, the class, and the curricular materials, digital-era language learners can make use of a wealth of resources on the Internet. These include reference materials (e.g., dictionaries, grammars, encyclopedias), tutorials (on a variety of linguistic and cultural topics), artistic productions (e.g., music, films, exhibits), day-to-day information and vocabulary (through news sites, business websites, websites on any interest under the sun), and, perhaps most significant, engagement with other speakers of the language through social media, forums, telecollaborative exchanges, and so forth.

This shift has tremendous implications for language learning. As just one example, consider the case of “TexFrançais” a young American learner of French who began a YouTube channel in 2011 to connect with French speakers and today has 42,400 subscribers (see [Figure 2](#) for the trajectory of viewership of one of TexFrançais’s early videos—as of this writing this same video now has had 1,740,360 views). Through his videos (and the thousands of comments they elicit), TexFrançais obtains not only massive language input and opportunities for interaction but also he creates a new identity in French that is different from his identity in his communities in Texas and Boston (Codreanu & Combe, 2018; Combe, 2017). Moreover, his “virtual” communication (which is real, albeit with people he has never met face to face) can affect his real-world social contexts and identity formation.<sup>3</sup> This kind of social dynamic can also enhance learner autonomy, as discussed by Hafner and Miller (2011), who showed that learners making digital videos were “forced” to use their L2 (English) independently in researching and writing their script, in filming, and doing voice-overs. Moreover, by engaging an authentic audience by sharing their videos over the Internet, their “learning extended into virtual spaces that were under the control of the learners, not the teachers” (p. 82).

**Figure 2**

2012-2016 Viewing History of One of TexFrançais's Early YouTube Videos (Combe, 2017)



The identity impact in TexFrançais's foreign language learning is something that Lam's ethnographic research (e.g., Lam, 2000, 2004, 2009) has demonstrated in immigrant contexts. Her 2000 study focused on Almon, a Chinese immigrant teenager who made friends and discovered his own expressivity in English through instant messaging and by creating his own web site about a Japanese pop music idol. Lam argued that this online engagement led Almon to develop a new identity that had not been available to him in his immediate community and school in the U.S. Lam's 2004 study followed two Chinese immigrant girls who joined a Hong Kong bilingual chat room to make new friends and work on their English. Although they were initially hesitant about their English, they quickly found they were more comfortable speaking English after joining the chat room. Engaging with peers around the world in a mixed code of English and romanized Cantonese that created a collective sense of ethnic identity, the girls developed their fluency and confidence in speaking English, which transferred to their American social context. Lam (2009) analyzed multilingual instant messages written by another Chinese immigrant (Kaiyee) whose exchanges drew strategically on different kinds of semiotic resources: linguistic resources from Mandarin, Cantonese, Taishanese, and English; graphic resources in the form of traditional and simplified characters, pinyin, Roman script, emoticons, and punctuation; and technical resources in using the computer hardware and its software interface. These various resources all contributed importantly to the meanings she produced. Lam's research is important in that it considers not only how social contexts shape language use in online environments but also how online communication shapes social contexts and participants' identity formation. Furthermore, her work draws attention to the ways in which language functions in relation to other forms of online semiosis.

These themes have been reiterated in more recent research dealing with more multimodal expression

(e.g., Mina, 2014; Schreiber, 2015, 2019). Fluid use of multimedia resources is an important component of digital literacy, and whereas early multimedia language environments were teacher-developed (e.g., Chun & Plass, 1996), it quickly become common for students themselves to author their own multimedia documents. Cummins et al. (2015) describe student-produced multimodal *identity texts* that “represent *expressions* of identity, *projection* of identity into new social spheres, and *re-creation* of identity as a result of feedback from and dialogue with multiple audiences” (p. 557) that are especially validating for learners from marginalized groups.

The shadow side of this resource wealth is that Internet users are themselves commodified by technology companies and social networks, which have their own invisible agency. The algorithms that are woven into texts to monitor people’s online actions not only feed behavioral futures markets (Zuboff, 2019) but also silently filter what information an individual can most readily access (Pariser, 2011) and the degree of agency individuals can exercise over what and how they read (Jones, 2019, p. 1). Moreover, spelling/grammar/style checkers and autocorrect programs encourage only normative (and monolingual) language use. Learners’ agency is therefore not as broad as is often claimed. Thus, as Jones (2019) suggests, digital literacies education should “engage students in critically evaluating how technologies ‘work’ though getting them to reflect on their subjective experiences of ‘working with’ and being ‘worked on by’ technologies” (p. 7).

### **New Opportunities for Creativity**

Today people are faced with more choices than ever about how to communicate, and the combination of semiotic resources has become routine. Whereas the integration of multiple media used to be the domain of specialists, it is now within the grasp of children—and it is more social. As Levine (2020) remarks, “Creativity that earlier may have never manifested at all, or only privately in a journal or scrapbook, can now go viral if it finds resonance in others who likewise find inspiration or amusement in it, share it, mix it, or mash it up” (p. 53).

Language play, a fundamentally important dimension of language learning (Cook, 2000; Crystal, 1998; Lantolf, 1997), has been explored in social media contexts like Facebook (Lantz-Andersson, 2018) but also in telecollaborative online exchanges (Belz & Reinhardt, 2004) and blogs (Vaisman, 2011).

A major way that language learners can showcase their creativity is through multimodal composition (Yi et al., 2020), which involves the use of video, photographs, drawings, animation, voice, text, or music to develop short personal filmic narratives. One of the early adopters, Nelson (2006), taught digital storytelling to university freshman ESL students. Grounding his work in Kress’s (2003) notions of transformation, transduction, and synaesthesia, Nelson found that his students were conscious of how a given image could accumulate additional meaning as it was reiterated in the digital story, and he hypothesized that this awareness could transfer to students’ analyses of written texts, where shifts in significance of repeated elements are often far more subtle. Multimodal composition also afforded students a means to experiment with designing complementary relations of meaning across modes. Nelson noted some downsides, including the generic quality of some students’ expression and an over-accommodation of audience—both tied to students’ expectations of what a multimodal narrative “should be like.” In their overview of research on digital storytelling in L2 contexts, Oskoz and Elola (2016) point out that although there is some evidence that learners’ pronunciation, listening comprehension, and attention to grammatical rules benefit from developing digital stories, assessment is one of the challenges that teachers and researchers face, and that more methodologically rigorous studies are needed.

Addressing the assessment issue, Hafner and Ho (2020) propose a multi-stage, process-oriented model for assessing multimodal compositions in both formative and summative ways. While some teachers worry that a focus on multiple modes might be detrimental to language learning, a counter-argument is that digital literacies expand learners’ expressive potential (Belcher, 2017) as well as their meta-communicative ability to reflect broadly on their signifying practices, recognizing language as just one

dimension of their semiosis (Nelson, 2006; Shin et al., 2020; Yang, 2012). Another controversial aspect of multimodal composition is the widespread practice of remixing, or combining and manipulating cultural artifacts to produce something new (Knobel & Lankshear, 2008). At the conclusion of her study of two English language learners' digital storytelling projects, Yang (2012) poses the question of how we can distinguish "creation" from plagiarism in the context of multimodal practices (p. 235). In turn, Hafner (2015) asks whether the practice of appropriating and remixing existing resources in multimodal composition "promotes or compromises the expression of learner voice" (p. 486), concluding that it can do both, depending on how it is used. What is clear from multimodal composition studies is that learners need guidance in thinking through the legal and practical issues related to the ethics of appropriation in digital creations. As Early et al. (2015) argue, "It would be a mistake to think of multimodal practices as something "out there," beyond the normative pressures that shape our more traditional understandings of the accepted text" (p. 453).

Fan fiction is another way language learners showcase their creativity. Fans of television shows, movies, books, plays, video games (or of celebrities such as actors, musicians, and athletes) use digital environments to discuss an episode or, most often, elaborate their own creative adaptations or extensions of narratives. Black (2008) provided an ethnographic study of three adolescent English learners' participation in Fanfiction.net, showing how, through their online narratives, these English learners created authorial and social spaces that afforded them novel opportunities to use English, develop their composition skills, and express their evolving identities. Sauro, in her (2017) review of online fan practices and CALL, notes that research on fan fiction in language learning has focused primarily on writing development (particularly the role of feedback), as well as identity work and empowerment. In terms of language skill development, Sauro writes, "fan fiction offers a clear link between reading and writing (in the case of fan fiction based on popular texts) or listening and writing (in the case of fan fiction based on movies and television shows)" (p. 135). To date, research has focused on English fan fiction sites, so examining fan fiction in other languages is an important opportunity for future research.

Another area of burgeoning digital creativity is games. Reinhardt (2019) demonstrates that games are an ecologically valid and effective means of promoting language learning and provides a comprehensive guide to the theory and practice of incorporating games in language teaching. Sykes (2019) considers games in terms of their affordances for analysis of digital discourse, presenting four contexts (interaction *with* games, interaction *through* games, interaction *around* games, and interaction *about* games) that can further the development of learners' language abilities and digital discourse abilities. Reinhardt et al. (2014) describe a two-week game-enhanced, literacy-based instructional unit in a German class. Students' evaluations were mixed, with some students enjoying the experience, but others feeling it was at odds with their expectations for academic study, to the point that they procrastinated their play in favor of doing "real" homework. The authors propose that this tension between expectations about play and about learning can be thought of as being emblematic of the very process of learning a foreign language, involving constant negotiation between the familiar and the contested.

Finally, the advent of 'maker' culture shifts the emphasis from creativity in the use of digital environments to creativity in shaping the very digital environments themselves. As Meyers et al. (2013) point out,

Understanding oneself not only as a creative producer of digital media, but also as a hacker or a maker, underscores the contention that technologies are not givens to be adjusted to and blindly followed, but, rather, are malleable, *mashable*, and perpetually adaptable." (p. 362)

From this perspective, digital literacy requires understanding the extent to which one's creative online activity unfolds within a socio-technical network that necessitates parameters and rules to ensure interoperability—and recognizing one's own responsibility for adhering to such norms in order to maintain connectability, which Meyers et al. characterize as "a key component of being digitally literate in the twenty-first century" (Meyers et al., 2013, p. 363) This digital social contract involves acknowledging the importance of sharing and attribution, respect for the autonomy and privacy of others,

and embracing openness. Meyers et al. argue that although the specifics of the conventions will change, the disposition to act collectively will remain essential:

This culture is not imposed from any central power, but rather is the result of individual choices across the web that aggregate upwards into a shared understanding of what is valued and what is not. With time and technological developments, the content of these particular norms will shift and adapt, but the need to operate collectively will continue to be an important aspect of literacy into the future.” (Meyers et al., 2013, p. 363)

This leads us to our third theme.

### **The New Sociality and Virtual Communities**

Perhaps most obvious in social media spaces, the last 25 years have seen the development of new forms of sociality made possible through networking technology. ‘Friending’, ‘liking’, ‘sharing’, or ‘retweeting’ put on a public stage what was once private and personal, and emoticons and emoji carry some of the emotional (or ironic) tonal signals in communication. On platforms like Facebook and Twitter, people can maintain social connections not only actively through direct messaging, but also passively through ‘status updates’, ‘posts’, and ‘tweets’ addressed to no one in particular, leaving textual traces of their activities, location, thoughts, and moods on a centralized server, displayed to ‘friends’ or ‘followers’. Literacy practices have had to adapt to the reading and interpretation of these new “open” symbolic forms, as well as the new social responsibility that goes with widely-dispersed communication that can go viral.

Social conventions in digital environments are being dynamically revisited on an ongoing basis—and this is what makes communication in digital environments at once exciting and precarious. One area that affects everyone, but is particularly challenging for language learners, is interpreting the tone of written online messages and the pragmatic intentions they index. Missing from writing are features such as inflection, tone, accent, fluency, vocal expressiveness, facial expression, gesture, and body language that contribute to meaning in face-to-face communication. While absence of these features can be highly useful (language learners can craft communication that makes them appear to be native speakers; ethnicity/gender/age stereotypes can be side-stepped), it can also contribute to ambiguity. Kruger et al. (2005) found not only that people are better at expressing and interpreting tone in speech than in writing, but also that people overestimate the degree to which the tone of their writing will be accurately interpreted by readers. More dangerous is what they found about stereotypes. Epley and Kruger (2005) tested the hypothesis that expectancies and stereotypes would influence impressions formed over email more than impressions formed via vocal communication. A series of three experiments (in which participants’ expectations about a person they were to “interview” via email or via telephone were experimentally manipulated) showed that bogus first impressions were more persistent in email communication than in telephone communication. Digital writing is often touted as a socially “blind” medium (no one knows you’re a dog on the Internet). But Epley and Kruger’s research suggests that when people communicate with someone about whom they already have a stereotype, they are more, not less, likely to maintain that stereotype when that communication is by email rather than voice. Moreover, Epley and Kruger argue that this medium effect can lead to spreading of expectancies and stereotypes to friends, colleagues, or acquaintances who do not have first-hand experience with the person in question. When different cultures are added to the mix, as in written telecollaborative exchanges, the potential for falling back on stereotypes and entrenching a priori judgments is all too real.

A related literacy challenge for those engaged in social media is rethinking what social context means. In Facebook, for example, it is ‘friendship’ that substitutes for the situational context that is missing in any material sense. According to boyd (2006), there is a shift in the way that context is defined. In early online communities, such as chatrooms, mail lists, and Usenet groups, context and group identity were defined in terms of common interests or activities. On Facebook, on the other hand, people choose people first, interests second.<sup>4</sup> Moreover, their choice of people is tied to the image that they want to project of themselves and the audience they seek to address through their online profiles, posts, and comments.

What is important from a technological perspective is that this dynamic of context creation on Facebook is tied to Facebook's architecture: by textualizing friendship (by creating friend lists), by creating a textual profile and updating their textualized status (both verbally and visually), and by posting texts that are viewed not only by the direct addressee but also by "onlookers" within the social network, people engage in *extimacy* (Rouquette, 2008)—the obverse of intimacy, involving the overt sharing of thoughts or feelings that would usually be considered private.<sup>5</sup> In terms of online impression management, you are what you display in terms of friend list, profile, current status, posts, and responses to your posts. This puts a premium on literacy abilities in self-representation and community membership.

The learning context also changes when language learning involves digital environments. Unlike academic literacies, digital literacies develop largely in informal (i.e., out-of-school) contexts (Meyers et al., 2013). The environments and genres discussed in the two preceding sections (e.g., YouTube, instant messaging, chat rooms, Facebook, blogs, games, fan fiction, multimodal composition) have begun to be researched in terms of their affordances for language learning and show real promise, but it is difficult to tease out what is learned specifically from these "informal" contexts and what is learned through more formal academic study. In the end, what may be important is that learners develop the "multifarious" (Reinhardt & Thorne, 2019) abilities needed to use language and other semiotic modes effectively in both online and offline contexts. However, educators must consider what added value schools and universities can offer (van Leeuwen, 2015). Achieving synergism between informal and formal environments is where "bridging activities" of the type Thorne and Reinhardt (2008) propose come to play an important role.<sup>6</sup>

Contexts that emphasize the interactive, social nature of digital literacies include online games (mentioned earlier) and telecollaboration, or virtual exchange. So much has been written about this latter topic that I will refer readers to its own voluminous literature (O'Dowd & O'Rourke, 2019, is a good starting point). Another social learning context that has received increasing attention in recent years is digital social reading. Departing from a conception of reading as a private, solitary activity, social reading adds a collaborative dimension by having people share their reflections and annotations of a common text as they read it. Blyth (2014) describes eComma, one digital annotation platform among others such as hypothes.is and Perusall, as it was used in four case studies. He found that social reading created a zone of proximal development (Vygotsky, 1978) for less expert readers, it distributed the cognitive load among students in the class, it synthesized prereading, reading, and postreading into one unified activity, and it aggregated readers' interpretations, allowing for analysis of patterns of interpretation within the group. Acknowledging the many critiques that have been directed at social reading, Blyth concludes that "Reframing digital literacy as participatory culture has important entailments. The most consequential of which is that digital practices are no longer viewed as replacing print practices, but rather as transforming individual practices into social ones" (p. 222). Law et al. (2020) also showed that shared annotation of texts can deepen learners' analysis and understanding by exposing them to a diversity of perspectives. They point out, however, that engagement with annotation activities is highly variable, and that positive collaboration is dependent on a "community of learners who co-create a set of shared practices" (p. 82). The authors conclude with suggestions for teachers to optimize the use of digital social reading.

Participation in communities has long been an important aspect of language learning, whether it is studying in a classroom community, staying in a host family or student residence during study abroad, doing an internship with a foreign entity, engaging in a telecollaborative project, participating in organizations such as the Alliance Française or Goethe Institut, or volunteering in a local organization that serves speakers of the language. Currently, during the Covid-19 pandemic, essentially all communities are now online communities. The Internet has become the platform for interpersonal communication, education, business and commerce, religious worship, civic events, entertainment, and even aspects of medical practice. This Internet convergence offers new opportunities for language learners to make contact with, and potentially participate in, a wider than usual range of communities, albeit electronically and at a distance. Such participation will require well developed digital literacy that includes intercultural sensibilities and openness to new perspectives.

## Pedagogical Issues

Although it has been relatively rare to date in mainstream foreign language teaching, explicit attention to the development of digital literacies is likely to increase during periods of remote instruction, such as the current Covid-19 pandemic, simply because of students' and teachers' heightened awareness of the effects of technological mediation in all aspects of their educational experience. When digital literacies are explicitly addressed, they are typically framed within a multiliteracies orientation (Cope & Kalantzis, 2000, 2009; New London Group, 1996; Paesani et al., 2016). Warner and Dupuy (2018) discuss two important challenges to the implementation of a pedagogy of multiliteracies in foreign language programs. First is the training of graduate student instructors and lecturers, which requires the long-term development of conceptual knowledge and not just a set of classroom techniques and activities. The second challenge is the lack of textbook materials that adopt a multiliteracies approach—this means that instructors must create their own materials or adapt existing curricular materials, and this takes considerable time and training, which returns us to the first challenge. Warner and Dupuy present open-access resources (including [Foreign Languages and the Literary in the Everyday \(FLLITE\)](#), whose creative materials highlight the literariness of everyday language) and then discuss three ways that multiliteracies pedagogy could broaden its scope in foreign language programs: (a) by embracing new connections (e.g., ACTFL Standards) and contexts (less commonly taught languages, heritage language teaching); (b) by embracing new media environments that students are likely to already engage in (e.g., digital gaming and digital social media); and (c) by embracing new focal themes through which students can engage critically with the world outside the classroom (e.g., social justice, race, peace education).

All of this calls for a rearticulation of goals in language education, and specifically, goals that extend beyond communicative competence. Kress (2003) compared the communicative demands of paper literacy with those of electronic literacy, making an explicit link to the values underlying industrial versus information-based social economies:

In a world of stability, the competence of reliable reproduction was not just sufficient, but of the essence—on the production line as much as at the writing desk. In a world of instability, reproduction is no longer an issue: what is required now is the ability to assess what is needed in this situation now, for these conditions, these purposes, this audience—all of which will be differently configured for the next task. (p. 49)

Kress (2009) underlined the centrality of *design* and *rhetoric* in his framework, and how these must be at the heart of educational assessment:

Two terms are central in my approach: *design* and *rhetoric*. *Design* is “prospective” and makes the agency of the designer crucial. *Assessment*—the major device for social/pedagogic regulation—needs to fit that position: contrasting metrics aligned to power with metrics attuned to the learner’s interpretations and principles evident in her or his signs of learning. Apt assessment requires means of *recognition* of signs of learning, of the semiotic work, of the agency of the interpreters/learners. (p. 205)

Lotherington and Ronda (2014) underscore the importance of *mediation* in digital communication and remind us that communicative competence is distributed, not only among people engaged in discourse, but also between humans and machines. They write, “In order to be an effective communicator in digital environments, one must be able to navigate a complex web of shifting meanings created through multiple media, as well as become adept at splicing these meanings in personal production” (p. 18). What they propose as a “communicative competence 2.0 upgrade” involves multimedia competency (including coding ability), collaborative communication (including multiple authorship), agentive participation (including creating and remixing content), and multitasking ability. Reinhardt and Thorne (2019) offer six types of activities that “update” traditional digital literacies activities “to reflect the participatory, multifarious, and everyday qualities of digital literacy practice” (p. 224) These include web scavenger hunts, webquests, online advertisement and social media post analysis, online translator and dictionary

activities, app collections, and online role play and simulation activities. Alexander et al. (2016) offer an *adaptive remediation* framework to help multimodal writers to adapt or transfer their composing knowledge across media to meet their rhetorical objectives.

Also taking mediation as a central focus, Kern (2015, 2018) argues for what he calls a relational pedagogy that focuses on meaning potentials that reside as much *between* the images, elements of language, spatial arrangements of features, and so forth as *within* them, and that makes connections between digital literacies and other communicative practices. His framework organizes teaching around five principles:

- 1) Meanings are situated and relational, not autonomous
- 2) Language, literacy, and communication rely on both convention and invention
- 3) The medium matters
- 4) Texts and communication are always multimodal
- 5) Language, technologies, and texts mediate between the social and the individual; between ourselves and real or imagined worlds

One pedagogical goal of Kern's fifth principle is to evaluate the authenticity and validity of information. In the digital era, fake artifacts (including photos and videos) can be made to look authentic, and people's ability to critically evaluate the source of information, to assess its credibility or bias, and to distinguish opinion from fact is essential to personal welfare as well as societal health. Leu et al. (2007) found that even the most proficient seventh-grade readers could be fooled about the reliability of information they found on the Internet, even when they were aware of how unreliable online information can be. A recent study by Avaaz (2020) shows that on Facebook, content relayed from the top ten websites known to spread health disinformation had almost four times as many views as information from the World Health Organization, the Centers for Disease Control and Prevention, and eight other websites of leading health organizations. Educating learners to distinguish trustworthy sources from those that merely gratify them by reaffirming their own convictions is therefore essential.

Drawing from these frameworks emphasizing design and mediation, we can draft a pedagogical agenda. A first challenge is to make learners aware of the importance of digital literacies. A survey by Williams et al. (2014) showed a limited understanding of digital literacies among over 600 language students aged 18-23. Kurek and Hauck (2014) argue that competence in digital literacies cannot be presumed to develop spontaneously in today's youth (e.g., Rowlands et al., 2008), and that systematic preparation and training are required. They propose a framework that takes advantage of the "dual mediation" of multiliteracies activities in technology-enhanced language education—mediation by the technology and by the new language being learned. Their task-based approach, which focuses on the development of learner autonomy in digital contexts rather than tool-specific skills, is structured progressively in three main phases—(a) informed reception of multimodal input, (b) thoughtful participation in opinion-generating acts, and (c) creative contribution—each phase with goals at the cognitive, discursive, social, and operational levels.

Another significant challenge has to do with assessment. So-called "traditional" literacy is extensively normed—there are long (albeit contested) traditions of teaching writing, reading, handwriting, grammar, and so forth. But in digitally-mediated environments, as the semiotic scope has expanded, norms and standards vary widely, if they exist at all. Moreover, the "distributed" nature of competence complicates how "individual" performance is to be considered. O'Neill (2019) reported that almost 90% of the intermediate Spanish and French students he surveyed used online translators (e.g., GoogleTranslate) at least occasionally, even when prohibited by their teachers. Should learners be assessed on their savvy in using such resources or are instructors wed to the idea of isolating individuals' "own" knowledge and resources? As Kress (2003) intimated in emphasizing 'here and now' context and purpose in digitally-mediated meaning making, more dynamic kinds of assessment that look at the effectiveness of learners' semiotic choices are needed (e.g., Hafner & Ho, 2020; VanKooten, 2013).

Finally, the shift from single-authored texts to collaborative and/or multimodal and/or remixed projects highlights the importance of rethinking the epistemological foundations of L2 writing, the degree to which language should remain the central focus (Polio, 2019), and how to deal with issues of intellectual property, plagiarism, and fair use. Three special issues of the *Journal of Second Language Writing* (Polio & Shi, 2012; Storch & Li, 2017; Yi et al., 2020) consider these topics, and Polio and Shi emphasize the importance of situating writing research within specific cultural and technological contexts since beliefs and attitudes about appropriation or plagiarism are closely linked to particular settings and purposes of writing.

## Conclusion

Digital technologies offer unprecedented opportunities for language learning—but they also require increasingly sophisticated ability to manipulate and interpret a broad range of symbol systems. Digital literacies integrate listening, speaking, viewing, reading, writing, and critical thinking, along with the skills necessary to operate digital devices and navigate their various resources. Over the past 25 years, language education has entered a “postlinguistic condition” (Nelson & Kern, 2012) not in the sense of rejecting language, or the importance of learning and teaching languages, but in the sense of needing to better acknowledge how learning and using language is always embedded within broader processes of communication and social action.

Over the past 25 years we have learned a great deal about how language learners act and interact in online environments. What we know less about is how the abilities they develop in online environments relate to their abilities elsewhere, in different contexts, genres, and modalities. We also need to know more about how interpretive and production skills developed in one modality might transfer to another.

In the last 25 years we have seen tremendous improvements in technological infrastructure, yet we know that different groups of people have different degrees and kinds of access to technology. Technological inequities have become especially important in the current pandemic era, when all education is so dependent on technology. We need to understand the full implications of differential access to electronic literacy tools and the social capital needed to use them effectively.

Finally, we have learned over the last 25 years that technology is no ‘magic bullet’ to improve language and literacy abilities—no technological medium is suited to all purposes and situations of language learning—yet it is so ubiquitous that all language educators must inevitably incorporate it in their teaching. Bruce’s (2002) conclusion that “It is ironic that the research showing how powerful computers can be ultimately brings us back to the familiar idea that it is teachers who make the difference” (p. 17) is as true today as it was then. This reminds us that digital literacy gives educators one more opportunity to develop in language learners the fundamental abilities needed to engage in a range of social practices involving the interpretation and production of texts.

## Notes

1. In a US national survey, 57% of teens reported having made a new friend online (Lenhart et al., 2015).
2. As of January 2021, Statista (2021) estimates that 4.66 billion people were active Internet users, encompassing 59% of the global population. An estimated 3.6 billion people were using social media in 2020, and global use is projected to increase to almost 4.41 billion by 2025.
3. An important caveat, however, is that communicating with unknown interlocutors can involve risks, such as trolling or flaming, and might heighten learner anxiety and inhibitions (Belcher, 2017).
4. This is less true of other kinds of social media environments, such as fan-based online communities, YouTube, and TikTok. What social networks may broadly have in common, however, is the need to be able to effectively present oneself online.
5. Onlookers result from the phenomenon of *context collapse* (boyd, 2002), when social spheres that are normally separate in offline life become blurred in online contexts. Context collapse can influence the amount and nature of people's self-disclosures (Gil-Lopez et al., 2018).
6. See Hafner (2014) for an example of how a digital video project served as a bridge to an academic writing task.

## References

- Alexander, K. P., DePalma, M.-J., & Ringer, J. M. (2016). Adaptive remediation and the facilitation of transfer in multiliteracy center contexts. *Computers and Composition, 41*, 32–45. <https://doi.org/10.1016/j.compcom.2016.04.005>
- Avaaz. (2020, August 19). *Facebook's algorithm: A major threat to public health*. [https://secure.avaaz.org/campaign/en/facebook\\_threat\\_health/](https://secure.avaaz.org/campaign/en/facebook_threat_health/)
- Barton, D., & Lee, C. (2013). *Language online: Investigating digital texts and practices*. Routledge.
- Belcher, D. D. (2017). On becoming facilitators of multimodal composing and digital design. *Journal of Second Language Writing, 38*, 80–85. <https://doi.org/10.1016/j.jslw.2017.10.004>
- Belz, J. A., & Reinhardt, J. (2004). Aspects of advanced foreign language proficiency: Internet-mediated German language play. *International Journal of Applied Linguistics, 14*(3), 324–362.
- Black, R. W. (2008). *Adolescents and online fan fiction*. Peter Lang.
- Blyth, C. S. (2014). Exploring the affordances of digital social reading for L2 literacy: The case of eComma. In J. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (Vol. 12, pp. 201–226). CALICO.
- boyd, d. (2006). Friends, friendsters, and top 8: Writing community into being on social network sites. *First Monday, 11*(12). <https://firstmonday.org/article/view/1418/1336>
- Bruce, B. C. (2002). Diversity and critical social engagement: How changing technologies enable new modes of literacy in changing circumstances. In D. E. Alvermann (Ed.), *Adolescents and literacies in a digital world* (pp. 1–18). Peter Lang.
- Carillo, E. C. (2019). *MLA guide to digital literacy*. Modern Language Association.
- CBS News. (2020, August 4). *U.N. chief says coronavirus causing "generational catastrophe" in education*. CBS News Interactive. <https://www.cbsnews.com/news/coronavirus-schools-education-catastrophe-united-nations-secretary-general/>

- Chun, D. M., & Plass, J. L. (1996). Facilitating reading comprehension with multimedia. *System*, 24(4), 503–519.
- Codreanu, T., & Combe, C. (2018). Glocal tensions: Exploring the dynamics of intercultural communication through a language learner's vlog. In R. Kern & C. Develotte (Eds.), *Screens and scenes: Multimodal communication in online intercultural encounters* (pp. 40–61). Routledge.
- Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). *Handbook of research on new literacies*. Lawrence Erlbaum Associates, Taylor & Francis Group.  
<http://www.loc.gov/catdir/toc/ecip0716/2007017594.html>
- Combe, C. (2017). Télécollaboration informelle 2.0 : Le vlogue d'un américain en français sur YouTube. *ALSIC*, 20(2). <http://journals.openedition.org/alsic/3094>
- Cook, G. (2000). *Language play, language learning*. Oxford University Press.
- Cope, B., & Kalantzis, M. (Eds.). (2000). *Multiliteracies: Literacy learning and the design of social futures*. Routledge.
- Cope, B., & Kalantzis, M. (2009). "Multiliteracies": New literacies, new learning. *Pedagogies*, 4(3), 164–195.
- Crystal, D. (1998). *Language play*. University of Chicago Press.
- Cummins, J., Hu, S., Markus, P., & Kristiina Montero, M. (2015). Identity texts and academic achievement: Connecting the dots in multilingual school contexts. *TESOL Quarterly*, 49(3), 555–581.  
<https://doi.org/10.1002/tesq.241>
- Early, M., Kendrick, M., & Potts, D. (2015). Multimodality: Out From the margins of English language teaching. *TESOL Quarterly*, 49(3), 447–460.
- Epley, N., & Kruger, J. (2005). When what you type isn't what they read: The perseverance of stereotypes and expectancies over e-mail. *Journal of Experimental Social Psychology*, 41(4), 414–422.
- Gil-Lopez, T., Shen, C., Benefield, G. A., Palomares, N. A., Kosinski, M., & Stillwell, D. (2018). One size fits all: Context collapse, self-presentation strategies and language styles on Facebook. *Journal of Computer-Mediated Communication*, 23(3), 127–145. <https://doi.org/10.1093/jcmc/zmy006>
- Gillen, J. (2014). *Digital literacies*. Routledge.
- Gillen, J., Barton, D., Kress, G., & Garnett, F. (2010). *Digital literacies. A research briefing by the technology enhanced learning phase of the teaching and learning research programme*. London Knowledge Lab, University of London.
- Gilster, P. (1997). *Digital literacy*. Wiley.
- Godwin-Jones, R. (2015). Contributing, creating, curating: Digital literacies for language learners. *Language Learning & Technology*, 19(3), 8–20. <http://dx.doi.org/10125/44427>
- Guikema, J. P., & Williams, L. (Eds.). (2014). *Digital literacies in foreign and second language education*. CALICO Monograph Series.
- Hafner, C. A. (2014). Embedding digital literacies in English language teaching: Students' digital video projects as multimodal ensembles. *TESOL Quarterly*, 48(4), 655–685.  
<https://doi.org/10.1002/tesq.138>
- Hafner, C. A. (2015). Remix culture and English language teaching: The expression of learner voice in digital multimodal compositions. *TESOL Quarterly*, 49(3), 486–509. <https://doi.org/10.1002/tesq.238>

- Hafner, C. A., Chik, A., & Jones, R. H. (2015). Digital literacies and language learning. *Language Learning & Technology*, 19(3), 1–7. <http://dx.doi.org/10125/44426>
- Hafner, C. A., & Ho, W. Y. J. (2020). Assessing digital multimodal composing in second language writing: Towards a process-based model. *Journal of Second Language Writing*, 47, article 100710. <https://doi.org/10.1016/j.jslw.2020.100710>
- Hafner, C. A., & Miller, L. (2011). Fostering learner autonomy in English for science. *Language Learning & Technology*, 15(3), 68–86. <http://dx.doi.org/10125/44263>
- Hawisher, G. E., & Selfe, C. L. (Eds.). (2000). *Global literacies and the world-wide web*. Routledge.
- Jones, R. H. (2019). The text is reading you: Teaching language in the age of the algorithm. *Linguistics and Education*, 62(April), article 100750. <https://doi.org/10.1016/j.linged.2019.100750>
- Jones, R. H., & Hafner, C. A. (2012). *Understanding digital literacies: A practical introduction*. Routledge.
- Kern, R. (2015). *Language, literacy, and technology*. Cambridge University Press.
- Kern, R. (2018). Five principles of a relational pedagogy: Integrating social, individual, and material dimensions of language use. *Journal of Technology and Chinese Language Teaching*, 9(2), 1–14.
- Knobel, M., & Lankshear, C. (2008). Remix: The art and craft of endless hybridization. *Journal of Adolescent and Adult Literacy*, 52(1), 22–33.
- Kress, G. (2003). *Literacy in the new media age*. Routledge.
- Kress, G. (2009). Comments on Cope and Kalantzis. *Pedagogies*, 4(3), 205–212.
- Kruger, J., Epley, N., Parker, J., & Ng, Z.-W. (2005). Egocentrism over e-mail: Can we communicate as well as we think? *Journal of Personality and Social Psychology*, 89(6), 925–936.
- Kurek, M., & Hauck, M. (2014). Closing the digital divide—A framework for multiliteracy training. In J. P. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 119–140). CALICO Monograph Series.
- Lam, W. S. E. (2000). L2 literacy and the design of the self: A case study of a teenager writing on the Internet. *TESOL Quarterly*, 34(3), 457–482.
- Lam, W. S. E. (2004). Second language socialization in a bilingual chat room: Global and local considerations. *Language Learning & Technology*, 8(3), 44–65. <http://dx.doi.org/10125/43994>
- Lam, W. S. E. (2009). Multiliteracies on instant messaging in negotiating local, translocal, and transnational affiliations: A case of an adolescent immigrant. *Reading Research Quarterly*, 44(4), 377–397. <https://doi.org/10.1598/rrq.44.4.5>
- Lanham, R. A. (1993). *The electronic word: Democracy, technology, and the arts*. University of Chicago Press.
- Lankshear, C., & Knobel, M. (2006). *New literacies: Everyday practices and classroom learning (2<sup>nd</sup> edition)*. Open University Press.
- Lankshear, C., & Knobel, M. (2008). *Digital literacies : concepts, policies and practices*. Peter Lang.
- Lantolf, J. P. (1997). The function of language play in the acquisition of L2 Spanish. In A. Pérez-Leroux & W. R. Glass (Eds.), *Contemporary perspectives on the acquisition of Spanish* (pp. 3–24). Cascadilla Press.
- Lantz-Andersson, A. (2018). Language play in a second language: Social media as contexts for emerging sociopragmatic competence. *Education and Information Technologies*, 23(2), 705–724. <https://doi.org/10.1007/s10639-017-9631-0>

- Law, J., Barny, D., & Poulin, R. (2020). Patterns of peer interaction in multimodal L2 digital social reading. *Language Learning & Technology*, 24(2), 70–85. <http://hdl.handle.net/10125/44726>
- Lenhart, A., Smith, A., Anderson, M., Duggan, M., & Perrin, A. (2015, August 6). *Teens, technology and friendships*. Pew Research Center. <https://www.pewresearch.org/internet/2015/08/06/teens-technology-and-friendships/>
- Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B. C., Liu, Y., & O’Neil, M. (2007). What Is New About The New Literacies of Online Reading Comprehension? In L. S. Rush, A. J. Eakle, & A. Berger (Eds.), *Secondary school literacy : What research reveals for classroom practice* (pp. 37–68). National Council of Teachers of English.
- Levine, G. S. (2020). *A human ecological language pedagogy* (Vol. 104). Modern Language Journal Monograph.
- Lotherington, H., & Jenson, J. (2011). Teaching multimodal and digital literacy in L2 settings: New literacies, new basics, new pedagogies. *Annual Review of Applied Linguistics*, 31, 226–246.
- Lotherington, H., & Ronda, N. (2014). 2B or not 2B? From pencil to multimodal programming: New frontiers in communicative competencies. In J. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 9–28). CALICO.
- Meyers, E. M., Erickson, I., & Small, R. V. (2013). Digital literacy and informal learning environments: An introduction. *Learning, Media and Technology*, 38(4), 355–367.
- Mina, L. (2014). Enacting identity through multimodal narratives: A study of multilingual students. In J. P. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 141–158). CALICO Monograph Series.
- Nelson, M. E. (2006). Mode, meaning, and synaesthesia in multimedia L2 writing. *Language Learning & Technology*, 10(2), 56–76. <http://dx.doi.org/10125/44061>
- Nelson, M. E., & Kern, R. (2012). Language teaching and learning in the *Postlinguistic Condition*? In L. Alsagoff, S. L. McKay, G. Hu, & W. A. Renandya (Eds.), *Principles and practices for teaching English as an international language* (pp. 47–66). Routledge.
- New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1), 60–92.
- O’Dowd, R., & O’Rourke, B. (2019). New developments in virtual exchange in foreign language education. *Language Learning & Technology*, 23(3), 1–7. <https://doi.org/10125/44690>
- O’Neill, E. M. (2019). Online translator, dictionary, and search engine use among L2 students. *CALL-EJ*, 20(1), 154–177.
- Oskoz, A., & Elola, I. (2016). Digital stories: Overview. *CALICO Journal*, 33(2), 157–173.
- Oskoz, A., & Elola, I. (2020). *Digital L2 writing literacies: Directions for classroom practice*. Equinox.
- Paesani, K., Allen, H. W., & Dupuy, B. (2016). *A multiliteracies framework for collegiate foreign language teaching*. Prentice Hall.
- Pariser, E. (2011). *The filter bubble: What the internet is hiding from you*. Penguin.
- Polio, C. (2019). Keeping the language in second language writing classes. *Journal of Second Language Writing*, 46. <https://doi.org/10.1016/j.jslw.2019.100675>
- Polio, C., & Shi, L. (2012). Textual appropriation and source use in L2 writing. *Journal of Second Language Writing*, 21(2), 95–186.

- Reinhardt, J. (2019). *Gameful second and foreign language teaching and learning: Theory, research, and practice*. Palgrave Macmillan.
- Reinhardt, J., & Thorne, S. L. (2019). Digital literacies as emergent multifarious literacies. In N. Arnold & L. Ducate (Eds.), *Engaging language learners through CALL* (pp. 208–239). Equinox.
- Reinhardt, J., Warner, C., & Lange, K. (2014). Digital games as practices and texts: New literacies and genres in an L2 German class. In J. P. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 159–178). CALICO Monograph Series.
- Reinking, D., McKenna, M. C., Labbo, L. D., & Kieffer, R. D. (Eds.). (1998). *Handbook of literacy and technology: Transformations in a post-typographic world*. Lawrence Erlbaum.
- Rouquette, S. (2008). Les blogs « extimes » : Analyse sociologique de l'interactivité des blogs. *TIC et Société*, 2(1). <https://doi.org/10.4000/ticetsociete.412>
- Rowlands, I., Nicholas, D., Williams, P., Huntington, P., Fieldhouse, M., Gunter, B., Withey, R., Jamali, H. R., Dobrowolski, T., & Tenopir, C. (2008). *Information behaviour of the researcher of the future*. University College London. [http://www.jisc.ac.uk/media/documents/programmes/reppres/gg\\_final\\_keynote\\_11012008.pdf](http://www.jisc.ac.uk/media/documents/programmes/reppres/gg_final_keynote_11012008.pdf)
- Sauro, S. (2017). Online fan practices and CALL. *CALICO Journal*, 34(2), 131–146.
- Schreiber, B. R. (2015). "I am what I am": Multilingual identity and digital translanguaging. *Language Learning & Technology*, 19(3), 69–87. <http://dx.doi.org/10125/44434>
- Schreiber, B. R. (2019). "More like you": Disrupting native speakerism through a multimodal online intercultural exchange. *TESOL Quarterly*, 53(4), 1115–1138.
- Shin, D., Cimasko, T., & Yi, Y. (2020). Development of metalanguage for multimodal composing: A case study of an L2 writer's design of multimedia texts. *Journal of Second Language Writing*, 47, article 100714. <https://doi.org/10.1016/j.jslw.2020.100714>
- Snyder, I. (Ed.). (1998). *Page to screen: Taking literacy into the electronic era*. Routledge.
- Statista. (2021, January). *Global digital population as of January 2021*. <https://www.statista.com/statistics/617136/digital-population-worldwide/>
- Storch, N., & Li, M. (2017). Second language writing in the age of CMC: Affordances, multimodality, and collaboration. *Journal of Second Language Writing*, 36, 1–5.
- Sykes, J. M. (2019). Emergent digital discourses: What can we learn from hashtags and digital games to expand learners' second language repertoire? *Annual Review of Applied Linguistics*, 39, 128–145.
- Thomas, M., & Peterson, M. (2014). Web 2.0 and language learning: Rhetoric and reality. *CALICO Journal*, 31(1), i–iii.
- Thorne, S. L., & Reinhardt, J. (2008). "Bridging activities," new media literacies, and advanced foreign language proficiency. *CALICO Journal*, 25(3), 558–572.
- Vaisman, C. (2011). Performing girlhood through typographic play in Hebrew blogs. In C. Thurlow & K. Mroczek (Eds.), *Digital discourse: Language in the new media* (pp. 177–196). Oxford University Press.
- van Leeuwen, T. (2015). Multimodality in education: Some directions and some questions. *TESOL Quarterly*, 49(3), 582–589. <https://doi.org/10.1002/tesq.242>
- VanKooten, C. (2013). Toward a rhetorically sensitive assessment model for new media composition. In H. A. McKee & D. N. DeVoss (Eds.), *Digital writing assessment & evaluation* (n.p.). Computers and Composition Digital Press / Utah State University Press. [https://ccdigitalpress.org/book/dwae/09\\_vankooten.html](https://ccdigitalpress.org/book/dwae/09_vankooten.html)

- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Ware, P., Kern, R., & Warschauer, M. (2016). The development of digital literacies. In R. Manchón & P. K. Matsuda (Eds.), *Handbook of second and foreign language writing* (pp. 307–328). Mouton De Gruyter.
- Warner, C., & Dupuy, B. (2018). Moving toward multiliteracies in foreign language teaching: Past and present perspectives ... and beyond. *Foreign Language Annals*, 51(1), 116–128.
- Warschauer, M. (1997). From the Editor. *Language Learning & Technology*, 1(1), 1. <http://dx.doi.org/10125/25006>
- Warschauer, M. (1999). *Electronic literacies: Language, culture, and power in online education*. Erlbaum.
- Warschauer, M. (2010). Digital literacy studies: Progress and prospects. In M. Baynham & M. Prinsloo (Eds.), *The future of literacy studies* (pp. 123–140). Palgrave Macmillan.
- Williams, L., Abraham, L. B., & Bostelmann, E. D. (2014). A survey-driven study of the use of digital tools for language learning and teaching. In J. P. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 29–67). CALICO Monograph Series.
- Williams, R. (2020, May 29). *Mobile data surges 75% amid jump in video streaming*. Mobile Marketer. <https://www.mobilemarketer.com/news/mobile-data-surges-75-amid-jump-in-video-streaming/578824/>
- Yang, Y.-F. (2012). Multimodal composing in digital storytelling. *Computers and Composition*, 29(3), 221–238. <https://doi.org/10.1016/j.compcom.2012.07.001>
- Yi, Y., Shin, D., & Cimasko, T. (2020). Special issue: Multimodal composing in multilingual learning and teaching contexts. *Journal of Second Language Writing*, 47, 1–6. <https://doi.org/10.1016/j.jslw.2020.100717>
- Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. Public Affairs.

## About the Author

Richard Kern is Professor of French and Director of the Berkeley Language Center at the University of California at Berkeley. He teaches courses in French linguistics, language, and foreign language pedagogy, and supervises graduate teaching assistants. His most recent book is *Screens and Scenes: Multimodal Communication in Online Intercultural Encounters* (Routledge, 2018), co-edited with Christine Develotte, and in 2015 he published *Language, Literacy, and Technology* (Cambridge UP). Earlier books include *Literacy and Language Teaching* (Oxford UP) and *Network-Based Language Teaching* (Cambridge UP) with Mark Warschauer.

**E-mail:** [rkern@berkeley.edu](mailto:rkern@berkeley.edu)