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Technology and the future of language teaching

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Challenges

Technology offers unprecedented opportunities to communicate with others in authentic and compelling, linguistically and culturally contextualized domains. How can we leverage learners' technologically mediated and highly participatory culture and an array of quickly emerging technologies, including language learning media, artificial intelligence, big data, and augmented reality to enhance language teaching and learning?

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Abstract

We are living in a time with unprecedented opportunities to communicate with others in authentic and compelling linguistically and culturally contextualized domains. In fact, language teachers today are faced with so many fascinating options for using technology to enhance language learning that it can be overwhelming. Even for those who are inclined to experiment with emerging technologies, it can be challenging to identify which resources, tools, or Web sites may best fit a particular lesson, activity, or goal. Many of the most compelling opportunities are situated within the same global social and technology trends that have become commonplace in our daily lives, including social media, artificial intelligence, big data, and augmented reality. This article addresses the extent to which technology-mediated social interactions dominate our daily lives, how we can leverage those interactions to the benefit of our learners, and how we can engage them in learning experiences in ways that will encourage them to practice language extensively.

KEYWORDS

authentic materials, computer-assisted language learning, computer-mediated communication, teaching methods (communicative), teacher preparation

1 | INTRODUCTION

We are living in a time with unprecedented opportunities to communicate with others in authentic and compelling linguistically and culturally contextualized domains. In fact, language teachers today are faced with so many fascinating options for using technology to enhance language learning that it can be overwhelming. Even for those who are inclined to experiment with emerging technologies, it can be challenging to identify which resources, tools, or Web sites may best fit a particular lesson, activity, or goal. We are also teaching students who expect us to use social technologies in ways that align with their established social practices. In fact, such technology use has become so ubiquitous in our daily lives that the absence in our classroom is quite noticeable. Many of the most compelling opportunities are situated within the same global social and technology trends that have become commonplace in our daily lives, including social media, artificial intelligence, big data, and augmented reality. These technologies are familiar to many of us, and learning to use them for our personal lives has become an expected societal norm. However, using them for language teaching is often overlooked. Unfortunately, many language teachers are unfamiliar with the extensive body of research and practice produced by professionals in the field of computer-assisted language learning (CALL).

Yet we can easily create opportunities for learners to record their oral production for speaking and pronunciation improvement while presenting them with feedback from native speakers, peers, instructors, and others. We can easily gather extensive authentic language samples of specific vocabulary relevant to their lexical development and present it to students in a manner that is compellingly contextualized and familiar. We can easily create opportunities for them to engage in extensive and meaningful target language practice both in and out of the classroom with interlocutors who offer salient, nonthreatening feedback. We can do all this within contexts that are familiar and promising. We can also anticipate an increasing array of options for creating engaging experiences for learners. Learning to use these contemporary CALL technologies is so much easier than previous iterations of technology that were designed for language teaching. What teachers seem to lack is the support and encouragement to use these increasingly familiar tools in the context of teaching. This article addresses the extent to which technology-mediated social interactions dominate our daily lives, how we can leverage those interactions to the benefit of our learners, and how we can engage them in learning experiences in ways that will encourage them to practice language extensively.

2 | SOCIAL MEDIA AND PARTICIPATORY CULTURE

Not surprisingly, we are communicating with one another in more varied ways and more extensively than at any time in the past thanks to social media and Internet-based communication technologies. This communication is taking place in varied contexts through a diversity of modalities. Text, audio, video, images, and a variety of mashups involving these mediums are created, shared, and distributed widely as a normal daily part of the participatory culture that is ubiquitous across the Internet today (Kessler, 2013). Social media contexts are so compelling that there are now more than three billion active social media users on the planet. That is slightly more than 40% of the entire world population, and it is growing more rapidly than experts had predicted (Kemp, 2017). The sheer number of participants and the extended periods of time that people voluntarily devote to technology-mediated social activities both attest to the power of such environments. In fact, participation in informal communities has become so compelling that many people around the world often interact with and learn new languages in order to be a participating member of a new community.

3 | PARTICIPATORY CULTURE AND THE TEACHING OF FOREIGN LANGUAGES

Looking back, the influences of technology have been substantial throughout the history of CALL. Innovative instructors have been creating ambitious CALL applications for decades using newly discovered technologies. However, it has been common for these to only reach a very limited community of like-minded individuals. In contrast, the new worldwide participatory culture presents foreign language teachers with limitless opportunities to create for learners meaningful, authentic language practice experiences that situate learning in truly compelling contexts. Thus, unlike at any other point in our history as a profession, new technologies provide opportunities that truly support effective learning: They allow us to create learning activities, tasks, and experiences that are authentic, that take place in authentic contexts, and that involve authentic language in order to optimize language learning (Egbert, Hanson-Smith, & Chao, 2007). Further, such opportunities have an important impact on student motivation, which is known to be critical for success (Dörnyei, 2001). What is more, creating opportunities for students to collaboratively coconstruct knowledge and collectively build communities supports them in developing autonomy over their own learning and can increase their motivation and also contribute to their engagement (Reinders & Hubbard, 2012). In sum, the qualities that attract people to online communities as a whole can also inform our language teaching practices.

4 | LEARNING CONTEXTS AND TOOLS: LOOKING BACK

As we anticipate how current trends will influence future language teaching and learning practices, it is important to reflect on what we know today. In recent years we have witnessed trends that have dramatically altered how we think of language learning experiences. Until recently many have referred to *online* and *face-to-face* as if they were a dichotomous set of teaching domains. Today we have numerous variations within both of these categories. We also have blurred boundaries between the two. Within these varied domains researchers have observed how learners interact with one another. It is important for teachers to understand what we know about this kind of interaction. It is also important to understand what we have done to try to make learning more appropriate and relevant for individual learners. Ultimately, raising awareness of these current realities will help us best incorporate the next generation of technologies and social practices that will accompany them.

4.1 | Variety of learning contexts

One of the biggest influences that technology has had on teaching and learning contexts is the increasing variety of learning contexts. Just a few years ago, it would have been common for educators and educational designers to refer to teaching contexts dichotomously, as either face-to-face or online. Today, teachers and learners are faced with numerous options within both of these domains. In face-to-face contexts, there is a growing interest in creating active learning spaces that support learner-centered practices. Instructors can enhance the physical classroom space with simulations of target language cultures, by means of augmented and virtual reality. Similarly, the variety of online contexts that are available to support language teaching and learning is increasing as a direct result of the development of these different informal social domains from what Thorne (2016) has called “the wilds” of authentic language practice that is constantly being documented across the Internet as individuals engage with one another. Each of these comes with its own set of social expectations and practices that create new opportunities for learners to explore notions of genre, register, and culturally specific and appropriate

interactions. These include a variety of social media contexts, gaming platforms, collaborative- and telecollaborative-based projects, and numerous mashups. At the core of these experiences is the application of various computer-mediated communication (CMC) tools. The use of these tools has been the focus of much early research into the potential use of Web 2.0 in language learning and continues to offer promising instructional avenues into the future.

Similarly, while numerous studies have explored the potential of instructional applications of popular CMC tools, these tools have typically been identified as either synchronous or asynchronous. Communication using synchronous tools tends to resemble face-to-face spoken communication and includes technology such as texting, chats, and microblogging. In contrast, asynchronous communication typically involves a period of time between turn-taking and involves technology such as e-mail, online discussions, and blogging.

While numerous CMC tools still fit easily into this paradigm, new varieties come along frequently, proving these established categories to be insufficient. Each of these tools offers unique affordances. For example, wikis and tools such as Web-based word processing allow multiple writers to contribute to a single shared document at the same time, an example of simultaneous CMC (Kessler, Bikowski, & Boggs, 2012). This is different from synchronous CMC because an interlocutor does not have to wait for others to finish their thought or contribution before he or she can contribute. In fact, in contexts such Google Docs, authors can see their collaborative partners writing in real time with each keystroke as they type. This can assist writers in some ways. For example, those faced with writer's block may pause and follow their partners' contributions, which may help them come up with additional related ideas.

In addition to challenging existing dichotomies (face-to-face vs. online courses; synchronous vs. asynchronous uses), it is also important to understand the extent to which research can inform our use of technology. For example, studies have shown that wikis can support attention to audience (Lund, 2008), attention to form (Kessler, 2009), and attention to task type (Aydin & Yildiz, 2014). Other researchers have observed that instructional blogging helps students focus on reflection and increases agency (Lee, 2017). Chat-based activities have been found to promote cognitive processing skills, while online discussion forums offer learners an opportunity to reflect and express themselves at greater length (Sotillo, 2000). Unfortunately, some observations of the way in which these tools are used in practice have tended to decontextualize their potential from the larger ecological context—the learning environment and experience—and have led some to make sweeping generalizations about the application of these tools. It is thus important to recognize not only that the ecological context in which a tool or practice is used is important, but also that these tools are not created equal and do not all function in the same way. Further, each iteration of a particular tool may differ from a previous version, and an example from a previous study may be unrecognizable to a current user. Thus, readers should take this into account when planning for, or reflecting on, the use of these tools. That said, teachers and researchers have used a number of CMC tools to support collaborative learning practices (Elola & Oskoz, 2010; Kost, 2011), and this work has provided the building blocks for considering the development and use of additional forms of social media.

4.2 | Learner-centered instruction

Finally, when considering the use of existing, evolving, and new technologies, it is important to consider the extent to which they facilitate learner-centered instruction. Education has been migrating toward a more learner-centered focus for decades: Papalia (1976) described approaches to redesigning methods and materials in order to create a more learner-centered foreign language classroom more than 40 years ago, and this tenet has provided the foundation for the communicative approach to language teaching and learning.

However, many examples of actual current practice may not in fact be learner centered; that is, they do not refocus education with the learner as the point of leverage—for example, by attending to students' learning styles or helping learners to develop awareness of how they learn best. Warschauer and Kern (2000) described learner centeredness in technology-enhanced environments as allowing students more control over the planning for what and how they learn. Today's technologies enable language educators to strive for a more robust and individualized learner centeredness, one that benefits from technological innovations that influence enhanced individualized experiences, social activity, and access to data.

It is important to develop an understanding of these foundational underpinnings before we can effectively look toward the future. Teachers must be familiar with a variety of online and face-to-face learning contexts in order to appropriately prepare for more robust and sophisticated future interpretations of these domains. Similarly, understanding extant CMC practices undergirds the use and adoption of the next generation of these tools. Understanding previous attempts to make learning more student centered is necessary for anyone who wants to strive to create the individualized and intelligent data-driven learning systems of the future. Of course, it is also important that language teachers understand how this body of research about teaching with technology can inform our own teaching practice. As we prepare to look toward the future of technology and language teaching, we should be prepared for many opportunities along with many challenges.

5 | LOOKING FORWARD: INCREASED COLLABORATION, EMERGING TOOLS AND SPACES

Early examples of next-generation technologies that will influence language teaching are already in use in many language teaching contexts. We can anticipate that they will each evolve and diversify as their use becomes more common and as we develop a better understanding of their true potential. There are recent numerous examples of collaborative approaches in both local and remote contexts. The growth in this area is largely the result of what have commonly become known as Web 2.0 tools that promote sharing and collaborative practices. There is also an increase in the use of automation, particularly around the productive skills of speaking and writing. In addition, there is growing interest in and much anticipation for the potential of augmented reality and virtual reality.

5.1 | Collaborative approaches

World language teachers today are certainly already familiar with and have experienced the enormous potential of a variety of collaborative, social media–based language learning approaches, practices, and activities that make use of the aforementioned CMC tools, including wikis, blogs, and microblogs. For example, research has indicated that wikis promote a shared responsibility for written activities among multiple contributors and promote awareness of the concept of audience (Lund, 2008). They also encourage more participation and support peer and self-editing (Kessler, 2009). Elola and Oskoz (2010) found that collaborative writing practice can also have a washback effect of improving students' individual writing performance. Collaborative writing contexts are also becoming more commonplace in various professional settings as well, thus increasing the relevance of incorporating such activities into our teaching.

In addition to collaborative writing, collaborative learning activities have often been constructed around project-based experiences. Project-based learning experiences engage students in real-life tasks that take place in important and authentic contexts. In these experiences, students need to work together

to make decisions and design and create something tangible somewhat autonomously over an extended period of time (Thomas, 2000). Projects can be constructed around virtually any kind of content or product. Digital projects can include Web sites, movies, travel blogs, serialized podcasts, or cookbooks. Black (2006) provided an overview of the potential for implementing fanfiction in language learning. Sauro (2017) expanded upon this to provide an extensive perspective on the use of fandom and affinity spaces in language education. Digital storytelling is another domain that allows students to create extensive and compelling projects (Vinogradova, 2011). Students can also be engaged in the collaborative process of designing a video game; see for example Dubriel and Staples's (2016) application in French. Not surprisingly, the use of authentic approaches to assessment can also help keep projects relevant.

Telecollaboration, which O'Dowd (2007) has also referred to as online interactions and exchanges, involves two groups of learners in geographically distinct areas learning online through a shared experience. It can present language learners with access to other speakers, including native speakers, of the language who would otherwise be inaccessible. In some cases, the ability to collaborate with others in spite of or perhaps because of their distant and unique geographical location has presented a breadth of opportunities for learners to participate in meaningful, engaging, and authentic contexts. Such collaborative efforts not only allow learners to practice and use language but also to explore concepts such as intercultural communicative competence (ICC). This complex concept reflects one's ability to effectively understand one's role, the role of interlocutors, and the role of all participants' respective cultures in intercultural interactions. Numerous telecollaborative exchanges have focused on the potential use of technology to increase learners' ICC, and various telecollaborative practices have already become commonplace in foreign language teaching. However, while there are many potential benefits available to participants, managing these exchanges can be quite challenging. Research has focused on the potential for miscommunication that can take place within these exchanges as well as the role of feedback and attention given to each individual language.

In addition to the project-based applications of telecollaboration, this instructional approach has also been applied to the increasingly popular domain of gaming. Given the need for groups of players work together, gaming has also been explored as a means of increasing engagement and contextualizing learning in authentic and meaningful language experience and use (Gee & Hayes, 2011). Game-based practices have also been shown to support autonomy, social engagement, and motivation (Gee, 2003), and studies have shown that learning within a gaming context can increase students' willingness to participate (Reinders & Wattana, 2014) by helping to engage learners and allow them to feel comfortable, confident, and connected to real-world goals.

Thus, as teachers develop a better awareness of the potential for collaborative tools, we are likely to see them used more widely and in more varied ways (Kessler, 2013) and can anticipate the next-generation communication functions that these systems will continue to inspire. For example, more than 10 years ago, Storch anticipated that the many positive contributions of collaborative and telecollaborative projects and games will require "[A] reconceptualization of classroom teaching" (2005, p. 169). We are likely to witness a number of similarly dramatic changes to language education in the near future.

5.2 | Mashups

Mashups are combinations of media forms—for example, the mix of text and images that are used in memes or YouTube videos of popular songs that are combined with additional text or images or are recontextualized in some other way—that result in something wholly new and unique, allowing students to express their creativity in a way that encourages them to continue or even increase their

participation. Because mashups are popular across the social media landscape, they present opportunities to experiment with language as one element of a communicative mashup.

5.3 | Automation

There have been numerous examples of automation in language teaching in recent years that some very technology-savvy teachers have embraced; it is expected that we will soon see developments that demand the attention of all language teachers. Automated speech recognition (ASR) has advanced dramatically thanks to big data and artificial intelligence (AI). ASR presents the ability to use speech to control computers and other devices, including digital assistants like the Amazon Echo and Google Home. The functions that these devices can perform are increasing daily, and their expansion to many languages is highly anticipated. These devices provide opportunities to practice speaking while getting automated spoken feedback. They also allow language educators to create customized functions. For example, work in the development of and research related to voice-controlled trivia and adventure games for English language learners has indicated that learners who participate in these experiences find them engaging and seek out additional, similar opportunities (Incerti, Franklin, & Kessler, 2017). This technology will certainly be used in various promising applications in the future.

Automated writing evaluation (AWE) is also showing great promise, as there are many developments that process text automatically in various ways. While readers are familiar with the typical grammar and spelling tools that are offered in word processing software such as Microsoft Word, they are less likely to be familiar with the robust tools that are emerging to help writers choose appropriate vocabulary or avoid redundancy. Research has suggested that students find automated writing feedback helpful but less useful than peer feedback, particularly within specific genres (Ware, 2014). Although there have been many reports of challenges that are inherent in AWE, including the tendency to encourage overly simplistic or formulaic writing, there are numerous potential benefits to students interacting with automated feedback when instructors intervene (Li, Link, & Hegelheimer, 2015).

One such approach involves the implementation of bots, which are programs that function automatically to accomplish tasks that one might independently perform; it is estimated that as much as 60% of all Internet traffic is represented by bots (Glaser, 2017, n.p.). With the negative press that bots have received recently, readers may assume that they are all negative and dangerous. Some of these, in fact, are malicious; however, many are simply maintaining a presence for business, organizations, or other entities. We all likely interact with bots daily in our online activities in spite of our lack of awareness. In fact, that is the test of an effective bot!

It is easy to imagine how bots can be used to assist learners in their linguistic development. For example, chatbots (automated interlocutors that function within text chat contexts) can be used to engage learners in extensive language practice that might be tedious for a teacher to take on—it is simply not possible to dialogue with numerous individual students. Bots, however, can do so and also easily provide various kinds of formative and corrective automated feedback. Language teachers can easily create bots to assist students using free Web sites like Chattypeople.com, Botsify.com, and Robot.me, which guide those who are interested through the easy process of chatbot creation.

5.4 | Augmented and virtual reality

The potential for enhancing language learning experiences through augmented reality (AR) is enormous. By layering digital content upon the physical world, we can enable students to interact with one another within any space as if they were in a target language culture environment and thus engage

with one another in a familiar space in wholly new and varied ways. Perhaps the best example of AR is Pokémon Go! This highly compelling game has captured the imagination of thousands of players around the world. What is more, these players go to great lengths to engage with the virtual characters in a friendly form of competition. Similar forms of technology are being used by language teachers with similarly engaging results. For example, Holden and Sykes (2011) described a highly contextualized AR location-based murder mystery game that was designed to teach Spanish and provide learners with a reason to engage. The game was created using ARIS (http://arisgames.com), a free tool that allows users to create their own games. Aurasma (http://aurasma.com) is another very accessible and simple way to embed digital material in any environment, and offers an easy-to-use mobile game creation platform that takes advantage of AR. Godwin-Jones (2016) also provided a number of practical examples that can help teachers get started implementing AR right away. Language educators can expect to see numerous developments in AR in the near future.

In addition to AR, there is a growing interest in language education use of virtual reality (VR), a concept that has been used in various forms for many years and thus may cause some confusion for readers. For the purposes of this article, I refer to VR in the broadest terms possible to include any simulated, artificial, or synthetic environment that creates a convincing presentation of a desired space. VR allows learners to be transported to an immersive target language culture experience where they can practice culturally appropriate tasks in ways that would otherwise only be possible by traveling. Students can be transported to a museum such as the Louvre, where they can be encouraged to interact with others as well as with the works of art and the space itself. They can also be immersed in a street market within a target language culture where they feel compelled to interact with vendors.

A few years ago, the largest VR company in the world was consumed by Facebook in anticipation of this future-learning context, and VR has taken many paths since. Google offers its very inexpensive, and often free, cardboard VR headset, while systems like the HTC Vive, which allows a more enhanced experience, costs hundreds of dollars per user. While one cannot be sure what the future of VR holds, it is certain that there is a future and we should anticipate having the ability to easily customize VR landscapes to cater to our students' unique individual needs. Taken together, the implementation of both AR and VR will continue to allow deeply contextualized, motivating, and collaborative learning experiences in which learners use—and enjoy using—the language while simultaneously developing sociopragmatic and intercultural competence.

5.5 | Future trends: AI and big data

While we should anticipate the widespread use of chatbots in future foreign language education, these varied teaching and learning domains will certainly be enhanced by other trends that are influencing the world of computing and social practices as well as nearly every domain across society thanks to AI and big data. Readers may benefit from a brief description of these terms. AI is computational processing that mimics the thinking of humans. This includes the technology necessary for various forms of automation to function, including robots. Typically these functions resemble human thinking, and one indication of successful AI is to convince people that they are interacting with another person instead of a computer. Ideally, AI is transparent to users. AI is empowered by big data, or the increasing accumulation of digital information that provides opportunities to develop wholly new sophisticated ways of understanding the world and the way humans behave within it. Because AI and big data are generally transparent megatrends that provide a foundation for many forms of innovation, they are not the kind of topics that language teachers spend much time reflecting on. However, considering their influence, it would be shortsighted to overlook these important topics. Although it is rarely evident to most of us as users of these

emerging technologies, the common infrastructure they rely on is big data. This refers to the ability to gather, aggregate, and make large collections of data meaningful and useful for a variety of purposes. Developments in big data have dramatically influenced every profession. Most readers have probably heard this term but have little awareness of what it means or how it contributes to our digital activities. Following are examples of big data applications to language education.

5.5.1 | Corpora

In language education, the most obvious place to begin to address big data is the use of corpora, or large collections of authentic language such as the entire works of an author; an entire library; or, increasingly, digital databases. Researchers have relied on corpora as a means of identifying authentic language use for decades, but extending this application to language learning pedagogical purposes is still a fairly new practice. The Internet and various related technologies have made an expanding number of corpora available for use across a number of languages. These large collections of text are one example of many modern contexts in which big data and analytics are changing the world around us. These large collections of linguistic data also serve as a source of authentic language production. Recently, Boulton and Cobb (2017) conducted a meta-analysis that found corpus-based or data-driven learning to result in better learning outcomes than traditional approaches. Bennett (2010) has provided a number of suggestions for using corpora in language classrooms while Cobb (2007) has written extensively about the use of corpora for teaching vocabulary in context. More recently, researchers have studied the use of corpora to teach genre (Cotos, Link, & Huffman, 2017), extensive reading (Hadley & Charles, 2017), pragmatics in speaking (Bardovi-Harlig, Mossman, & Su, 2017), and collocational competence (Li, 2017). Some have recognized the potential for using the entire Internet as a corpus. Han and Shin (2017) found that this requires teacher support but has great potential. Considering this, we have a limitless supply of authentic linguistic content for contextual reference. Further, the ever-increasing body of authentic language that is captured on the Internet as people engage in these social activities provides us with new opportunities. We can thus utilize these corpora to create authentic activities that take place in authentic contexts and thus authentically represent the kind of language that learners will encounter in the real world. Doing so can provide students with numerous contextualized authentic examples of how any given word, phrase, sentence, or concept is described in any target language. As we develop better abilities to observe, gather, and track student behavior, we will be able to use these corpora to design individualized data-driven language activities that specifically target the language aspects that are most critical or salient for any learners at a specific point in their linguistic development and are tailored to the learners' personal interests and professional goals. In fact, Leńko-Szymańska (2017) proposed courses in corpus literacy for teachers in preparation.

5.5.2 | Tracking

In addition to having authentic linguistic corpora, we have access to increasingly large and valuable collections of data about individual and collective student performance thanks to our ability to observe, monitor, and track students' behavior, performance, and usage of digital materials and environments both in and beyond the classroom. In fact, we now have expanded and enhanced access to data across learning contexts and tasks, such as the ability to observe every keystroke and decision point of a learner as he or she interacts within learning experiences. Modern learning management systems, along with social media sites, provide a window into such activity in a way that has allowed teachers to better understand students' abilities and challenges. This knowledge can help us design individualized

instruction that caters to specific student needs, including increased uptake of feedback and awareness of linguistic forms. With the intervention of increasingly intelligent tools, we can expect that this kind of data will allow us to create customized, on-demand feedback and guidance that will address issues related to accuracy in language production as well opportunities to expand fluency and that can be disseminated at the points in the learning process where they are most salient to the learner. Tracking data in conjunction with other data gathered through artificial intelligence can thus provide learners with individualized and appropriate support.

5.5.3 | Translation tools

The increasing diversity and sophistication of translation tools is often perceived by foreign language teachers as a threat to their own instruction: There is a widespread attitude that these tools are being used by our students to avoid doing the work we require or expect of them. This was a reasonable reaction when these translation tools offered limited functionality, accuracy, and usefulness because it was obvious and easily detected by educators. In spite of this, some teachers have used translation tools as a means of creating meaningful experiences for students. Until recently, the weaknesses of these tools were actually exploited by some language teachers, turning their limitations into learning opportunities. For example, having students translate texts and then identify or correct particular incorrect characteristics could help students focus on specific aspects of language. Similar practices could also help students identify the specific effectiveness and weaknesses of translation tools in order to use them in a more informed manner. These activities could also be used to boost learners' confidence as they could see how superior their language skills could be when compared to those offered using technology. However, these tools have reached a level of accuracy and reliability that it is now necessary to consider new ways to fit them into our teaching contexts. When using AI and big data, it is important to point out that there are ethical considerations, particularly when using or sharing individual student data. Thus we need to be constantly mindful of the many new challenges that we will face when considering how we access, evaluate, and share such data.

6 | FUTURE TEACHER TECHNOLOGY PREPARATION

Because all of these ideal conditions for language learning can be positively influenced by these digital domains and since the qualities that attract people to online communities make learning more efficient, pleasurable, and tailored, world language teachers in the 21st century should have an awareness of the potential for adopting digital tools and artifacts from real-world language practice so that they can be adapted for the language classroom. More important, there is an expectation that aspiring teachers will learn to integrate these technologies in their teaching: ACTFL released a position statement in 2017 that strongly supports the integration of technology by teachers. It begins, "ACTFL strongly recommends that a language educator be responsible for the planning, instruction, assessment, and facilitation of any language course, leveraging technology to support language learning" (ACTFL, 2017, n.p.). Because the language teacher is at the center of this important focus, teacher candidates—in fact, all teachers—should be able to use existing and emerging social communication technologies to create or enhance the spectrum of language learning experiences for students, for example, to provide enhanced feedback, to engage learners in extensive language practice, and to provide opportunities for students to participate in social media–supported activities such as digital storytelling, fan fiction, various forms of gaming, and AR and VR that are associated with meaningful and authentic language practices (Kessler, 2013).

7 | CHALLENGES IN TEACHER TECHNOLOGY PREPARATION

Unfortunately, teacher preparation for technology use in language education has faced many challenges: It is still often neglected completely or focused on learning to use existing technologies rather than looking forward to the ways in which cutting-edge technologies can enhance or revolutionize teaching and learning. With the many demands of language teacher preparation, technology use is often sacrificed but is becoming increasingly important across the spectrum of language teacher preparation. The literacy practices associated with these emerging domains are likely to be unique from established practices in various ways. This is an important consideration regarding teacher preparation. Guikema and Menke (2014) discussed the importance of incorporating current and emerging forms of digital literacy in teacher preparation. There are many other aspects of teacher preparation impacted by these developments. Many researchers have observed an appreciation for the importance of using technology in teaching (Hlas, Conroy, & Hildebrandt, 2017; Kessler, 2006). However, there has long been a reluctance to use technology for language teaching even when teachers have received preparation. Researchers have observed that the preparation that teachers receive is often inadequate, inappropriate, irrelevant, or outdated (Kessler, 2010; Williams, Abraham, & Bostelmann, 2014). There have been numerous suggestions for how to address this disconnect, but the challenge persists.

This article has presented a number of opportunities to embrace emerging technologies and the associated social practices they promote in order to make technology integration relevant and engaging. Introducing such practices to teachers in preparation would help them toward considering possible future applications. The potential for adapting our digital social practices in teaching and learning contexts is vast and should be explored by those who prepare future teachers. In fact, these new domains require that we reflect upon our current approaches to teacher preparation. It is reasonable to suggest that all aspects of language teaching may benefit from some integration of technology. Whether we are monitoring student progress, creating opportunities for extensive language practice, or performing assessment, technology presents enhancements and efficiencies.

Kessler and Hubbard (2017) suggested that teachers need to be equipped for these changing realities, including being prepared for increased mobility, interactivity, and social experiences. These suggestions are built upon the foundation of the TESOL Technology Standards (Healey et al., 2011). This set of standards establishes benchmark expectations for technology knowledge and use by students, teachers, and administrators in language learning contexts, including sample vignettes that can be adapted to various teaching contexts. The standards also include a series of can-do statements and a program assessment guide that can help readers identify strengths and weaknesses in order to focus on opportunities for improvement. While these standards were created for English teaching, they have also been adopted in a number of foreign language teaching contexts (Arnold, 2013; Kessler, 2016). Frameworks such as the TESOL Technology Standards can help guide teachers toward thoughtful, reflective technology use, but this is just a foundation. We need to intentionally prepare teachers who are already likely to bring extensive participation in social networks and are comfortable investigating a range of emerging technologies to go beyond what is provided by their textbook and create exciting experiences for tomorrow's language learners. What is more, we need to help teacher candidates develop a mindset that acknowledges the need to evaluate their use of technology; embrace what will certainly be continually emerging contexts, tools, and social practices that support language practice and retention; and evaluate the relationships between technology and learning goals so as to discard or disregard technological advances that may represent an engaging but ineffectual distraction.

8 | CONCLUSION

Given the accelerated evolution of technology and the social interaction and learning opportunities it supports, it becomes increasingly important for prospective teachers, teacher trainers, and K–12 and postsecondary teachers at all stages in their careers across a range of languages and with differing professional interests and specializations to be attentive to these changes. Furthermore, I also emphasize that significant and sustained professional development opportunities will be needed in order to help guide all professionals to recognize the potential of these established and quickly emerging opportunities, take into account the participatory nature of modern society, and actively move beyond their current foundation of pedagogical and CALL skills. In sum, it is clear that all language teachers must become comfortable with what are currently new, intelligent, and increasingly sophisticated resources as well as with those that will succeed them and make time to understand the great opportunities and obligations that will form the new landscape of world language teaching and learning.

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