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INTRODUCTION

History, Pedagogy, Data and New Directions: An Introduction to the Educational Technology Issue

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The focus of this 2019 issue of ARAL is educational technology. The issue includes review articles, position articles, empirical articles, and short reports. It is a unique compilation in that, unlike other special issues in computer-assisted language learning (CALL) journals (e.g., *CALICO Journal, CALL, Language Learning & Technology, ReCALL*, and *System*) that are specifically devoted to research that reports on a particular aspect of language learning and technology (e.g., computer-mediated communication), the topics covered here are dynamic and wide ranging, as befits the broad field of applied linguistics. Articles here include a commentary on second dialects as well as second languages (L2s), concerns of multilingualism and technology, corpus linguistics and its relationship to second language acquisition (SLA), learner autonomy, current issues in pragmatics, digital discourses, and data mining, as well as two empirical studies dealing with learning contributions of technology-mediated instruction. The authors of these pieces hail from universities in the United States, the United Kingdom, Ireland, Hong Kong, Australia, New Zealand, Germany, The Netherlands, France, and Japan. Work by senior scholars who have a long history of contributions in this area appears together with work by junior scholars and graduate students, which underscores the variety of viewpoints represented.

In this introduction, we provide a short overview of the articles included in this issue with a special focus on the novel and forward-thinking ideas and innovative applications of technologies presented in these contributions. We also highlight the ways in which familiar ideas have been challenged or expanded, or have otherwise evolved with the goal of inspiring new understandings and advances in technology-mediated language learning contexts.

Historical Developments

CALL is a relatively new field of study, born out of the idea of harnessing the capabilities of technology for language instruction first taken up in the 1960s by individual teachers and a few researchers at universities. Over the past 60 years, CALL has gone through various evolutionary cycles (for a review, see, e.g., Chun, 2016), and our ideas about teaching L2s with technology have been influenced by theories of linguistics, SLA, and psychology, among others, as well as, naturally, by the continuous advances and innovations of technology.

In their article "Reframing Technology's Role in Language Teaching: A Retrospective Report," Lara Lomicka and Gillian Lord first position their piece within the history of CALL by reflecting on the affordances of technology in language education in general,

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as well as offering new directions for technology moving forward. They provide an overview of the development of CALL pointing to distinct phases (Otto, 2017; Warschauer, 2004) and highlight many of the concerns that have arisen through the advent of new technologies and their potential impact on language teaching and learning. One important issue the authors raise is that there is a general consensus that technologies have been *normalized* (Bax, 2003, 2011), in that many of our students, especially our Generation Z learners, are considered true digital natives, which impacts not only how our language students live their lives but also how they learn and how they experience instruction.

Lomicka and Lord's article pays particular attention to the U.S. Modern Language Association and its role in shaping debates about technology and L2 teaching and learning. In their survey, they observe that newer technologies (e.g., social media, realia sources, language games) are the second most used technologies in language classes, following course management systems. These results suggest that technologies that emphasize symbolic and intercultural competence are becoming prevalent in shaping technology-mediated language learning environments, as argued by those making the case for ecological perspectives on SLA (Kramsch & Whiteside, 2008; Thorne, 2013; van Lier, 2004).

In the next article, "Multilingualism and Technology: A Review of Developments in Digital Communication From Monolingualism to Idiolingualism," Helen Kelly-Holmes focuses on a historical overview while specifically examining the development of the language of the internet. The article focuses on the evolutions of language and technology and the expansion of multilingualism in parallel, paying attention to both their technical and economic contexts as well as their implications for linguistic diversity online and in wider society. One of the key points Kelly-Holmes makes is that within a relatively short period of time (barely 30 years) there has been an increasing and increasingly rapid level of fragmentation of the internet and the World Wide Web, first to nationally-based spaces (monolingualism), then gradually to individually styled spaces (idiolingualism). Kelly-Holmes notes that the meteoric development of digital communication technology may also work against multilingualism, pointing out, for example, that translation technology is becoming so sophisticated that it is possible to remain "cocooned from other languages," navigating a global, multilingual web in a "monolingual bubble." These are important concerns, and her article should be read with interest by those who argue for the internet as a tool for multilingual development.

Pedagogical/Methodological Issues in the Use of Technologies

The next three articles focus on pedagogical and methodological aspects of CALL by emphasizing the factors that affect the learner's success in the use of language learning technologies. Here, the transfer of acquired skills (e.g., autonomy, literacy) between formal and informal contexts is essential, with instructor training in how to promote these skills in technology-mediated teaching contexts being equally important.

In the first article in this set, a position article entitled "Technology, Motivation and Autonomy, and Teacher Psychology in Language Learning: Exploring the Myths and Possibilities," Glenn Stockwell and Hayo Reinders consider the realities of technology and its impact on motivation and autonomy. They outline how appropriate pedagogies, technology training, and teacher attitudes can all affect how learners may benefit from technology. The authors provide guidelines for teaching professionals about how to

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integrate technology into their classroom and emphasize the importance of first introducing technology into their *own* teaching contexts.

The next article is a short piece, "Technology and Learner Autonomy: An Argument in Favor of the Nexus of Formal and Informal Language Learning," which also focuses on the important issue of learner autonomy although in quite different ways. The author, Chun Lai, surveys the relationship between technology and learner autonomy in formal and informal contexts while describing how research in the two contexts may benefit one another. The main take-away in this piece is that there has been limited interaction between the two bodies of literature—technology and autonomy—which may have constrained efforts to amplify learner autonomy using technology. She argues that, given that the three types of autonomy—personal autonomy, language use autonomy, and language learning autonomy—interact with one another in dynamic and bidirectional processes, situating technology at the nexus of formal and informal learning contexts may contribute significantly to the development of learner autonomy.

The final article in this set continues the discussion on the effective use of new technologies in L2 learning. In "World CALL: Are we connected?" Mike Levy takes a broader view and describes the complexity of the internet and its relation to the wider, often, unpredictable world. In his piece, Levy reviews a range of relevant concepts, including digital literacy, authentic materials and texts, and input and output, and considers how they apply to humans as well as machines. Through this discussion, he ponders how increased connectedness between the world and the classroom may help to better situate applied linguistics for technological changes in the future.

Constructing and Examining Corpora and Data Sets

Inasmuch as (applied) linguistic theories have been influential in CALL, research with large data sets that allow for examining language usage and learner behavior has also contributed to SLA, although perhaps not as much as it could until now. For instance, while corpus studies began to emerge in their modern form as far back as the 1960s, with the goal of informing the contents of textbooks and reference tools, the numbers of teachers and learners interacting with corpora themselves only started to grow in the 1980s (Vyatkina & Boulton, 2017). Corpora continue to expand, now covering written and spoken language, learner and native corpora, and face-to-face and online communication. The search tools used to perform such data-driven learning, which allow users to routinely examine these large data sets, are becoming more comprehensive and intuitive.

Data mining (i.e., the discovery of patterns in large data sets) using modern machine learning and statistical techniques has transformed many areas of life, and the use of data mining, particularly in language learning, is only in its infancy. While the study of corpora generally allows for pattern recognition of language samples and use, data mining research illustrates how such patterns or characteristics of learner behaviors can be mined from unstructured data.

In the first article in this set, Tony McEnery, Vaclav Brezina, Dana Gablasova, and Jayanti Banerjee discuss corpus studies, an increasingly important topic in the field of applied linguistics, by examining the relationship between corpus linguistics work and research in SLA. Their piece, "Corpus Linguistics, Learner Corpora and SLA: Employing Technology to Analyze Language Use," provides a clear and compelling explanation of why closer collaboration between these two fields is critical to answering important questions in SLA, and we expect this piece to drive future research and

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considerations of corpora in applied linguistics, since the groundwork is now so clear about how the fields can benefit each other.

The second piece in this set, "Recent Contributions of Data Mining to Language Learning Research" by Mark Warschauer, Soobin Yim, Hansol Lee, and Binbin Zheng discusses how data mining can be used in general and introduces three specific areas of data mining: clustering, text mining, and social networks. The authors describe the interdisciplinary practice and emphasize that research efforts to document and interpret learner behaviors from tracking data compiled into large data sets will continue to be important. According to the authors, the multiple sources of learner data collected in online environments, especially those in contextually rich naturalistic settings, not only feed back into enhancing pedagogy but also contribute to the development of language learning theory. Learner interactions and the mediating role of technology can be best understood in contextually rich and naturalistic environments. They reason, logically, that large quantitative data sets illustrated and analyzed using data-mining techniques will be a useful complement to qualitative investigations.

Rethinking and Expanding Current Perspectives

While new technologies have always driven innovations in CALL practice, practitioners have also looked at ways to enhance the scope of how technologies are used based on applied linguistic theories. Likewise, data from CALL studies have been used to advance the conversation on concepts and constructs in applied linguistics in productive ways. Indeed, as texting and social media become the preferred modes of communication among some groups (Common Sense, 2018), many researchers are calling for the rethinking and expansion of research in language use and acquisition to better reflect our multimodal daily communications.

In her article, "Technology and L2 Pragmatics Learning," Marta González-Lloret highlights the need for more research into how communication technologies may facilitate the development of L2 pragmatics and how digital pragmatics is similar or different from that in face-to-face interactions. Arguing that what constitutes appropriate linguistic behavior is largely shaped by modality, the construct of appropriateness could be added to constructs like complexity, accuracy, and fluency, given that online interpersonal communication is often argued to be poised to supplant face-to-face communication. She further suggests that L2 curricula with strong cultural, social, or authentic elements will allow for better integration of pragmatic materials and that technology-enabled environments are an important means of incorporating the teaching and practice of L2 pragmatics.

In "Emergent Digital Discourses: What Can We Learn From Hashtags and Digital Games to Expand Learners' Second Language Repertoire?" Julie Sykes suggests that applied linguists and language teachers are positioned to significantly diversify and strengthen learners' target language repertoires by explicitly addressing the functions of digital discourses. She defines and then synthesizes work related to two digital discourse contexts—the use of hashtags in online communication and digital games—both of which are "ubiquitous in social, political, educational, and economic domains, yet, largely absent from language instruction." She makes a compelling case for the pedagogical value of hashtag use and digital games, sets forth a framework for exploring these digital discourses, and offers concrete examples of how to use each in teaching language and culture. She argues that content and context are vital in future work pertaining to digital discourse and language learning therein. By

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examining these two digital discourse contexts (hashtags and digital games), Sykes concludes that empirical studies are needed to determine instructional means that can enhance a deeper understanding of the ways in which explicit attention to digital discourse practices can be integrated in the L2 curriculum. We look forward to seeing more such studies by readers of her article.

In the next article, another short one, "Past the Anthropocentric: Sociocognitive Perspectives for Tech-Mediated Language Learning," Maria Ocando Finol argues that technology-based research needs to expand in terms of the theoretical frameworks it considers. She critically calls for the field to adopt a less instrumental, more determinist view of technology in language learning. She makes the important observation that the tensions seen between cognitive and sociocognitive approaches in mainstream applied linguistics carry over into the field of CALL and that technology has the potential to challenge existing theories and approaches by illuminating new ways of thinking about SLA and applied linguistics.

In the final article in this group, "Media and Second Dialect Acquisition," Jennifer Nycz examines the effects of different types of media on second dialect acquisition. Arguing that it is *engagement* rather than simple interaction with new linguistic input that may facilitate convergence and dialect learning, a claim also made in second language (not dialect) acquisition, of course, Nycz suggests that the most successful YouTube videos and podcasts create a high-engagement user experience, which results in heightened attention or sensitivity to the dialect, thus offering more potential for dialect learning. High-engagement new media, then, may serve to "accelerate" the use of dialect features that have already been adopted by the speaker/listener via conventional means.

Empirical Investigations in Technology-mediated Language Learning Contexts

There has been a strong push in empirical educational technology research in favor of tracking technology (Fischer, 2007; Smith, 2008; Warschauer et al., this volume), in which detailed process data on the learners' interactions during technology-mediated instruction are recorded. The data collected can provide insights into learners' performance and behavior as well as the efficacy of a specific technology. One of the main issues scholars typically face when collecting this type of data is that they either have to rely on off-the-shelf applications that come with their own tracking mechanisms (e.g., learning management systems) or build their own (prototype) applications to use for the purpose of a specific study. Cost, time, and (lack of) expertise often prevent the development of suitable tools, which negatively impact what data can be collected and adequately analyzed, resulting in limited or potentially misleading findings.

In "Scaling Up Intervention Studies to Investigate Real-Life Foreign Language Learning in School," Detmar Meurers, Kordula De Kuthy, Florian Nuxoll, Björn Rudzewitz, and Ramon Ziai describe a large-scale intervention study with intact English secondary classrooms and discuss the challenges in conducting SLA interventions. In using a more ecologically valid setting, they increase the likelihood that the findings are generalizable to other real-life L2 contexts. The FeedBook project they describe, designed to provide immediate scaffolded feedback to students on form and meaning, establishes a space for individualized, interactive learning that can fully scale to authentic school contexts. Their article discusses the functionality of FeedBook and examines the impact of technology-mediated corrective feedback provided by this web-based technology. Their project aims to help ground the public

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and political discussion of the digitization of education in actual evidence linked to applied linguistics and learning research.

Concluding the issue is another empirical piece, "Alignment During Synchronous Video Versus Written Chat L2 Interactions: A Methodological Exploration." In this important article Marije Michel and Marco Cappellini provide a conceptual overview and outline the historical trajectory of the framework of alignment in applied linguistics research to ground their argument. They use this framework to empirically explore L2 interaction in two synchronous computer-mediated communication (SCMC) contexts: peer videoconferences and text chat with a peer or tutor. Using an off-the-shelf tool to identify instances of alignment, their results show that lexical and structural alignment were both present and observable in different SCMC contexts. The videoconference conversations yielded more lexical alignment, with more structural alignment occurring in written SCMC. They conclude by suggesting that the framework of alignment has both theoretical and pedagogical advantages. First, it allows us to move beyond the cognitive-sociocultural debate, drawing on the strengths of each approach. Second, as alignment has been shown to be a pervasive phenomenon, it is a potentially powerful tool for instructed SLA.

Conclusion

This 39th volume of ARAL is unique in that each contribution invites us to consider instructed L2 (or dialect) acquisition (or use) through the lens of digital communication technologies. In doing so, it offers the reader the opportunity to revisit many familiar constructs in new ways, while introducing novel challenges in eliciting, capturing, analyzing, and interpreting linguistic data (e.g., in the pieces by McEnery et al.; Michel & Cappellini; Warschauer et al.). This volume also highlights the fact that many aspects of online communication are fundamentally different from face-to-face interaction. The growing preeminence of online communication will increasingly require us to reexamine many well-researched notions in applied linguistics, such as what constitutes appropriate pragmatic behavior (González-Lloret), language change (Nycz), and discourse practices in general (Sykes), which, in turn, may lead us to examine how best to integrate these notions into traditional language and culture classrooms, on the one hand, and develop fresh avenues for researching these constructs, on the other. Examples of the latter are seen in Michel and Cappellini's forward-looking framework of evaluating digital alignment and in Meurers et al., who successfully implemented and examined the performance of an intelligent tutoring system in an intact English secondary class in Germany.

Finally, the papers in this volume underscore the need for pedagogically sound practice and guidance for language teaching professionals in the use of digital technology in L2 teaching and learning (Lomicka & Lord; Stockwell & Reinders; Sykes) both in informal and formal language learning environments (Lai; Levy). The complicated relationship that many L2 professionals have with using digital technology in the classroom is partially based on fears about humans being rendered redundant by technology. The discussion, however, has moved beyond the question of whether or not to use technology for L2 teaching and learning. We are now in an age where Gen Z and millennials communicate with others more digitally than in person, mostly through messaging. The smartphone has become an extension of ourselves, typically no further than an arm's length away, even when we sleep. And even though we do not expect technology to completely replace classroom teachers in the future, we do believe it is

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likely that teachers who are skilled at integrating technology and who take judicious approaches to its prevalence will almost certainly replace those who are not comfortable with it, at least in the short term. We would be remiss if we did not note here that many of the architects of technology's pervasive grip on life (such as Facebook's founders) are widely reported to be severely restricting or banning its use by their children. It is no longer enough to become skilled in specific technologies—they simply evolve too rapidly. Moving forward, we believe that teachers need to become skilled at identifying the affordances of these new technologies and matching these affordances with their desired pedagogical outcomes in ways that are consistent with current findings in applied linguistics and language teaching and learning.

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