



FROM THE SPECIAL ISSUE EDITORS

The effects of information and communication technologies in language education are often mediated by the learner, the content, the teacher, and the learning environment. Up until recently, research has primarily focused on the relationship between technology and the learner, and between technology and content. A large part of the existing CALL research is about how language learners interact with technology as well as how certain technologies can be used to support the teaching of certain types of content (e.g., vocabulary, grammar, listening, or writing). Relatively little is known about how teachers interact with technology. However it has become increasingly clear that teachers are key to the realization of its claimed educational potentials (Cuban, 1986; Zhao, 2001, 2002). They are the "gate-keepers" of technology, who not only determine whether it enters the classroom, but also affect how it is used in the classroom. If it is not allowed in the classroom or not used properly, it cannot have the opportunity to exercise its educational power. The realization of teachers' critical role in effective uses of technology has led to a surge of interest in the relationship between the two (Zhao, in press; US Congress Office of Technology Assessment, 1995). In some countries, this interest has also led to radical changes in teacher education programs, which now include considerably more courses in educational use of ICTs than a few years ago. This special issue of *LLT* joins the conversation about teachers and technology by exploring a number of critical issues in this field.

There are two broad categories of issues related to teachers and technology. The first includes concerns with preparing teachers to effectively use technology as a pedagogical and professional tool to achieve greater educational outcomes, and the second includes issues about how to use technology in teacher education to prepare more versatile and better skilled teachers by making changes in their educational environment. In this special issue, we invited contributions exploring issues in both categories.

How to Prepare Teachers to Use Technology?

The ability to teach with technology is quite different from the ability to use it, because technology must be integrated with a sound pedagogical framework. Thus, the first issue we must consider in preparing teachers to use technology as a pedagogical tool and as a new teaching and learning environment is how it interacts with current pedagogical approaches. Research suggests that teachers are more likely to use it when it is found to be compatible with their pedagogical styles (Zhao, 2002). To find that compatibility, we must understand the salient features of various technologies and the attributes of promising pedagogical approaches.

Weasenforth, Biesenbach-Lucas, and Meloni's article "[Realizing Constructivist Objectives Through Collaborative Technologies: Threaded Discussions](#)" is an excellent example of research attempting to connect pedagogy to technology. Through an extensive situated study of the implementation of one of the most widely used computer-mediated communication technologies, threaded discussion, this paper examines how technology can be used to meet curricular goals within a constructivist framework. In particular, the authors investigated the extent to which teacher-mediated technology promoted selected cognitive and social skills as well as addressed affective factors and individual differences in students. The examination of the interactions



between technology and a constructivist pedagogical framework offers many important insights into the issue of compatibility between technology and pedagogy.

Another critical issue in answering the question of how to prepare teachers to use technology is what factors affect its use by teachers. Klaus Brandl's article "[Enhancing Authentic Language Use: The Integration of Internet-Based Reading Materials Into the Foreign Language Curriculum](#)" identifies three factors which influence teachers' uses of technology in language teaching: teachers' technology proficiency, teachers' pedagogical approach, and students' language proficiency. Considering these three factors, the author suggests three approaches to integrating Internet-based reading materials into a foreign language curriculum: teacher-determined lessons, teacher-facilitated lessons, and student-determined lessons. Additionally, Brandl provides specific, detailed guidelines for curriculum development and instruction. Although this article deals with only one specific technology (the Internet) and one specific aspect of language teaching (reading), its analytical framework can serve as an excellent example for language educators and researchers in their thinking about using technology to support language teaching.

Furthermore, [Weasenforth et al.](#) and [Brandl's](#) contributions point out directions to address another significant issue in preparing teachers to teach with technology, that is, the content of their preparation programs. Many organizations and agencies have started to define technology of knowledge through teacher technology standards (e.g., International Society for Technology in Education, 2000; National Council for Accreditation of Teacher Education, 1997). Suggestions from these two articles are consistent with these standards in that they emphasize not the technical capability of technology but its pedagogical connections. It is the pedagogical capacity of the technology and the context that may best take advantage of the technology itself, and which should form the core content of programs preparing teachers to use it. In other words, they suggest that we should teach teachers should not be limited to how to use the technology, but how to use it to teach.

Immediately following the issue of *what* to teach teachers is the issue of *how*. Teachers learn how to use technology in a number of different ways. Some learn from their colleagues; others learn from the friends and family members; still others learn on their own. Of course, many teachers learn through organized professional development programs or courses, especially for pre-service teachers. A growing number also profit from upgraded teacher education programs that take information and communication technologies into account. While each approach may have its own merits, the question of efficiency and effectiveness remains. For example, one commonly asked question about teacher education is to what degree formalized teacher education makes a difference.

In "[The Impact of CALL Instruction on Classroom Computer Use](#)," Joy Egbert, Trena Paulus, and Yoko Nakamichi examine the effects of formal teacher education programs on teachers' actual use of technology. Through a survey study, they compared what teachers learned in CALL courses and what they report using in their teaching. They found that those who use CALL implement activities that they learned and practiced outside of the course. They also found that lack of time, support, and resources inhibits use of CALL activities in some classrooms and that colleagues are the most common resources for CALL activities outside of formal coursework.



How to Use Technology to Support Teacher Education?

Technology can be an effective tool for teacher education as it is often conducive to creating more versatile teaching, studying, and learning environments. Online technologies can be used to support professional communities for teachers. Multimedia and mobile technologies can be used to help teachers observe in more focused ways exemplary practices. Videos can be used by the teachers themselves to more carefully examine and reflect on their teaching practices. Videoconference systems with remote control make it possible for language trainees to observe lessons at a distance or receive guidance from a distant teacher, thus enhancing real-time and on-line communication between teachers, teacher educators, and students. Technology tools can also be used to help pre-service teachers connect with real classrooms.

In this special issue, [Aaron Doering and Richard Beach](#) report their experiences using a variety of technologies to support teachers' acquisition of literacy practices. Connecting pre-service teachers to middle school students in a collaborative writing project, technology was used to help future teachers develop an understanding of various technology practices and of their future students. The authors found that hypermedia productions with middle school students helped pre-service teachers learn how to model the literacy practices of making intertextual or hypertextual links. This study demonstrated the potential of technology in support of teacher education.

Summary

Technology and teacher education is a complex and fairly recent phenomenon. Although technology, in a broad sense, has always been part of education, and teachers have always used it (e.g., books, blackboard, tape-recorders, language labs) in their professional lives, the technologies they must use today are much more complex and powerful. As a result, the process of preparing teachers to use technology becomes more complex as well. While the papers in this special issue offer insights into some of the significant issues that arise when teachers meet technology, there are many more questions in this process that remain unexplored. The following are a few examples.

First, the cognitive and psychological process of technology integration by teachers awaits exploring. Some of the issues include the following: What kind of cognitive and psychological factors affect teacher adoption of technology? How do teachers become proficient in the use of technology? What mental models do teachers proficient in its use possess? How are these models different from those of novice users?

Second, the kind of social and organizational arrangements that promote technology use by teachers is another area that needs further exploration. Some of the persistent issues include the following: Why do only few teachers in a particular school use technology? How can we help bring an exemplary teacher's practices into the next-door classroom? What kind of professional development is more effective in promoting technology integration? Which institutional policies result in more rapid adoption of technology?

Third, the relationship between teachers and technology has been a long-standing issue that is yet to be resolved. Some argue that technology will replace teachers while others contend that we actually do not need technology. Apparently, the truth lies somewhere in between. Further research is needed not to settle the debate but to define the different roles technology and teachers can and should play in the language classroom.



Last, as Internet-based education becomes increasingly popular, we also need to explore the differences and similarities in online versus face-to-face teaching. Due to the vast differences in delivery and communication media between these two, teachers may have to take different approaches requiring different teaching abilities. Research is needed to help us understand what abilities teachers must have in order to teach online on the one hand, and to incorporate network-based education into more traditional classroom-based approaches on the other.

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Sincerely,

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