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Mediating the digital divide in CALL classrooms: Promoting effective language tasks in limited technology contexts

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Abstract

This paper focuses on the divide at the classroom level in computer-assisted language learning (CALL) that is centered on how those who have technology use it in the pursuit of effective language teaching and learning. This divide is the result in part of the current emphasis on emerging technologies in the CALL literature and in CALL language teacher development that seems to indicate that good CALL activities and lessons can only be carried out with the use of advanced and cutting-edge technologies. The aim of this paper is twofold: (a) to argue that optimal language learning activities can be supported by the use of 'limited' technologies, and (b) to present a framework for developing language learning tasks in limited technology contexts. We do not suggest ways to bridge the digital divide that exists between technology haves and have-nots. Instead, we focus on ways to provide effective language learning experiences in CALL classrooms regardless of the technologies available. In doing so, we propose ways to work around the divide created by the overemphasis on new technologies. We suggest that rather than lamenting the fact that our tools are not the latest and greatest, we must pay attention to using the tools at hand to students' best advantage while we look for ways to obtain additional resources. We must also consider and collaborate with educators who have accepted the position that the use of limited technology cannot be effective in supporting student learning or who do not know how to use their technology to present students with effective opportunities. By addressing these issues in the literature and other forums, the digital divide in CALL classrooms between good technology use and poor technology use can be bridged to the benefit of all.

1 Introduction

Much attention is currently focused on the 'digital divide', a phenomenon that has been characterized in many different ways. It has been described as the gap between "those who can effectively use new information and communication tools, such as the Internet,

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and those who cannot" (Digital Divide Network, 2003; also see Warschauer, 2003). Others have depicted it as the disparity between information-poor and information-rich communities (BBC News, 1999) and even as the lack of relevant content on the Web for certain populations (Children's Partnership, 2000). The most common portrayal of the divide is the social and economic inequality between those who have technology and those who do not; Warschauer (2003, 2002b) discusses this as a problem of context rather than availability. The bases for such divides are numerous and well documented; they include political, economic, philosophical and other influences. Regardless of which definition is used, educators must consider how these rifts affect opportunities for student learning and what can be done to mitigate their negative effects.

Like Warschauer (2003), we suggest that there are other digital divides. We focus on the divide at the classroom level in computer-assisted language learning (CALL) that is centered not on those who have or do not have technology, but on how those who have it use it in the pursuit of effective language teaching and learning. Although overly simplistic, we can use the terms 'good use' and 'poor use' to present this dichotomy. This divide is the result in part of the current emphasis on emerging technologies in the CALL literature and in CALL language teacher development that seems to indicate that good CALL activities and lessons can only be carried out with the use of advanced and cutting-edge technologies. In CALL, as Michael Cole observes in general, "The modern belief that new technologies hold the key to human progress seems to be sacrosanct." Given the reality that technology in many countries as well as in many ESL classrooms in the United States remains limited, this focus does not provide consideration for the majority of language teachers who work in contexts without cutting-edge technologies and *de facto* creates its own kind of covert digital divide in language classrooms. As a result of this emphasis, some educators might view limited technology as lending itself only to poor use and as a handicap to their instruction; however, when viewed through a lens of creating optimal language learning environments, the use of limited technology can be as effective for teaching language as the use of 'unlimited' technology.

This trend of discarding older technologies and embracing more innovative and sophisticated technologies is not new. If we look back 10 or 15 years at the CALL literature, we can see that there was a lot of excitement about the same technologies that are now considered outdated and no longer useful. For example, when Hypercard (Apple Computer, 1986) was first published, the effectiveness and benefits of this program for a variety of functions in CALL classrooms were widely discussed (see, for example, Lackstrom, 1993/4; Young & Shermis, 1993). However, as time went by, the older versions of this software were no longer mentioned. Instead, new versions of software packages that contain features such as multimedia graphics and additional supports have been widely promoted not only by publishers but also by educators. A similar situation applies to drill-and-practice software programs. In early programs the software served as a 'tutor' that was mainly responsible for checking learners' answers. In the 21st century, such programs are often considered outdated and useless, regardless of the fact that many language educators still use computers that support this software. Streaming video and links to other useful resources are often incorporated into drill-and-practice programs to what are hyped as better ends, although this claim has not yet been proven.

The excitement in CALL has moved on to new technologies such as digital video, online chat, and virtual worlds (Egbert, 2001, 2002a–d), and language teaching has moved

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on to new methods in many cases. For example, Warschauer (1996) and others note that we have moved past behaviorism in our understanding of how languages are learned; however, much of the software and many of the textbooks that language teachers around the world have access to are still based on this paradigm. That it not to say that there is anything inherently wrong with activities based on behaviorism, but rather that we have learned much since then about conditions for language learning. We understand that one method or technique does not fit the great variety of students in our classrooms and that we must therefore broaden our instruction to match our learners' needs (Freeman & Freeman, 1998; Peregoy & Boyle, 2001). However, these changes in theories and methods have not always been paralleled by changes in the available technologies, and so teachers continue to use their now 'limited' technologies in ways with which they are familiar. To close the gap between good use and poor use, we need to facilitate teachers in limited technology contexts in developing tasks that take into account both our new theoretical understandings and their technology contexts.

The aim of this paper is twofold: (a) to argue that optimal language learning activities can be supported by the use of 'limited' technologies, and (b) to present a framework for developing language learning tasks in limited technology contexts. To meet these goals, we first define and discuss language classrooms in limited technology contexts. We then present a framework of conditions for creating opportunities for effective language learning and provide two examples of tasks to demonstrate how this framework might be applied in limited technology contexts. Finally, we discuss issues with this approach and suggest ways to work around additional barriers that may be found in limited technology contexts. We do not suggest ways to bridge the digital divide that exists between technology haves and have-nots. Instead, we focus on ways to provide effective language learning experiences in CALL classrooms regardless of the technologies available. In doing so, we propose ways to work around the divide created by the overemphasis on new technologies.

2 Classrooms with limited technology

Many teachers will not be surprised to learn that, although their school or language program has the most up-to-date hardware and a variety of software programs, they are still functioning in what can be defined in some ways as a limited technology context.[1] In most limited technology contexts, one or more of the following conditions are satisfied:

- *Limited general access to technology*. Limited access can include a regularly set time/day for access to a lab (thereby restricting when technology can be used), parents who prohibit their children from accessing the Internet at school, computers, projectors, or even telephones located only in labs (limiting where technology can be used), or general restrictions on access. For example, Warschauer (2002a) reports on high schools in Southern California that have unstable Internet access, student restrictions for certain Web pages that limit the usefulness of the Web, and inflexible Internet filters.

[1]Although the terms 'limited' and 'low' can have different connotations when describing technology, in this article we use the term 'limited' to describe technology in both contexts.

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- *Limited or no Internet access*. Limited access includes text-only Web capabilities, slow connections, limited bandwidth, lack of file transfer protocol (ftp) and downloading capabilities. Limited access contexts vary widely both abroad and in the US. For example, Greenspan (2003a) reports that only 2% of the populations of Central America are Internet users, while 29% of Europeans have access (Greenspan, 2003b). However, in Europe this number varies greatly by country; for example 57% of people in the UK but less than 1% in Moldova and Albania have Internet access. Ninety eight percent of schools in the US are reported to be connected to the Internet, but schools with high poverty levels are less often connected (Cattagni & Ferris-Westat, 2001). In addition, many of these schools are still using dial-up connections that are slow and/or unstable. Although national statistics suggest that the use of the Internet in schools in the United States has increased, many ESL classrooms, like many around the world, still remain low-tech.
- *No software, old software*. Software that does not work well on newer operating systems or that does not provide opportunities for learners with a variety of learning and working styles can cause problems in both access and equity.
- *Mandated software*. Jung (2003) reports that the Korean schools that she studied are mandated to use specific software provided by the federal Ministry of Education. Even though the software is cutting-edge, the teachers report that its use leaves little time for other activities in their language classes.
- *Few computers and other technologies*. Much has been written about effective uses of technology in the one computer classroom (Bedient *et al*., 2000; Dockterman, 1998; Scolari *et al*., 2000; Tamela, Bedient & Scolari, 2000). However, if the number of students exceeds the number of computers that students have access to so that not everyone can see a monitor, this qualifies as a limited technology environment. Cattagni & Ferris-Westat (2001) report that many schools in the US maintain an average ratio of nine students to each computer.

Although 'limited' is the common term for these technology-enhanced environments, our assertion is that these contexts have *unlimited* potential to support learning opportunities in the language classroom.

Not much is written about the benefits of limited technology contexts; however, they include that students are not overwhelmed by functions of the technology, can learn a few technologies well, can work on metacognitive strategies with simple technologies as support, avoid distractions caused by 'bells and whistles,' do not need to worry about connections going down or Web sites being out of place, may concentrate on the tasks and the interactions with others more than the 'toys,' and have opportunities to use other resources as well (e.g. books, interviews with native speakers). Teacher education in technology integration might also be easier in limited technology contexts because more emphasis can be placed on the use of the technology than on its functions. Of course, learners in these contexts are also missing out on opportunities because they are not learning new technologies, cannot access all of the most current information provided on the World Wide Web, and perhaps do not have teachers who are well trained in CALL. However, as in any situation there are gains and losses, and language learning in these circumstances can be just as effective as in contexts with richer technologies.

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3 Creating opportunities in CALL classrooms

While many of the newer features of technology (voice chat, synchronous conversation, commenting features) are useful, their role in language learning classrooms is often gratuitous. It is rather easy to find anecdotes in the literature of failed information and communication technology (ICT) uses where students were not motivated, do not participate as planned, or fell prey to the vagaries of the technology. Even with rich technologies, uses for learning can be poor. On the other side of this CALL divide are classrooms with technology that is well integrated and provides efficient and effective language learning. These classrooms, even when limited in technology, provide learners with tasks based on principles of language learning in instances of good use.

Using language learning principles as a framework for technology application in the classroom can create opportunities for learners for effective and efficient language learning. Below we present eight conditions for language learning classrooms that are based on and apply such principles (adapted from Egbert, 1993; Egbert & Hanson-Smith, 1999; Egbert & Jessup, 1996; Jung, 2003; Spolsky, 1989). These conditions are:

1. *Learners have opportunities to interact socially and negotiate meaning.*
   Individual practice has been found to help learners master certain elements of grammar and other discrete skills; however, research indicates that effective learning takes place when learners work actively with other people with whom they can use language creatively. Interaction allows learners to receive input, to use feedback to monitor their language, and to produce output that becomes input for other learners.
2. *Learners interact in the target language with an authentic audience.*
   It is important for learners to have a reason to listen to others and to be listened to themselves. This means an audience at the right level for the student, including fluent speakers who are willing to adjust their language to the students' ability. It also means people who will interact because the topic is of interest and meaning is paramount.
3. *Learners are involved in authentic tasks.*
   Developing authentic tasks is the most important of these learning conditions because the task influences all of the others (Egbert, 1993). For our purposes, an authentic task is one that learners perceive as something that they will use outside of class in their lives. The key word to determining authenticity is 'perceive': Even the much maligned grammar drill and practice can be an authentic task if learners see the need for it in their language use outside of the classroom.
4. *Learners are exposed to and encouraged to produce varied and creative language.*
   Learners from different educational and cultural backgrounds may prefer to demonstrate their knowledge and experience in a variety of ways. Learners therefore need opportunities to interact with multiple forms of input and the chance to express themselves in ways with which they are comfortable. This is especially important when learning content, as there are multiple ways to express understanding in science, math, and social studies.
5. *Learners have enough time and feedback.*
   Learners differ in the amount of time they need and in the kind and amount of feedback that they require to accomplish a task. It is important to provide

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feedback from a variety of sources so that learners get a clear understanding of their language proficiency and content competence.

6. *Learners are guided to attend mindfully to the learning process.*
   Students who perceive the goals and structure of the task in addition to the instructions will also be more attentive and more motivated to learn. Motivation in language learning also stems from uninterrupted time on task, sufficient help, and other of the conditions.
7. *Learners work in an atmosphere with an ideal stress/anxiety level.*
   Language learners should feel comfortable enough to take risks with the target language, but they should not be pushed into apathy by tasks and exercises that do not present sufficient challenge. For some learners a low-stress atmosphere is appropriate, while others might need more stress to perform at their optimal level.
8. *Learner autonomy is supported.*
   Many language classes push learners along an inflexible schedule with a certain amount of materials to cover in a specified amount of time (for example, see Jung, 2003). This type of syllabus may be effective for some students, but it may ignore the needs of others who need more time, more feedback, or more opportunities to work with the language. Even in contexts where this rigid schedule is in place, supporting learner control over even a few facets of their learning can help learners with different language levels, interests, and learning styles. Opportunities for choices can be as basic as choosing the color of the paper learners write on or as autonomous as choosing the way to study a certain subject.

We do not expect that teachers can incorporate every condition at the appropriate level for every student in every lesson. It is not clear if that is even necessary. The goal is to develop tasks that present different levels of different conditions so that learners have a variety of opportunities. In doing so, teachers can avoid the barriers to learning that the literature implies limited technology creates.

4 Developing opportunities

The next section presents examples of two activities in limited technology contexts that are based on the conditions presented above. These activities present varied opportunities for language learners.

4.1 Example one: Grammar practice

In a secondary school EFL course in Eastern Europe, the goal of the grammar-based syllabus is for students to master the forms and be able to use them proficiently. There is a set curriculum that dictates which structures are to be studied when. The textbook contains mostly grammar drills, and only grammar drill software and a word processor are available on the program's older lab computers (thus it can be considered a limited technology context). The instructor is required to use the lab weekly. A typical class period has students working through a number of drills and dialogs. The conduct of the course does not provide many of the opportunities described previously: There is little true

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social interaction, the audience for the dialogs is by their nature not authentic, learners have no choice of content or exercise, there is little variation in input or ways to produce language. On the other hand, learners do have immediate feedback from the teacher and the software about their grammatical mistakes, some of the students are motivated to study grammar in the belief it is an authentic part of language learning, and there is little stress since the students are used to such exercises.

Below is an example (adapted from Egbert *et al.*, 2003) of one possible way that the teacher of this course can build on the benefits of the available technology while adhering to the goals and guidelines of the program:

Students in pairs work on a grammar drill about present tense verb forms. Student A works at the computer, Student B sits close but cannot see the screen. The software program presents each fill-in-the-blank question separately, uncontextualized from the rest of the sentences in the drill. Student A reads each question presented on the screen while Student B writes the question down on a piece of paper, writing odd numbered questions on the left side of the paper, even numbered on the right.

> Student A reads the four possible answers (or reads the first answer, and if the students do not think it is correct, goes to the next, and so on). The students choose what they believe to be the correct answer together. Student A checks it with the software and Student B writes down the correct answer as Student A confirms it. Student B repeats the completed sentence out loud as a final check. After all of the sentences are complete, the learners review them from the paper. The paper is then divided between the columns. Student A takes one set of sentences and Student B takes the other. Now Student B sits at the computer, while Student A sits close by. The students interact, not showing each other their sentences, and try to put them together into a cohesive story, creating links by developing additional sentences. They can use dictionaries and/or other resources if they need to. Student B types the story as they agree on it and reads it aloud for Student A's approval. They share their stories with other groups who used the same sentences for their stories.

During this activity both students have had multiple and multi-modal exposures to all of the sentences and both have produced each one many times. The exercise therefore still functions to provide opportunities for practice of the forms, but in addition, during this activity, the students

- are participating in social interaction as they negotiate the content and structure of their story with an authentic audience (their classmate)
- have opportunities to choose their story content, but have a scaffold (the sentences, already correctly written) for support
- still have immediate feedback from the software, but also receive input and feedback from their partner and peers
- must be very creative to develop a story line that makes sense.

Because this exercise was based on conditions for effective language learning, the use of this limited technology has moved from a simple drill to a set of tasks that provide more opportunities for students to learn language. Because the students have not had

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these types of learning opportunities in the past, they may feel a greater degree of stress than they would completing the software exercise in the traditional way. However, 'eustress' or good stress may be created, giving students just enough difficulty to help them pay close attention while providing them with tasks that are possible to complete. With the support of language learning principles and conditions, this activity demonstrates that good technology use in CALL is not limited to the use of new technologies. The second example, below, underscores this point.

4.2 Example two: Introducing American culture

In the low-intermediate ESL course at a community college in the United States, part of the curriculum is to help students become familiar with life in the US. In their limited technology context, computers are only available in the computer lab, are restricted access, and do not have a connection to the Internet. The teachers are currently using MacTrivia (Killion, 1989), a freeware program (available from the CELIA archive, http://oregonstate.edu/Dept/eli/celia/macreading.html) to help students practise facts about the US. MacTrivia is authorable, so the teachers have changed the original content questions and answers to topics germane to the class. However, the format of the software is not adaptable; students choose one answer out of four, receive a 'correct' or 'wrong' response and the right answer flashes momentarily. The teachers are finding that, even though they put the students in pairs to work on the software, students do not necessarily interact, they do not have opportunities to produce language, they do not have choices in how to proceed with the activity, and there is no encouragement for learners to be mindful in their choices of answers. They do like that learners get instant feedback from the software, but are concerned that there is no further explanation of the topics and concepts. The students like the software and are motivated to use it, but the instructors see the need to make the activity more effective as both a language and a culture learning exercise. The activity below (reported in Egbert (1993) and Egbert & Jessup (1996)) is one way that the teachers might adapt the use of this program to offer learners more opportunities for learning.

Students work in pairs or triads around the computer. Each student has a different resource: Student A has the book *Living in the USA* (Lanier, 1988), Student B has a worksheet prepared by the instructors, and Student C has the teacher-adapted MacTrivia on the screen. The students are not allowed to show their teammates their resource. As Student C reads a question from the screen, Student A busily looks in the book for the correct answer. Student B, meanwhile, is looking for a similar but differently worded question on the worksheet. Because each student is concerned that they get the most answers correct, they are interacting to make sure that each person understands the question and the possible answers. Students B and C also make suggestions for Student A about what topics she might look under to find the answer in the book. A sample question is shown in Figure 1.

On the worksheet the questions are not in the same order as in the software program, so Student B must scan until finding the question which reads, "Which state has the most Hispanic-Americans?" In the book index, Student A can find the answer under "National Differences." The book notes that "California has more citizens of Hispanic origin that any other state" (p. 35). The book also mentions that Florida, Texas, and New

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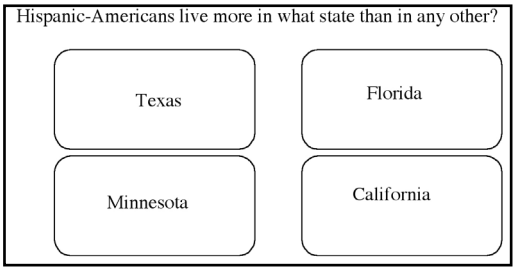


Fig. 1. Mockup of screen from MacTrivia (Killion, 1989).

York are expected to have more Hispanic citizens within the next several years.

After the students agree on the answer from the book, Student C clicks on their choice and announces to the group whether or not the answer is correct. Student B fills in the correct answer on the worksheet. When they have finished, the groups will review their answers and use the information they gained to complete other class tasks.

Students might have learned about American culture from the software program alone, but this drill-type software does not cater to different learning styles and therefore is probably less effective alone than used with complementary resources. The use of the technology in the example provides multiple and varied opportunities for language and content learning. For example, students are exposed to the question in three different ways and have to extrapolate to find the correct worksheet question. Because the activity provides a gap in information among group members, students must interact to reach the goal. Although learners do have individual choices of task – to work with the computer and read out loud, to do the book scanning, to do the worksheet scanning and writing – all are required to participate and interact in some way to reach the activity goal. The teachers could use the book alone, but the results might be the same as with the software alone – no interaction, no instant feedback unless the class is teacher-fronted, and little exposure to a variety of language sources.

These same conditions can be applied to CALL activities in both rich technology and limited technology contexts in order to ensure that good use has nothing to do with the technology available and everything to do with the learning opportunities that students are presented with. In this way, the artificial divide between these contexts will be bridged.

5 Issues

As in any classroom situation, in many limited technology contexts the opportunities for language learning are not constrained only by the technology. At our presentation at WorldCALL 2003, participants mentioned other limitations that included a set curriculum, lack of time, size of classes, and teacher attitudes. We address several of these issues below.

5.1 What if there is a set curriculum?

The use of technology does not change the goals of the curriculum. Used as a tool, as in

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the examples above, technology use can assist teachers in meeting curriculum goals more effectively and/or efficiently. Textbook pages and other required curriculum materials can be integrated with the technology in creative ways to give students more opportunities to learn and practise.

5.2 Why use a computer when drills can be done without it easily?

In many cases, the answer is that the computer then should not be used. However, in both examples above the technology provides feedback more efficiently than most teachers can, provides structure for the learning, and frees the teacher to help where needed.

5.3 What about the time factor?

The activities described previously are not add-ons to an existing curriculum. The conditions for language learning give us ways to rethink the opportunities that we provide for our learners. Because they can make learning more effective and/or more efficient, tasks like those in the examples can replace others that do not provide these opportunities. We do not expect that teachers will develop such activities to use constantly, but rather that they will balance the gains from doing so with their goals.

5.4 What about big classes?

These activities work with adaptations even with large groups of students in one-computer classrooms. In Example One, while the teacher or other person reads the sentences from the screen, students in the class can take the role of 'A' or 'B' to write down odd/even numbered sentences. The teacher can call on random students to discuss answers or create groups that provide group answers. Learners then pair up to write the story.

5.5 What if our teachers do not have the technology training?

If your teachers are well-versed in principles of language learning and their application, they can use very simple technologies to their students' benefit, including but not limited to the telephone, the overhead projector, and the tape recorder.

6 Conclusion

Why use technology in limited technology contexts? Although in some cases we would recommend against its use, we often use it because we are required to, because students like it, or because it can support tasks more efficiently or effectively than we can. Rather than lamenting the fact that our tools are not the latest and greatest, we must pay attention to using the tools at hand to students' best advantage while we look for ways to obtain additional resources. We must also consider and collaborate with educators who have accepted the position that the use of limited technology cannot be effective in supporting student learning or who do not know how to use their technology to present

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students with effective opportunities. By addressing these issues in the literature and other forums, the digital divide in CALL classrooms between good use and poor use can be bridged to the benefit of all.

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