An overview of socio-cultural factors limiting access to computers for learning

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Reference Data:
Bradford-Watts, K. (2005). An overview of socio-cultural factors limiting access to computers for learning. In K. Bradford-Watts, C. Ikeguchi, & M. Swanson (Eds.) *JALT2004 Conference Proceedings.* Tokyo: JALT.

Although technological factors affecting access to computers for learning are well documented, fewer researchers have focused upon other factors including economic, social, or cultural factors impacting a learner's ability to access computers for learning. This paper provides an overview of research into socio-cultural factors concerned with access to computers for language learning.

学習目的としてコンピュータに触れることへ影響を及ぼす技術的な要因については多くの研究がなされているが、あまり注目されていないことは、学習者がコンピュータに触れることに影響を与える、経済的、社会的あるいは文化的な要因である。この論文は、言語学習を目的としてコンピュータに触れることに関しての社会文化的な要因に対する考察の概略図を提示している。

Language teachers and learners exist worldwide. In an increasingly globalized world, communication and information are inextricably linked with technology, so we are increasingly finding ourselves teaching language for and with technology. Are all of our students equally able to access the wealth of information and opportunities that the recent developments in technology have brought? If we change jobs, or even countries, will we be able to assume that our students have the same level of access?

Wikipedia (2005) defines the digital divide as

> … a social/political issue referring to the socio-economic gap between communities that have access to computers and the Internet and those who do not. The term also refers to gaps that exist between groups regarding their ability to use ICTs (Information and Communications Technologies) effectively, due to differing levels of literacy and technical skills, as well as the gap between those groups that have access to quality, useful digital content and those that do not (Wikipedia, 2005).

Although technological factors affecting access to computers for learning are well documented, fewer researchers have focused upon the economic, social, or cultural factors impacting a learner's ability to access computers for learning. The effects of the digital divide are apparent in both unequal access between nations of first and developing worlds, and within nations. In terms of teaching, Brown (2002) considers that:

> … the digital divide is the latest challenge in multicultural education's struggle toward closing the larger gap in equity and access to and outcomes from full participation in democracy among those with different combinations of cultural capital and economic standing. (Brown, 2002, p. 52)

This paper provides an overview of research into socio-cultural factors, and is concerned with access to computers for language learning in general. Implications and suggested solutions are also discussed, and a potential areas for further research have also been identified.

Benefits of Using Computers for Language Learning

Table 1 summarizes a selection of studies confirming the benefits of using computers to support second or foreign language learning. Given the potential value and importance of computer use in language education, the examination of issues of access becomes crucial.

Table 1. Studies confirming benefits of using computers to support second or foreign language learning

Area	Studies
Writing	e.g. Belisle, 1996; Choi & Nesi, 1999; Cunningham, 2000; Gonglewski, Meloni & Brant, 2001
Listening	e.g. Meskill, 1996; Hoven, 1999
Speaking	e.g. Kern, 1995
Pronunciation	e.g. Eskenazi, 1999
Reading & Vocabulary Development	e.g. De Ridder, 1992; Chun & Plas, 1996; Nikolova, 2002; Radi, 2002
Grammar	e.g. Collentine, 2000; Sotillo, 2000
Authenticity & Voice	e.g. Linder, 2000; Kramsch, A'Ness & Lam, 2000
Development of Intercultural Competence	e.g. Muller-Hartmann, 2000; Shulman, 2001; Belz, 2002; Belz, 2003; Hanna & de Nooy, 2003; Thorne, 2003

The pedagogical benefits of computer use reported in these studies include:

- Students in computer-based classes spent more time on tasks than in non-computer-based classrooms.
- Computer-based classes generated a greater number of interactions and more types of interactions than in non-computer-based classes.
- Participants in computer-based classes experienced increased access to and production of appropriate scaffolding from/for interlocutors than those in non-computer-based classes.
- There was a greater negotiation of tasks in computer-based classes.

- Learners increasingly made decisions about learning materials and ways to study with the materials in computer-based classrooms.
- Computer-based learning supported development of learner autonomy.
- Computer-based learning supported the development of cognitive and metacognitive skills.
- Computer-based classes supported production of a greater variety of text types.
- Participants in computer-based classes demonstrated greater retention of vocabulary.
- Participants in computer-based classrooms demonstrated better comprehension.
- Participants in computer-based classrooms experienced easier contextualization of grammatical forms vis-a-vis functional approaches.
- Participants in computer-based classes enjoyed increased access to authentic materials.
- Participants in computer-based classes displayed a greater ability and tendency towards exploring self through interactions and/or production of artifacts.
- Participants in computer-based classes demonstrated more critical and detailed representations of categories and information.
- Participants in computer-based classes created increasingly complex representations of self in interactions, leading to the development of voice.
- Learners in computer-based courses reported greater contact with and awareness of differing discourse styles in English used as a Global Language, as well as a developing awareness of cultural aspects of the target language community.

Role of Socio-cultural factors

The digital divide is caused in part by discrepancies in the availability or standard of technologies. Socio-cultural factors contribute to the digital divide in less obvious, but equally important ways. Bolt and Crawford (2000, in First & Hart, 2002) identify three areas in which access to computers for learning may be hampered:

> Access to this technology, around which much of our educational system is becoming based, is not equally available to all students, is not handled equally well by all educators, and is not equally useful to everyone in education as it is presently structured (Bolt & Crawford, 2000, in First & Hart, 2002).

The challenge of ensuring that all students have access to an equal range of computing power and functions for similar amounts of time both at school and at home leads to computers being unequally available to learners. Some factors relevant to this challenge include ownership of technology, access to the Internet at similar connection rates, access to similar programs for learning, and the development and provision of technological alternatives for physically or mentally-challenged learners. Much of the research on causes and effects of the digital divide in education has focused on this area.

The second area, in which Bolt and Crawford (2000, in First & Hart, 2002) identify the fact that technology is not handled equally well by all educators may point to the first two socio-cultural factors identified below: cultures of computer usage, and institutional factors. The final area identified by Bolt and Crawford (2000, in First & Hart, 2002), that "technology is not equally useful to everyone in education as it is presently structured," points to the final factors to be discussed below: identity; use of metaphor; ownership; appropriateness; cultural norms and expectations; and learner characteristics.

Socio-cultural factors affecting access

Socio-cultural factors are less obvious in considering issues of access to computers for language learning. It is obvious to any observer that if one student has good access to a computer with a broadband Internet connection and digital camera while another doesn't, then the second student will be less able to use online information or learning resources, or create interesting web-based artifacts to present their ideas and research. However, even providing two students with the same technology does not guarantee similar levels of access. An investigation of socio-cultural factors sheds light on possible reasons for this kind of discrepancy.

Cultures of computer usage

Cultures of usage may limit the variety of uses to which the technology may be put. In the educational setting, for example, teachers of sciences are more likely to incorporate computers into the instructional process that those in the humanities. This may be as a result of teachers of the sciences being required to incorporate computers into the curriculum, or the perceived usefulness of computer usage with the particular content area. However, it may also be as a result of differing teacher training techniques between the disciplines. Albion & Ertmer (2002) report a study by Becker which found that, of 4000 teachers in 1100 schools in the USA, those with constructivist pedagogical beliefs and practices as well as access to computers were likely to incorporate their use with their teaching, but the majority of teachers had not transformed their practices at all.

Institutional factors

Felix (2003) considers that:

> [W]hile the new digital technologies make a learning revolution possible, they certainly do not guarantee it. Early results are not encouraging. In most places where new technologies are being used in education today, the technologies are used simply to reinforce outmoded approaches to learning (Felix, 2003, p 147).

This is due in part to issues of funding, expertise and preconceptions of decision-making staff, and subsequent decisions concerning training (Davies, 2003). Each of these factors can restrict access to computers for students and teachers. Whether many computers are provided in labs or one or more are provided in individual classrooms is a decision made by institutions and impact upon the use of these technologies by teachers in their classes. The same is true of the method chosen for Internet access – whether

wireless or cable connections are available to faculty and students in classrooms and public areas, or only in computer laboratory settings. Decisions regarding the means by which computers will be introduced into schools are often made by bureaucrats with little knowledge of alternative models of education. Bureaucrats may also assume that teachers familiar with computers also know how to set up and teach computer-based classes, and may therefore not understand the need to schedule training sessions for staff.

Identity

Another factor influencing access is identity. Bolt & Crawford (2000, in First & Hart, 2002) note that minority students in the USA cannot identify with software or webpages since they are not represented by the images or content provided. This may be even more pronounced in non-North-American communities, where the individual's language and culture may, at best, be scantily represented. Examples of backlash to this can be seen in the varying responses to computer technology and language learning made by many indigenous groups around the world (McConaghy & Snyder, 2000; Auld, 2002; McHenry, 2002; Villa, 2002).

Students need the freedom to explore their developing identity in any language. Language teachers must be aware of issues of identity, and be prepared to validate each language and culture that students encounter. However, as a part of exploring identity in different languages and across cultures, being able to invent an online identity may allow the student to interact more freely (Freeman & Capper, 1999, in Felix, 2003).

Metaphor

The control of metaphor is another issue related to identity. The choice of metaphor in design and teaching is basic for access of individuals, groups, and communities. If the selected metaphor (e.g. *desktop*) is not salient to the user group, access will be limited or non-existent.

Metaphor is of great import in the exclusion or inclusion of groups or populations. In describing a situation or thing in terms of another, metaphors use the concrete in order to describe the abstract. Each metaphor highlights certain aspects of that which it is attempting to describe, whilst downplaying others. In so doing, it is both maximizing cognitive processing, and ignoring potentially important information about that which is so described.

Goatley (1997) notes the role played by metaphor in creating a sense of community. It is argued that those who understand the entailments of the metaphor will understand the concept for which it stands. Those who do not know the entailments will not understand, and thus will be excluded from the discourse. Our conception of reality, and the metaphors that we ascribe to it, are of unquestionable import in defining who we are within the environment in which we find ourselves, and how we react in it, including the models and means of discourse and action useful in that reality.

Computer interfaces rely largely on metaphors created in the context of business in the United States. Teachers need to be conscious of the metaphors which they are dealing with in the computer environment, and be prepared to explain both metaphors and entailments to enable understanding. Cross-cultural comparisons may prove helpful.

Metaphors from a largely white, educated, male culture are now being imposed on all who use computers. However, since these metaphors are not salient in all cultures, access may be restricted until they become meaningful to members of these other cultures. Often, members of younger generations are more easily able to adopt the metaphors of the new technology, but as this occurs, so does the adoption of an underlying reality of a politically, economically, and militarily powerful cultural group. Imposition of metaphors through technology opens up questions of cultural imperialism.

Ownership

Another factor, related to the two above, is ownership of language and culture. This factor is also related to identity. Lynch (2002), writing about offering language courses over the Internet, challenges developers to consider (a) whether courses should be written in the local language of the original course developer, or a "common" language shared by those accessing the course, and (b) what cross-cultural differences in interaction and communication may exist. A further question arises, since the local language of the original course developer may not be the target language.

The role of CALL in language revival, maintenance, and survival of indigenous languages is also of concern here. Reported approaches to teaching community language via computers in such diverse situations as Ndjebbana in Maningrida (Auld, 2002), and Navajo (Villa, 2002) reflect these concerns. McHenry (2002) describes the following issues arising from ownership of language and teaching online: community issues of empowerment in all necessary languages, maximizing communicative skills in languages, while balancing the teaching of culture, to achieve a balance in first and target language representation; the disparity between numbers learning different languages and resources available; and the accuracy of representation of indigenous languages and cultures by indigenous peoples, those claiming online to be an indigenous person or persons, and other groups with vested interests in the existence of indigenous language or culture, for example tourist agencies (See Saari Kitalong & Kitalong, 2000 for reactions against the latter in Palauan online literacy practices).

Cultural Norms & Expectations

Cultural norms and expectations also affect access, especially for women and girls, who have been historically marginalized from sites of power, including education. In regions where girls and boys study separately, computers may not be available in areas accessible by girls. Even in "wired" communities, women and girls tend to have less access, use different discourse styles (Rosetti, 1998), have different purposes in accessing technology, and contribute to interactions less than men and boys. However, Preston (1998) documents interactions in the online environment challenging the cultural norms dictated by traditional gender roles.

Cultural norms and expectations of education may also affect access. In cultures where education is traditionally directed from teacher to student, access may be affected if students do not understand or accept the alternative model being offered. Other cultural models or expectations of education may also affect student access in similar ways.

Appropriateness

A fifth factor, acting as bridge between metaphor, identity, ownership, and cultural norms and expectations, and the following factor, learner characteristics, is appropriateness. Auld (2002) describes the development of a project to provide talking books in Ndjebbana via a series of touch screens set up around the community, reporting on the development of the system, the reasons for choice of devices, the development of a bank of stories, the involvement of the community in collecting and narrating the stories, and the patterns of interaction which occur when stories are being accessed via the touch-screens. The project was an attempt to increase print-literacy in Ndjebbana, a language with only 200 speakers. This report makes clear that the selection of devices and means of using them must be appropriate for the target community in terms of ease of use and social interaction based on careful needs analysis and negotiation in order for the technology to be embraced by community members.

Learner Characteristics

Beatty (2003) explains that:

> [a] challenge to CALL is to create materials which encourage learners to shape their roles and working process ... Determining goals and priorities is a central concern of CALL because computer-based multimedia present a new pedagogical problem: too many materials ... learners must balance task completion with exploration ... but learners may be unable to manage their time properly" (Beatty, 2003, 163).

It is therefore necessary for language learners to not only learn language and culture, but also metacognitive skills, and CALL developers and teachers must be aware of, and train students to understand, metacognitive factors of learning. A part of this is enabling students to understand how learning styles and preferences may enable them to learn more easily, and how the management of learning is their responsibility. Skills of planning, information management and representation, time management, and reflection must be nurtured, so CALL environments need to encourage this.

Implications

A number of implications are clear within the context of this study. These are discussed in this section together with suggested instructional strategies to equalize access in the Japanese English as a Foreign Language (EFL) classroom.

Firstly, in terms of institutional factors, for successful integration of computers into the learning environment there needs to be a great deal of discussion between learners, faculty, and bureaucrats prior to decisions being made regarding the introduction of computers into any educational institution. Funding issues must be resolved vis-à-vis equal access for all subject areas, available space in existing classroom and common areas or the design of new dedicated areas for computers, the needs of students to be able to use computers for individual study, the needs of faculty to create and maintain online learning activities or environments, the types of software and hardware that will be introduced, and the necessity of training faculty and students to use the hardware and software provided. Furthermore, in terms of cultures of computer usage, all teacher education and training programs should require the

completion of courses relevant to both the use of technology in the classroom and constructivist pedagogies.

In order to address issues of identity, teachers need to be able to design a variety of task types in which the computer is used individually, cooperatively, or collaboratively for communication and problem-solving activities between as great a variety of people as possible. Just as there are textbooks specifically designed for use in the Japanese context, for example, the need also exists for online activities and learning environments to be developed for local contexts. Students should be encouraged to explore and share their reactions to global, cultural, and language issues as well as to the task they have completed. In the creation of activities and environments for learning, educators should, as far as possible, aim to use metaphors appropriate to their situation. In the event that a metaphor unfamiliar to learners is used, teachers need to be prepared to explain the metaphor and entailments, and encourage cross-cultural comparisons.

For encouraging "ownership" of language, implications for the Japanese EFL context may require, for example, learning resources for beginner level students to feature a glossary, a Japanese description of links towards which students are being directed, or Japanese language explanations for language features to which learners are being exposed. It may also mean that learners themselves should be encouraged to build a collection of resources, created by both native and non-native speakers in both Japanese and English, to support their own learning. These may be shared in the online learning environment, and may, in the case of intermediate and advanced learners, for example, include a Japanese explanation of corpus studies, a link to an online corpus, and examples of various genres encountered by students, along with their conclusions about the features of these, and examples of their own work in a number of genres. Such an approach would encourage all learners to build the kind of learning environment with which they are most comfortable, while being able to access materials as organized and conceived by others.

To ensure equal access considering cultural norms and expectations, teachers need to organize groups completing a task to allow equal time on the computer for each group member. Groups should be changed regularly to ensure the greatest number of different kinds of interaction possible, as well as the students being able to play a number of different roles in their groups. In regions where teacher-fronted lessons are the norm, instructors may find by beginning the term with mini-lectures followed by problems to be solved collaboratively by pairs or groups of students and responses critiqued by the instructor will lead students towards a more independent approach to learning. Instructors working within other cultural contexts will need to consider the most effective way of leading learners towards independence in the online environment in the planning of their course.

However, depending on the focus and goals of the course, as well as the cultural context, the appropriateness of the technology chosen must be determined. This leaves teachers in Japan with the question of which is the best technology to use with students to support learning. Mobile phones and i-Pods are two examples of technology which have been used in Japan to complement computer-based learning. What other devices may be appropriate?

Finally, because learners will need to acquire metacognitive skills to support their individual learner characteristics and extend and complement their learning styles within the computer-based learning environment, instructors will need to develop instructional strategies and materials to allow learners to understand the importance of planning their work, completing it to required levels within a reasonable time limit, and reflecting on the process. Evaluation rubrics are useful in allowing learners to gauge the level of involvement that will be necessary for them to successfully complete the task or unit. Learning metacognitive skills will also need to be understood as being a learning process, with students practicing the skills individually, cooperatively, and collaboratively.

Areas for further research

Any one of the areas outlined in this paper presents opportunities for further research in order to add to our understanding of how socio-cultural factors affect access to computers for language learning and how these may be resolved in any given context. Research needs to be conducted to determine how these factors interrelate to influence learning, and finally, research is necessary to determine which factors affect access to computers for language learning in Japan, how they are interrelated, and the extent of their influence, as well as determining the most effective instructional strategies to counteract the factors which are inhibiting access.

Conclusion

Computers offer an exciting opportunity for language teachers to support their learner's development. However, we must be aware of all factors limiting access to the technology for the individuals and groups we teach. More research needs to be done in this field to further our understanding of the interrelationships between factors and how these become manifest in different contexts both worldwide and locally.

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