E-learning: Issues and Choices

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Abstract

E-learning is becoming progressively more influential across the educational spectrum. Many schools and universities are instituting e-learning for students, some offering entire degree courses via the Internet. Developments in computer technologies have heralded a range of changes in possibilities both in the delivery of content and the implementation of methodologies, reflecting the situation vis-à-vis approaches to teaching that followed developments in audio and video content delivery systems. This paper outlines issues and choices that influence decision-making about the kind of e-learning program to be implemented.

As computers become increasingly fast and powerful, available, and mobile; interfaces more user-friendly; software more highly sophisticated; and students and faculty become increasingly familiar within the virtual environment, those involved in education are struggling with decisions regarding the best means in which to integrate computers into learning. However, the breadth of options for the utilization of computer technologies in education and the range of applications for which they may be used lead to conflicts of expectations and practice between school or program administrators, teachers, and students. These conflicts affect the choice of program as well as the ongoing success of any particular program once it has been implemented.

The choices are not easy; much depends on metaphors in which computer use is perceived, concepts of learning and teaching, the know-

ledge or skill set selected for e-learning focus, funding and other institutional constraints, as well as the skills and dedication of, and time constraints upon, those programming and managing the course. Success of an e-learning course is dependent upon a number of issues, including limitations of hardware and software; definitions of success and goals of the program; student access, confidence, and acceptance; teacher access, confidence, and acceptance; support for both students and teachers; and institutional factors.

The issues and choices described first in this paper determine the type of program to be implemented. Options for the type of program are constrained by these initial choices, which are, in many cases, invisible in the decision-making process. It is argued that these factors should be examined prior to the point at which decisions regarding e-learning programs are made and should continue to be considered in the ongoing evaluations of any program.

Metaphors of computer usage

Taylor (1980) identifies three metaphors of educational computer usage: *computer as tutor*, *computer as tool*, and *computer as tutee*. In effect, the first metaphor, *computer as tutor*, sets the computer as the teacher, delivering problem sets, answers, and tracking student participation and results of programmed tests. Some of these programs are developed enough to monitor student answers and deliver personalized tracks through the instructional program for each student. The second, *computer as tool*, describes student use of the computer to complete tasks, either individually or in groups. The third, computer as tutee, refers to teaching contexts in which students program the computer to achieve a predetermined outcome, such as demonstrating "understanding of Newton's Laws of Motion by writing 10– or 20–line programs to calculate and plot orbits" (Luehrmann, 2002, para. 5).

However, Luehrman (2002) suggests that in the USA

> Out of Taylor's trichotomy, teaching tool use is just about the only impact that computers have on schools. ... The computer as tutor (then called CAI) is today limited to a few useful keyboarding tutorials and some drill-and-kill programs. ... Similarly, the computer as tutee (programming) is limited to a tiny fraction of students aiming for careers in computer science. (paras. 1–3)

The situation is not as clear-cut in foreign language instructional contexts in Japan. Perhaps due in part to the importance of standardized tests such as TOEIC, as well as historic and cultural concepts of learning and teaching, the salient metaphors of computer use appear to be "*computer as tutor*" and "*computer as tool*."

Discussions to ascertain differences in metaphors of computer usage salient to those involved in the planning and implementation of e-learning are necessary prior to determining types of programs appropriate for the particular educational context.

Concepts of learning and teaching

Concepts of learning and teaching also influence the kind of program selected for implementation. Although there is a range of approaches apparent in educational contexts, behaviourist and constructivist theories underlie most. Behaviourist approaches to foreign language education in Japan manifest most often in grammar-translation and audio-lingual methodologies, although they may also be observed in some drama-based, content-based, Silent Way, or focus-on-form instructional techniques. Constructivist approaches may be observed in communicative, cooperative or collaborative problem-solving or task-based educational contexts. Recently, however, educational theorists have suggested that the most empowering concept of learning is that of complex learning, in which, through the collaborative actions of individuals and groups, learning

Table 1: How differences in metaphors of computer usage and concepts of learning influence choice of instructional tasks

	Computer as tutor	Computer as tool
Behaviourist	· Grammar drills · Vocabulary games · Typing practice	· Typing missing information into blanks on a form · Taking dictation · Downloading a podcast and transcribing and translating the contents
Constructivist	· Groups play computer simulation game and report what they have learned about the topic on a blog or class bulletin board · Groups access site dedicated to movie trailers for language education, complete the exercises, then report to the class about the trailer they have seen · Groups identify an error they usually make on a grammatical drill, research it, and search for other examples before presenting it to their peers.	· E-pal programs · Researching holiday sites, making posters, and reporting to classmates · In collaboration with peers in a different country, work to produce a webpage comparing and contrasting cultural aspects of the two countries · Groups identify a sentence structure that is often erroneously used in their work, research the grammar, and compile a list of correct examples from a corpus or other body of work, before presenting it to their peers
Complexivist	· Groups play computer simulation game and based on what they have learned about the simulation games, and with further research of the topic, create a game using a different scenario for widespread distribution	· Production of peer-reviewed magazines for distribution to the wider community · Collecting stories from a special group and creating a documentary or book for distribution to the wider community

outcomes and educational artifacts more complex than any possible through cooperation or individual effort may be achieved (Davis & Sumera, 2006). One example of this would be a student-produced peer-reviewed journal of academic writing for distribution to the wider community, which relies upon collaboration between authors, reviewers, editors, and layout personnel, as well as the supervising teachers and other staff of the academic institution involved in the endeavour.

Concepts of learning and teaching are deeply personal and rely on one's experiences as a learner and in extra-curricular and non-school activities, as well as teacher training and post-educational experiences. Although all involved in planning and implementing e-learning may assume that they share concepts of learning and teaching, this may not be the case, and discussions to ascertain differences and involving all stakeholders—including administration, teaching, and other support staff, parents, and learners—are necessary prior to determining types of programs appropriate for the particular educational context.

How choices of metaphor of computer usage and concepts of learning and teaching may interact to determine task options in e-learning programs is illustrated in Table 1. Clarifying these factors early in the planning process is, therefore, vital.

Knowledge and/or skill set(s) selected for e-learning

As is apparent in the example activities described in Table 1, decisions regarding the selection of metaphor of computer usage and concepts of learning and teaching lend themselves to different knowledge and/or skill sets. Shield (2000) notes that "often the rote learning of factual information is essential before a learner can be engaged in problem solving or higher order activities deemed more desirable" (p.74), which, in the case of foreign language instruction, would suggest that at least initial instruction of grammar, spelling, and vocabulary can usefully be supported by such e-learning programs. However, drills will not result

in improved research and presentation skills, for example, although research and presentation tasks may lead to noticing of salient genre features and, therefore, a deeper understanding of vocabulary and grammar. Mismatches between the knowledge and/or skill set(s) selected for e-learning, salient metaphors of computer usage, and the concepts of learning and teaching held by stakeholders may result in failure of the selected program in the educational context.

The question of the computing knowledge and/or skill set(s) selected for the foreign language e-learning class is also salient. While behaviourist approaches to instruction generally require lower order computing skills, constructivist and complexivist approaches incorporate a wider skill set and mix lower and higher order activities. I would like to use the following rather lengthy quote about technological fluency from Papert (1996) to illustrate the argument for introducing a broader computer skills set in the foreign language e-learning context:

> The way you get to be fluent in using technology is like the way you get to be fluent in French. Fluency comes from use. Being fluent in a language never comes from school-book exercises. It comes from struggling to express yourself in the language in a lot of different situations...being fluent with computers doesn't mean that you know everything. In fact good evidence of your technological fluency would be what you do when you don't know how something works. One of the powerful ideas of technological fluency is that there is no subject to which it cannot be applied. This is not surprising. Fluency in your native language allows you to discuss every possible subject; why should this not be equally true of technological fluency? (p. 28).

Or, in the words of Luehrmann (1980),

> To use that resource as a mere delivery system for instruction, but not to give a student instruction in how he[sic] might use the resource himself, has been the chief failure of the CAI effort. What a loss of opportunity if the skill of computing were to be harnessed

for the purpose of turning out masses of students who were unable to use computers! (p. 133).

Mayfield (n. d.) provides descriptions of a large variety of tasks with which educators are incorporating e-learning into collaborative approaches utilizing a range of computer knowledge and skill sets. The benefits of such approaches are outlined in Cho and Jonassen (2002), Fletcher (2001), Flynn and Klein (2001), Gilbert and Driscoll (2002), Hirumi (2002), Hung 2002a, (2002b), and Jonassen and Kwan (2001).

Funding and other institutional constraints

Institutional support is necessary for all e-learning initiatives in terms of purchasing decisions, funding, technical and logistical support, use of school facilities for meetings and classes, provision of necessary hardware, software, and support personnel, professional development for all involved staff, and change management. These issues may appear to be either routine or related more directly to program implementation, but careful consideration prior to deciding the kind of program to be adopted is essential.

For instance, purchasing decisions modeled on traditional practices involve a very few people selecting, for example, textbooks for all instructors to use in class. Although materials in behaviourist-based textbooks can be taught using constructivist principles and vice versa, the same is not true of computer-delivered programs, which may lead to mismatches as described in the section above. Additionally, funding new programs can be costly when similar results may be achieved using pre-existing hardware and software. Technical and logistical support, use of school facilities for meetings and classes, and provision of necessary equipment and personnel may add to the operating costs of the program. Professional development requires staff to devote hours of additional time to learning the program, and may necessitate weekly meetings with those who are uncomfortable with the the new system. Finally, e-learning

systems may not be confined to classes meeting at a specific time in a predetermined place, so change will occur across the institution as a result of the implementation of such a system. Change management systems must be in place to anticipate and identify such changes and to offer solutions as necessary throughout the process of implementation.

Crystal (2001), Eifler, Greene, and Carroll (2001), Lemke (2003), McCampbell (2001), and Polonoli (2001) offer guidance in the process of consideration of these issues in the decision-making stages.

Factors relating to teaching staff

Prior to deciding on the form that an e-learning program will take, an analysis of the skills of the teaching staff is necessary. A program of professional development may be necessary to enable staff to teach using the new e-learning program. Other support systems may be necessary, such as a peer-mentor program, so that all members of staff feel that they are competent to undertake the new duties required by e-learning.

An additional factor in foreign language programs is the selection of the language in which the program is offered. If it is offered in the students' first language, teaching staff who are not native speakers of that language may not be able to navigate the system, or may be disinclined to try. Extensive second language documentation and training may be required. If, however, the program is offered in the L2, students and L1 teaching staff my resist the environment.

However, even with consideration of the above factors, the success of any e-learning program will depend to a great degree on the additional demands in terms of time placed on already busy instructors and program administrators. This may be an especially relevant consideration with respect to adjunct staff in universities.

Defining and measuring success

Defining what successful implementation of a program is and how to measure whether the program is, in fact, successful according to the definition, is vital in the planning stages. Writing intended outcomes, how these will be tested, and measurement instruments will allow planners to be specific with requirements of e-learning and of the program to be instituted. Table 2 shows two examples.

Table 2: Defining and measuring snccess

Intended outcome	What to test	Measurement instrument
Learners will learn to type quickly to facilitate online work using typing program and games	Typing speed of 30 words/minute or higher	Typing program such as *Typershark*, available on Yahoo Games
Learners will spend at least 30 minutes/week completing required units	a) Student activity b) Student self-report records c) Any artifacts students are required to complete as part of the unit	a) Details of student log-in/log-off times, individual unit completion records, and keystroke/minute records b) Analysis of student self-report records c) Analysis of required artifacts

Student acceptance of and participation in the program

Student acceptance of, and participation in, the e-learning program is the major factor in determining success of the program. Although

e-learning generally increases student control over their learning environments, individual student characteristics are extremely influential in uptake and success of any given program, especially factors of student ability, passivity, motivation, and epistemological beliefs.

Student ability in content focus area, learning skill set, and computer use will influence how they use the e-learning environment, how much they use it, how often, and how useful they find it. Significant differences in acceptance of, and participation in, e-learning programs have been reported by Repman, Willer, and Lan (1993, in Hartley & Bendixon, 2001). Other issues of concern center on student access to computers and the Internet, including questions regarding how much time busy students may be able to commit to e-learning due to employment and social networking commitments, or who may share access to their computers with others.

Moreover, students who have encountered educational situations in which they are expected to be passive or dependant learners may not thrive in an e-learning environment (Jonassen & Wang, 1993; Lee & Lehman, 1993, both in Hartley & Bendixon, 2001). Such students require training and guidance in active, independent learning techniques including time management and goal-setting in order to support their first experiences in an e-learning environment.

Motivation continues to be an important area for research in educational contexts. It is not within the scope of this paper to conduct an in-depth investigation of motivation in e-learning environments, but it is necessary to acknowledge some related issues. As Song and Keller (2001) note, "students who are highly motivated before starting a CAI program will not always remain motivated throughout the whole learning process" (p.6), and the reverse is also true. Motivational levels are dependent on the interaction of a host of factors, and vary over time.

Song and Keller (2001) point out that, although research has suggested the necessity for including adaptive responses to changes in student motivation into computer assisted instructional contexts, to date "student

motivation to learn is disregarded or assumed to be embedded in the cognitively adaptive CAI" (p.6). Efforts to determine the ability of any e-learning program to monitor and respond to changes in student motivation, as well as the underlying models upon which these are based, should be underaken prior to decisions concerning adoption of a program. They also note the importance of conducting motivational analyses at strategic points throughout the program, although the use of student self-report through logs or learning journals may also be effective.

Other factors of student difference will also impact acceptance of and participation in the e-learning program. Tergan (1977, in Hartley & Bendixon, 2001) suggest that "individual learning prerequisites, like differences in learning goals, may override structural parameters of hypertext/hypermedia documents in affecting performance" (p.22). Investigation into such differences is necessary to assist in determining the type of program that will offer the greatest fit to learner prerequisites.

Moreover, Hartley and Bendixon (2001), suggest that self-regulation (i.e. how students use and monitor cognitive strategies in learning) and student epistemological beliefs (i.e. beliefs about what knowledge is and how it is learned), important in traditional learning environments, become more pronounced in e-learning environments. Schommer (1990, in Hartley & Bendixon, 2001) found that some student epistemological beliefs hampered student participation in e-learning, notably those who believed that they have a "fixed ability" to learn a subject, since for them, extra effort does not translate into added learning, as well as those who believe that "knowledge is the sum of simple facts," because they may view the extra links and activities to be extraneous to the body of knowledge presented in the text or on the main screen.

Such concerns should be researched and addressed prior to decisions being made about how an e-learning program will be implemented. However, it is conceivable that increasing familiarity with e-learning environments will influence degree of acceptance and participation of future students in the program. Research will need to be conducted

over time to establish if the e-learning program remains relevant to the current state of individual and group ability, passivity, motivation, characteristics, and epistemological beliefs.

Conclusion

This paper has outlined the issues and choices related to decisions regarding e-learning programs. It is essential to consider the implementation of e-learning not only as curriculum development, but as a measure towards increasing learner independence. Congruence with attitudes and expectations of all stakeholders is necessary for successful implementation of the program, and factors related to these will need to be considered prior to deciding on the program for implementation. Moreover, additional training of both staff and learners in hardware and software manipulation and issues concerning learner independence, such as goal-setting, will need to be conducted on a regular basis beginning prior to implementation. Ongoing evaluation of both the efficacy of the program and the suitability of the program for incoming future students will need to be undertaken to ensure learner acceptance and participation, and, therefore, program success.

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