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Editorial

Content is King?

Donald G. Perrin

Pursuit of knowledge is the focus of education. Acquisition of knowledge, modified by experience, is the basis of wisdom. Science and technology have led to an explosion of knowledge so great that abstracts, and more recently indexes, cannot keep up with the deluge of information. The "half life" of relevant information is decreasing daily.

Knowledge as we knew it early in the 20th century is drowning in a sea of redundancy, or it was until data processing, storage and retrieval with computers launched us into the information age. Just as the hand calculator replaced human skills in adding and multiplication, Google searches have made even the remotest knowledge accessible to all. Emphasis has changed from storing knowledge in our memory to accessing it from a machine. Computers speed up literature searches and broaden our opportunity to apply this knowledge for profit and pleasure.

Technology has not changed the role of scholars. They continue to research and adapt ideas to our changing world, but with greater speed and depth. For business, industry, government, military, health care, and community organizations, digital technologies have changed the very nature of work. Emphasis moves from acquisition to application of knowledge, and from knowledge for its own sake to critical thinking, analysis, problem solving and creation of new knowledge.

Rapid growth of colleges and universities has opened higher levels of learning to all who qualify. Traditional evaluation tools created by Stanford and Binet a century ago are not adequate to assess intelligence and skills of today's 6th grader let alone a12th grade student. The problem is compounded by the need to compare test results with previous years in a world that is forever changing. What is the impact of cultural diversity, television, computers, and interactive communication technologies? Do technology skills reduced the need for memorization and move emphasis from regurgitation to application and problem solving in a real world setting?

In times of crisis, people revert to goals and behaviors they considered successful earlier in life. "Back to Basics" and the "McGuffy Reader" continue to emerge in a world changing so rapidly that the solution becomes the problem. Are we preparing students for the world as we knew it or for a world that exists in the future? Is it prudent to prepare students using a curriculum and standards that reflect the past and are not relevant to the future?

Educators must collaborate with each other and colleagues in business, industry and government to explore the needs, goals, and substantive components for education in the future and design a future oriented curriculum to prepare world-class students. We need models of what a graduating student will need to be employable and successful. We must develop awareness to change, ability to adapt, and eagerness to explore, learn and apply new knowledge and skills.

The world into which we are moving demands intelligence and critical thinking skills. It favors teamwork and collaborative activities. Jobs for physical labor and unskilled workers (hands) are decreasing, and there is a growing need for persons who are technically and intellectually proficient (minds). Competition was once based on local standards. Modern transportation, television and the Internet have changed that. Today we live in a global world and preparation for our role in the workforce must be modeled on global standards. We will team with people from different nations and cultures in solving problems that are local and national, and problems that cross international boundaries and are global.

Academics have made an excellent first step to depose content as king by introduction of rubrics and portfolios to measure of performance. Additional research and development is needed.

Editor's Note: This is an evocative research paper about second language (L2) learning. Moving from one language to another has many ambiguities. There are psychological tensions between learning a language to read research and learning a language to communicate, exchange concepts and synthesize disparate concepts. Motivation to learn is imperative. The effectiveness of computer-assisted language instruction (CALL) may be determined by the purpose as well as the motivation of each learner.

Is there any Relationship between Motivation as an Advantage of Computer Assisted Language Learning (CALL) and Second Language Acquisition (SLA)?

Iman Tohidian

Iran

Abstract

Language is at the center of human life. It is one of the most important ways of expressing our love or our hatred for people; it is vital to achieving many of our goals and our careers; it is a source of artistic satisfaction or simple pleasure. We use language for planning our lives and remembering our past; we exchange ideas and experiences through language; we identify ourselves with people who speak the same language. Some people are able to do this in more than one language. Knowing another language may mean: getting a job; a chance to get educated; the ability to take a fuller part in the life of one's own country or the opportunity to emigrate to another, and an expansion of one's literary and cultural horizons. There are several factors that combine in a profile of a successful second language learner. Obviously, the motivation to learn is very important. Some second language learners do better than others because they are better motivated. Focusing on motivation, we are going to explore the relationship between Computer Assisted Language Learning (CALL) and Second Language Acquisition (SLA). The paper provides some data on the history of CALL and the theories behind the concept and the main focus shall be on the motivation, as an advantage of Computer Assisted Language Learning (CALL) and its connection with Second Language Acquisition (SLA).

Keywords: Computer Assisted Language Learning; Second Language Acquisition; motivation; integrative motivation; instrumental motivation; artificial intelligence; computational linguistics; student; teacher; computer.

Introduction

Computer Assisted Language Learning (CALL) can be defined as "the search for and study of applications of the computer in language teaching and learning"(1). Although earlier practitioners relied on acronyms such as CAI (Computer Aided Instruction), CAL (Computer Assisted Learning), CELL (Computer Enhanced Language Learning) and TELL (Technology Enhanced Language Learning), CALL is now widely regarded as the central acronym to refer to studies concerned with second language and computer technology. The main objective of CALL is to "improve the learning capacity of those who are being taught a language through computerized means"(2). Note that such a definition focuses particularly on language learning, not language teaching, while at the same time the use of the computer forces reconsideration of traditional stakeholder roles: learners and teachers have each had to adapt to demands and opportunities afforded by a range of new technologies. As with the broader field of applied linguistics, CALL can be located at the crossroads of a number of disciplines.

Levy (3) regards the studies in psychology, artificial intelligence (AI), computational linguistics, instructional technology, and human- computer interaction as primary influences. Although Levy

is aware that the area can be framed somewhat differently, he draws on these five cross-disciplinary fields to as a way to structure the knowledge base. While Chapelle in her extensive review (4) places CALL within six computer-related sub-disciplines: educational technology, computer- supported collaborative learning (CSCL), artificial intelligence (AI), computational linguistics, corpus linguistics, and computer- assisted assessment. Unlike Levy (1997), Chapelle argues that studies in human- computer interaction have had little impact on CALL and sees educational technology as a much more significant influence.

Major Theoretical Perspectives

Trends in CALL roughly parallel those in other areas of applied linguistics. Starting with the Structural and Behaviorist models that manifested in audio-lingual approaches to language learning, CALL educators then explored aspects of communicative approaches to language learning. Socio-cognitive theories of instruction are now an integral part of CALL. Table. 1 summarizes key aspects of CALL over 30 years. This table provides a way to organize the rather fluid categories that characterize the development of CALL.

Table 1

Key aspects of theoretical perspectives in CALL

	Structural CALL (1970s- 1980s)	**Communicative CALL (1980s- 1990s)**	**Integrative CALL (twenty- first century)**
Role of the computer	Information carrier; as a tutor	Workstation; as a pupil	Unified information management system; as a toolbox
Technology focus	Materials delivery	Cognitive augmentation	Group orchestration
Theory of learning	Behaviorist	Information processing theory; cognitive constructivist learning	Sociocultural theories of learning
Model and process of instruction	Programmed instruction; assimilation	Interactive, discovery-based learning; interaction	Collaborative learning; intra-action
View of second language acquisition	Structural (a formal system)	Cognitive (a mentally constructed system)	Socio- cognitive (developed in social interaction)
Dominant approaches to second language acquisition	Grammar translation & audiolingual	Communicative language teaching	Content based; specific purposes
Learner status	Dependent	Independent	Collaborative
Principal use of computers in CALL	Drill and practice	Communicative exercises	Authentic discourse
Principle learning objective of CALL	Accuracy	And fluency	And agency
Primary research concern	Instructional efficacy, instructional competence	Instructional transfer, learner proficiency	Instruction as enacted practice, team coficiency

Source: Based on Warschauer (2000a), with Crook (1994), Koschmann (1996), Ullmer (1994)

Practitioners in the era of structural CALL placed a strong emphasis on grammar and they employed the use of mainframe computers to help students gain accuracy in their language usage. Grammar Translation and Audio Lingual methods, grounded in behaviorism, went hand in hand with programmed instruction. Students were able to repeat drills with the seemingly tireless and patient computer-as-tutor, and instruction appeared to be at an upmost efficiency. Crook (5) sees the tutorial metaphor as a central preoccupation in the "computer-assisted instruction" (CAI) tradition of educational technologies. The goals of CAI developers were centered on making responses uniquely fitted to individual learner needs and delivering helpful, customized feedback through "intelligent tutorial systems."

Crook (6) examines the tutorial role of computers and the popularity of drill exercises. First, he notes, computers never truly became "intelligent" because of the inherent difficulties in constructing algorithms that could sensitively respond to learner profiles. At the time, the sophisticated hardware needed to attempt this goal was available almost exclusively in military and industrial training contexts. Nonetheless, Crook writes, tutorial drills have a continued appeal to educators for two reasons:

> 1) Teachers uncomfortable with innovative uses in technology "may well adopt the comparatively easy solution of focusing their commitment on straightforward, self contained programs"(7); and
>
> 2) Many instructors feel that repeated exposures to certain practices and structures are beneficial to students.

Crook's observations can be applied to the CALL context. Indeed, Decoo and Colpaert(8) point out that there is "a mass of learners who are deeply embedded in fixed educational structures and who are asking for and welcoming effective forms of tutorial CALL matching those structures."

They urge researchers to re-evaluate the role of the computer in drills and practice for classroom activities which are time-consuming and repetitive.

Richmond (1999) argues that a true picture of CALL resembles a split between "dedicated" and "integrated" streams. Much more widely practiced, "dedicated CALL" largely consists of using stand-alone programs to drill and practice items of grammar, vocabulary, and syntax. Richmond argues that the complexity and costs of software, as well as a host of technical problems, has shied teachers and students away from more integrated uses of the computer. The popularity of "dedicated CALL" has prompted researchers to continue to develop increasingly sophisticated tutorial applications that aid vocabulary acquisition, improve the writing in character-based languages, and build sustained interactions with target materials (e.g., Hamburger, Schoelles, & Reeder, 1999). Over the long term, Richmond predicts, the increased ease of software use and greater access to networks will bring the "dedicated" practices closer to "integrated" ones.

Following an overall shift in teaching methods aligned with cognitive constructivist theories of learning, practices in communicative CALL sought to help students develop their own mental models through use of the target language. Exercises were designed to guide meaningful peer interactions and promote fluency, listing (1991), created a series of task-based CALL activities to promote productive email exchanges between ESL students at two Canadian universities. In these activities, for example, students were directed to describe photographs, give directions, or express an opinion. The role of computer software was to help deliver visual materials for description, process word documents, or provide interactive simulations.

In another project, Abraham and Liou (1991) studied the spoken language of learners at workstations to compare the talk elicited by different types of computer applications and to see if the talk was more useful and productive than would otherwise be the case in non-computer

situations. In their conclusion, they report that the talk elicited by the different programs did not vary widely, nor was it significantly different than in non-computer situations.

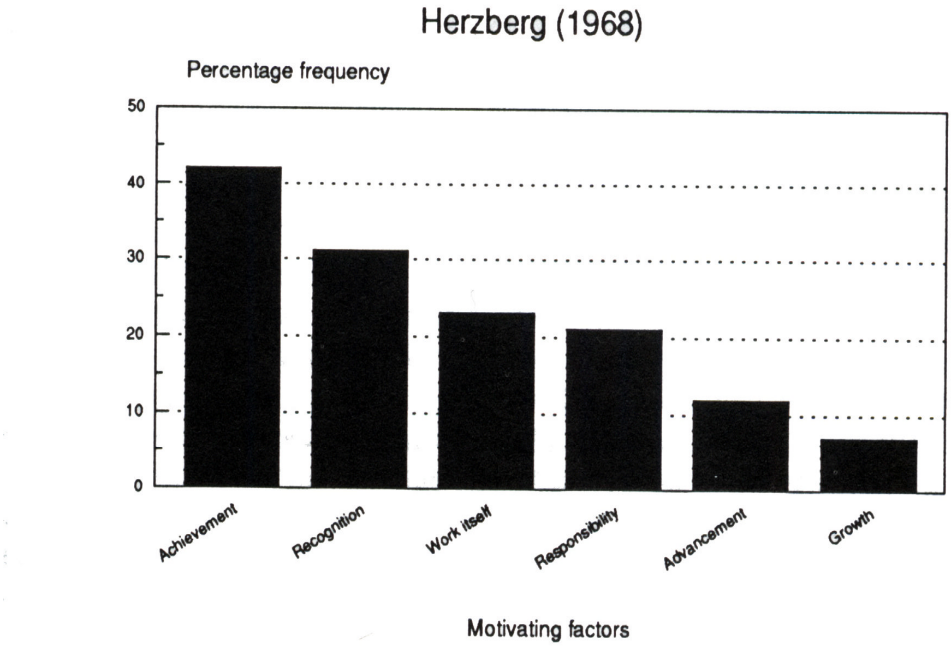
Integrative CALL seeks to make full use of networked computers as a means to engage learners in meaningful, large-scale collaborative activities (9). Instructors promote close ties between learning processes, objectives, and a student ownership of the outcomes. As with mainstream computer-supported collaborative learning (e.g., Bonk & King, 1998; Koschmann, 1996; Land & Hannafin, 2000), meaningful interaction and authentic project work are highlighted. Authentic discourse provides the basis for learning material. Students are taught techniques in online publishing, and are urged to produce their own texts. Fostering learner agency or "the satisfying power to take meaningful action and see the results of our own decisions and choices" (10), is a primary goal of integrative CALL. The key distinction between communicative CALL and integrative CALL is that, in the former, learner choice and self-management of activity are driven by task-based approaches to syllabus design. At its most liberal interpretation, a syllabus in integrative CALL simply represents a "dynamic blueprint" where learning occurs through "accidents" generated by projects (11). In contrast, a syllabus in communicative CALL is likely to be discrete and related to a set of curricular guidelines that have been defined in advance of learner needs (12).

In practice, however, the realization of integrative CALL may lie beyond the realm of language learning institutions constrained by a lack of resources, embedded teaching practices, and large class sizes. Such is the case in adult migrant education centers in Australia, for example (Taylor & Corbel, 1998) or in educational centers in South Africa (13). At such sites, students are generally directed to access online materials alone, teachers are not free to alter a syllabus based on established curriculum guidelines. Students may not have the means to make use of the Internet outside limited class times.

Motivation and Computers

It stands to reason that if CALL is enjoyable and perceived as useful, the introduction of the computer into the learning situation will have a beneficial effect on attitudes. In Krashen's terms, the Affective Filter will be lowered and this will promote acquisition. As far as motivation is concerned, the use of computers is more likely to affect day-to-day effort than basic motivation. The learner's ultimate goals in learning the language will probably remain the same whatever the CALL experience so that the question of whether the learner is obeying instrumental or integrative motives, assuming the distinction is justified, can be regarded as irrelevant.

What motivates people is clearly of interest in any context in which one set of individuals is trying to get another set to do something; from marketing to politics, from the workplace to the classroom. Motivation has consequently been the subject of a considerable number of studies, both empirical and theoretical. Some of the findings have challenged preconceived ideas as to how best to persuade people to throw themselves enthusiastically into whatever it is you want them to do. For example, an empirical study involving nearly 2000 employees, in a range of American businesses, found that the biggest motivators were achievement and recognition, with salary level featuring only in a negative sense; a poor salary can cause dissatisfaction, but salary in itself is not a motivator (14); see Figure 2. If these findings can be carried over into a CALL context, and there is every reason to suppose that they can, it is clear that targeting the learners' needs for achievement and recognition is likely to be an effective way of maximizing learner motivation. For example, the use of the computer's word processing capabilities in promoting writing skills, can help the learner produce a more polished and presentable script, thus increasing the likelihood that they will get a sense of achievement from their work.



Source: Computers and Language Learning (M. –M. Kenning and M. J. Kenning)

Psychological studies into motivation of a more theoretical nature have also been carried out. According to Brown (16), motivation is commonly presented by psychologists as being underpinned by six needs:

1) The need for exploration, for seeing 'the other side of the mountain', for probing the unknown;
2) The need for manipulation, for operating - to use Skinner's term - on the environment and causing change;
3) The need for activity, for movement, exercise, both physical and mental;
4) The need for stimulation, the need to be stimulated by the environment, by other people, or by ideas, thoughts, and feelings;
5) The need for knowledge, the need to process and internalize the results of exploration, manipulation, activity, and stimulation, to resolve contradictions, to quest for solutions to problems and for self-consistent systems of knowledge;
6) Finally the need for ego-enhancement, for the self to be known and to be accepted and approved of by others.'

These are mostly needs that computers, thanks to their unique features, can help satisfy. It gives computers an in-built capability to induce task-oriented motivation, and this can be used to sustain the learner's inner drive and help prevent overall motivation from flagging. What is required is good courseware and the elimination of hardware and software hazards.

The question of learner motivation is investigated further by Malone, using computer games as a particular 'source of insight for designing intrinsically motivating instructional environments'(17). In a comprehensive study embracing a review of previous theories, and an analysis of experimental data drawn from a survey of the responses of 65 schoolchildren to various versions of a range of computer games, Malone seeks to discover

1. Why are computer games so captivating?
2. How can the features that make computer games captivating be used to make learning - especially learning with computers - interesting and enjoyable? (18).

While it was observed both that there were large variations between individuals in the kinds of game they enjoy, with no one game standing out as everybody's favorite, and also that there were variations between boys and girls preferences, and between older and younger children, nonetheless, Malone reports 'indications of the kinds of features that arc important in general', particularly 'the importance of having a goal' (19). This tends to confirm our own observations, based on limited feedback received from users of the A vous la France suite, reported in M.J. Kenning (1986a).

When designing these programs we deliberately set out to include a range of different styles, and, in particular, to incorporate a strong competitive element in some programs but not others. We found that users from a less pedagogical background tended to react more favorably to those units with a competitive element: they reported the feeling that they couldn't see the point of exercises which do not come to some kind of competitive climax. Whether such limited observations are of a wider validity, and whether they stem from cultural reasons or are due to the way computer activities have traditionally been constructed hitherto (have people simply become conditioned to expecting computer activities to consist of high-speed tests of hand-eye coordination?), are clearly questions of considerable interest in an educational context, as stressed by Malone. He cites three main factors common to games with a high rating in his survey: challenge, fantasy and curiosity. He goes on to suggest a framework of techniques to enhance these features and thus improve the appeal of a piece of software. For example, under the heading of challenge, is listed the need to build in a variable difficulty level, so that the user can select a level appropriate to his or her skill: this avoids the situation of putting the user off with an impossibly difficult, or trivially easy, task, and also allows the user to improve over time. Malone suggests that those games which do not incorporate such a feature would benefit from its inclusion. Incorporating a timer of some form into CALL programs is one possible way of implementing this recommendation.

Motivational attitudes to the computer can also be influenced by hardware considerations. For instance, cassettes have fortunately all but disappeared as a storage medium for software; the length of time it used to take to load programs from tape, when they were in common use, was certainly a strong disincentive to using the computer. On the whole, hardware is remarkably reliable. It is true that demonstrations are sometimes marred or even ruined by machine problems but the cause usually lies in some difference between the apparatus the software is normally used with and that available for the occasion. Breakdowns are in fact fairly rare and faulty hardware is something the ordinary user is unlikely to suffer from. Faulty software is more of a problem. It may be due either to the fact that program bugs can remained undetected for a long time or to some production defect. The only effective safeguard is good validation in the first case and efficient quality control in the second.

Motivation and Language:

Motivation is another characteristic that varies considerably across Second Language (L2) learners. The commonsense view is that motivated language learners, who are willing to devote more time and energy to achieving fluency in the target language, are more successful. Some researchers have even claimed that motivation is the single most important individual difference impacting on SLA. Motivation is not monolithic, however; it is a complex, multidimensional construct. Studies making use of Robert Gardner's socio-educational model of motivation have focused not only on integrative aspects of motivation (involving the learner's attitudes towards the

target language group and the desire to integrate into the target language community), but also on instrumental orientations, which refer to more practical reasons for language learning, such as gaining some social or economic reward through L2 achievement. Distinctions have also been made between extrinsic and intrinsic bases of motivation. Although SLA researchers are still debating whether motivation causes language learning (e.g. by putting learners in contact with more input) or whether success in language learning gives rise to motivation, some recent studies do suggest that motivation helps to predict the level of proficiency that an L2 learner ultimately attains. Studies also show that motivation can change during the learning process, varying from day to day and even from task to task. A learner's motivation additionally appears to be affected by such factors as group dynamics, the learning environment, and even the learner's conversational partner's motivation. So, Second Language Acquisition research views motivation as a key factor in second language learning. There have been differences, however, in the way in which teachers and researchers have typically conceptualized motivation (20). In an attempt to characterize a non-theoretical view of motivation, Skehan (1989) puts forward four hypotheses:

1. The Intrinsic Hypothesis: motivation derives from an inherent interest in the learning tasks the learner is asked to perform.
2. The Resultative Hypothesis: learners who do well will persevere; those who do not do well will be discouraged and try less hard.
3. The internal Cause Hypothesis: the learner brings to the learning situation a certain quantity of motivation as a given.
4. The Carrot and Stick Hypothesis: external influences and incentives will affect the strength of the learner's motivation.

Conclusion:

Generally speaking, the use of technology inside or outside the classroom tends to make the class more interesting. However, certain design issues affect just how the particular tool creates motivation. One quantifiable benefit to increased motivation is that students tend to spend more time on tasks when on the computer. More time is frequently cited as a factor in achievement. The commonsense view is that motivated language learners, who are willing to devote more time and energy to achieving fluency in the target language, are more successful. Some researchers have even claimed that motivation is the single most important individual difference impacting on SLA. Motivation in second language learning constitutes one of the most fully researched areas of individual differences. The bulk of the research, however, has focused rather narrowly on integrative and instrumental motivation, relying almost exclusively on self-report questionnaires and correlational designs. Little work on motivation as intrinsic interest has taken place. Also, little attention has been paid to the effect of motivation on the process of learning. But what we discussed here was the importance of motivation which is one of the advantages of Computer Assisted Language Learning (CALL). CALL creates a more motivated class, resulting in better language learning, especially Second Language Learning (SLA).

End Notes

1- (Levy, 1997, p. 1)
2- (Cameron, 1999a, p. 2)
3- (1997, pp. 47-75)
4- (2001, pp. 27-43)
5- (1994, p. 12)
6- (1994, pp. 13-16)
7- Crook (p. 14)
8- (1999, p. 56)
9- (Debski, 2000; Warschauer & Kern, 2000)
10- (Murray, 1997, p. 126 cited in Warschauer, 2000b, p. 524)
11- (Barson, 1999)
12- (Corbel, 1999)
13- (Oberprieler, 1999)
14- (Herzberg, 1968)
15- (1981, p. 122)
16- (1981, p. 122)
17- (Malone 1981, p. 340)
18- (Malone, 1981, p. 334)
19- (Malone, 1981, p. 343)
20- (see Crookes and Schmidt 1990)

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About the Author

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Editor's Note: This paper identifies profound cultural differences that provide dissonance in the learning process. It also shows how language combined with teaching and learning styles impact learner behavior and academic success. This intriguing article is made moreso because of the author's acute analysis of her own culturally imprinted learning style. It has implications across whole realms of interactions world wide.

Problems of Distance Education Materials from the Perspectives of Japanese Learners

Mitsuko Maeda

Japan

Abstract

This paper examines the problems of distance education materials in the UK from the perspectives of Japanese learners. It aims to provide course designers in distance education with information to improve the study materials for overseas students, particularly Japanese learners. Self-reflection was used to examine the problems. This paper identifies and discusses two aspects of difficulties for Japanese students learning from distance education materials: language construction and learning style. Some recommendations are made for mitigating these difficulties and to accommodate the Japanese learners in the UK distance education programmes.

Keywords: Distance education materials, Japanese learner, learning style, language construction, UK distance education, cultural difference, self-reflection, campus-based learning, distance learning, overseas student, course book.

Introduction

Many western academic institutes have been opening their door to Asian students. However, it is not an easy task for foreign students to adapt to the different learning environment. While many Asian students are required to make an effort to adapt themselves to the foreign academic way (Henderson, Milhouse, & Cao, 1993; Liu, 2001), it is strongly suggested that western academic staff should be required to understand socio-cultural variations and to respond to overseas learners (Carroll & Ryan, 2005; Cortazzi & Jin, 1997; Robert Harris, 1995; Li & Kaye, 1998; Scherto, 2007). Indeed, this issue has arisen not only within campus-based education, but also in distance education, and study materials that are more sensitive to learners' cultural background are increasingly called for (Allen, 1993; Matthew, 2006; Simon, Parboteeah, & Yushan, 2004).

This paper responds to this call, critically examines the study materials of a distance education programme in the UK and makes some recommendations to accommodate overseas learners, particularly Japanese learners. The paper starts by describing the aim and approach of this research. Then, findings and discussion are presented, followed by recommendations.

Aim

The major aim of this paper is to provide course designers with information to improve study materials for Japanese learners. There were three objectives:

1. Identify parts of the materials that Japanese learners find difficult.
2. Identify and analyse reasons why Japanese learners experience difficulties.
3. Suggest ways to reduce or eliminate these difficulties.

Approach

Researcher's self-reflection

Learners' self-reflection is widely recognised as a powerful instrument in educational research and the improvement of educational programmes (e.g. Catherine, 1999; Jackie, 2006; Richard, 2005). A researcher's self-reflection and experience is also acknowledged as significant research data (Bell, 1998; Lewis-Beck, Bryman, & Liao, 2004, p. 890; Potts, 2007). Based on such recognition, this study is largely based on the author's personal experience as a distance learner, with reference to her campus-based learning experience both in Japan and in the UK. She was familiar with both Japanese and British teaching and learning styles and academic environments because she obtained each of her two MA degrees in Japan and the UK. While it is acknowledged that her experience could not be all-encompassing, her background in the field of education helps to provide a generalised concept to identify the different aspects of British and Japanese learning styles and identify the problems which arise from them. It should be noted that provisional generalisation from a single case study should not be underestimated in scientific inquiry (Evers & Wu, 2006; Stake, 1995).

In this research, the author studied the materials and attempted to find out difficulties that could exist, all the while assuming that she was a Japanese distance learner with no experience of studying in the UK. She kept a learning diary for three months, employing Race's (1992, p. 81) approach. She noted her impression in each section of the course book with evaluation adjectives such as clear, readable, irritating, longwinded or difficult. Later, this impression was analysed, with particular focus on the negative adjectives. It is recognised that, like other self-evaluation studies, this method might not lead to an appropriate evaluation fitting all study programmes. Her observations and reflections were not conducted as systematically as predefined criteria would require. However, this method provides initial data to guide design of effective study programmes targeting overseas customers, particularly Japanese students.

Materials

The University of London External Programme offers an MA and Postgraduate Diploma in Distance Education to distance learners worldwide. This research focuses on one unit from the study materials which was developed by the International Extension College and used since 1997. The examined unit was, Unit 15: Industrialisation and the Human Face, written by Tony Dodds from Course 2: The development of distance education.

Since the research was concerned with the effective interaction between a British teacher and a Japanese student in distance education, the topic 'Industrialisation and the Human Face' was chosen for these course materials. This topic discusses the issue of industrialised education through distance media and identifies drawbacks in that human contact between teachers and students does not exist. The materials studied in this research were two items: a course book, and a set reader including 6 articles.

Findings and Discussion

Broadly, the difficulties in the study materials were identified in two areas: (i) language construction and (ii) learning styles.

Language Construction

Competence in the English language is essential to study in the UK and the lack of it is the cause of considerable difficulties for many students (Cammish, 1997, p. 149-152). However, compared to campus-based education in the UK, there are some advantages to distance education for the non-native English learners, in terms of language skills (Allen, 1993, p. 15).

The author experienced that, in a conventional (i.e. a typical campus-based) university in the UK, lectures and group discussions were often stressful events. It was sometimes difficult to follow what native speakers said, as they often used rapid, unfamiliar and non-standard English. Once she missed the lecturer's words, she had little chance to listen to the same words again. When she tried to say something and made sentences in her brain, the lecturer had already moved on to the next topic. She was afraid to make a mistake in asking questions and she chose to keep quiet so she would not be seen as an incapable student in class. She believed that many Japanese students might have similar feelings.

On the other hand, in distance learning, she would feel free from such stress because she was not required to have direct verbal interactions with people. She could read the text over and over many times, until she could understand. She felt that distance learning materials were effective for getting information and would help to avoid unwanted stress. In some cases, distance learning could be more effective than campus-based learning for Japanese students whose language skills were not sufficient.

Even though distance learning might be easier than campus-based learning for the less language-proficient students, distance education materials are not always easy-to-use for non-native English speakers. Even native learners find the language difficult in some educational materials.

In order to examine this point, the level of difficulty in reading the study materials was analysed (the course book and the set reader). Indeed, many scholars indicate the significance of readable prose in relation to the ability the learner to understand the materials (e.g., Lewis & Paine, 1985; Rowntree, 1994). The following segments discuss how the readability of the texts is measured. This is followed by analysis of the elements that affect readability.

Measurement of Readability

The difficulty level (i.e., readability) of the text in the course book was measured by two methods: (i) Cloze Test and (ii) Fog Index. From the text, the author identified two blocks of sentences which she found difficult to understand and they were labelled as Section A and B. Also, she identified two blocks of sentences which she did not find difficult and labelled them Section C and D. Each Section consisted of 4-5 paragraphs.

The Cloze Test

The method of the Cloze Text is suggested by Lewis and Paine (1985) as follows:

- Take a 250 word long text and delete the 36^{th} word and then every tenth word thereafter (e.g. 46^{th}, 56^{th}, 66^{th}, ... , 226^{th}).
- Ask someone to provide the 20 missing words.
- If he/she fails to provide the correct word or a totally acceptable alternative in at least 13 cases out of the 20, the text would be considered to be too difficult.

A paper test of Sections A, B, C, and D was prepared and ten Japanese students and five English native speakers were asked to try it out. It should be noted that the competence in English of the ten Japanese students satisfied the course entrance requirement. That is, their International English Language Testing System (IELTS) scores were above 6.0.

The results (the medium values of the numbers of words that they failed) were as follows:

Japanese…A 16, B 15, C 14, D 15

English … A 13, B 12, C 12, D 11

Although the number of research participants was limited, results show the text was at the right level for the English native speakers, but Japanese students were not comfortable with the text.

The Fog Index

Rowntree (1994, p. 141) introduces the Fog Index as a measurement of readability. It is calculated as follows:

Fog Index = [(The number of words / the number of sentences)
+ (the number of three or more syllable words
× 100/ the number of words)] × 0.4

According to Rowntree, if the Fog Index is more than 12, the text is too difficult for many readers.

The results calculated for sections A, B, C, and D, were:

A= 17.7, B = 17.5, C = 21.0, and D = 17.8.

As a control, the Fog Indexes of three articles in the Guardian, a major British newspaper, were calculated. They were, 14.5, 19.6, and 17.8.

We may say that the readability of the text in the course book is nearly the same as that of a newspaper. Although Rowntree (1994) suggests that a text whose Fog Index is above 12 is difficult for many readers, there is fairly general agreement that a newspaper is not difficult for general English speakers. Therefore, perhaps, the readability of the course book is appropriate for the English students, but not for the Japanese students.

It is acknowledged that the results of these two tests cannot be generalised because of the limited number of tests and these tests themselves are a blunt instrument, as Race (1992, p. 100) points out. For example, the author's perception of the readability did not always agree with the results of the test, as shown in the Fog Index test on Section C. Moreover, it can be said from the tests that some parts of the text are not easy for Japanese students to read.

Elements of Readability

As shown above, some parts of the reading materials may be too difficult for Japanese learners. Many scholars point out elements that affect the readability of materials and give guidelines to improve them (e.g., Lewis & Paine, 1985; Rowntree, 1994). This section looks at some of the elements that can be altered and thus improve readability: paragraphing, sentences, writer's voice, and reading guide.

Paragraphing

One element that makes text difficult is paragraph structure. According to Lewis and Paine (1985, p. 56), each paragraph should be one idea, usually introduced by the first sentence, and the maximum length should be about 5-7 lines assuming 13 words to one line.

Most paragraphs in the course book were in accordance with this guideline. The researcher could read these paragraphs without any difficulty. However, some parts failed to satisfy these criteria. For example, Section A, which was pointed out earlier as difficult text, consisted of two 12-line paragraphs, each of which failed to provide a clear point.

Sentences

Lewis and Paine (1985, p. 56) suggest that writers should make an effort to restrict sentences to a maximum of 20 words. However, in the text in the course book, there were some sentences that disturbed the author's understanding due to their length and complexity. For example, one sentence was 70 words long. Important information was highlighted as boldface words and letters. Another sentence was 50 words long with tangled clauses and phrases that made this sentence's meaning unclear.

Writer's voice

'Reader-friendly' writing also affects readability (e.g., Rowntree, 1994, p. 139). For example, the 'voice' of the writer is a plain speaking or conversation style using the word 'I' as an author and 'you' as a learner. This text is written in a personal voice, as the writer Dodds (1994, p. 76) himself says in the course book. The author felt that there was a teacher in the text rather than a computer.

Sometimes this speaking style can affect readability in a negative way if inserting a writer's voice makes sentences more complex. For example:

> There is no doubt that we must beware of becoming too closely tied to individual definitions of these terms: no learning can be completely independent of other people or of outside influences - *thank goodness*; and technology is increasingly giving us new opportunities to interact without direct face-to-face contact (Dodds, 1994, p. 72).
>
> But the dilemma remains, and, *I am sure*, will remain, for planners of distance and open learning: How much of our resources should be devoted to the distance media? (Dodds, 1994, p. 72)

As shown, the colloquial expression 'thank goodness' or 'I am sure' stopped the flow of the sentences. Therefore, although the speaking style was effective to improve the readability, it may cause, rather than solve, comprehension problems for some students.

Reading guide

Generally, assigned reader articles are not written with the intention of being used as distance education materials. Quite the contrary, they often use complicated, vague and abstract words or sentences. One way to solve this problem may be to change these articles into good teaching materials for use in distance education through, for example, editing to the text, as Melton (1990) suggested. Alternately, the course book should provide the reading guide, such as outlines, summary or how to read. Also, Nathenson (1979, p. 104, p. 108) pointed out that advice on how to tackle the course material was a significant aid to improve study comprehension.

In this course book, useful reading guides were provided to the author in order to read 6 articles in a set reader. For example:

- **How to tackle**… 'As the article is quite long, I suggest you read it in two parts: first read pages 16-23, up to...'(Dodds, 1994, p. 71)
- **Summary**…' This article has come to be recognised as an important statement of the problems posed, …'(Dodds, 1994, p. 71)
- **Introduction**…'A more detailed analysis of this problem can be found in chapter 24 of your set reader.' (Dodds, 1994, p. 74)

Learning Style

> While language skills are very important, the major problem for students has less to do with difficulties in language skills than with ways of studying. Students may simply not understand what is involved in writing, thinking and talking in the UK, particularly at postgraduate level (Todd, 1997, p. 176).

As shown in the above statement, in addition to the language difficulty overseas students, including Japanese students, face difficulties in coping with the different teaching and learning styles used in conventional universities in the UK (Woodhall, 1989, p. 107-108). As seen in campus-based learning, the same problems are found in distance learning (Allen, 1993). This

section discusses the difficulties in terms of three features of different learning styles: result versus process, single solution versus multiple solutions, and hierarchical versus horizontal relations between teachers and students.

Result versus process

The first feature that is different between Japanese and British learning styles is emphasis on the point of learning, that is, a result or process, as shown in the following example.

One of the unnecessary activities for this author was to answer leading questions in the course book. The author found that leading questions were typical of the British academic style. The purpose of this activity is to guide learners to answer in a certain way before getting into a topic. The answer is normally described in the following section or page. Without this activity (process), learners can easily achieve this purpose (result).

Like the author, Japanese learners might regard this kind of leading questions as a time wasting activity, because it is generally known that our expectation of teaching style is product-oriented while the British expectation is in problem-solving. In other words, a teacher provides unquestionable knowledge in Japan; but a teacher raises argument and discussion in the UK (R. Harris, 1997, p. 42; Macrae, 1997, p. 141). Japanese learners might not be accustomed to engage in process-centered activities.

Single solution versus multiple solutions

The second feature of difference is the way in which the answer is sought, that is, single solution or multiple solutions, as in the example below.

In the course book, there were questions that gave the author confidence to answer. They were "which" and "what" questions. On the other hand, there were questions to which the author was unable to answer in a straightforward manner. They were "how" questions. The former questions had one relatively clear answer, but the latter ones had many answers the learners can give. When answers were diverse, the author could not have the same level of confidence in her answer.

This feeling might be explained by Cortazzi and Jin (1997). According to them, the Japanese students tend to seek one correct answer, whereas most British see that only one correct answer is too limited. In other words, the Japanese approach is a 'dualistic' one, in which there are right and wrong answers to everything, the British approach is a 'relativistic' one in which all knowledge is relative but equally valid (Jaques, 1995, p. 46). Indeed, such different attitudes towards knowledge can be measured by the Uncertainty Avoidance Index, which shows the degree of the aversion to unknown or uncertain situations. Japan is ranked 7th out of 53, while the UK is ranked 47th (Hofstede, 1994, p. 113). Thus, generally speaking, Japanese are not good at replying to open-ended questions, which allow for wide-ranging answers.

However, the problem of open-ended questions is not limited to Japanese learners. Race (1992, p. 63) recommends writers not use too many open-ended questions, because it is very difficult to respond to the learners' varied answers. He also suggests that if a writer uses them, model answers or important ideas should be provided to allow learners to judge their answers by comparing them to valid alternative answers (p. 91).

Hierarchical relation versus horizontal relation

The third feature of different learning styles is the relationship between teacher and student, that is, hierarchy or horizontal relations. This is illustrated by the experience described below.

The author often found it confusing when views and opinions of the writer differed from the facts presented. One example is the way in which Otto Peters is introduced in the course book. Peters is introduced as 'The principal proponent of the idea of distance education as a highly

industrialised form of education'. However, Peters denies the view that he himself is seen as an advocate of industrialisation of teaching and learning (Peters, 1989, p. 180). Later, the author realised that the statement introducing Peters was based on the writer's own point of view and not the fact.

This kind of statement, which shows the viewpoints of the writer, may be a strategy to develop learners' critical thinking in the UK, but perhaps it should be avoided for the Japanese learners. The reason is that in terms of communication between listener/reader and speaker/writer, the former has a responsibility in Japan while the latter has that responsibilityin the UK. Moreover, Japanese learners tend to accept everything a writer says, and to regard a writer as a teacher. Japanese see teacher's words, even in printed form, as correct knowledge which is not to be questioned (Allen, 1993, p. 10-11). Indeed, as Galtung (1981) pointed out, while the relationship between a teacher and a student in Japan is hierarchical, in the UK they are socially equal. Therefore, writers needs to be more sensitive to the relationship with learners, particularly for Japanese learners.

Recommendations

This paper identified and discussed two aspects of difficulties for Japanese students learning from distance education materials: language construction and learning style. Suggestions for mitigating these difficulties now follow.

In terms of language difficulty, distance learning course designers should improve the readability of the course book and a set reader through:

- short and well-structured paragraphs
- short and simple sentences
- inserting a writer's voice but making sure it does not interrupt the sentence structure, and
- include a reading guide

In terms of learning style difficulties, the first step to minimise difficulties is to have a practical understanding of the gap between the Japanese learning styles and the British teaching styles. Designers should be aware that Japanese learners tend to emphasise the result of learning by looking for a single correct solution and not to question the writer's views. Designers should also recognise that Japanese learning styles are different in intent from British teaching, which encourages students to emphasise the process of learning, to seek for multiple solutions and to criticise writer's views. Ballard (1989, p. 170) suggests that:

> Instead of merely dismissing them as "rote learners," "text dependent students" and "students who can memorize but can't think," the staff can recognize that such behaviours are symptomatic not of incompetence or intellectual limitations but of different cultural approaches to the task of being a good student.

The second step is to find a way to bridge this gap. It is not suggested here to revise the materials entirely to suit Japanese learners. Indeed, introducing the Japanese learning style into the materials may unintentionally extend the weak points of distance learning, as pointed out in this course book as follows:

> Distance education by its nature is in danger of being authoritarian, teacher dominated and indoctrinatory (Dodds, 1994, p. 68).
>
> The promotion of learning by enquiry and discovery is less common and more difficult to design (Dodds, 1994, p. 69).

Perhaps the way to solve this problem is to lead, but not force, Japanese learners to be familiar with British learning styles. Indeed, understanding British learning styles may bring considerable benefit to the Japanese learners. It would teach learners critical thinking and give them an opportunity to create new knowledge rather than just regurgitate old knowledge. Furthermore, the shift from Japanese learning style into British learning style, that is, from 'dualism' to 'relativism', is seen by some educators as intellectual development (e.g., Jaques, 1995, p. 45-49). Hence, it is suggested that the designers help, but not force, the Japanese learners to understand and even adopt a British learning approach. As Ballard (1989, p. 170) points out, once the differences of learning styles are recognised by the teaching side, then:

> It is possible to make explicit the shifts that are necessary, and for the lecturers to make clearer exactly what they do expect of their students.

Materials for Japanese learners should more precisely show the designers' expectation and recognise the differences of learning styles. The materials should be produced in the way that guides Japanese learners to the British style. For example, in the course book, a Japanese learner would be helped towards learning the British way if the writer provides some guidelines, such as, how to constructively criticise a writer, how to find multiple solutions, and how to think step by step. In doing so, the difficulties in learning style could ease.

In conclusion, in so far as the British distance education is offered to the Japanese learners, the designers need to ascertain its quality and effectiveness for Japanese learners. Although this paper may be limited in scope, the author hopes that it will contribute to improvement of course materials and accommodate Japanese learners as well as learners from other cultures.

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Editor's Note: Training faculty and staff is integral to adoption of new information and communication technologies (ICT). This study, conducted in Jordan, is research verification of the extent to which Information and Communication Technologies function within Jordanian Public Secondary Schools. It also compares the results with surrounding countries. The findings are uncomfortable because the percentage of integration of ICT within many secondary school systems is low and teacher training in ICT is lacking.

Information and Communication Technologies: ICT Staff Development in Jordanian Public Secondary Schools

Khalid Ajlouni

Jordan

Abstract

The objectives of this study can be summarized as follows: produce statistical indicators of the extent to which Information and Communication Technologies (ICTs) are integrated in the educational processes; show developments over time and investigate to what extent these are comparable with other countries in the region and beyond; analyze factors that can inhibit or promote the nature and speed of educational changes; and study and document examples of educational innovations that are supported by ICTs. The ultimate objective is to identify best practices that can be implemented and disseminated into the system at large. The results of this study show that a very crucial condition for changing pedagogical practices and integrating ICTs is that teachers and support staff need to be adequately trained in order to feel comfortable with ICT applications in their daily instructional activities. A substantial number of school principals think that many teachers do not yet possess the required ICT knowledge and skills, despite the fact that almost all teachers have received some form of training. Along with this, technical resource personnel at schools indicated that, although their technical knowledge was quite acceptable, only half of them thought that they were well-prepared regarding didactical and organizational integration of computers. This state-of-affairs is not a phenomenon that is exclusively witnessed in Jordan. To the contrary, it was observed in many of the other countries included in this study.

Keywords: Information and Communication Technologies, ICT, Staff Development, Schools

Background

Since 2002, the Jordanian Government has been striving to introduce major reforms in the overall educational system in the country. The following four policy orientations were formulated:

- Re-structuring the educational system to ensure lifelong learning
- Ensuring responsiveness and relevance of the educational system to the ever-changing needs and demands of economy
- Accessing and utilizing information and communication technologies to support effective learning and system management
- Ensuring quality learning experiences and environments

In the Spring of 2004, the first round of this study initiated a survey amongst a sample of Jordan's Ministry of Education (MoE) schools. One of the main topics that this survey addressed was in relation to staff development especially in relation to ICT skills knowledge and use by teachers and school personnel (ICT-monitor).

The design and instrumentation of this study in Jordan was based on the methodology that was developed in the **S**econd **I**nformation **T**echnology in **E**ducation **S**tudy (SITES) and run between 1998 and 2003 by the **I**nternational Association for the **E**valuation of Educational **A**chievement (IEA). The 2004 study provides baseline data for evaluation of changes in the field of ICT that may occur in the forthcoming years. Moreover, by comparing the current situation in Jordan's schools with those of other countries that took part in SITES, a first appreciation of the current situation sounds feasible. In addition, the current data can be compared with data that were collected in other international studies in which Jordan participated in 1999 and 2003.

Many studies (Harris, 2002; Lucock & Underwood, 2001) have explored the contribution that ICT can make to the processes of teaching and learning. Some of these studies have focused on students' outcomes, while others have focused on pedagogy. SITES, organized by IEA, was designed to make a further contribution to the growing body of evidence concerning the effective use of ICT within an educational context (Harris, 2002). In their study which investigated the role of technology coordinators in three US primary schools, Strudler and Gall (1988) found that the ICT coordinators were responsible for training teachers, providing technical support, organizing the school's instructional computing program, and supporting and energizing teachers. A follow-up study by Strudler (1994) showed that school-based technology coordinators, as change agents, could support teachers to overcome various obstacles encountered when using technology in their teaching. Strudler (1994) stated that without the support that technology coordinators provide, it is unlikely that technology would have an impact on teaching and learning.

Along the same line, Becker (1994) found that exemplary computer-using teachers in US schools were more likely to be found in schools with adequate professional development and computer coordination. A study exploring an ICT initiative in British schools (Somekh, Barnes, Trigg, Sutherland, Passey, Holt, Harrison, Fisher, Joyes, and Scott, 2001) found that the ICT coordinators in many of these schools were responsible for a number of areas, such as: professional development, students' skill levels, development of infrastructure, and use of ICT to support teaching and learning. They noted that coordinating ICT to support teaching and learning was an area that received little attention when needed to provide technical support.

A great deal of theoretical and empirical work has been done for several decades regarding the impact of ICT on educational processes. The incorporation of ICT into the school has affected its functioning at multiple levels: viz., new configurations of learning spaces and timetable have been created; innovative teaching methods have been devised; autonomous and active learning processes using the technology have been adopted; teachers' traditional roles have been expanded and included personal and group tutoring and guidance functions, and new ICT-based curricular solutions have been generated (Mioduser, Nashmicas, Tobin, and Frankish, 2002).

Policy Issues, Concepts, Indicators, and Research Questions

The conceptual framework of SITES-M1 (Module 1) was designed as a collaborative activity by researchers from over 25 countries (Pelgrum & Anderson, 2002). It took into account policy documents and research literature on ICT with a view to developing a conceptual framework in which four areas were distinguished (curriculum, infrastructure, staff development and management/organization). This framework was used as a basis for mapping indicators, generating research questions and constructing instruments. It is important for any country that considers repeating SITES-M1 to verify that all concepts, indicators and research questions from SITES-M1 are still relevant, given the actual status of educational policies. The following list of indicators related to the concept "Staff Development" can be obtained From Pelgrum & Anderson (2002):

- Problems with regard to staff qualifications

- Policies with regard to staff development and its realization
- Methods of transferring ICT-related knowledge
- Availability of ICT-training courses
- Respondents' self-ratings

Research Questions

For the purpose of this study, the following questions were highlighted:

1. To what extent are teachers adequately trained in ICT?
2. Have schools adopted specific policies regarding staff development on ICT?
3. To what extent are staff development facilities available in schools?
4. How is ICT- related knowledge transferred at schools?
5. Which ICT-related courses are available for teachers?
6. To what extent are technical resource personnel at schools adequately prepared to support maintenance and pedagogical ICT related activities?

Population Definitions and Sampling Design

The population of this study comprises all MoE-schools in which students from grade 7 or higher are enrolled, and which house one or more computer lab (with at least 15 operational computers). This resulted in a list of 1240 schools housing 351,279 students. The total number of schools that enrol students in grade 7 in Jordan is 1,862. This means that approximately 67% of schools in Jordan had access to computers in 2004. This estimate was derived from the Third International Mathematics and Science Study TIMSS-2003 data.

Instruments

The instrumentation of SITES-M1 consisted of a questionnaire addressed to school principals (further referred to as "Principal Questionnaire") and another questionnaire designed for a person in the school who was knowledgeable about the ICT infrastructure and its use. This last questionnaire is referred to as "Technical Questionnaire". The SITES-M1 questionnaires were translated into Arabic by the researcher. However, several ICT specialists and students who hold a degree in English Language double-checked the translation. The translated questionnaires were piloted by a group of university students who also had jobs as school principals or as teachers.

Data Collection

Data collection in Jordan was accomplished by means of personal visits conducted by data collectors to each of the selected schools. These data collectors made sure that the questionnaires were duly completed and that any clarifications needed for answering the questions were adequately provided to respondents. A team of 15 data collectors were involved in this operation. Assuming that the administration of the questionnaires took one day per school and given the sample size of 150 schools, this whole exercise needed 10 working days. The obvious advantage of this approach (although costly) is that it results in an almost 100% response rate and it also guarantees that the quality of data will be accurate and authentic, as the data collectors can on the spot address problems that would occur during the whole process of administering the questionnaires..

In order to monitor developments regarding the ICT-staff development, the current issues were assessed on the basis of the research questions:

Are Teachers Adequately Trained?

A considerable number of school principals (61%) indicated that a lack of teachers' knowledge or skills seemed to be a major obstacle in realizing the school's ICT related objectives. However, a small group of school principals (22%) reported it was a major obstacle that teachers felt uncomfortable because some students were more competent with ICT than their teachers.

Policies With Regard to Staff Development and its Realization

Staff development was perceived as an expensive activity, so it was reasonable to expect that schools would set priorities with regard to training their staff members. In order to make sure that adequate answers are provided for the second Research Question: 'Have schools adopted specific policies regarding staff development on ICT?', school principals were asked, beforehand, if it was the policy of their schools to train all staff members or only some of them, and to what extent their schools had realized this policy. Table 1 shows the percentage of schools that had adopted goals regarding training of their teachers and percentages of schools that had realized these goals.

Table 1

% Schools that Adopted Goals and % Schools that Implemented Goals regarding Training of Teachers

Country	Primary Education				Lower Secondary Education				Upper Secondary Education			
	Goal training all teachers to use ICT	Goal train few teach. ICT specialist	Real. Train. all teachers to use ICT	Real. train. few teach. ICT spec.	Goal training all teachers to use ICT	Goal train few teach. ICT specialist	Real. Train. all teachers to use ICT	Real. train. few teach. ICT spec.	Goal training all teachers to use ICT	Goal train few teach. ICT specialist	Real. Train. all teachers to use ICT	Real. train. few teach. ICT spec.
Belgium-French *	~	~	~	~	81	95	10	42	78	95	11	43
Bulgaria	~	~	~	~	71	83	2	16	72	88	1	15
Canada *	85	76	23	34	80	74	17	29	81	73	16	35
China Hong Kong	95	93	4	10	95	88	2	13	95	88	2	13
Chinese Taipei	91	88	23	40	97	90	15	34	97	87	31	41
Cyprus	85	62	3	10	38	49	0	8	92	89	4	12
Czech Republic	~	~	~	~	83	78	12	31	84	89	17	45
Denmark	~	~	~	~	85	88	19	60	~	~	~	~
Finland	97	87	32	35	98	94	31	38	~	~	~	~
France	73	57	3	5	82	87	5	20	85	88	4	30
Hungary	~	~	~	~	97	68	7	15	~	~	~	~
Iceland	80	78	10	21	78	77	8	25	79	69	7	25
Israel *	89	83	30	34	95	84	31	25	95	89	28	32
Italy *	86	72	23	32	90	75	14	22	91	80	17	33
Japan	74	41	16	7	67	47	12	11	45	48	7	10
Latvia *	~	~	~	~	~	~	~	~	91	83	18	20
Jordan	~	~	~	~	87	83	39	39	91	76	14	13
Luxembourg	~	~	~	~	71	100	5	51	71	98	5	49
New Zealand *	95	73	30	39	93	77	22	37	~	~	~	~
Norway	95	86	20	38	97	88	24	47	97	85	24	46
Russian Federation *					51	44	6	13	51	44	6	13
Singapore	99	85	80	36	99	87	74	36	100	93	58	46
Slovak Republic *	~	~	~	~	~	~	~	~	18	21	17	29
Slovenia	98	92	21	46	98	93	17	53	99	94	23	42
South Africa *	~	~	~	~	64	65	6	24	60	67	7	21
Thailand	~	~	~	~	90	91	48	48	~	~	~	~

The overall observation from Table (1)1 is that training all teachers to use ICT was a policy goal of the majority of schools in most countries. However, in Cyprus and the Russian Federation, the case much less so than it is in Jordan where the training of all teachers was a policy goal at a majority of schools (87%). As a matter of fact, this goal had been almost or fully realized at 39% of the schools.

Methods of Transferring ICT-related Knowledge

It is known from innovation theories that continuous staff development is an important precondition for sustainable progress and for continuous implementation of change. Therefore, it seemed relevant to investigate to what extent schools had set up mechanisms for facilitating the transfer of ICT-related knowledge amongst teachers in their schools in order to address the question in relation to "How is ICT related knowledge transferred in the school?" Transfer may, for example, occur via working groups, the computer coordinator, newsletters, a cascade

approach (trained teachers who further disseminate information within the school) and courses within the school. Table (2) contains the percentages of school principals who indicated that each of these arrangements was actually practised and implemented by their schools.

Table 2

% Schools in Lower Secondary Education with arrangements for Transfer of ICT Knowledge among Teachers

Country	1. Via informal contacts/communic.	2. Via school's ICT working group	3. Regular item on staff meetings	4. Via a regular newsletter	5. Teacher repeats external course	6. Courses by an external agency	7. Via in-school courses	8. Via computer coordinator	9. No organized structure	10. Transfer ICT knowledge, other
Belgium-French *	75	15	7	4	60	21	28	56	23	0
Bulgaria	71	5	4	5	10	28	16	19	38	5
Canada *	90	45	16	12	36	32	44	65	22	6
China Hong Kong	88	44	17	12	33	44	57	45	12	3
Chinese Taipei	79	14	5	2	46	38	59	58	6	1
Cyprus	74	14	0	0	0	0	1	1	49	2
Czech Republic	85	6	11	0	17	10	32	35	17	2
Denmark	92	23	5	14	33	50	63	78	50	6
Finland	67	7	3	2	19	33	45	72	14	9
France	86	7	7	1	12	11	18	43	44	2
Hungary	30	21	7	14	25	17	25	29	36	4
Iceland	85	3	6	2	9	33	30	79	45	13
Israel *	49	34	11	5	46	53	57	65	17	6
Italy *	74	32	13	5	29	45	72	44	18	4
Japan	72	18	8	3	14	41	38	41	18	1
Jordan	50	27	26	11	28	28	38	37	28	10
Luxembourg	89	6	0	0	24	52	43	74	52	0
New Zealand *	90	61	13	12	31	38	61	74	20	1
Norway	87	16	4	1	16	38	61	73	22	3
Russian Federation *	68	9	9	2	22	45	8	8	22	6
Singapore	96	79	59	15	57	87	92	87	8	14
Slovenia	91	6	14	45	16	57	37	83	1	6
South Africa *	74	12	7	2	14	14	26	41	38	2
Thailand	59	26	15	5	50	41	72	29	5	3

From the above table, it appears that, overall, the most prevalent arrangements involved informal contacts, computer coordinators, courses run by external agencies, and in-school courses. Moreover, the respondents in Jordan indicated that transfer of ICT-related knowledge took place in the following ways: (1) informal contacts/communication (50%); (2) in-school courses (38%); (3) computer coordinator (37%).

Availability of ICT training courses

The availability of training courses is a crucial condition for raising the ICT qualifications of staff. Therefore, a question about this topic was included in the questionnaires in order to address the fourth Research Question about 'Which ICT-related courses are available for teachers?'.

The percentages of respondents who checked the in-house availability of each possible course are shown in Table (3).

Table 3

% Students whose Schools (technical respondents) indicated in-house ICT Courses were available for lower secondary-education Teachers

Country	1. General technical introduction	2. Introduction, history, relevance,..	3. Introduction in applications	4. Introduction use of the Internet	5. Introduction maintenance	6. Advanced application use	7. Advanced Internet use	8. Advanced maintenance	9. General didactical principles	10. Subject specific training	11. Programming own software	12. Digital video/audio equipment
Belgium-French *	~	~	~	~	~	~	~	~	~	~	~	~
Bulgaria	32	15	22	13	6	5	3	1	4	3	4	2
Canada *	65	20	58	69	9	15	15	3	10	25	2	10
China Hong Kong	53	23	63	48	11	17	6	5	6	4	3	8
Chinese Taipei	~	~	~	~	~	~	~	~	~	~	~	~
Cyprus	28	15	14	0	5	5	0	0	19	14	0	0
Czech Republic	58	16	45	18	4	13	3	1	6	25	1	2
Denmark	67	15	65	63	9	12	11	5	8	18	2	15
Finland	41	5	35	51	6	7	15	3	4	9	5	3
France	~	~	~	~	~	~	~	~	~	~	~	~
Hungary	46	14	41	22	15	10	2	2	2	4	3	0
Iceland	30	2	26	22	2	4	5	0	1	13	1	1
Israel *	51	11	47	26	6	18	8	1	11	21	6	3
Italy *	77	46	67	43	15	12	21	3	11	18	16	6
Japan	48	45	11	22	32	9	6	4	8	19	6	7
Jordan	56	35	49	41	11	28	11	9	35	19	15	12
Luxembourg	~	~	~	~	~	~	~	~	~	~	~	~
New Zealand *	74	20	68	71	17	27	19	6	9	27	7	17
Norway	~	~	~	~	~	~	~	~	~	~	~	~
Russian Federation *	12	0	5	1	4	0	0	0	2	4	1	2
Singapore	57	28	53	41	24	16	24	4	28	50	17	26
Slovenia	81	26	78	54	8	38	12	5	17	37	5	3
South Africa *	69	26	69	39	11	10	10	5	8	5	7	3
Thailand	78	51	73	14	24	21	4	3	27	14	7	7

Note: * Counties did not ratify all sampling criteria.

Table (4) contains the percentages for externally available courses.

Table 4

% Students whose schools (technical respondents) indicated external ICT-Courses were available for lower secondary-education teachers.

Country	1. General technical introduction	2. Introduction, history, relevance,..	3. Introduction in applications	4. Introduction use of the Internet	5. Introduction maintenance	6. Advanced application use	7. Advanced Internet use	8. Advanced maintenance	9. General didactical principles	10. Subject specific training	11. Programming own software	12. Digital video-/audio equipment
Belgium-French *	~	~	~	~	~	~	~	~	~	~	~	~
Bulgaria	37	22	34	30	11	15	11	7	15	11	17	7
Canada *	44	27	49	46	30	36	42	26	21	34	20	23
China Hong Kong	37	31	47	46	31	37	39	28	25	32	35	25
Chinese Taipei	~	~	~	~	~	~	~	~	~	~	~	~
Cyprus	61	19	67	40	0	13	8	0	40	31	14	8
Czech Republic	28	10	31	20	8	14	10	8	5	7	7	2
Denmark	36	26	51	44	38	33	34	38	33	38	14	34
Finland	38	12	43	44	23	25	36	23	19	18	15	16
France	~	~	~	~	~	~	~	~	~	~	~	~
Hungary	47	21	53	45	26	37	27	24	22	25	18	13
Iceland	66	41	68	73	46	48	63	40	38	31	21	21
Israel *	29	17	38	39	6	19	11	7	18	16	6	3
Italy *	19	14	16	19	2	8	9	8	8	11	8	4
Japan	72	73	63	69	50	51	55	46	54	42	54	44
Jordan	45	38	52	46	24	27	23	20	27	21	23	15
Luxembourg	~	~	~	~	~	~	~	~	~	~	~	~
New Zealand *	13	12	22	21	13	17	17	18	13	17	11	12
Norway	~	~	~	~	~	~	~	~	~	~	~	~
Russian Federation *	42	24	43	24	27	5	4	5	24	25	34	4
Singapore	52	29	84	78	42	35	48	21	30	48	41	25
Slovenia	31	11	39	40	37	37	37	26	34	38	21	16
South Africa *	23	13	28	20	13	10	15	11	3	3	7	2
Thailand	24	16	28	17	18	16	11	11	18	17	13	8

Not surprisingly, with regard to the in-house training facilities, the largest percentages were observed for courses relating to basic computer-literacy, basic computer-handling skills as well as the use of basic applications (word-processing, spreadsheets, and databases). It should be noted, however, that in some countries like Bulgaria, Cyprus, and the Russian Federation only a small group of this introductory training could be handled inside the school. In the case of Jordan, the most important courses concerning the in-house training facilities are the following:

1. General introductory course (how to use a computer, principles of software and hardware, functions of mouse, and printer) (56%).

2. Introductory course for applications/standard tools (basic word-processing, spreadsheet, databases, etc.) (49%).
3. Introductory course for Internet use (retrieving information, sending/receiving e-mails, etc.) (41%).

In relation to = external courses, it seems reasonable to expect that training facilities would be available for most of the above mentioned topics. However, as the data in Table (3) reveals, this was, according to the perceptions of the technical respondents, clearly not the case. Another finding of relevance was a relatively small group of the questionnaire respondents indicated that external courses were available and dealt with the didactical / pedagogical principles of computer use and with subject-specific training. The availability of such courses may be hypothesized as an important factor affecting the use of ICT in daily classroom practices. In Jordan, the questionnaire respondents indicated that external courses were available and dealt with the following:

1. Introductory course for applications/standard tools (basic word-processing, spreadsheet, databases, etc.) (52%).
2. Introductory course for Internet use (retrieving information, sending/receiving e-mails, etc.) (46%).
3. General introductory course (how to use a computer, principles of software and hardware, functions of mouse, and printer) (45%).

A more condensed impression of the extent of availability of in-house and external courses can be gained from Figure (1). In-house availability in this figure reflects the average percentage of courses that were checked. External availability was calculated in the same way. In general, and again, not surprisingly, more external than in-house courses were accessible for teachers.

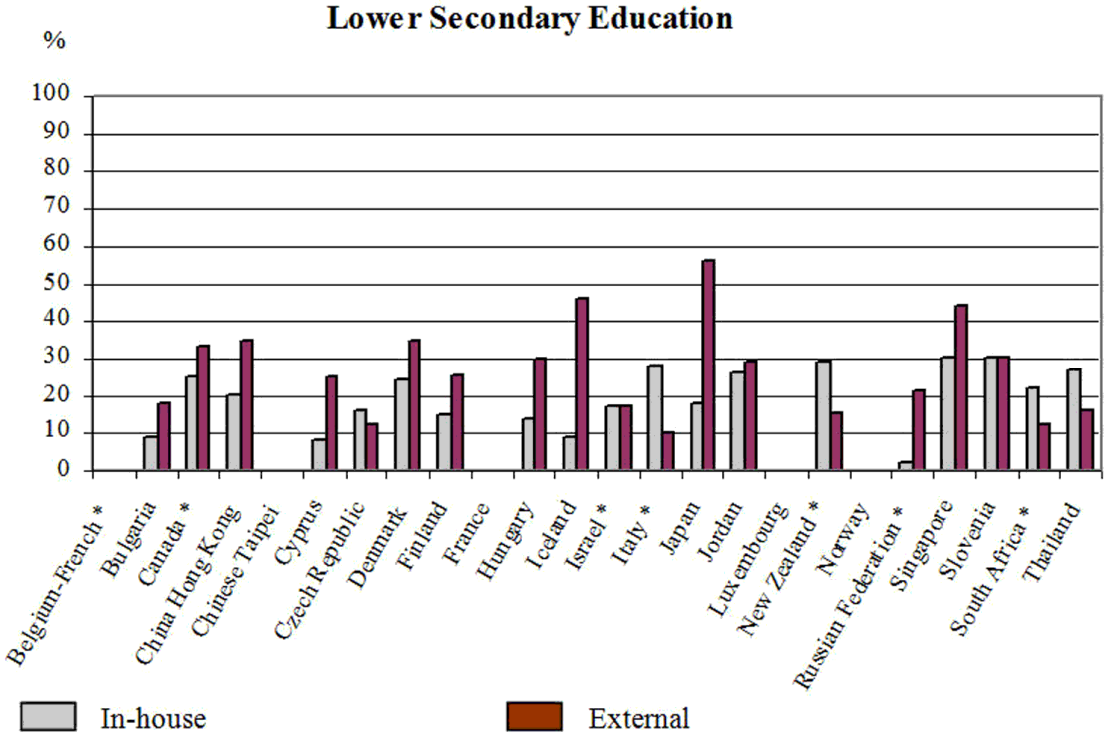

Figure 1. Average percentages across schools of available in-house and external courses.

A relatively high availability of external courses existed, for instance, in China Hong Kong, Cyprus, Hungary, Iceland, Japan, Russian Federation, and Singapore; while it was relatively low in, for example, Italy, New Zealand, South Africa, and Thailand. For Jordan, it appears that the availability of external courses was a little bit higher than the availability of in-house courses.

On the whole, however, the availability of courses (at least in the perception of school principals) tends to be low. This is consistent with the finding that a substantial number of school principals reported that lack of training facilities was a major obstacle in realizing the schools' ICT-related objectives; while also a meaningful number of respondents found the quality of available teacher training courses as insufficient (53%). This was often viewed as a major obstacle for most of the other countries. In Jordan, however, it was mentioned most frequently.

Knowledge and Skills of Technology Coordinators in the Schools

If one assumes that the person who answered the technical questionnaire is also the one who plays an important role in transferring knowledge within the school, it would then be important to know to what extent these persons were adequately prepared for their work in supporting ICT activities within the school. In order to acquire and estimate such an indicator, the questionnaire respondents were asked to rate how well-prepared they thought they were in relation to each of the following areas:

General

1. MS-Windows
2. MacOs
3. MS-DOS
4. Word processing
5. Databases
6. Spreadsheets

Instructional Processes

7. Subject specific applications
8. Application of student progress tracking software
9. Didactical and organizational integration of computers in subjects
10. The use of specific programs for subjects
11. Evaluation and selection of instructional software
12. Use of computers for individualized learning programs
13. The use of multimedia application
14. Adaptation of software to fit school purposes

E-mail, Internet, WWW

15. The use of e-mail for educational purposes
16. The use of the Internet/WWW for educational purposes

Presentation

17. The use of software for making presentations

If the area was not relevant, respondents would be allowed to check a box entitled: 'Not Applicable.' Table (5) highlights the percentages of respondents who answered each item affirmatively. Some general observations can be made on the basis of data collected in this table. Overall, it seems that the highest self-assessment in relation to adequacy of preparation occurred for word-processing. It is not surprising to find that self-assessments were low for the Mac

operating system as the majority of schools do not yet use these operating systems. In some countries (for example, Canada, Singapore, and Slovenia), 85% or more of the respondents indicated that they felt adequately prepared to use the Internet for instructional purposes. However, this was barely the case in other countries like, Bulgaria, Cyprus, Czech Republic, Japan, Russian Federation, and Thailand.

Table 5

% Students whose Schools (technical respondents) indicated they are adequately prepared to support ICT-activities for lower-secondary Education.

Country	1. MS-Windows	2. Mac Operating System	3. MS-DOS	4. Word processing	5. Data bases	6. Spreadsheets	7. Subject specific applications	8. Application student progress soft.	9. Didactical integration of ICT	10. Use specific progr. for subjects	11. Eval/select instruc. softw.	12. Use for individualized learning	13. Use of multimedia applications	14. Adaptation of software	15. Use of e-mail for instruction	16. Use Internet for instruction	17. Use of softw. for presentations
Belgium-French *	88	6	75	94	62	74	23	18	20	24	26	22	43	28	59	57	39
Bulgaria	75	17	85	89	70	82	37	21	23	34	36	27	41	38	38	33	26
Canada *	82	29	64	94	78	84	61	44	41	55	59	34	70	54	79	88	75
China Hong Kong	95	9	89	97	85	89	54	10	32	41	50	57	64	25	71	72	83
Chinese Taipei	95	2	93	97	58	74	47	25	44	46	58	43	68	26	82	84	72
Cyprus	70	6	47	70	30	24	78	19	23	20	9	11	29	13	28	33	11
Czech Republic	89	8	79	93	50	78	58	29	33	43	57	49	53	33	36	35	28
Denmark	93	5	64	97	65	89	54	15	41	58	55	45	65	44	72	76	53
Finland	89	3	88	95	76	92	46	13	25	50	33	22	46	23	70	74	49
France	78	4	63	90	53	80	40	26	12	23	20	30	51	26	37	41	43
Hungary	96	4	95	98	74	92	64	69	53	40	59	67	66	41	53	57	51
Iceland	85	29	51	98	55	79	44	46	43	53	51	61	73	46	80	79	68
Israel *	77	8	55	91	79	60	48	37	56	53	53	50	62	64	50	52	77
Italy*	92	6	77	89	59	83	57	16	50	59	53	27	72	48	67	73	60
Japan	58	12	60	77	41	70	48	55	16	38	22	27	28	29	27	30	26
Jordan	96	20	84	100	97	97	83	56	53	75	65	68	82	70	66	72	86
Luxembourg	88	0	89	87	69	87	27	12	18	21	27	5	24	34	78	81	69
New Zealand *	82	35	60	97	81	88	48	39	67	44	53	30	60	42	80	77	67
Norway	72	2	51	88	32	65	26	13	13	21	27	22	36	11	54	58	38
Russian Federation *	70	7	76	88	73	87	54	35	36	50	67	66	29	48	26	20	28
Singapore	98	6	62	100	59	85	76	34	44	61	88	74	75	64	85	85	97
Slovenia	96	6	76	98	52	86	71	28	68	75	55	54	62	58	83	86	69
South Africa *	81	5	77	92	78	88	48	22	24	44	43	24	47	32	56	55	49
Thailand	63	4	53	68	37	50	18	4	4	4	9	19	10	10	10	11	23

Notes: */ country did not satisfy all sampling criteria.

On the basis of answers received from Jordanian respondents, the rank order of items addressing adequacy of preparation was as follows:

Table 3

Adequacy of Preparation

Rank	Item	Percentage
1	Word processing	100%
2	Databases	97%
3	Spreadsheets	97%
4	MS-Windows	96%
5	The use of software for making presentations	86%
6	MS-DOS	84%
7	Subject specific applications	83%
8	The use of multimedia application	82%
9	The use of specific programs for subjects	75%

10	The use of the Internet/WWW for educational purposes	72%
11	Adaptation of software to fit school purposes	70%
12	Use of computers for individualized learning programs	68%
13	The use of e-mail for edu16.7cational purposes	66%
14	Evaluation and selection of instructional software	65%
15	Application of student progress tracking software	56%
16	Didactical and organizational integration of computers in subjects	53%
17	MacOs	20%

From these items, two scales were created, one reflecting the extent to which general ICT skillls were mastered, and the other reflecting the instructionally related topics. Figure 2 includes the average percentages for each of these scales in each country.

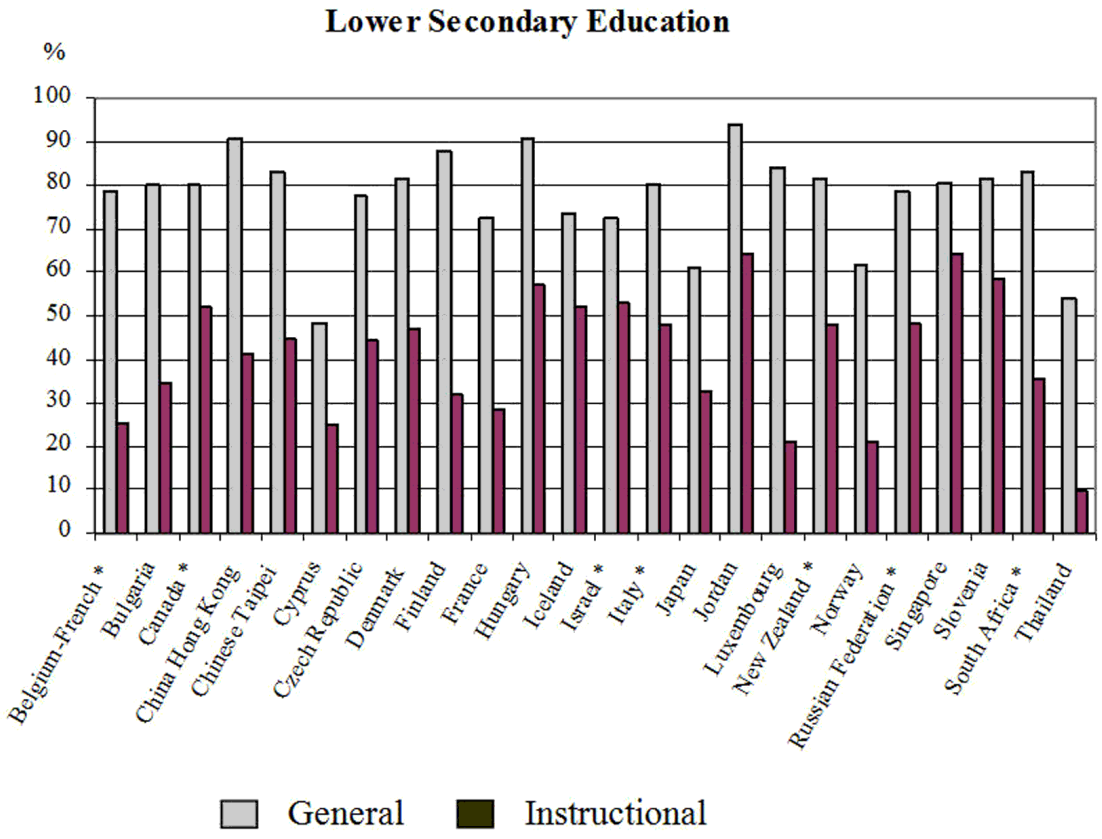

Figure 2. Average values of self-ratings from technical respondents regarding the adequacy of preparation for supporting general ICT-related and pedagogical ICT-related activities in lower-secondary education.

A first observation from this figure is that the self-ratings for the general (or alternatively more technical) ICT-related activities were much higher than those for the instructionally related activities. With regard to the latter activities, the ratings were relatively high in Jordan, Hungary and Singapore. However, the instructionally related ratings were comparatively low in Belgium-French, Cyprus, France, Luxembourg, Norway, and Thailand.

Summary of Findings

One basic and very crucial condition for changing pedagogical practices and integrating ICTs in education is that teachers and support personnel need to be adequately trained in order to feel comfortable with ICT applications in their daily instructional activities. A substantial number of school principals assert that many of their teachers, as yet, do not have the required ICT knowledge and skills, despite the fact that almost all of them have received some form of training in this regard. At the same time, technical resource personnel in the schools indicated that although their technical knowledge was quite acceptable, only half of them felt that they were well-prepared regarding the didactical and organizational integration of computers. This state-of-affairs is by no means a phenomenon that is exclusively witnessed in Jordan. To the contrary, it was observed in a great number of other countries included in this study. Almost all schools intended to train all teachers to use ICTs and a few teachers to become ICT-specialists. These goals are, according to the perceptions of school principals, realized in 40% of the schools. This is a fairly high percentage when compared with other countries (Cyprus and the Russian Federation). On the other hand the lack of skills of teachers to use ICT is mentioned by 60% of the schools as a major obstacle in realizing the school's ICT-related objectives.

From these observations, coupled with the perceived lack of availability of courses, it seems that more attention should be given to improving the facilities for staff development. As the training of teachers usually is a very costly activity, it may be worthwhile to explore the possibilities for distance learning (like, for instance, via an educational portal) in combination with a cascade approach, whereby one or a few well-trained teachers in the school guide their colleagues in acquiring the necessary skills and in making adaptations in their didactical approaches. In particular, emphasis should be placed on training the technical support personnel of whom roughly 50% indicated that they were not adequately prepared to support the didactical integration of ICTs in the school.

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Editor's Note: This article discusses the rationale for a telehealth web course, using video and web to extend steps to achieve the educational goals, and provides analysis of feedback received from students.

Developing a Web-based Telehealth Course

Ilkka Winblad I, Riitta-Liisa Kortesluoma, Jarmo Reponen

Finland

Abstract

The transfer from a paper-based workflow to an electronic environment in health care has created an increasing need for education in telehealth. Real-time videoconferencing enables education in spite of distance, but it is bound by time and date constrictions that may affect participation. web courses offer teaching any time and anywhere. They necessitate careful consideration and design of topics to be taught, students with the necessary computing skills, receive site with adequate coverage and maturity of technology, and design of interactivity between the students and teachers. Most of our students rated the developed web course better than conventional lectures although some of them mentioned the lower interaction as a drawback. They usually viewed the video recorded lectures of the course for half an hour in each session without break, outside office hours, and at their own convenience.

Keywords: tele-education, web-based course, telehealth, telemedicine, telecommunication, assessment of performance, student self-assessment, e-learning environment, e-learning methods, computing skills.

Introduction

Information exchange and the delivery of health care services are increasingly achieved through telemedicine. In Finland, implementation of telemedicine in health care began in the 1990s. This created a need for formal education and in 1998 the Open University of Oulu started a course in telemedicine for students of health sciences, medical technology, information technology, social work, and for professionals of health care and social welfare (Kortesluoma & Rajaniemi, 1998). The decision was in line with a strategic choice taken in the development of education as the University of Oulu operates in the low populated northern part of Finland distinguished by long distances between populated areas.

In the first year, a course entitled "Introduction to Telemedicine" was offered to 36 students of the Faculty of Medicine. The first realization was almost entirely delivered through conventional contact teaching in Oulu, however, two video-lectures were given by a foreign expert from the UK (Kortesluoma & Rajaniemi 1998). For assessment of their performance, students answered exam questions at home and mailed their responses to the teachers. After correcting and commenting on the answers, teachers mailed them to the Open University, which passed the results to the students.

Attendance at lectures was laborious because the students were from different parts of Finland and separated by distances up to 400 km. To offer better access from remote sites, the following course was delivered by contact teaching and also through real time interactive video conferencing supported by local tutoring and group work. The telecommunication links were 2-3 ISDN lines (each 128 kbits/s) from one and or up to six remote sites.

At this stage, real time videoconferencing with discussions were bound to a certain point of time and date, which constrained the attendance of those who were also working. For the teachers, real-time videoconferencing required the same resources as conventional classroom with technical support for television. Support of distant students required re-assessment of teaching practices and for distance education.

Developing a web-based course

To facilitate course development, the university established in 2005 an e-learning team consisting of experts in medical informatics, clinical medicine and distance learning from the Centre of Excellence for Telehealth, Learning and Research Services and the Department of Information Processing Science.

The team had four questions to answer:

1) *Why to develop?* – Analysis of learning needs within the proposed operational environment,
2) *What to educate?* – Analysis of the content,
3) *Who to educate* – Analysis of potential students and
4) *How to educate?* – Analysis of the educational technology and management.

Why to develop? On a strategic level, e-learning has the potential to improve the quality of learning, to facilitate access to learning resources, to address special needs, and to enhance learning in the workplace (European Parliament and the Council, 2003). On a practical level, the goal is simply to serve the students better by offering them easy access to education regardless of distance and time factors.

What to educate? The widespread use of information and communication technology belongs to strategic choices in the delivery of health services both on an international and national level (WHO, 1998; Craig, 1999). This development has raised an increasing need for education in telemedicine. Although Finland together with the other Scandinavian countries is at the forefront in the use of information technology in the health sector (Hämäläinen et al., 2007), there has been a lack of education in the field of telemedicine.

Opinions on the content of the course "Introduction to Telemedicine" were collected from the teachers and students on earlier courses, and the course was updated in accordance with this data. This led to a new program entitled 'The Basics of Telehealth'. It now consists of sixteen different modules on telehealth as follows: society, delivery of health services, legislation, human interaction, electronic patient records and data transfer, remote consultations, radiology, surgery, psychiatry, economic assessment, functional assessment, education, technical requirements, data security, and visions for the future. The whole course is worth five ECTS (European Credit Transfer and Accumulation System) credits (about 120 hours of student work). This provides basic, updating, and post-graduate education for physicians, nursing sciences and medical technology.

Who to educate*?* Being a basic course it was planned to meet the needs of both undergraduate and postgraduate students of health sciences in the university and polytechnics as well as students in higher or continuing education. Marketing research was carried out and many universities and polytechnics with health sciences in their education programs expressed interest in purchasing the course.

***How to educate*?** The target set up was an educational module which would offer: 1) effortless access to the factual content of the course and other educational resources, 2) support interaction between the teachers and students, and 3) facilitate assessment of course activity, evaluation, and course management, regardless of time and distance. The choice was made to tap into a modern mixed learning strategy, the main components being: video streaming files on web sites, asynchronous computer mediated interaction, assessment and evaluation, and course management (Curran et al., 2003). In addition, the module had to be flexible enough to deliver a forum open to all students, and a forum for confidential private communication.

The technical determinants of a web based multimedia educational material necessitate computers, software and broadband connections capable of delivering user friendly and effective materials (Curran et al., 2003; McKimm et al., 2003). Students must have basic computer skills with support and guidance (McKimm et al., 2003; Jennet et al., 2003). In earlier years, there were problems in complying with these prerequisites. This is no longer the case. Currently, every educational institution in Finland has computers and an Internet connection, there are 1.5 million broadband connections in Finland and 84 % of Finns used the Internet in 2006 (http://www.tietoyhteiskuntaohjelma). This implies a high degree of computing skills.

Description of course arrangements

The Basic Telehealth course starts with a short general introduction to the course, followed by video-recordings of the sixteen topics divided into twelve indexed lectures. Nine of the lectures were video-recorded during conventional contact teaching in a lecture hall, and three were recorded in a studio without an audience. In order to facilitate browsing the recordings, each of them was indexed by subheadings giving the duration in minutes. The length of each of the video-recordings was about one hour, and included 3-15 subheadings that varied from 3-30 minutes. The duration of the video-recordings was fifteen hours with the same factual content as 18 hours of conventional contact lectures. All the video-recorded lectures were accompanied by PowerPoint presentations, which were also available for printing beforehand through a separate web address. There were also links to related websites and video clips.

New students were given user names and passwords for the virtual learning environment called Optima, which includes indexed links for learning materials as well as instructions for use. Optima also includes discussion boards, chat rooms, online assessment, tracking students' use of the web course, and course management. There is also an area where teachers and students introduce themselves to each other with a photograph and short story about her/his background and their expectations for the course.

Students have access to the web site for two months. In the discussion area of Optima, they ask questions and make comments on course-related topics. Discussions are asynchronous to accommodate the family and work responsibilities of students. At the end of the course there is an exam to be answered at home using Optima. In addition, students prepare an essay on one of six topics provided by the teacher. The time provided to complete these tasks is three weeks.

Students return the essay and exam answers in the private area of Optima. The teacher accesses the same area to assess the essays. After returning their answers to exam questions, the students receive optimal answers structured by key words with instructions to assess and score their own work. After receiving the students' self-assessments, the teacher scores the exams and gives the final grades. Students receive feedback from their performance and may be required to repeat important topics. The course is free for the students in basic or post-graduate education. For those updating their education, the price is 80€ (about 108$). Modules cannot be performed separately.

Evaluating the course

In order to evaluate the course and its methods, the students were asked to respond anonymously on a web questionnaire. Four questions requested their opinions on: 1) the accessibility of the course, 2) the length of the entire web course, 3) the comfortable duration for a single video clip, and time for viewing a video without pause.

Five Likert Scale questions documented the quality of the course (very weak, somewhat weak, can't say, better, much better). Responses were summarised in a mode that facilitates interpretation. Additionally, there was one open-ended question dealing with

the student's general idea of the course. The qualitative data obtained was analysed by inductive content analysis (Downe-Wamboldt, 1992).

The trustworthiness of the self-assessments of students was also evaluated. This was done by the teacher who rated the answers of the students to the four questions in the exam before checking the scores the students gave to themselves. The scores of the teacher and students were compared using Cronbach's alpha coefficient of consistency.

Results of the Evaluation

A total of 21 students, six of them women, participated in 2006 in the first web-based course. They were aged from 20 to 49 years, and most of them were Electrical or IT engineers, 2 nurses in updating education, and engineers in medical technology. Sixteen of them lived in the city of Oulu and five elsewhere at a distance of 30-600 km. Anonymous feedback was provided by 12 students.

According to the answers, the median of the optimal length of the duration of the whole course was two months (range 1-4 months). All but one studied the course outside office hours (Mon - Fri 8 am-6 pm). They usually viewed the video-recordings for half an hour without a break (median 30 min, range 5-120 min). When asked to compare this web course to conventional lectures in terms of learning, most of them (8/12) rated the web course as *better* or *much better* than conventional lectures. One rated the web course *somewhat weaker* and three *could not say*.

When asked to compare this web course to a conventional course in terms of the interaction between teachers and students, five of them rated the web course as *weaker*, three as *better*, and four *could not say*. In open questions, two students mentioned low interaction as a drawback to the course. One of them wrote: "*Interaction depends on yourself just as in a lecture hall, too. You can ask questions through electronic communication and the answer might be even better when given in written form"*.

The students gave high marks to the course in general: 4 on the scale of 1 – 5 (median 4, range 3 – 4). They evaluated the technical quality of the lectures video-recorded in the studio without an audience to be better than that of the lectures video-recorded during a conventional lecture in a lecture hall (medians 4 vs. 3). In open questions one of the students pointed out that a lecture video-recorded without an audience is too intensive: "Y*ou see only the speaking head and powerpoint slides without any interruption"*.

With regard to the exam, each answer to the four questions could be rated from 0 – 6, the sum of total scores being 24. The mean of the total scores given by the students was 16.1 (on a range of 10 – 21), and the mean assessed by the teacher was 17.3 (on a range of 11-21). Four students scored their own performance higher and nine of them lower than the teacher and in four cases the scores were congruent. The consistency of the scores between the students and the teachers was by Cronbach's alpha 0.584, i.e. quite low.

Discussion

The education of telemedicine in the University of Oulu started as conventional lecture hall education. The need arose to integrate the principles of "medicine at a distance" into the delivery of education. In the second year, the education was available both in conventional form and in real time videoconferencing. This improved access to education, especially for those who participated in further education while they worked, and for those who experienced difficulties finding a suitable time slot for learning. The web course removed the obstacles of time and distance for them. Almost all of the respondents answered that they viewed the videos out of

office hours. This reflects the high motivation and mature attitude toward education that is typical of adult learners (Newman & Peile, 2002). Web courses also free up teacher resources and technical support for other tasks.

A web course necessitates more organized management of education than the traditional collection of lectures given by experts in different special fields. In this case, the Centre of Excellence for Telehealth in the University of Oulu (FinnTelemedicum), established in 2003, took over the realization of the course in 2005. It was decided that a person should be appointed to take charge of the program to implement a multidisciplinary course in an integrated manner and to ensure seamless collaboration with other units of the Educational Institute.

The study sample was small, yet the case feedback confirms the need for continual assessment so as to enhance further development. In terms of learning, most of the students rated the web course higher than conventional lectures. This is in line with the results of Lemaire and Green (2003) in which nursing-related health care workers found web-based education better than conventional classroom lectures without multimedia content. However, in that study, the CD-ROM education module, desktop conferencing and in-person lectures with multimedia content had higher overall ratings than web-based education. When comparing educational software modules to conventional lectures, it must be borne in mind that it is not only a matter of a change in the delivery medium, but also a change in the educational method (Johnson et. al. 2003).

Moreover, the aspects of web-based learning appreciated by learners are accessibility, convenience and ease of use (Curran et al., 2003; McKimm et al., 2003). In order to avoid measuring only superficial learning, a possible disadvantage in computer based education (McKimm et al., 2003), the essay and exam questions were planned so that the students have to use analysis and synthesis of the learning material in their answers. The online assessment of performance is quick and convenient for students from remote sites (McKimm et al., 2003). When students compare their own answers to test answers, they complete their knowledge and have personal feedback on their performance. This method may partially compensate for face-to-face discussions between a learner and a teacher and thereby bring more interactive elements into the web course. The self-assessment saves time for teachers because it is faster to check students' self-assessments than to produce separate feedback on numerous points of the exam answers. It seems, however, that student self-assessments cannot substitute for those of the teachers.

Many students considered the low interaction between teachers and students as a drawback in the web course. This raises a need to develop new pedagogical tools, because lively interaction supports learning. An effective web course is based on the idea of collaborative learning targeted to construct an understanding of the topic by mutual interaction (Dillenbourg, 2002; Crook, 2000). It activates effective mechanisms for learning such as asking and stating, arguing and giving feedback, sharing dimensions of expertise and models for thinking, and synergy. Shared expertise means that students enhance their own understanding when they have to explain issues to others. An asynchronous discussion forum in the virtual learning environment is in the planning stages.

It is a general phenomenon anywhere that experienced professionals, not only in health care, but also in different disciplines and lines of business will undertake further education for their professional portfolio (Newman & Peile, 2002; Hutchinson et al., 2002). A cumulative number of students have undertaken the present course, including experts in technology, information technology, management studies and economics. They have produced qualified and up to date essays with multidisciplinary points of view. This is fruitful for education in this rapidly changing environment. Student skills and knowledge also enrich the know-how of the teachers. The best essays will be stored, with the authors' permission, in an electronic database to supplement recommended literature for the course. This can be further expanded as a way of working known

as "web-weaving" (Tremaine & Mackay, 1999), where students and teachers collaboratively produce materials and lists of references during the course study.

Conclusions

The aim of telehealth is not only to be a channel to deliver education and services, but also to provide an alternative to traditional education. A combination of a mature technical environment, computing literacy, modern pedagogic tools and pioneering spirit support education resulting in better health care services for the future.

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Editor's Note: Distance learning requires careful planning to maximize learning opportunities. When learning materials are consolidated into reusable interactive multimedia formats, the role of the teacher changes from lecturing to tutoring to emphasize guidance and course development.

Developing a Computer-Based Instructional Material Model for Teacher Training at Allama Iqbal Open University (AIOU)

Tanvir Malik

Pakistan

Introduction

The Government of Pakistan established Allama Iqbal Open University (AIOU) under the act of Parliament number XXXIX, passed by the National Assembly (equivalent to the American Congress) in May 1974. The distance learning system is one of the most important developments in the field of education and Allama Iqbal Open University is one of the leading open universities in the world. Allama Iqbal Open University provides support for the educational needs of the masses through its distance learning system. Allama Iqbal Open University has many regional offices and more than 1000 study centers throughout the country. Allama Iqbal Open University offers more than 200 programs from High School diploma (equivalent to GED in US) to PhD (Dr. Rashid, 2007).

According to DR. Rashid (2007),

> "The Allama Iqbal Open University is employing multi-dimensional methodology suited to distance education. Textbooks and other reading material are written and developed by the Faculties and outside experts and provided to the students after enrollment. Local experts are appointed as tutors for the groups of students for the purpose of continuous guidance. Tutors help students write assignments. Workshops are organized towards the end of the semester where distance education students get an opportunity for internship and practical training."

No courses have been developed at any level that use computers for instruction. At the masters level only one class was offered in which students were briefly exposed to computer technology. "In today's world of technology it is important that all the courses are modified in order to incorporate computer technology." (Abate, RJ. 2002)

The primary goal of this study was to examine optimal uses of computers and educational software. Since computers are becoming ubiquitous in both classrooms and work settings, the ability to use them as tools for learning and academic achievement is increasingly important for both teachers and students.

> "Unfortunately, in most of the countries of third world, practitioners often do not use computers effectively to support instruction. They are often used in homes and in schools in ways that isolate children, locking them into drill and practice programs devoid of human interaction" (Rasid, 2007).

Computer Assisted Instruction (CAI) tutorials are characterized by drill and practice activities that are essentially electronic worksheets to deliver instruction directly to students without interaction with teachers. Such one-dimensional experiences with computers conflict with research findings that document the importance of social interaction in education. Few studies have shown how to integrate computers into socio-cultural contexts of classrooms in interactive ways that support students' educational development. To date, the field of educational technology has been hindered by a research tradition that is often narrowly focused on techno-centric

accounts of how the technology itself functions, while paying little attention to learners or the social environments in which learning takes place.

According to Artz J (2001),

> "A child's education takes place primarily at home in a family setting with a parent acting as a teacher or supervisor of the learning activity. Some observers claim that the computer has created many home-based jobs and enabled teachers to practice computer and earn money at home with online resources. Some speculated that the same technology that opens up new horizon for enjoyment can also greatly facilitate learning about computers and receiving teacher training by computer at home."

Some supporters of computer technology predict that most learning might soon take place in the way many teachers learn on the computer or out in the community, but not in a classroom. Their experiences can help us to understand the present and potential role of educational technology in non-traditional education settings.

> "Though numerous studies have been conducted to investigate how the computer is being used in public schools or formal institutions for the past decades, computer use in teacher training through distance education remains an area that is rarely studied." (Rasid, 2007).

For example, teacher preparation has little training about computer use, why to purchase computers, and what a learner hopes to achieve with this technology. Likewise, there is no research data on how distance education teacher training institutions integrate the computer into their daily instruction. There have been magazines and newspaper articles reporting numerous online resources for use by teachers. These articles list web pages of Distance Education Teacher Training Organizations. These web sites are designed especially for the teachers, online bulletin boards, memos, letters, and online courses, geared towards teacher training particularly in western world. Other information, primarily from newspaper articles, consists of claims or personal opinion about how the computer is being used or might be used in teacher training in the future. These articles do not provide clear information about sources of information, how the information was collected, and what kinds of institutions were investigated. Almost none of the reports published in this area involved system research. Often, conclusions were drawn from personal impressions rather than from research data. A lack of research data on why and how computers are used in teacher training through distance education prompted the researcher to design this study to gather preliminary date from field research.

Several researchers in the field of educational technology relate computer use to the surrounding social context. Researchers in developed countries report that technology rich Distance Education institutions in the west provide teacher training with one-on-one instruction and flexibility to integrate learning with daily living.

Some researchers have recognized the impact of social expectations on computer use. They believe that focusing solely on what the computer can offer and people's behavior towards the computer is sufficient to understand the nature of computer use (Baker, M. 2003). They advocate a social approach to analyze computer use in the context of traditional education rather than focusing on the capabilities of the technology.

> "Distance education students need to recognize that computers systems are 'complex' social objects constrained by the context infrastructure and history. A particular combination of hardware and software may be utilized in very different ways in different contexts with very different results." (D'Ignazio, F. 2003)

In analyzing computers used in distance education contexts, modern researchers found that the amount and type of computer utilization in distance education is related to how students, instructors or other administrators perceive computers, and what role they play in computer use. Teachers tend to judge the usefulness of the computer by how computers would fit into their on-going classroom practices and the already established curriculum. Following the syllabus and covering the required materials were regarded by teachers to be their primary responsibility. New technology and innovative teaching, which directly address course elements in the existing syllabus, are more likely to attract the interest and cooperation of teacher.

In general, teachers' major concerns about computer use in the classroom were the level of difficulty of the software, the precise subject materials covered, and the way the software meshed with their textbooks.

In one study conducted by Lui et al (2002), teachers mentioned that their goals for using the computer in the classroom were to prepare the students to live in a world of advanced technology. This attitude was shared by administrators in the districts, which resulted in more attention paid to acquisition and required use of computer hardware than to the design, development and support of educational applications of computers. Furthermore, a teacher's inability to realize the potential contribution of the computer in classroom teaching hampers computer integration.

A study conducted in the third world Chan and Van (2004) found several teachers that did not know any educational software that they believed could significantly improve their instruction. Other teachers were interested in educational software but felt they could not introduce the new technology into their teaching and still cover the required curriculum.

> "As teachers vary in their educational beliefs, their teaching styles, their policies regarding curriculum, they adopt different approaches to educational computing in a distance education setting. Therefore, it is important to study teacher's existing attitudes and pedagogy, which can enable them to better understand their acceptance to the computer, their style of implementation and the outcome of their computer use in distance education classrooms" Smith, Houston and Robin (2004).

In developed countries, new techniques, skills, and tools for teaching are being tested and applied at all levels within distance education institutions. The hope is that computer use will help revolutionize the distance educational system and set patterns that will have a positive long-term influence on the further development of education. In less developed countries, distance education institutions are far from using computers as instructional material in teacher training classrooms (Rashid, 2007).

Recent developments in the field of computers, both hardware and software, are extending their influence in the world and in education. Researchers like Wills (2001) consider invention of the computer as to be of even greater significance and consequence to humanity than the industrial revolution of the nineteenth century. In developed countries, use of computers in post-secondary education is quite varied. They are widely used for instruction, for example, in medical science, where students practice diagnosis and prescription on a large number of patients simulated by a computer program. Educators should be concerned with computers and ways to use them for teaching and learning. Computers are successfully used in many disciplines in developed countries. In less developed countries there is even greater need for computers. Computers are an instructional tool to enhance leaning and understanding of knowledge.

This study was conducted to develop a computer instructional material model for teacher training at AIOU. Specifically, it was designed to explore role of computers for instruction in teacher-training programmes, use of computers for instruction by instructors/tutors, and to develop a computer-based instructional material model for teacher-training programmes at AIOU.

Nine hypotheses were formulated for this study:

H_o1: In Pakistan, teacher training students who use computers as instructional material show better understanding of concepts than students who do not learn from computers.

H_o2: There is no significance difference between the performance of students who use modified books according to use of computer as instructional material and those who used textbooks not modified for computer use as instructional material

H_o3: There is no significant difference between the academic achievements of the students who are using computer as instructional material in teacher training classes in comparison with those who are not.

H_o4: Students of teacher training program of AIOU, who are teachers themselves in different institutions, do not use computers in the classrooms where they teach.

H_o5: Most of the students of teacher training programs of Allama Iqbal Open university Islamabad do not know how to use email in order to contact the university.

H_o6: Most of the students of teacher training programs of Allama Iqbal Open university Islamabad are not computer literate.

H_o7: Tutors and Instructors do not use computers as an instructional tool to present material to students of teacher training programs of Allama Iqbal Open University Islamabad

H_o8: Most of the students of teacher training programs of Allama Iqbal Open university Islamabad do not use Internet for research and study

H_o9: Most of the students of teacher training programs of Allama Iqbal Open university Islamabad are not familiar with any software such as MS word, Power Point or MS Excel.

Population and Sample Size

The total population for the study was comprised of 2000 students of teacher-training programme of AIOU, 15 academicians and administrative staff of education faculty of AIOU Islamabad and 20 tutors and resource persons.

Tools of Research:

The researchers prepared questionnaire containing open-ended questions and restricted answers. The questionnaire for student comprised of demographic questions, 54 close-ended questions and 8 open ended questions. The questionnaires for academicians, tutors/instructors had both open-ended and closed-ended questions in order to find out their opinions. In all these questionnaires mostly questions were asked about the use of computers as an instructional material in teacher-training classrooms. Expert opinion was taken into consideration for preparation and validation of questionnaire.

Pilot Study

Researcher conducted a pilot study at Faculty of Education of AIOU in the months of August and September during the year 2005. The sample of pilot study was 84 students, five academicians, five tutors and two instructors. Researcher also discussed the questionnaires with staff of faculty of education and other researchers personally. Pilot study was conducted to revise questionnaires and to see how effective the questionnaires were. Sample was asked not to solve the questionnaires, but to read these for language improvements and to see effectiveness of the questionnaires. Questionnaires had been revised and the language had been improved according to the suggestions of the respondents. The number of questions has been reduced to 54 from 81. Language of certain questions has been improved. Similar improvements were done in other questionnaires.

Questionnaires were validated for the present study by authentic sources, colleagues and by the staff and faculty of the education department of Allama Iqbal Open University Islamabad. Questionnaires were sent to 23 different individuals who have extensive experience in educational research. Very few changes have been made in the in the light of their opinion.

Final Study

The final study was conducted during early summer of 2007. The population for the final study consisted of all the students, staff, supporting staff and faculty members of the Departments of DNFE (Distance and Non-Formal Education) and Teacher Education of the Faculty of Education Allama Iqbal Open University Islamabad.

From the population a proportionate sample was selected by using simple random sampling technique. The population for the study consisted of students, who completed a Distance Education and Teacher training course through the Faculty of Education AIOU Islamabad for the semesters Fall 2005 and spring 2006.

Tools of Research for Final Study

In this study researcher used three different questionnaires, one for students, second for tutors/instructors and third for academicians. The questionnaire for students administered in this study had demographic part that followed by items grouped according to the categories like, instruction, computer knowledge, and the use of computer knowledge for classrooms of the teachers training colleges. The grouping of similar items was suggested as the most appropriate and effective form for use with the survey questionnaire. This facilitates the respondent to maintain a single train of thought (Mental use) and to provide well thought out answers.

The students were asked to respond to each item using the 5-choice Likert-type scale. The possible responses were strongly agree, agree, neutral, disagree, and strongly disagree. Each of the response categories was assigned a numeric value. A response which indicated the highest positive response (strongly agree) was symbolized by a “5” and a response, which indicated the greatest negative response which was indicated with a response of “1.” The third section of the student questionnaire had 10 open ended questions.

Second questionnaire was developed for academicians. This questionnaire contains 12 closed-ended and 8- open-ended items. Percentile ranks and scores were applied on this questionnaire.

The third tool was a questionnaire for the tutors and instructor (resource persons). Researcher used same tool for both instructors and tutors because the nature of their job was same and most of the instructors were also working as tutors. This tool contained three parts also. Part one had demographic questions and part two consisted of about instruction and planning. That part of the questionnaires had closed-ended questions. Part three contained a few open-ended items and deals with tutoring.

The questionnaires were coded in the upper left-hand corner on the front of the first page. This coding device allowed for respondent to be identified in order that follow-up mailing to those who did not return the questionnaire. All the questionnaires were anonymous.

A reminder postcard that encourages non-respondent to respond to the survey followed the initial mailing. This reminder was mailed August of 2007. The amount of time between the initial mailing and the mailing of the post card was lengthy in order to allow for the possible complications with the seasonal abundance of mail. Mailing of a second copy of the questionnaire followed the reminder postcard to respondents who so requested. The number of initial respondent was 539.

The initial mailing resulted in a return of 371 questionnaires prior to August 01, 2007. Following the reminder postcard mailed to non-respondents, 11 questionnaires were received by August 31, 2007. After this no additional questionnaires were included in the study.

Data Analysis was performed in several phases. This first phase comprised descriptive over view of the demographic data. The next phase included factor analysis to identify composite variable to represent the many charters of significantly interrelated independent variables. The resulting composite variables were then used into the final phase utilizing ANOVA and p-value. Analysis of variance (ANOVA) was applied in order to examine bivariate relationships and determine whether or not these relationships are significant.

Dependent Variables

The basic dependent variables of the study were student access to computer as an instructional material, computer training, understanding of educational software, instruction style of the instructor/tutor and how comfortable they were with the model. The questionnaire items were subjected to factor analysis designed to determine the principal components. This purpose of factor analysis is to discover simple patterns in the pattern relationships among the variables. In particular it seeks to discover if the observed variables can be explained largely or entirely in terms of a much smaller number of variables called factors.

Independent Variables

The basic dependent variables in this study were considered both as represented by the questionnaire and as composite variable after it was shown to have no interaction effect with any of the other independent variables. Some researchers indicated age as a variable, which contributes to the difference in learning between traditional college age students and adult students. No other demographic variables were considered in terms of their interaction effects with other independent variables.

Tabulation was conducted by making a master sheet on a spreadsheet of MS SPSS (statistical Program of Social Sciences). A numeric value was assigned to each response. All responses were defined and were given a label. Two different statistical tests were applied, ANOVA and P-Value.

Results and Discussion

This study was designed to make a computer based instructional material model for the teacher training classes of Allama Iqbal Open University Islamabad.

First part of the student questionnaire had demographic information. All the questionnaires were anonymous. The sample's age group was between 20-39 years of age. More females responded to the questionnaires than males. Sample was highly qualified mostly having either a bachelor or master degree in education. The teaching experience range was 5 years to 16 or more years. Majority had the computers in the offices they worked but none had the computers in the classrooms. Many of the respondents had computer literacy experience and they were those who took the computer literacy class at Allama Iqbal Open University. Some of the respondents also accepted having a computer at their homes.

The second part of the questionnaire had Likert type scale. P-value and ANOVA were applied in order to get the results for discussion

In open-ended question section respondents agreed that Teacher Training Program of AIOU is far behind in the use of computer generally and as instructional material particularly as compared to the developed countries. They feel that there should be more training available to future teachers

to learn to use computers to present instructional material in their own classrooms. They feel that this is the age of technology and involvement of computers in the classrooms is a necessity for future progress. They agreed that at office level AIOU Islamabad have computers and they are widely in use but none of the classrooms have computers in them. Even the main library does not have computers available to students. Tutors and instructors should have their own web sites and email addresses available to students. At this moment correspondence is through mail only and none of the instructors or tutors have a web site although Allama Iqbal Open University has its own web site. The respondents feel that Allama Iqbal Open University is a distance education institution and must use a computer based instructional material model for teacher training classes and also for other classes. Some teachers who live in remote area of the country and this may be the only opportunity to learn and use computers.

Two other questionnaires were used in order to find the expert opinion of the tutors, instructors and academicians. Their responses were in agreement with student's responses. Some of the academicians had foreign training and education. They are familiar with the advancement and use of computers in the present classrooms of developed countries. Some of them have visited British Open University and other open universities of the world and accept that Allama Iqbal Open University is much behind in the use of computer to present instruction in teacher training programs. They agreed that there is a need for total change in the system and the use of email, web sites, and CD ROMs could eventually reduce the cost. At this moment, the university spends millions of Rupees (thousands of Dollars in US) in mailing text materials to the students. A significant volume of these do not reach the destination or arrive damaged. On the other hand, materials on CD ROM can be developed cheaper and faster and mailed to students at less expense. That may reduce the overall expenditure of the university. The remainder of responses to the questions were in complete agreement with responses of students discussed earlier.

The experts and the faculty confirmed that they did not have email addresses or web sites themselves and were not comfortable with the use of technology. Their contact with the students was through mail only and they not use computers to present instructional materials in their classrooms. They also did not require students to use technology for research or assignments.

Conclusion

The first hypothesis proved to be true – respondents demonstrated better learning and better grades in AIOU teacher training classes that used computer to present instructional materials.

The second hypothesis proved to be false – there was a significant difference in the performance between students who used modified textbooks.

The third hypothesis proved to be false – academic achievement was better in the course the respondents took that used computers than the others.

The fourth hypothesis proved to be true – most respondents do not use email to contact either tutor or the university. Also, most teacher training students at AIOU Islamabad do not use computers in the classrooms where they teach.

The fifth hypothesis proved to be true – most students of teacher training programs of AIOU Islamabad do not use email in order to contact university.

The sixth hypothesis proved to be true – most students of teacher training programs of AIOU Islamabad are not computer literate.

The seventh hypothesis proved to be true – most tutors and instructors of teacher training programs of AIOU Islamabad do not use computer to present instruction during workshops

The eighth hypothesis proved to be true – most students of teacher training programs of AIOU Islamabad did not know how to use the Internet to conduct research or find information on line.

The ninth hypothesis proved to be true – most of the students of teacher training programs of AIOU Islamabad were not familiar with software like MS Words, PowerPoint and Excel.

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