

Supporting the Technical and Vocational Training for Girls Through Web

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Abstract

The emergence and the proliferation of models for online and flexible learning initiated a process of convergence between the traditionally distinct face-to-face education and distance education. This paper discusses the use of Information and Communication Technology (ICT)-based tools for supporting technical and vocational training. The Open Polytechnic of New Zealand has been used as an example to illustrate good practices in supporting students over the Internet. Over 60 years tradition in distance education and with average of 2/3 female students on the course, our experience becomes relevant for technical and vocational training for girls particularly in Islamic countries.

After brief introductory remarks about the changes in the global learning environment the various Internet tools for students support are discussed. We consider further changing roles of the teacher in the distance education and the new pedagogy the ICT-based tools imply. Finally the way in which these new technologies can be used to support the demands of the technical and vocational training for girls are considered.

Keywords

Student support, Internet, distance education

1. Introduction

Over the years the meaning of “distance education” has changed. It has moved from correspondence study and mail delivery, to ICT supported learning. Taylor (1995, 2001) provided a theoretical framework for discussion how the distance education evolved from the first generation (well-known the correspondence model), through second (multimedia model), third (telelearning model), fourth (flexible learning model) to the fifth generation which is the intelligent flexible learning model. The emerging and proliferation of models of online and flexible learning has initiated a process of convergence between the traditionally distinct and separate distance education and face-to-face education. This also known as blended or mixed learning mode creates an additional educational avenue. Pure flexible and blended learning provide excellent

opportunities to use ICT in technical and vocational training.

The literature on distance and flexible learning reports on the wide acceptance of ICT-based education, and highlights successful development efforts. The introduction of a typical online learning programme radically changes the relationship between the learner, the educator, and the manager; a shared learning space is created, defined by the nature of the educational institution and by the interactive relationship between the tutor and the learner without the need to meet face to face. A fifth generation distance learning model raises expectations that the vocational education and training would be accessible by those who were so far left outside the traditional educational and training facilities. Taylor (2001) defines this fifth generation model as involving the use of interactive multimedia online, Internet-based access to WWW resources, computer mediated communication, using automated response systems and portal access to institutional process and resources.

As the need for technical and vocational training for girls becomes more important in Islamic countries, the demand for a high quality distance education, which is one of the main ways - and, in many cases, the only possible way - to deliver technical and vocational training for girls is higher than ever before. The advantages of flexible distance learning are particularly attractive for girls students, who are looking for the education necessary for their careers, but have full-time at home and families to look after.

For over sixty years The Open Polytechnic of New Zealand has delivered education in a flexible, open and distance learning modes. At present 35,000 students a year enrol in a variety of technical and vocational training programmes from certificates to degree level. It is interesting in light of this paper to note that the majority of students at the Open Polytechnic are girls (on average 2/3 students on a course are female), they are over twenty five years of age and are part-time students. Most of our students at The Open Polytechnic, who enrolled in the degree or diploma level courses in Information Technology, belong to this category, but there is always

another category of female students who are studying just because of their "internal" need for self-improvement.

Since 1996 the Open Polytechnic of New Zealand, embarked upon their Internet Project to determine the viability of web-based instruction as an accessible cost-effective delivery system, particularly for students in the growing technical and vocational area. Initially the courses at the Open Polytechnic were largely print-based, but now mostly on the Internet including also materials on audio and video tapes, disk, and CD-ROM.

To develop an effective learning environment for our students we have tried to ensure that the main pedagogical principles underlying high quality education are fulfilled. We believe that especially important pedagogical aspect in distance learning is a human interaction.

Learning always requires interaction, both teacher-student and student-student. We consider this interaction as the main contributor to the active learning and development of technical and vocational training.

Student interaction has helped students to learn and develop some subject knowledge by planning, sharing, comparing and contributing information resources. Johnson & Johnson (1996) identified various 'interaction patterns' when a student interaction at the group level is concern. They categorised these patterns as follows: 1) giving and receiving help and assistance; 2) exchanging resources and information; 3) giving and receiving feedback; 4) challenging each other's reasoning; 5) advocating increased efforts to achieve; 6) mutually influencing each other's reasoning and behavior; 7) engaging in the interpersonal and small skills; 8) processing group members effectiveness. Our experience shows the same 'interaction patterns' among collaborative study groups formed on our courses.

We consider further the various Internet tools for students support, changing roles of the teacher in the distance education and the new pedagogy the ICT-based tools imply.

2. Internet Tools

Following is a description of some of the tools that we can now implement and experiment with in our efforts to enhance educational practices through the Internet and the World Wide Web.

2.1 Course website

Multimedia provides a fast, reliable and easy-to-use computer interface and presents information in a way that holds a student's attention. It is always fresh, clear and

comprehensive. It allows the tutor to control the processing of information and presentation and to tailor the computer's ability to question, analyze, and respond - thus guiding the student along a path that best meets the learner's needs.

Multimedia technologies found their first significant application in computer-based training (CBT). Learning to assemble a machine or to understand a complex procedure requires visual realism, which CBT achieves by delivering controlled video segments from a videodisk. Students navigate the information at their own pace, while the system maintains a progress record.

To enhance our teaching, we can place our lecture on a Web home page; we can combine the text of the lecture with pictures, diagrams, audio and video clippings - thus creating a digital document. Using the client-server model of the Internet, we can place this information on a server; the student acquires the ability to access course material anywhere, any time through a client computer and this indeed is one of the strengths of the emerging communication mode, which does not require coincidence of presence. They can choose the time and place - when and where they are ready to learn. The good side of this way of delivering instruction is that changes in the instruction are not only easy, but take effect immediately. We can augment our instruction by creating branches to other pages on the Web, thus allowing students to explore the subject in a greater depth.

An interactive web page with form-based quizzes is used as a basic assessment tool which provides instantaneous feedback to students. Interactive nature of the course web pages stimulates student's engagement with the course material and thus increases a chance for successful completion of the course.

2.2 Discussion forums

Discussion forums are the main communication tools used in The Open Polytechnic of New Zealand to support students. Forums replaced mailing lists used at the early stage of Internet-based students support at The Open Polytechnic. Shifting from the mailing lists to discussion forums occurred because of more features and flexibilities in structuring students support discussion forums are offering. Discussion forums allow a structured/threaded discussion between teachers and students and between students themselves. Forum system could send an email notification, but at the same time keeping each posting in archive on the server making the past discussions available at any time.

2.3 E-mails

This is the most common mode of electronic communication for on-to-one student support. Students send email messages to us directly to seek individual assistance or to comment on some aspect of their learning. However, for a teacher answering individual emails is a time consuming process. If the question asked in the email was of general interest we advised sender to post the same question in student discussion forum hoping that other students will provide answer or that our comment, if we had to answer it, would reach much wider audience. E-mail exchange has proven to be one of the dominant uses of the Internet both in academic and business circles. Its advantages are by no means restricted to a learning environment, and include faster, more responsive communication which (unlike voice communication, for example) can be easily archived, and does not require the communicating parties to be all present at the same place or time. E-mail has also been shown to have an impact on hierarchical structures, and has great potential to make the instructor-student relationship more collaborative and less authoritative. Finally, e-mail encourages peer-to-peer communication by breaking down interpersonal barriers amongst students. This allows a learning culture to form within a class, independent of geographic and social factors, at the same time entailing inevitable extension of working time an intensification of work for teaching staff (Noble, 1998).

2.4 Chats

While discussion forums and e-mail are mostly used for asynchronous communication, synchronous online discussions in the chat rooms can be conducted through exploring relevant Internet technology for synchronous dialogue between a teacher and a class of students. A live conference room or a chat room can be set up for all students in a class to log into at the same time. Whatever a student types on his workstation is displayed along with his name and is broadcast to all participants of the conference. Protocols must be established to facilitate the orderly flow of discussion. The discussion text can also be stored so that both participants and other parties can later review it. This technology involves high levels of cooperation and needs careful management; motivation of teachers and students is one of the critical success factors.

2.5 Online Course and Reference Materials

In this mode, the lecturer posts documents such as course texts, practical exercises, case studies and other reference materials to a course website where the students can access them via a browser. There are obvious advantages to this method over traditional paper-based resources; more specifically the instructor is able to make resources available through hyperlinks or even direct citation, rather

than recommending materials, which may be difficult to find - particularly where extramural students do not have access to libraries. Furthermore, many students, in contrast to printed resources, of which an institution will only have a few copies, can access online resources simultaneously.

Currently however the Internet offers lower-quality (almost free) material than traditional "paid" reference sources such as books and journals. The obstacle to providing quality online reference sources lies in the lack of an established electronic payment infrastructure, which would make it worthwhile for authors and publishers to make their works available digitally. A development in e-commerce, micro transactions in particular, is suited to make this possible through the automatic payment of small amounts of money occurring each time a resource, or part of a resource, is accessed. The whole new industry emerged - the online equivalent of today's libraries, unrestricted by geographic or social boundaries as predicted by Kalakota & Whinston (1997).

2.6 Workgroup Computing

Workgroup computing is a computing paradigm to enable groups of people to work together, for instance to create publications, reports, or databases. A case in point might be a market survey report to management as a basis for deciding whether the company should venture into a new market. Students simulating a company environment can do this. There are some entirely new advantages to be gained by "sharing" data for a particular assignment among a number of applications - and by enabling a number of people to work on the same document at the same time. One student may be responsible for gathering information about the market. Another may be responsible for compiling a comparative dataset - perhaps using data from the company's own internal accounting - and a third student may be assigned the task of covering the data into presentation graphics for inclusion in the final report by a fourth student. The various learning management systems (LMSs) such as WebCT, Blackboard and open Source Moodle LMS we are using in The Open Polytechnic of New Zealand are designed to facilitate an interactive exchange of information via use of calendar, group private space, forum, and other resources, supporting thus a collaborative group work.

3. An online programming course

The course *Programming with Visual Basic* was introduced in The Open Polytechnic of New Zealand in the first semester of 2001. This is an introductory programming course, which is quite intense and contains some elements of more advanced programming concepts and techniques. The course is based on the printed learning material and the textbook, but the teaching process occurs online. This

process includes teacher-student and student-student interaction, support, assessment submissions and feedback. All students are participating in discussion forums and all course assessments have been submitted through the Online Campus web site.

The structure of the printed Learning Guide accommodates basically the teacher-directed approach – predefined sequence of topics, programming exercises and activities organised on a week-by-week basis. We believe that this approach is justified for this course specially for girls, taken into account the introductory level of the course and the nature of the subject, which demands a carefully defined, logical order of topics to study.

The course in computer programming especially needs to employ a problem-based learning; for that reason our course included a large amount of programming exercises and projects. The contents of many of these programming tasks reflect real-world situations.

A part of these programming activities consists of the weekly programming projects. We consider these weekly projects as an essential part of the course. The first time when the course was offered it appeared quite hard for a teacher to cope with almost a hundred student projects coming in on a weekly basis to be assessed. To reduce the teacher's workload in the next semester, we introduced a practice of posting sample solutions to the weekly projects on the course website. The solutions have been sent out on the day following the due date for the particular project. This eliminates the need for providing an individual feedback for every student, but the general feedback highlighting the common errors, has been posted to the course website. The weekly programming projects, on the one hand, helped to maintain a good pace of studying, and, on the other hand, helped the teacher to be aware of a student's misunderstanding of the particular topic in a timely fashion and to be able to provide a prompt feedback.

3.1 Teacher - student interaction

The interaction between teacher and students in our course has been mostly maintained via emails, telephone dialog, but mainly via discussion forums. Email conversations with our students proved to be very useful and fruitful. In this mode (as opposed to face-to-face dialogs), students have more time to carefully formulate their questions; that is advantages for both teacher and student. Teacher-student contacts were also helpful in motivating students to continue working, when they had family or work related circumstances.

A very important component of teacher-student interaction was communication via the course discussion forums. The teacher has used the discussion forums for several different purposes:

- providing instructions, tips, and advice on the current topic
- answering commonly asked questions
- providing links to relevant web sites
- sending questions to be discussed on the forum
- providing sample answers to programming exercises and projects
- stimulating and encouraging students
- sending marking sheets and comments on assessments.

The teacher's feedback included answers to ad-hoc students questions, sample answers to programming exercises and weekly programming projects, and marks and comments on in-course summative assessments.

3.2. Student - student interaction

One way to encourage students to communicate with other students or to remove their fear of the new communication technology is to ask them to post a few words about themselves (for that purpose we have created a thread: *Introduce Yourself!*). Students willingly did that, describing their biography, family, goals in life and study, hobbies etc. This helped to create a community of learners. We find these postings very useful. Some of them wrote about their fears of new technology or feeling anxious about studying again after a couple of years after they left school. Their comments put the other student at ease, because now they know that they are not alone feeling stressed at the beginning of the course.

The interaction between students in our course mostly occurred through the discussion forums. Here again, this mode of Internet-based discussion, proved to be really effective, as students had a chance to carefully think through the discussed issue. It is hard to overstress the importance of discussions - sometimes inspired by the teacher, sometimes spontaneous - in grasping the core programming concepts and clarifying poorly understood details, as well as in stimulating and motivating students.

3.3 Online pedagogy

When students ask questions on the forum a teacher do not rush to answer the question himself, but used this situation as a chance for students to answer the question. This was favourable to both parties – one part of students learned from others, while the others felt themselves more confident in the newly acquired knowledge, as well as satisfied with helping others.

There are some components of the human communication that are missing in online communication; communication includes such things (except words) as voice modulation, body language etc. Students usually try using other ways or special techniques, such as 'emoticons', to compensate these lacking interaction components and express their emotions. The teacher can help students to familiarise themselves with these and others Netiquette rules and techniques.

It is worth to note, that to maintain a high level of interactivity, the teacher should spend a lot of time, participating in class discussions and personal dialogs, but this will pay-off by students satisfaction and knowledge. Eventually more active and engaged students will increase completion and retention rates.

Learning is not a passive process, especially when the subject of learning is computer programming. To make the learning active, discussions on the forums have been a key tool. Another tool that we employed to facilitate active learning was a student journal. Students used the course journal as a workbook to record their responses to activities and specific questions about the course content, and, most importantly, to record their reflections on the learning process. We explained to students that their student journal can be a very good tool of learning how to learn. We asked students to reflect not only on what they have learned, but on their approach to learning - is it effective or not, are there better ways of studying? Students were advised to reflect on problems, difficulties they met and the ways to resolve these problems.

Both tools – discussion forums and the course journal – proved to be successful in achieving their goal and we had a very positive students' feedback on that. The followings are students' responses regarding the forums:

- *"...there's been the feeling of being in a class of friendly and helpful people. I really appreciate that."*
- *"The discussion forum has really helped me and I'm sure others in keeping up the motivation to keep on trucking on."*
- *"The liveliness of the interchanges and the atmosphere of "we're all in this together" made me realise how powerful an aid to distance learning the discussion forum can be."*
- *"I thought the discussion forum was very user friendly and helpful. I looked forward every time I was studying to seeing the forum email notification."*
- *"I found the discussion forum extremely helpful. As I struggled with this course I found it was great to be able to post questions to the list and get helpful hints*

from others doing the save course. It also helped knowing I wasn't the only one having trouble, I have chosen to study through The Open Polytechnic as it is the only way I can fit my study in with my work and family commitments. The only problem is not having daily contact with other students and the opportunity to compare notes. The forum goes a long way to overcoming this problem."

4. Concluding Remarks

We are participants in a revolution that is changing the way we live, communicate, think, educate and prosper. Around 5,000 years ago our ancestors first learned and taught how to grow crops and put animals to work. This started the agricultural revolution. Around 250 years ago they discovered the power of steam and pioneered the industrial revolution. Over the past 10 years, we have entered the age of instant information and education on demand, and the world will never be the same again. A revolutionary new economy is arising based on knowledge rather than conventional raw materials and physical labor.

New technologies increases learning effectiveness and make online education and open learning even more appealing over traditional, lecture-based teaching It reveals significant potential in improving interpersonal communication skills, increasing productivity and reducing educational cost as the primary cost of online instruction shifts from replication, distribution and delivery to design and production.

If institutions teaching technical and vocational training for girls collaborate and develop complementary student support material, the cost per student could be reduced, as more students will be using the same material. It would also bring instructional consistency between them. Technology based instructional systems do not have bad days or tire at the end of a long day. Instruction can be delivered in a well-tested and reliable fashion that does not vary in quality from class to class or from institution to institution.

With supplementary material on the Web, students are free to ask questions and explore areas that might cause embarrassment in class situation. Instructional systems never lose patience - they encourage students to persist in asking questions and reviewing material. What is more, a well designed interactive system need not move on to new material until the current material is mastered to ensure that students have a strong foundation for their continued learning. The very process of interaction provides a strong learning reinforcement that significantly increases content retention over time.

The new teaching and learning environment currently unfolding before us is set to change dramatically the traditional roles of the girls students and teacher. The role of the teacher will shift from that of subject expert to a facilitator managing the transformation of information into knowledge. Furthermore, in light of the speed of progress, the teacher himself will be cast as a learner, continuously updating his knowledge base and enabling students to do so as well. Information will be increasingly made available from sources other than the teacher and a new emphasis will be placed on leadership and motivational skills. Still the Internet is just a medium, and there is plenty of room to develop different student support services and to make the most of all available technologies – while relying on the teacher's dedication and ability as the most important educational tool.

Although the teacher is physically separated from the girls as distance learners, the major pedagogical principles of a good education are still in place. The way humans learn doesn't change. Girls students need support, feedback, and motivation. They need some ways of expressing themselves; not only their thoughts should be involved, but emotions as well. They need to explain how they understand the particular aspect of the course, how they approach the given task. They need also a confirmation that their understanding is correct.

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