

# Integrating New Technologies in Distance Education: Pedagogical, Social and Technological Aspects

*Michal Beller*

*The Open University of Israel. 16 Klausner St. Tel-Aviv 61392  
Israel, tel: +972 3 6460790, fax: +972 3 6460700,  
e-mail: michalb@oumail.openu.ac.il*

## **Abstract**

This paper briefly describes three modes of distance learning currently practiced at the Open University of Israel (Independent Learning, Distributing Classrooms, and Learning Community), and the way modern technologies are integrated in each mode. It is believed that certain media, particularly those which combine screen and telecommunication, have the potential to mediate more of the teaching goals and learning activities. The integration of advanced technology into higher education in general, and the OUI's teaching process in particular, presents an excellent opportunity of improving the services provided to students, while preserving the unique character and relative advantage of the University as a distance-education institution which maintains high academic standards and keeps abreast of changes and innovations. These technological means are incorporated as needed into the written course materials which the OUI produces in the diverse disciplines. The development of the proper pedagogy most suited to each mode of distance education remains a challenge.

## **Keywords**

Distance education, telecourses, multimedia, satellite, computer-mediated-communication.

## 1 INTRODUCTION

Laurillard (1993) claimed that the learning process must recognize the special character of academic knowledge and entail a dialogue between teacher and student. This dialogue should be discursive, adaptive, interactive and reflective. In particular, teachers and their students must agree on learning goals, make their concepts accessible to each other, and provide mutual feedback. The teachers have to alter the

focus of the dialogue in the light of the emerging relationship between their own and their students' conceptions, while the students must act to achieve the task goal. The teachers must provide the students with feedback on their actions, and help them link the feedback to the topic goal at every level.

In the framework of distance education technology offers an opportunity to facilitate some of the target learning goals cited. It allows students to ask more probing questions, and enables teachers to devise assignments that help students confront their beliefs and test their skills. Electronic mail and computer conferencing may provide students with safer and more thoughtful means of discourse and communication, as well as, more and better feedback than ever before from their peers, from distant experts, and from their instructor. Being more interactive with their peers, students would begin to bond, and to take more responsibility for their own learning (Daniel, 1995).

To create such a learning environment, and also to extend access to a more diverse set of learners - while controlling spiraling costs - the Open University of Israel (OUI) has decided that it should introduce improved educational strategies and new ways of organizing teaching and learning. It is believed that certain media, particularly those which combine screen and telecommunication, have the potential to mediate more of the teaching goals and learning activities. However, buying the hardware will not, in and of itself, solve the problems. What matters is *how* the technology is to be used to achieve the targeted pedagogical goals.

The Center for the Design of Distance Teaching Methods was set up by the OUI in order to develop and assimilate new distance learning methods by incorporating state-of-the-art technologies into the existing course-development and teaching procedures. These technological innovations will be incorporated as needed into the written course materials which the OUI produces in the diverse disciplines. By coordinating and integrating the diverse teaching media, OUI aims to (a) improve the quality of the learning experience, and (b) enhance student outreach and retention.

a. The of quality of the learning experience will be improved by:

- Bridging over geographical distances and allowing for an ongoing dialogue between students and their tutors or their fellow-students.
- Opening up new avenues to OUI students by increasing guided independent resource-based learning, providing feedback and offering more opportunities for practice.
- Improving and upgrading instruction by taking advantage of multimedia aids capable of transmitting study material with accuracy and speed.
- Providing learning possibilities which do not depend on time, place or means of instruction, while allowing students to choose the interactive learning process that best suits their needs and styles.

b. Student outreach and retention will be enhanced by:

- Using technology to broaden student range and recruit from new groups.
- Improving access for students with learning disabilities.

- Improving advice to students on course selection.
- Improving retention through a better advice system and an enhanced quality of learning.

OUI faces an exciting challenge: How to deliver personalized, easily updated, performance-focused, learner-controlled multimedia learning tools and information to the desktop, the office or the student's home, as well as to study centers and laboratories. Miller (1995) describes three modes of distance education (DE), all of which are utilized at the OUI: Independent Learning, Distributing Classrooms, and Learning Community. Ahead is a description of each mode, its advantages and disadvantages and the form it currently takes at the OUI.

## 2 INDEPENDENT LEARNING

This mode of DE is based on correspondence or broadcast courses. It assumes that the students are studying alone, that each student controls the pace of learning, and that learning takes place at different times and in different places. Instruction is material-based and interaction is formalized. Accordingly, approaches to Independent Learning are based on: correspondence study (written material); TV-assisted teaching (telecourses; TV cable stations; VCR), and multimedia interactive courseware (CD-ROM).

The strengths of the Independent Learning mode are: learner control over the learning environment; course production may be inter- or multi-disciplinary; instruction is multiple-media based. The weaknesses of Independent Learning are: rigidity of course design (once created and then long used); student isolation (from each other); teacher isolation, and lack of interactivity on the part of correspondence and TV-assisted courses.

### *2.1 Correspondence study at OUI*

This is the traditional and currently the most widely used means of teaching at the OUI. It is based on printed texts sent to the student's home. The text-books are meticulously formulated and attractively illustrated to highlight and enhance learning. The text is designed to be the best possible "written lecture" in the field, and, as such, the OUI enlists the cooperation of distinguished faculty from other institutions of higher learning. The OUI produces texts for all of its courses and is the largest University Press in Israel and one of the largest publishing houses in the country (the University publishes around 450,000 volumes a year, about half of which are purchased outside the framework of the University's courses).

### *2.2 TV assisted teaching at OUI - Telecourses*

Television broadcasts (on cable TV) accompany many of the OUI courses. Some of these broadcasts are produced by the University expressly for its courses and others are quality films acquired by the University for its educational purposes.

A number of companies around the world have been engaged in the development of academic courses that are transmitted partially or entirely via television. They are

known as telecourses. Telecourses are usually accompanied by a viewer's guidebook. The OUI has operated one such televised course to date: "The World of Chemistry". A second telecourse, "Developmental Psychology", has been approved for operationalization, while several telecourses are to be adapted in various other fields. It has also been decided to self-produce telecourses in areas where courses are scarce and in which television has an obvious advantage. One example is the production of a telecourse on opera (combining existing operatic excerpts with a narrative produced in Israel) which is well under way (Gordon-Chen, 1995).

### *2.3 Multimedia interactive courseware at OUI*

The OUI aims at developing and adapting computerized, interactive supplementary learning facilities that combine text, image, video and sound (CD-ROM, diskettes). Multimedia integration is designed to afford easier access to masses of up-to-date information, and to encourage inquisitive studying. It generally falls into the following categories: data-banks; computerized lessons and exercises: problem-solving tasks; displays and simulations: and laboratory experiments. Several multimedia courseware programs, displays and assisting material, are currently developed in various fields of study. In addition, selected multimedia courseware, produced by others, is adapted and integrated into the OUI courses (Klemes, 1995).

## 3 DISTRIBUTED CLASSROOMS

This mode is based on the simultaneous distribution of teaching from a central location to groups of students at different locations. The pace of learning and the material is instructor/institution based, and spontaneous interaction may occur. The approaches to the distributed classrooms mode are based on interactive communications technology: audiographic conferencing; one-way video, two-way audio; compressed interactive video systems; interactive satellite communication; computer conferencing, and multiple media.

The strengths of the Distributed Classrooms mode are: spontaneous interaction; learning can take place in different and outlying locations; courses are easily updated; and the quality of the lecture is similar to or better than on-campus classes. The weaknesses of this mode are: some what limited interactivity; same-time teaching, and teacher isolation.

### *3.1 Studies via satellite at OUI (Ofek)*

The OUI is presently embarking on a teaching program of distributed classrooms using Ofek, an interactive satellite communications system for interactive distance learning via satellite. Ofek operates under a cooperation agreement between the OUI and two companies engaged respectively in communication and computers: "Gilat" Communication Engineering, and "Arel" Communication and Software. The system enables a teacher to deliver a "live" lesson from a central studio concurrently to any number of classrooms throughout the country.

The students in these remote classrooms can participate in the lesson by means of voice communication and data communication.

Instruction via Ofek provides the lecturer with technological means to improve the quality of instruction and the internalization of new knowledge by the students. This innovative project requires the development of all the tools and instructional components needed for teaching programs using interactive satellite communications. The OUI has established its instruction program via satellite, creating an initial outreach throughout Israel. A broadcasting system was set up at the main campus. It comprises a central computer and a studio fully equipped to process a broad range of visual information. This consists of three video cameras, two PCs and a Mac computer used for computations and multimedia presentations, a special writing board, a color scanner, audio sources, CD and tape.

Fifteen classrooms throughout the country are equipped with computerized equipment and telephones enabling students to speak to the lecturer at the center and to enter their computerized responses. At present Ofek applies to eight academic courses and eight continuing education courses for teachers, and will transmit 800 hours of teaching this year through this system. The main advantages of delivering courses via satellite are as follows (Or, 1995):

a. The best lesson

Teaching via satellite enables the best and most proficient lecturers and experts to teach and present any given subject. Usually, these experts are not accessible to most students or teachers, particularly those who live in remote areas. The system “forces” the teacher to prepare the lesson well by utilizing all the audio-visual means at his/her command. It is thus possible to combine the best teacher with a fine lesson, thoroughly prepared with the help of experts, and utilizing the most advanced aids and technology.

b. Economy of scale

Since the number of participating classrooms is technically unlimited, one may add classrooms to the extent of the interaction level one wishes to allow for. The high cost of preparing the lesson is divided among the receiving classes. The number of students per classroom can also be increased at no extra cost.

c. The lesson “comes” to the student

Classrooms can be installed everywhere, without delay, thus saving students traveling expenses and time. Since the time factor of arrival in class is reduced or eliminated, lessons can be planned according to purely didactic considerations: they can be split into several meetings and take place at times that are most convenient to the students.

d. A 24-hour communication system

The system’s two-way audio and data communication facilities can be used at all hours of the day or night. These include electronic mail, voice response, teleprocessing, access to information banks, etc.

An evaluation of several teacher’s training courses, conducted after 12 sessions, has revealed a high level of satisfaction among the participants. In comparing their experience with satellite classes to their previous experience in regular classes, 85%,

86%, 95% and 96% of the students responded that satellite classes are similar to, or better than, regular face-to-face classes, on the following four dimensions: interest, enjoyment, organization, and focus of the courses, respectively.

#### 4 LEARNING COMMUNITY

This mode of teaching functions at both the individual level and the group level ("virtual community"). It is self-paced within group norms, resource-based and occurs at different times and different places. The interaction (student-student and faculty-student) is spontaneous. The Learning Community approaches are based on computer-Mediated Communication (CMC): asynchronous and synchronous telecommunications media; the creation of a "virtual campus"; direct access to large data bases, hypermedia stacks, "dial-up" access to video and text material.

Daniel (1995) describes three types of CMC that are relevant to university teaching: electronic mail, computer conferencing, and the Internet/World Wide Web, which at present all come together in integrated software packages. Electronic-mail provides asynchronous communication between students and tutors, and submission and marking of students' assignments. Computer conferencing provides group communication (many-to-many), literary discourse, and interactive, reflective and asynchronous communication; discussions are adaptive and flexible. The Internet & WWW provides, ready access to libraries and resources, easy communication with the academic community, navigation assistance in searching resources, bank of course-related audio/visual items, and potentially a network of tutors all over the world.

The advantages of the Learning Community approach are: preservation of the flexibility of asynchronous communication (students control the time, place, and pace of study); ability to communicate freely with faculty and peers; considerable control over the scope and sequence of the material to be studied; holding of synchronous events as needed; provision of access to a rich universe of learning resources. The difficulties are: the necessary requirement for mastery of the English language (Internet is English-based); hardware and computing costs (computing power has declined in cost faster than any technology in history but still does not exist in every home); other costs (of key importance are the cost of making systems work together, the human costs of learning to use tools that are always changing, and demand caused by rising expectations); technological problems; providing a support system (guidance and help in exploiting new technology); training and rewarding moderators .

##### *4.1 Computer-Mediated-Communication at OUI - Telem*

The Computer-Mediated-Communication project at the OUI, called Telem, is an experimental project that is going into its fourth semester (Aviv, 1995). During its third semester it served 200 students (150 in academic courses and 50 in teachers' training programs) who connected through computer communication. Each student received, at his home, a modem and communication software which allowed him to take an active part in a "computerized conference" or a "discussion group" together with the rest of his fellow-students. The students could also communicate with course-coordinators and tutors and ask questions about the course material (or other subjects). They were

asked to carry out assignments in pairs or groups of three, via E-mail, and were free to roam the information superhighways (Internet) and retrieve whatever information they needed. The first courses in which CMC was implemented were all in Computer Science. The intention is to broaden the scope of courses based on CMC.

In order to make CMC a common reality students and tutors must have the necessary equipment at home, and be both prepared and sufficiently trained to use it for this purpose. A reliable and pedagogically effective handling system has to be developed, with careful attention being given to effective moderation (Rowntree, 1995).

## 5 SUMMARY AND DISCUSSION

As distance education has evolved, so too have the roles of student, teacher and institution in the system. Distance education no longer has a distinct pedagogy common to all its forms. The pedagogy of synchronous remote-classroom teaching resembles the pedagogy of classroom teaching more than that of traditional asynchronous correspondence teaching (Daniel, 1995). The development of the proper pedagogy most suited to each mode of distance education remains a challenge.

Eisenstadt (1995) has introduced the term "knowledge media" to describe the "convergence of telecommunications, computing and the learning or cognitive sciences". Knowledge media are about capturing, storing, imparting, sharing accessing and creating knowledge. A medium, according to this approach, is not just a technical format, such as video or CD-ROM, but the entire presentational style, the user interface, the accessibility and the interactivity. A key supposition in Eisenstadt's description of the knowledge media is that, for some media, quantitative improvements in performance (e.g., in speed, bandwidth, ease of manipulation) create changes in kind, rather than merely of degree, insofar as the user is concerned. Today's computer-mediated communications systems are much more sophisticated and provide a good example of an increase in quantity leading to a change in quality.

The integration of advanced technology into higher education in general, and into the Open University's teaching process in particular, presents an excellent opportunity to improve the services available to students, while preserving its unique character and relative advantage as a distance-education institution which maintains high academic standards and keeps abreast of changes and innovations. Therefore, the university intends to move ahead with this innovative project at a pace and on a level that will put it in the forefront of this important field.

By diversifying distance-education facilities, the OUI will enable more students from such target populations as soldiers, teachers, disabled students and new immigrants to join its ranks. It will also be possible to make these facilities available to potential students around the world (from Jewish communities overseas, from the Middle East, etc.). In addition, networks for collaborative course development with scholars overseas can become feasible. Development efforts in this area are designed to make the system more flexible and better adapted to the pedagogical needs of special groups (including students with specific disabilities). Furthermore, it seems that these modern

technologies can, to some extent, compensate students for the absence of a university campus (“virtual campus”).

University libraries’ enormous resources of knowledge and expertise will become accessible to the OUI faculty and students through new electronic links and made available wherever they are needed. Students will interact with research data once available only to specialists. They will explore subjects in the media best suited to the material and to their own learning styles, drawn from a palette of text, sound, video, and still pictures. Researchers in more fields will use visualization tools to find patterns, understand relationships, and work with ideas as metaphors and images. Through the increased proficiency of teachers in the use of technologies in incorporating the spectrum of sophisticated tools and in bringing this knowledge to the environment of their pupils, the milieu of advanced technology will become a fact of life for the young people who constitute the next generation, one which will benefit greatly from the leaps and bounds being made today in the use of technology.

## 6 REFERENCES

- Aviv, R. (1995) *The CMC Telem project*. Personal communication.
- Daniel, S. J. (1995) *The mega-universities and the knowledge media: Implications of new technologies for large distance teaching universities*. Presented in partial fulfillment of the requirements for an MA degree at Concordia University, Montreal, Canada.
- Eisenstadt, M. (1995) Overt strategy for global learning. *Times Higher Educational Supplement - Multimedia Section*.
- Gordon-Chen, N. (1995) *Telecourses*. Personal communication.
- Laurillard, D. (1993) *Rethinking university teaching: a framework for the effective use of educational-technology*, Routledge, London and New-York.
- Klemes, J. (1995) *The multimedia project*. Personal communication.
- Miller, G. E. (1995) *Long Term Trends in Distance Education*. Paper presented at conference organized by the International University Consortium. University of Maryland, College-Park.
- Or, E. (1995) *Satellite mediated studies*. Personal communication.
- Rowntree, D. (1995) Teaching and learning online: a correspondence education for the 21st century? *British Journal of Educational Technology*, 26(3), 205-215.

## 7 BIOGRAPHY

Michal Beller was admitted to the BA, MA and Ph.D degrees at the Hebrew University of Jerusalem, Israel. Her specialisations focus on psychometric methods; psychological and educational measurement; instructional technology. During her professional life she has served as the Director-General of the Israeli National Institute for Testing and Evaluation (NITE) for the last eight years. She joined the faculty of the Open-University of Israel in 1995, and was appointed the Director of the Center for the Design of Distance Teaching Methods.