Using the Internet in the delivery of educational services. Concepts and practical implementation.

ORT Uruguay University. National Director's Forum, Oxford, March 2001.
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A conceptual framework for studying the role of technology in the delivery of educational services.

Two key variables (or constraints) shape the delivery of educational services: *proximity* and *simultaneity*. Proximity (i.e. the need for teacher and students to be close enough to see and hear each other) refers to the physical distance separating teachers and students (or students from each other)[i]. Simultaneity refers to the need for teacher and students to participate *at the same time* of the educational exchange[ii].

The more traditional format for educational services delivery, the classroom, reflects both needs. Most courses are organised for teachers and students to be physically in the same room at the same time. Indeed, the physical lay out of schools and teachers and students' timetables reflect those logistic imperatives.

Historically, technology has been used to attenuate and in some cases overcome these constraints. For example, radio and TV have been utilised (although their potential impact to change the fundamentals of delivering educational services was grossly overestimated at the time)[iii] to overcome the requirement of physical proximity[iv]. However, while radio and TV obviate the need for geographical proximity (the issue of financial costs is not discussed in this paper although it is obviously of great relevance for educational planners), being "synchronous" media they still require that teachers and students attend to the exchange at *the same time*.

Open learning using printed or videotaped materials (some times called "impersonal sources") have been traditionally used to overcome the constraint of simultaneity. The table below presents some of these traditional examples[v].

Proximity	Low	High
High	I Incompatible Schedules	II Classrooms
Low	III Printed or videotaped materials	IV Educational TV

Simultaneity

A third variable, *interactivity*, is useful for enriching this basic framework for understanding and studying the logistics of delivering educational services. Interactivity refers to the degree to which the channels used for communication between teachers and students allow for real-time, bilateral exchange (sometimes called "feedback"). Face-to-face (FTF) communication (where both proximity and

simultaneity are high) is usually considered the most "interactive" way of communicating. However, even in such situation (corresponding to quadrant II), there are differences in the level of effective interactivity between different FTF contexts based on the student teacher ratio or other variables. For example, tutorials or seminars are considered more "interactive" settings than conferences in large lecture halls.

In the case of the fourth quadrant, the type of technology used determines the level (or lack) of interactivity that may be achieved. For example, TV does not allow for any kind of interactivity. On the other hand, videoconferencing supports real time interactive participation (again the issue of costs is not discussed in this paper, although it should be clear that the financial and technological implications of such technological choices should be carefully considered).

Quadrants III and IV have been traditionally associated with the provision of educational services to geographically distant students or "distance education". However, it should be noted that educational services rarely exist in "pure" forms. FTF students spend only part of their time in classrooms; they also need and want to interact with each other and especially with their teachers out of class. This rarely happens in many educational institutions where at the most, teachers have a few hours a week of extra time for interacting with students out of class. On the other hand, many models of distance education allow for some measure of FTF contact between teachers and students or at least for some measure of media-based feedback.

How Internet may support the delivery of educational services.

The section above has briefly discussed a basic framework for discussing the role of technology for supporting the delivery of educational services. The section below discussed where the Internet might fit into this conceptual framework.

One of the obvious uses of the Internet (see quadrant III) is to facilitate the distribution of teaching materials to students scattered over long distances. Although this is conceptually fairly obvious it should not be understated in its financial, logistical and even legal (customs …) implications. Distributing teaching materials (which may include books, reports, CD-ROMs and other weighty items) over long distances and eventually across international borders may amount to a complex and costly operation which schools are not usually adequately prepared, staffed or experienced enough to run.

Another use of the Internet refers to the need to facilitate communication between students and teachers and between students themselves. As discussed above FTF or media such as videoconferencing require simultaneity. This is costly in terms of the rigidities it introduces in the respective schedules of teachers and students that may live and work according to very different work and study patterns, even across different time zones.

The Internet allows, through e-mail and forum discussions, a greater measure of feedback than impersonal sources with no simultaneity requirement. Through e-mail, students are able to communicate with their teachers and peers at the time of their choosing, privately (using electronic messages) or publicly (in discussion groups). This communication is in practice *independent of distance*, meaning that the cost and effort of reaching a teacher or peer in the same building is the same than reaching a person who is physically across the world. Furthermore, such communication is largely *independent of volume*. That is, the cost is (within certain reasonable limits) the same for sending a 10-line message than a whole essay with graphics and eventually audio and video attachments. Last but not least, e-mail is *independent of the number of receivers*. An e-mail may be sent to a single receiver or to whole class with the same cost and effort.

All these factors make e-mail a very different communication mechanism than conventional mail or fax for example. Although technically e-communication is not interactive (i.e. senders write and receivers read messages at different times), research has shown that the low costs and ease of use of the technology fosters communication and dialogue in a way resembling (for most pedagogical purposes) interactive communication. Within this context, students may consult in private with their teachers before or after class and in private, teachers may pursue classroom discussions over longer periods of time and students may collaborate with each other in ways that would be impractical or impossible without access to the Internet. More importantly for the purposes of distance education, e-

communication may be used to conduct courses and seminars, and even tutorials. The following and final section of this paper describes one such course, which was run for the first time by ORT Uruguay in 2000.

Proximity

High	I Incompatible Schedules	II Classrooms, Seminars, tutorials
Low	III Printed or videotaped materials *Web sites facilitate the delivery of educational materials.* *Electronic mail and discussion groups support student communication with their teachers and peers.*	IV Educational TV *Chats allow for synchronous exchanges*

Low High

Simultaneity

The Diploma in Education

The Diploma in Education is a one-year graduate course aimed at educators. The course, launched in 1996, attracts practising teachers and has a clear focus on educational research.

In the 2000 academic year, the course was also delivered in distance mode across Uruguay for the first time, using Internet technology. It was perceived that there was a geographically dispersed potential market, eager for professional development opportunities in the field of in-service training, though unable to attend contact sessions at ORT in Montevideo. The distance-based option attracted 33 students from 18 different locations, with a very low drop-out rate over the year (6%). The face-to-face version had 27 students and saw a 4% drop-out rate during the same period.

Entry and assessment requirements are equal in both modes of delivery. However, the distance-based course had the following additional requirements:

- Basic IT skills, regular access to a PC and reliable Internet connectivity.
- Seven days at ORT (Montevideo) spread over the year, for the delivery of certain face-to-face classes, project presentation and the final oral examination.

As each student enrolled, they received a set of print-based materials, study guides and books (the basic 'kit'). They were also given a username and a password, along with instructions on how to access the web server. From that point onwards, the course was delivered essentially in an asynchronous mode.

Considerable research was carried out before selecting the tool that would help us deliver this on-line course. A number of options were considered, including LearningSpace, TopClass, FirstClass and Alma Gesto. WebCT was the software finally chosen for the management of the course and therefore

the environment within which all activities would occur, including course materials, notice boards, email, discussion fora and chat rooms.

Library services, normally in the form of loans and faxed articles, were provided to participants on demand through the postal service at no additional cost. Additional communication channels were in place, including the use of the telephone and fax. Tutors also received personal visits by students.

Evaluation

As ORT was delivering this Diploma in face-to-face and distance modes simultaneously, we were in an ideal position to assess this experience from a pedagogic, administrative and economic perspective.

This evaluation is currently well under way. Our aim is to draw conclusions that could then be applied to other courses within the university. The evaluation started in November 2000 and will finalise in June, 2001. Qualitative and quantitative data have been gathered through a range of tools over a period of four months. Although the analysis is not complete, it is possible to raise a number of issues that lead to some preliminary conclusions.

Issues

- The course materials used were solid and constituted a good guide. However, the value did not appear to lie in the materials themselves but in the **interaction** and **students' contributions**, in two modes: synchronous (chat) and asynchronous (email, discussion forum). These were implemented within WebCT and were an integral part of the course. Rich interactions were generated from the teachers' participation through the different tools.

- The public **discussion forum** was the core of the delivery of this course. It was through the forum that the lecturers developed strategies aimed at exploiting the separation in time, and enhancing the reflection process. In this sense, the forum was perceived as the asynchronous version of the traditional classroom (some would term this the 'virtual classroom'), respecting different paces and time constraints. In other words, it appears that the quality of a given module is linked to the success in the management of the discussion forum.

- Considering the above, it should be noted that this evaluation showed a need for teacher training in the use of these tools, with a special emphasis on tutor-led activities focusing on the generation of motivation in the group. If a successful discussion forum is central to overall success in this scenario, then making a pedagogically sound use of this tool and adequately combining it with the others seems key to quality of the course as a whole.

- As a result of a course that is IT intensive at both ends, the need for further training in basic IT skills became apparent, both for participants and tutors.

- **Chat sessions**, i.e. real-time text-based 'virtual' encounters proved very popular, as they resemble face-to-face sessions, without the faces. They were used at agreed times during certain modules. These sessions were motivating and although not all lecturers made use of this tool, those who did, expressed satisfaction and valued them very much. The effective use of this tool also calls for teacher training.

- The physical absence suggests some sort of "impunity" on the part of all concerned (students and tutors). However, every contribution is made in written form, which is perceived as more 'serious' and of higher accountability. Moreover, it exposes tutors and students alike to the comments and possible criticism of all the others. This has an impact upon the quality of these contributions. A tutor who publishes a comment in a discussion forum is aware that whatever s/he writes will become a 'public document', so a proper amount of thought is given to every posting.

- **Group cohesion** was not a problem. There are several projects involving participants from different locations who work well at a distance.

- There is a significant deal of **anxiety** on the part of some lecturers, due to the fact that they are unaware of "what is going on at the other end". On the other hand, despite the permanent Internet contact, many students feel somehow isolated.

Some recommendations

- It appears essential to improve teaching materials in terms of (i) adding interactivity student-materials (for instance, adding interactive on-line tasks); (ii) design and interface; (iii) user friendliness.

- An increase in the use of links to related topics worldwide seems desirable.

- Almost all lecturers indicated that they would like to see more contact sessions, ideally one per module. Although participants in general see the value of these instances and appreciate those that have been implemented, many consider that travelling to Montevideo on a regular basis constitutes an expensive, time-consuming exercise that in a distance-based course should reduce to a minimum.

- According to the lecturers, rather than putting all course materials on line at the beginning of the course, they should be made available as each module progresses.

- The quality of the course, coupled with its low drop-out rate is linked to the amount of time this project has demanded. The time invested in the development of the course materials, plus the delivery of the course itself is significantly higher than has been the case for the face-to-face version of this Diploma. It could be argued, however, that the quality of the face-to-face course has increased, to a certain extent, as a result of the development of the distance-based version.

- It is difficult to establish to what extent this course can be delivered to more students without causing an unwanted impact on its quality.

The future

In 2001, ORT Uruguay aims to offer this course throughout the region, which opens up a number of new, challenging questions. Teaching international students on line raises issues such as marketing, legal accreditation, provision of library services and billing, to name a few. The need to travel to ORT in Montevideo for the oral examination, for example, will imply some additional and potentially significant cost to the distance student.

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[i] Other dimensions of the "distance" concept may be relevant such as "organisational distance" as discussed below.

[ii] In communication terms, the need for transceivers to attend a communication exchange simultaneously.

[iii] See Cuban, L, Teachers and Machines: the Classroom Use of Technology since 1920, New York: Teachers College Press, 1986 for a discussion on this issue.

[iv] It should be noted that physical proximity *allows* for *interactivity* but not necessarily leads to it *per se*. Other factors, such as the number of students per teacher, the cultural factors shaping teacher student relations or teaching styles have been found to influence the level of and nature of educational exchange.

[v] The situation of high proximity and low simultaneity reflects, for example, the not uncommon situation where people may physically be at the same time in the same building but schedules make impossible for them to attend to the same exchange (e.g. conference, seminar tutorial).