

5. Informatics and telecommunication systems as a support to the educational model

In the previous sections the Educational Model has been explained and will continue influencing the decision-making and actions undertaken by professors during the next years. One of Tec's strength to carry them out is the use of new information and communication technologies because they make possible to use electronic networks and gather collaborative and intercultural teamworks to perform tasks, projects and solve problems virtual environments. These new technologies have shown that besides being a resource, they are also a working environment that enhances the practice of the Educational Model.

The application of these technological tools is nothing new in the institution. The Monterrey Tec has always worried about searching for state-of-the-art technologies to support education which was the foundation for the distance education system to promote interactive learning. Seven years later, this experience generated in the System became to be known as the Virtual University; which spread its services and actions to all parts of Mexico and some other countries from Latin America. Nowadays and thanks to their experience, the use of new technologies has been spread out to all traditional classroom courses that are offered by the Monterrey Tec and has become an essential characteristic of the Educational Model .

Use of technological tools

The Educational Model includes a great number of processes. Many of them not only become more efficient through technology, but also technology makes them wider and more enriching. Students interact with their computer in different ways, depending on the nature of the task and the learning objective. Next, the way professors use the technological applications will be described.

Internet

The value of internet is based upon very valuable resources of information more updated and far-reaching technology rather than the one he could have in the university where he studies or in the campus library; on the other hand, it allows the stored information packages to be shared at the same time by students and professors from all campuses.

The information offered by internet is not organized and this allows students to navigate, select, analyze, construct and evaluate the information through a process of research so that the professor assumes the role of coordinator of information rather than just a supplier of information.

The digital library

Another valuable resource of electronic information is the Digital Library for both professors and students. From January 1999 on, a universe of scientific very

and other campuses and even from other countries. Such as online courses offered by the University of British Columbia in association with Tec within the Master's Degree in Educational Technology in the Virtual University. This program integrates students from all over the world in working sessions to form along with the instructors a highly intercultural learning community. The possibilities of virtual collaborative work are very high: seminars, projects, discussions, solution to problems and simulations among others.

This virtual group offers a high range of educational possibilities and control for professors when having access to the information registered which can be used to facilitate the course process and the progress made by every student in a continuous way and their adaptation to the established plans.

Applications

A great number of electronic applications are available in the network to professors and as a support for the students learning. They are very valuable learning means for example simulators (Ithink, Promodel, Fingame, Intopia) virtual labs (labview, Matlab, Applet); Word processors (Word, Works, etc). Calculus sheets (Excel, Lotus Notes); applications for presentations (Power Point, Flash); applications to design (Autocad, 3Dstudio max, Photoshop) and others that professors can incorporate to their courses.

Figure 5.1. shows technological tools available as a support for the learning process in a classroom course.

Figure 5.1. Educational Applications of the technology

Technologies	Applications	Activities done by professors	Activities done by students
Internet and Digital Library	Development and cognitive abilities: ? Search of information. ? Analysis ? Synthesis ? Critical thinking	? To guide ? To help the information process. ? To clarify	? To navigate ? To search ? To process information
Virtual group	? Exchange of information ? Professional development ? Actions with common goals. ? Solution of problems. ? Social development.	? To offer feedback ? To stimulate participation ? Guides the process. ? Evaluates.	? To contribute to perform common tasks. ? To make decisions in group. ? To evaluate results in group.
E-mail	? Personal interaction ? Punctual tutoring ? Personal communication ? Individual feedback ? Exchange documents	? To tutor ? To give feedback ? To guide ? To evaluate permanently	? To gather results. ? To look for solutions. ? To interact with the

- The use of this platform has several advantages for students:
- ? The data bases are interconnected and allow students to navigate.

Table 5.1. Modules of Learning Space, the Technological Platform

Modules	Description	Example
	Presents the design and structure of the course created by the professor. It contains the guide of activities for students to do in order to fulfill the objectives, their deadlines and the evaluation criteria.	<p>SCHEDULE1.4. Analyzing the United Nations (UN) case</p> <p>Week Module 1: international Relations</p> <p>Activity: Case Studies</p> <p>Due: 10/14/98</p> <p>Analyzing the United Nations (UN) case</p> <p>Security Council</p> <ol style="list-style-type: none"> 1. The UN security council. Research in three bibliographical sources the most recent conflicts (year 1999) where the UN has intervened. 2. Analyze the information selected and identify conflicts and challenges for the committee. 3. Write an essay following the Case Study Chart (facts, problems and solutions).
	It is a data base that contains didactic materials selected by the professor. It allows students to explore the information sources, do a personal folder with annotations and have external access to texts, video clips, multimedia and other sources.	<p>Pc-95400 Scientific Research Methodology</p> <p>Scientific Research Methodology Group 00 SIN</p> <p>By Type</p> <p>Document Title Writer</p> <p>Abstract</p> <p>Scientific Knowledge Characteristics</p> <p>Bunge</p> <p>Article</p> <p>A guide to increase creativity in research inspiration or perspiration?</p> <p>Loehle Craig</p>
	It allows an interactive environment where students participate in discussions among themselves and with the professor, besides presenting space for homework, individual	<p>COURSE ROOM Question 2</p> <p>Main Topic: Hellet Communication Companies and Information technoly</p> <p>Created by: Martha on 01/16/02 11:42:12AM</p> <p>The Hellet Company which sells</p>

		Family reunions, gym, cooking, reading and writing (narrative gender).
	<p>It is an independent tool exclusive for professors through which he/she will be able to evaluate the students' performance and offer proper and punctual feedback.</p> <p>It contains quizzes, self-evaluations and polls that students will answer in order to be evaluated and receive their results.</p>	

- ? Can be accessed online or locally, this makes it more flexible.
- ? Replications of courses can be done (updates) from server to server or from a server to a personal computer.
- ? The operation of this tool is distributed and its legality is centralized.
- ? The content is always available.

Besides these advantages there are some difficulties such as the following:

- ? Sometimes the data synchronization when replicating is not achieved.
- ? It is a complex tool that requires training for using it.
- ? It is not suitable to use this platform through web.
- ? The administration of the access accounts to courses is very complex
- ? A high investment in infrastructure is required.

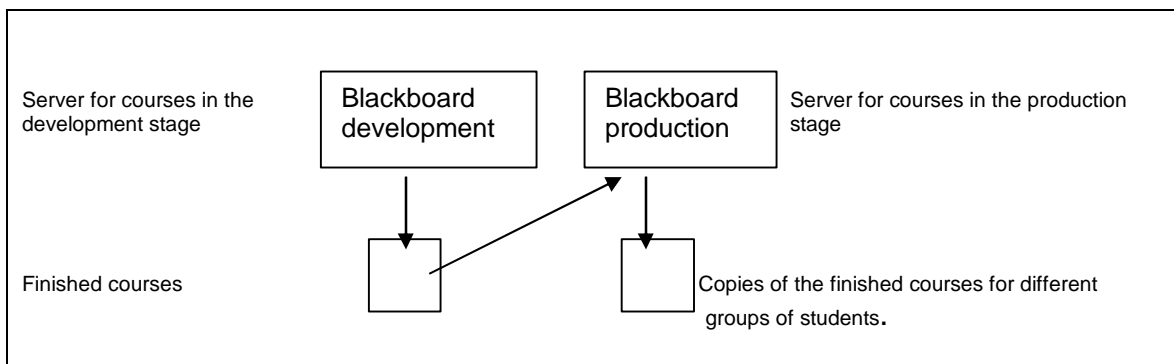
Figure 5.2. shows the infrastructure which was needed to develop the use of this platform at Tec.

Blackboard

Blackboard is a flexible, simple and intuitive platform that is used in many USA universities and contains basic functions to create the documents for the administration of a course, it uses web as the means and has the following characteristics:

- ? It offers the possibility to apply systems based on Web that help designing a course in a creative way and to use electronic resources that support learning.
- ? It is ruled by international standards (IMS) for the development of contents.
- ? It allows the synchronic and non-synchronic communication.
- ? It is a more familiar platform to professors and students, its use is simple and because it is based on Web, it does not require a lot of training .

Figure 5.3. Infrastructure developed by Tec for the Blackboard Platform



The infrastructure required is similar to the one used by Blackboard; therefore, they have common characteristics. This tool should be enriched with other options such as the following:

- ? To store information generated by professors when implementing the Educational Model .
- ? To offer professors different models for designing a course, more adequate to the Educational Model and the methodology of each didactic technique.
- ? To deliver finished courses to students with virtual environments of synchronic and non-synchronic interaction.
- ? To strengthen the evaluation process by giving students the chance to know his/her progress at any time. Also, professors can tutor students in a more personalized way.
- ? To handle international standards of learning that make possible to utilize the knowledge base from other educational entities.
- ? To offer a greater integration and a better control of the information because of being centralized.

Table 5.2. Equivalences between the Learning Space format and that of Blackboard

Learning Space	Blackboard
Start Here Modules/Sessions Calendar	Course Information Assignments Course Calendar
Media Center	Course Documents Course Materials External links
Course Room ? Discussion ? Assignments	Discussion Board and Virtual Classroom Digital DropBox
Profiles ? Instructor and assistants' profiles ? Student's profile ? Teams	Staff information List / Modify Users Manage Groups
Assessment Manager	Assessment Pool Manager Online Gradebook

- which is contrary to the exposition where all students are supposed to advance at the same time with the same background.
- ? *It changes the professor-students relation.* Working in this media, hierarchies are broken and the professor naturally becomes a facilitator of the learning process more than an authority. The professor defines the course objectives, he suggests texts and other materials, gives instructions and rules to be followed, continuously supervises; however, the students do the collaborative work.
 - ? *Authentic learning communities are formed.* These great communication and information possibilities in electronic media result in personal enrichment for all members of the group. The communication that flows is an intellectual stimuli and a source of personal satisfaction for all participants. Members of the virtual community share interests, get to know each other and are concerned about one another. Professors and students say that the interaction among them is more frequent, deeper and more personal than in a classroom session.
 - ? *It enhances responsibility.* A course in a platform gets students more involved in the process. For a student to succeed in a course he has to become responsible of his/her own learning and motivate his/her classmates to do the same. He has to read the comments made by the members of his group, to reflect about the issues discussed and look for additional information to answer properly. Students establish their own rules as a team work and they evaluate themselves reflecting about how they are doing, what and how they have achieved goals and what they need to improve. This enhances the building of a culture of continuous improvement, it increases the quality of the assignments and trains for continuous education.
 - ? *It facilitates the internationalization of education.* Within the online learning students acquire a wide knowledge and develop abilities to work in networks and far reaching environments; they get ready for understanding the world and a professional life with a global and universal mind. An exchange of experiences might be promoted with students from other countries and share this cultural diversity in the classroom; as well as other cooperative activities that break down physical barriers and enrich academic life.
 - ? *It helps for time management and it optimizes the space.* The Educational Model requires spaces where students can work in team works that do not always exist in the campus; on the other hand, the time of a class session is limited to different schedules or else it is not enough to complete the activities. The use of virtual environments partly solves the above mentioned because the student is working 24 hours in a space available and he/she is able to get in touch with his/her classmates and his professor and have access to the information and material that he needs permanently. This way professors can dedicate the classroom time to clarify, conclude, debate or present a new activity, reflect with the group, give feedback and motivate students to keep on going.

about relevant facts when implementing the Educational Model, the benefits of its application, as well as the problems that came up and the way to solve them. The information about this experience is complemented and enriched by means of forums and satellite sessions where all professors participate in their own campus. Within these sessions the most successful examples of the year are presented. These scenarios enhance the implementation of the Educational Model and accelerate the process of change.

Comments and conclusions

Using technology has been very important for both professors and students because it is a tool that facilitates tasks, it allows the non-synchronous communication, the construction of models and simulations. It is an added value in the teaching-learning process that we do not have in the traditional classroom classes.

Professors poll , 2001

Even though in this chapter the value of technologies is underlined, experience shows that technologies neither educate nor represent a panacea that solves all educational problems, as it was pointed out by a student: *Technology does not give feedback or guides for a personal improvement.*

On the other hand, if technology is not used properly, it might become a distracter for important educational objectives and might have a negative influence as it is shown in these comments:

- ? *I did not find academic relevance in this course.*
- ? *It is an assignment that lacks personal focus.*
- ? *It seems to be a correspondence course.*
- ? *My doubts were not clarified.*
- ? *Sometimes the information provided is bad quality and some other times it provides you with excessive information that hinders its use.*

Other comments show its educational virtues:

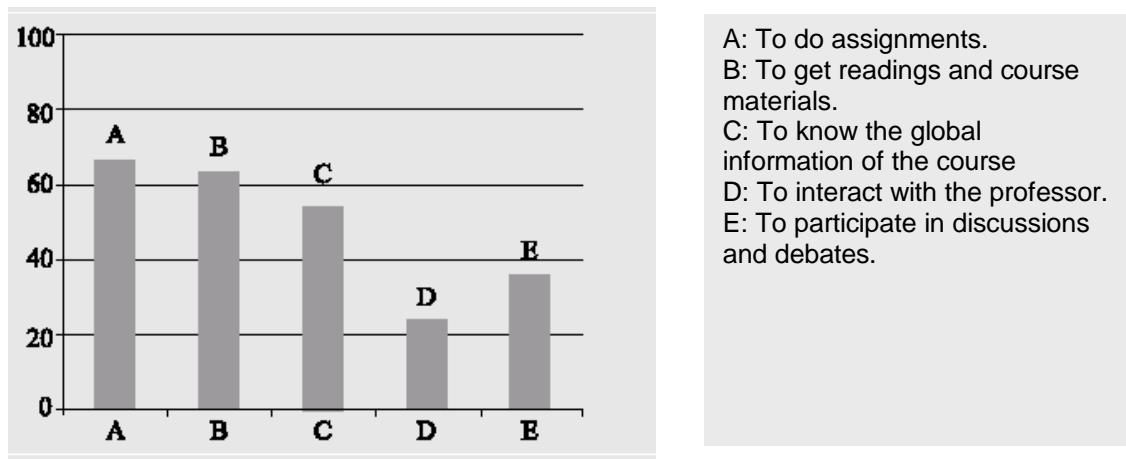
- ? *Working in web has changed my study habits; every day I have to do something and I cannot neglect it.*
- ? *It gives you responsibility and guides you for self-study*
- ? *Assignments take you longer because you have to apply all your knowledge, your criterion and not only memorization.*
- ? *You have to get prepared in advance with tasks to participate in discussions.*
- ? *It is a lot of work at the beginning but then you get used to a constant rhythm.*
- ? *I can publish my comment and make questions to all the group and this way give and receive a quick feedback.*
- ? *It allows me to participate in a space where I can express my opinions and where I learn from diverse opinions and points of view from my classmates about specific topics.*
- ? *It facilitates the interaction with my classmates and professor.*

- ? To organize the information in such a way that students find it easy to navigate in the course.
- ? To increase the professors' call for participation and promote a continuous relation with students.
- ? To motivate and help students think and study more deeply.
- ? To adapt the process to the levels and expectations for different receptors.
- ? To promote socialization in the virtual collaborative work.
- ? To integrate technologies adequately so that learning enriches.

Figure 5.5. reflects what type of activities are performed by students in the Learning Space platform. It can be seen that the rates are higher for those activities related with information while the interaction and collaborative work continues to be an area of opportunity.

Tec continues promoting the use of state-of-the-art technologies as a support for education, dedicating strong investments on one hand, to the development of infrastructure and to create more efficient virtual spaces; and on the other hand, to train its professors. Table 5.3. offers a brief description of the use of technology during the Collaborative Learning Workshop organized by the Learning Technology Center at the University of Texas, where professors worked in a virtual and classroom environment.

Figure 5.5. Use of Learningspace



Source: Monterrey Tec, A study of the Impact of the Educational Model, Learning Space. Students poll, 2000.

