Evaluation of a Distance Education Program
Offered by the Graduate School of Systems
Analysis of the Pontificia Universidade
Católica de Campinas

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Summary

This paper describes the experience and discusses the results of an evaluation undertaken with 34 students who attended Distance Education courses mediated by computers offered by the Systems Analysis Management Master's degree program at the Pontificia Universidade Católica de Campinas, Campinas, Brazil. The students' perceptions about the program's strengths and weaknesses, limitations, advantages were identified. Barriers encountered impeding the accomplishments of the course requirements as well as their motivation was also give attention. Overall, the program exceeded the participants' expectations highlighting the learning experience, flexibility in relation to time and the advantage of being able to accomplish course work and research from any where using the Internet. Information Technology structure and lack of a more intense interaction between students and instructors and amongst students were perceived by as shortcomings.

Key words

Educational evaluation; Distance Education; Distance Education evaluation.

Resumo

Este trabalho descreve a experiência e discute os resultados de uma avaliação realizada entre 34 alunos que freqüentaram disciplinas à Distância, mediados por Computadores oferecidos pelo Curso de Mestrado em Gerência de Sistemas de Informação do Instituto de Informática da Universidade Católica de Campinas, Campinas, SP. As percepções dos alunos com respeito aos pontos fortes, pontos fracos, limitações, e vantagens do programa foram identificados. Também foi dada atenção às barreiras encontradas, que impediam a realização dos requerimentos do curso. DE um modo geral, o programa superou as expectativas dos sujeitos enfatizando a experiência de aprendizagem, flexibilidade em relação a tempo e a vantagem de existir a possibilidade de realizar as tarefas do curso e pesquisa de qualquer lugar usando a Internet. A estrutura tecnológica a falta de um interação mais intensa entre os alunos e os instrutores foi percebida como uma limitação.

Palavras-chave

Avaliação educacional; Educação à Distância; Avaliação de Educação à Distância.
1 INTRODUCTION

Changes occurring today in our society are profound and striking. They unfold in a speed never thought of before. These changes are being felt in every sector of human life - economic, social, technological and educational as well.

If by one side it is imperative to "unlearn" in order to "re-learn" to survive in a World permeated by constant innovations and new situations, informational technology developments brought about, with a face lift, an old learning concept or model which is spreading with epidemic speed within educational institutions and varied productive enterprises - distance education. It is being used not only to promote but also as an answer to social changes.

This theme is rapidly gaining new theoretical and practical advocates. To confirm this, one needs only to verify the great number of papers published by the national as well as the international literature, including innumerable www sites dedicated to this subject.

Thesis and dissertations are being presented in graduate programs all over the World. More and more educational organizations and enterprises are adopting some type of Distance Education model based on computer technology to reach and meet their educational, instructional, and training objectives.

In a recent thesis presented to the Graduate School of Information Systems of the Pontificia Universidade Católica de Campinas' Institute of Informatics, located in the State of São Paulo, Brazil, Vieira (1998, p. 17) emphasize that:

"the term distance education represents a variety of educational models which has in common the physical separation of the teacher's body with his or some of his students. ...the models of distance education are developed around central components of the instructive process, that is: content presentation; interaction with faculty, resources, practical applications and evaluation. Each model applies technology by various means in order to focus some or all of those elements.

"The various distance education models differ not only regarding the types of technologies used, but also regarding the control of the speed and locality of the instruction. In some models, faculty and institution have full or primary control, .... In others, however, the control falls on the student."

This paper intends to evaluate, based on students' perceptions, the Distance Education model applied at the Information Systems Management graduate degree program offered by the Pontifícia Universidade Católica de Campinas' Institute of Informatics, of which I am a faculty member and teach two different disciplines using computer technology to mediate the teaching-learning process of students who opt for the Distance Education model, in our case, denominated Distance Education Mediated by Computers (EDMC).

Vieira (1998) well places that originally Distance Education programs were meant to serve students who by all sorts of reasons could not have access or could not attend formal educational institutions. However, with the expansion of technological options and with all the information available today, distance learning is no longer thought of as being a special program but as an essential component embedded in the educational system that intends to prepare students to take on a professional life inserted in a global society.

In fact, Distance Education can no longer be considered as an auxiliary to the educational system, or as a supplement to traditional programs. Today, Distance Education is seen as an integral part of and a viable alternative to learning.

This tendency seems to be irreversible. In 1994, Geoffrey Holland, vice-chancellor of the University of Exeter declared that by the year 2020 all education and every single training program that leads to a personal qualification would
be available in three modes: full time, part-time, and through Distance Learning.

Also, in a recent speech pronounced at the 8th Coloquio da Universidade do Estado do Rio de Janeiro which discussed "The University of the Future", Stanford University's chancellor, Dr. Gerhard Casper stressed the end of the traditional model of education being adopted in Brazilian universities, emphasizing that "this teaching model, based on Bolonha's methodology, with pupils sitting in front of a professor in a traditional class room tends to disappear in the next couple of decades."

The viability of adoption of Distance Education mediated by computers more and more accentuated is indisputable. Efficiency and low costs of modern digital telecommunication systems via satellite, high interactivity between systems, amplitude and accessible costs of computer networks such as Internets and Intranets all contribute to this reality. Today, these sets of technological resources and tools are facilitating and opening effective and attractive teaching/learning alternatives. (Wilson, 1997) and (Spodik, 1997)

1.1 DISTANCE EDUCATION CONCEPTS

The educational process and training has been adopting Distance Education mediated by computers as a significant and growing component of its physical and content structures. According to Blattmann (1999, p. 1), "...distance education is a teaching model which promotes learning opportunities that are being positively considered during this century, attracting more and more the interest of institutions and individuals."

With such interest, many definitions have been offered as it is possible to trace them embedded in the Brazilian and the international literature, such as the one offered by the University of Wisconsin's Distance Education subgroup defining it as "a planned teaching/learning experience that uses a wide spectrum of technologies to reach learners at a distance and is designed to encourage learner interaction and certification of learning."

Steiner (2000, p.1) defined distance education as an "instructional delivery that does not constrain the student to be physically present in the same location as the instructor. Historically, Distance Education meant correspondence study. Today, audio, video, and computer technologies are more common delivery modes."

A similar definition points out the use of technology to deliver course contents stating that Distance Education is "the process of extending learning, or delivering instructional resource-sharing opportunities, to locations away from a classroom, building or site, to another classroom, building or site, by using video, audio, computer, multimedia communications, or some combination of these with other traditional delivery methods." (Instructional Telecommunications Council, 2000, p.1)

Garcia Llamas (1986, p. 10) cited by Pravadelli (1966) discussing the main characteristics of Distance Education, emphasizes that there are no limits or constrains to time, place and age constraints. He confirms that this "is an educational strategy based on the application of technology to the learning process without limitations of time, place, occupation or students' age. It implies in new relationships both to students and faculty, new attitudes and new methodological focus.

Yet, a different definition stresses the teacher's physical distance and the self learning aspect of this teaching/learning model: "...a learning system in which the student carry out the major part of his learning...with scarce direct contact with professors..."

As we can see by these few definitions pointed out above, there are several aspects in common in the conceptualization of Distance Education. After analyzing several definitions, Lopes Junior
(1999, p. 21) offers a set of main terms he depicted from them. This exercise resulted in four important points: "self-learning; instructor-student relationship; instructional material production; and educational institutions and the industrialization of the educational process."

Citing Desmond Keegand (1986), Grimes (1993) summarizes what he thinks are the main characteristics of Distance Education. He mentions:

- geographical distance between student and faculty;
- the influence of an educational institution;
- the use of technology for communication purposes;
- appropriate conditions of bi-directional communication;
- absence or almost permanent absence of a homogeneous group.

It seems that these characteristics are agreed upon by several authors. According to Verduin & Clark (1991) cited by Seward (1995), distance education is typically characterized by four factors; "(a) professors and students are separated most part of the instruction; (b) an educational institution influences the whole process including some type of evaluation; (c) educational communication resources (e.g. technology) are used to unite teachers and students and transmit course contents; (d) two-way communication between professor, instructor or university and student.

Having these characteristics in mind, Vieira (1998, p. 12) states that they:

"...can be readily related to distance education practices. In practical terms, distance education is projected to serve students which are hindered by geographical or by time restrictions to attend an university. Principles of accessibility and equal opportunities are important values that guide this field. The fact that educational institutions such as prestigious universities and higher education institutions have adopted this method has been seen as a quality guarantee, as well as the fact that students have been evaluated. All types of technologies varying from printed materials to CD-ROM, satellites and Internet have been used to transfer course contents as well as to facilitate dialog and interaction between and amongst groups of professors and students. Finally, the students need strong didactic support systems outside the classroom period and methods which offer two-way communication, such as counseling, guidance, and library services."

When technology is inserted in the educational context as a mediator of the teaching/learning process, education tends to be more student centered and less organized around the instructor. It tends to be based more on actual cases and experiences and less on subject content, and it is a more democratic than elitist activity.

In a paper presenting the evolution of Distance Learning, Keegan (1986) cited by Grimes (1993) proposed specific advantages of this educational model. They are as follows:

- resource sharing: distance learning allows that instructive resources being used at one university be also used at another;
- better access to instructors: distance learning favor students located at a determined distance, access to professors and courses offered by different universities;
- better access to resources: through distance learning, students have access to instruction using many different sources, instead of having to go where the professor is located. This alone makes instruction more accessible to many students;
- improves curriculum: distance education is made viable through resource sharing practices and improved access tools. Small universities as well as larger ones can increase the number of courses offered to students. This propitiates economic advantages.
- improves educational quality: Distance Education should be a process to help meet the organization's mission and objectives.

As it is possible to extract from the advantages related above, Distance Education plays a holistic role within educational systems. It seems to favour instructors, students, organizational structure and budget, overall program quality and access to instruction. Of course, in order to implement this mode of teaching, it is also necessary to guarantee that course content will actually satisfy and meet the intended public's instructional needs and budget and consider their technological expertise before deciding which model will be offered.

1.3 DISTANCE LEARNING ENVIRONMENT

The distance education environment brings new opportunities to both professors and students, as well as to the educational system administrators. These opportunities can be translated into access to a growing number of different expertise in various fields of knowledge. It exposes students to a multi-cultural experience, diversified opinions, different learning experiences, the acquisition of a global conscious and international connections.

Distance learning offers to both students and instructors flexible programs, independent and responsible study and varied communication channels. According to Vieira (1998, p. 4) Distance Education provides: a) cohesion amongst students, promoting greater interaction; b) student interest; c) alternative communication channels, allowing the effective use of technological tools; a different role for professors, such as a facilitator in an virtual teaching/learning environment; d) an attractive educational environment, once one’s learning experience is expanded far beyond the limits of a class room in the university.

The environment where Distance Education is developed, creates, therefore, great impact on society as a whole. This environment is accountable only to those involved in technology and communication as a means of personal and professional growth through the acquisition of knowledge. The use of technology, which is essential in such environment, is a regular and inseparable part of the learning experience.

1.4 MOTIVES THAT LEAD TO THE USE OF DISTANCE EDUCATION

Students as well as educational institutions and varied types of organizations are using distance education for different reasons. More and more the value they attribute to information access is increasing as well as the importance they place on access equality. These are nowadays prioritial incentives.

Many adults who in the past, for the most different reasons didn't have the opportunity to improve their instructional level and their formal education, as well as those who were forced to abandon the educational process, seek this model of intellectual improvement in order to climb the educational system's letter.

Globalization is impregnating in the minds of individuals the need, desire and thrust (if not the obligation and guilt) to maintain competitiveness in each one's field and work. With life in such a rush today, Distance Education became an extremely attractive and sought after alternative.

Another factor that motivates people today to adopt Distance Education as a means to achieve intellectual and basic or superior educational background improvement is the indisputable information explosion which brings about an explosion and exploitation of knowledge. If by one side new "knowledge" is constantly and incessantly made available through the Internet, many of those already deep rooted in the cultural context of humanity become obsolete in a very
small time span. Therefore, many individuals are turning to Distance Education as a means of avoiding to be ingrained in their own intellectual boundaries.

Therefore, a strong motivation factor to seek and use this instructional model is the possibility to minimize this difficult to manage reality. Distance Education presents itself inherently, extremely flexible, permitting the individual to access and use any information in any representation frame and be able to teach and learn from anywhere at any time.

2 BRIEF DISTANCE EDUCATION DEVELOPMENT

Distance Education is not a new phenomenon. It has been a teaching/learning model for many individuals during the last one hundred years, according to Moore & Kearsley (1996).

Along the years, Distance Education has been developing using the most varied pedagogic tools depending of several factors such as: educational system characteristics; instructors profile; types of courses taught; geographic distribution amongst students and institutions; available technology; cost/benefit ratio in relation to the structure and technology used. (Prates and Loyolla, 1999).

2.1 DISTANCE EDUCATION IN THE WORLD

Distance Education, as reported by Donadel (2000, p. 17,18), appeared in 1833, in Sweden, where a correspondence course on accounting was first registered. Isaac Pittman offered in 1840 shorthand correspondence courses. In 1881, the founder of Chicago University, William Rainey HarperIn, also its first chancellor, made available a Hebrew course by correspondence with great success. In 1886, in Berlin, the first language course was founded by Gustav Langenscheidt. In the year 1889, Queen's College of Canada also offered correspondence courses obtaining good results in this new educational effort. By 1892 the University of Wisconsin used the term "Distance Education" for the first time ever.

With the advent of the radio, the American federal government authorized for the first time an educational radio station. The license was given to the Latter Day Saint's University of Salt Lake City in 1921. Shortly after, in 1922, the University of Wisconsin and also the University of Minnesota received licenses to establish their own educational radio stations. The University of Iowa became, in 1945, the first organization to transmit worldwide a T.V. educational program. (Saettler, 1990)

In the 70's emerged the so called "Open Universities", using printed materials, T.V. transmissions, radio, audio and video resources, telephone, satellites and cable T.V. Today, technologies used by Distance Education are evolutions brought about by digital telecommunication systems. This advancement made possible for the Open College of Canada to transmit Distance Education courses via satellite to more than 30 cities and communities of Ontario.

Other successful endeavors operating today are reported by Lewis & Romiszowski, 1997), Gomes (1997) and Klemm & Utsumi, (1997):

- Master's Programme at a Distance for IBM: it is a multinational effort involving the USA and Canada, operated by IBM through two organizations, Skill Dynamics-USA and Skill Dynamics-Canada. They develop graduate programs with academic support from Syracuse University;

- Universidad Nacional Experimental Simon Rodriguez: a higher education program developed in Venezuela involving several private universities operating in 30 different locations. This project also receives support from Syracuse University;
- Instituto Tecnológico y de Estudios Superiores de Monterrey: a private Mexican higher education institution which maintains a Distance Education Mediated by Computers program, denominated "Sistema de Mejoramiento Continuo" involving 26 different sites with 44 graduate programs and 33 undergraduate. They have two satellite channels operating exclusively for this purpose and receive support from the Carnegie Mellon University;

- Open Learning Australia: it's a multi-institutional program operating in Australia, reaching all Oceania, involving 40 institutions of which 20 are universities. Their powerful technological structure and network is complemented by radio and television, transmitting hundreds of courses;

- Electronic University Network: a fully dedicated Distance Education university, situated in California, USA. It is considered the largest online university in the World. It has been operating for more than 15 years. More than 25,000 students have graduated in their 300 courses.

Research has indicated that Distance Education is being used all over the globe. Three examples will suffice to demonstrate the importance of this activity around the World.

A special edition of The American Journal of Distance Education, published in 1991 about international aspects brings to the reader cases from Hong Kong, United Kingdom, Australia, Finland, Germany, China, Spain, and many Latin American countries. More than 270 articles were published as a result of the Distance Education International Counsel meeting held at Birmingham, (England) during the month of June of 1995. The Commonwealth of Learning, created by the Commonwealth Heads of Government located in Vancouver, Canada, promotes open and distance learning to countries belonging to the Commonwealth. The Consortium International Francophone de Formation à Distance, at Talence, France, performs similar activity in countries included in the La Francophnie.

As a consequence of the technology used by Distance Education programs through time, it is possible to divide its history in three distinctive periods or phases. The first period was marked by textual productions, which was based on a self-learning process with support only of simple printed materials. This phase went until the 1960. (Saba, 1997) and (Roberts 1996).

A second phase which went from 1960 to 1980 is known as the analogical generation, which was based on self learning heavily using printed materials intensively complemented by technological resources, such as multimedia tools.

We are living in the third phase today. It is the digital generation, based on self-learning with the support of almost exclusively highly differentiated technological resources.

### 2.2 DISTANCE EDUCATION IN BRAZIL

Distance Education in Brazil began in 1904 through correspondence courses efforts. In 1923 with the expansion of the radio the first educational program by radio was created in South America transmitted by the Radio Roquete Pinto. In 1936 emerged the Instituto Rádio Técnico Monitor, with courses directed to the electrical and electronics area. In 1941 appeared the Instituto Universal Brasileiro which until today promotes their correspondence courses in many areas of knowledge. (Donadel, 2000)

In 1980 the attention focused on the use of computer networks as tools to increment the teaching/learning process, and with the introduction of the Internet a decade later many institutions found the motivation that was until then lacking.

Although Distance Education efforts are not a recent phenomenon in Brazil, it has, however, been plagued by discontinuities of many projects for lack of resources, and fear to adopt more rigorous scientific procedures of evaluation. Other problems, which are mentioned by Nunes...
(1994) that has hindered the progress and extensive adoption of this mode of education are:

- inadequate pilot project planning;
- lack of performance criteria;
- of existence of a systematized memory of prior programs;
- discontinuity of programs without any accountability to society or government;
- programs not compatible to the needs of their target market;
- personnel with weak competencies and inadequate knowledge about Distance Education;

Despite the obstacles and difficulties present in the Brazilian educational and social scenario, nevertheless several institutions have developed and are promoting excellent initiatives worth mentioning. A few of them are:

- Escola do Futuro da Universidade de São Paulo (University of São Paulo's School of the Future Project): develops research in new communication technology applied to education using Internet tools seeking to develop new methodologies and didactic resources. (Litto, 1999)

- LED - Laboratório de Educação a Distância da Universidade Virtual de Santa Catarina (Distance Education Laboratory of Santa Catarina's State Virtual University: transfers high quality information and courses to more than 7,500 teachers state wide. The program's objective is to train and improve teaching skills of these teachers using all sorts of high tech Distance Education tools. (Barcia, 1996)

- Laboratório de Engenharia de Software - PUC-Rio de Janeiro (Software Engineering Laboratory of PUC-Rio de Janeiro): developed the site Aprendizagem Cooperativa à Distância (Distance Cooperative Learning). It’s main objective is to democratize Internet access to students and faculty, fomenting study habits and recycling knowledge to faculty members. (Santos, 1998)

2.2.1 - PUC - CAMPINAS' EDMC PROJECT

The EDMC is a Distance Education Mediated by Computers project that was developed by Dr. Waldomiro Loyolla and Dr. Mauricio Prates. The project is used at the Master's of Informatics curriculum, a graduate degree program offered at the Pontificia Universidade Católica de Campinas, located in the city of Campinas, state of São Paulo where both are faculty members.

This project was initiated in 1998 with the objective to prepare and develop highly qualified information systems managers. It also seeks to develop technological projects that will enhance their professional performance.

The structure of this Distance Education model also seeks an integration of computational and telecommunication resources available today in order to provide Distance Education with the greater interactivity possible between instructors and students, students and information and amongst students.

The disciplines offered obey the same pattern and basic structure. A course has a total of 45 hours, distributed in 15 encounters of 3 hours each, divided in three sections. Classes 1, 5, 10 and 15 are held with the physical presence of the students. Class 1 is designated to introduce the discipline and prepare the students for classes 2, 3, and 4. Class 5 is designated to monitor students' progress and evaluate what has been done. Class 10 is designated to monitor past progress, summarize the concepts taught so far, evaluate students activities and plan for the next and last classes. Class 15 is designated to summarize and evaluate the whole course and students' accomplishments.

Classes 2 through 4 are offered with virtual presence of the students and instructor, via Internet using the WebCT program. This part of the course emphasizes definitions and concepts. Students should take these classes using the course homepage, chat, e-mail and the bulletin
board plus links designated by the instructor for access to course materials and content.

Classes 6 through 9, also in the mode of virtual teaching using all the tools described above, are intended to provide students a more profound reading, reflection and group discussion experience of the main issues involving the discipline.

Classes 10 through 14, also virtually, are designated for research and seminar presentations by the students. In this section the instructors' role is to advise and guide students in their research and seminar preparation. This experience began in 1998. Following is a list of the disciplines that have been offered by the Master's program so far:

TABLE 1

DISTANCE EDUCATION DISCIPLINES OFFERED BY PUC-CAMPINAS' INFORMATION SYSTEMS MANAGEMENT MASTER'S PROGRAM

<table>
<thead>
<tr>
<th>Disciplines</th>
<th>F</th>
</tr>
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<tbody>
<tr>
<td>Introduction to General Information Systems (3 times)</td>
<td>6</td>
</tr>
<tr>
<td>Research Methodology in Informatics</td>
<td>6</td>
</tr>
<tr>
<td>Artificial Intelligence Applications</td>
<td>2</td>
</tr>
<tr>
<td>Technologies and Information Systems for Management</td>
<td>5</td>
</tr>
<tr>
<td>Advanced Topics in Informatics I</td>
<td>2</td>
</tr>
<tr>
<td>Organization Systems Modulation</td>
<td>2</td>
</tr>
<tr>
<td>Projects of Data Base Systems</td>
<td>2</td>
</tr>
<tr>
<td>Communication Networks and Distributed Systems</td>
<td>2</td>
</tr>
<tr>
<td>Informatics</td>
<td>1</td>
</tr>
<tr>
<td>Organizational Computation</td>
<td>1</td>
</tr>
<tr>
<td>Software Engineering for Information Systems</td>
<td>1</td>
</tr>
<tr>
<td>Public Access Data Bases</td>
<td>1</td>
</tr>
<tr>
<td>Research Seminar</td>
<td>2</td>
</tr>
<tr>
<td>New Application of Data Base Technology Tools</td>
<td>1</td>
</tr>
<tr>
<td>Knowledge Engineering</td>
<td>1</td>
</tr>
<tr>
<td>Executive's Information Needs</td>
<td>1</td>
</tr>
<tr>
<td>Psychology of TI Based Organizations</td>
<td>1</td>
</tr>
<tr>
<td>Advanced Topics in Informatics I</td>
<td>2</td>
</tr>
</tbody>
</table>

Seventeen different disciplines have been offered since it's beginning in 1998 of which some has been offered 6 times. So far, 13 different faculty members of the Department have been involved teaching Distance Education disciplines.

As a faculty member myself, I have witnessed the enthusiasm with which each one of my colleagues have participated in this "new" instructional format.
3 DISTANCE EDUCATION RESEARCH RESULTS

Due to the fact that Distance Education is sought of as a growing effective method of instruction, educational researchers have investigated the reason students and institutions are adopting it as well as for which situations it is most suited and adequate.

In his Master's thesis, Vieira (1998) lists 5 questions he regards as the ones researchers are more concerned about and dedicate most time and investigation effort attempting to answer them:

- distance learning mediated by computers is as effective as the traditional face-to-face learning?
- which factors determine the most effective technological mix taking in account a Distance Education scenario?
- what is the distance students' and faculties' profile?
- in which ways is the student-teacher interaction important in the Distance Education process and in which ways these interactions can effectively occur?
- what types of costs should be considered when planning and implementing Distance Education programs?

It seems that research results point out that in reality, instruction format has little effect on student's performance if technology is appropriate regarding the content which is being offered, and as long as every one has access to the same resources.

Conclusions deriving from this line of thought suggest that (a) instructors using Distance Education methods apply tests and quizzes more often than those teaching in the traditional mode (Sounder, 1993); (b) significant differences in the course materials have not been observed (Martin & Rainey, 1993); (c) conventional instruction was seen as being more organized and more clearly presented than Distance Education (Egan, et. al., 1991) (d) the organization and reflection required to effectively prepare and teach a Distance Education course not rarely improves instructor's methodology when teaching in the traditional process.

Some thought has been given and research conducted to identify factors that lead to students success when involved with Distance Education. The results obtained form this type of investigation, seems to suggest that success in this situation is highly correlated to basic characteristics that students bring to their learning experience. For example, it is important that they have clearly determined educational goals with high degree of expectation. (Schlosser & Anderson, 1994). These students should also be highly motivated and disciplined if they want to achieve success.

The literature also presents factors that influence the success one reaches independent of the type of instruction, be it traditional or Distance Education. They include: a) willingness to call instructors for help; b) exhibit a serious attitude towards the program; c) study a subject area highly in demand in the market. (Ross & Powell, 1990); d) have acquired a College degree previously.

Effective Distance Education teaching practices are basically the same as the ones required by the traditional methods. The factors that influence good teaching are almost universal, according to Wilkes & Burnham, (1991). However, Distance Education and the technological tools necessary to implement this mode of learning require extensive and exhaustive preparation and planning. Therefore, Distance Education instructors consider the following factors as being critical to improve their own performance:

- extensive planning and formative evaluation. Distance Education students value instructors who are well prepared and organized;
- students value a well structured program and presentation;

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- instructors should be well trained and acquainted with the Distance Education tools and look comfortable with the technology being applied.

Many students need support and guidance in order to achieve satisfactory results in their Distance learning experience. (Threlked & Brzoska, 1994). This support comes in the form of some type of student - instructor interaction.

It has been demonstrated that students value feedback about how well they are performing their activities, exams, papers and so forth. They value knowing to what level they performed. They also value participation in small groups. This seems to provide additional support and it is a source of motivation. They also feel more motivated when contacts with instructors are frequent. (Vieira, 1998)

Many educators question if Distance Education students learn as much as those studying by the traditional classroom environment. Evaluative studies indicate that the learning process using Distance Education can be as effective as using the traditional model, considering that methods and technological apparatus used are appropriate, professor - student and student-student interaction is guaranteed and evaluation of the student's performance is conducted. (Moore & Thompson, 1990); (Verduin & Clark, 1991).

4. OBJECTIVES AND METHOD

The main objective of this study was to evaluate the EDMC (Distance Education Mediated by Computers) project developed and being used by the Pontificia Universidade Católica de Campinas’ Masters degree program on Information Systems Management.

The study gathered, through a questionnaire sent by e-mail, students' opinions and perceptions on several factors regarding Distance Education as well as factors that influence its effectiveness. Thirty-four students responded the 25 question instrument.

The study also aimed at identifying the: reasons for choosing Distance Education disciplines instead of the ones offered using the traditional teaching model; level of satisfaction with the program; learning experience; advantages and disadvantages of the EDMC; strong and weak aspects of the project; weather the EDMC favoured learning or not; level of motivation reached; efficiency of the course structure and program; level of interaction obtained; limitations encountered; etc.

The results were tabulated in Tables to compare and interpret the data collected.

5. RESULTS PRESENTATION AND ANALYSIS

It will be presented and discussed in this section the main results obtained from the evaluative study undergone with 34 students who have taken Distance Education course work in the Information Systems Management Master's program offered by the Pontificia Universidade Católica de Campinas, located at Campinas, state of São Paulo, Brazil.

Table 2 demonstrates the reasons why students chose Distance Education disciplines offered by the program.
As shown above, "distance from the institution" is a predominant factor which leads students participating in this study to decide to take on Distance Education disciplines from the program, followed by the "flexibility" that this model offers. We can also observe that the Institution's "image" also influenced a few students.

What really calls the attention, however, is that 5 of the 8 reasons indicated are related to characteristics of the Distance Education mode, totaling 32 of the 38 answers and none of them are related to it's quality and efficacy. Two others include quality inherent to the program itself, such as "the institution" and it's "faculty".

Therefore, it seems that the main Distance Education characteristics, as has been depicted in the literature, are the factors that influence most students to attend such courses - flexibility relating to a "time frame" one has to dedicate to the learning process and the possibility to accomplish the course requirements without having to be present at the institution's physical quarters. This is in accordance to Loyolla's and Prates (2000) article emphasizing that time and distance are decisive factors influencing people to take distance Education courses.

Information access, access equality, opportunity to grow, increase personal and professional competitiveness, and actualization were not mentioned by the subjects, although elsewhere in this paper these factors were discussed as being motives why people seek and value Distance Education.

As with any type or model of instruction, Distance Education presents strong and weak aspects. The students pointed a varied range of strong points as demonstrated in Table 3.

It seems that the respondents don't have an homogeneous opinion. Seventeen different, but somewhat related answers were given, demonstrating that although Distance Education has many strong points, people experiencing this "new" learning process did not reach a consensus about which they are.

It is interesting to note that the aspects most pointed should also be emphasized independent of the teaching model used - research, discipline and motivation, reading, assignments, and instructor's participation. These aspects are actually very important and influence the teaching-learning quality and effectiveness. So it is a good sign that students perceive that these are present in the Distance Education model applied and used by the University. Teachers' involvement (dedication, motivation, experience, quality, monitoring) as well as the course overall content were also highlighted by the subjects as being strong aspects.

### Table 2

STUDENTS' MOTIVES FOR TAKING DISTANCE EDUCATION DISCIPLINES

<table>
<thead>
<tr>
<th>motives</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from Institution</td>
<td>12</td>
</tr>
<tr>
<td>Study period flexibility</td>
<td>8</td>
</tr>
<tr>
<td>Lack of time to attend classes</td>
<td>6</td>
</tr>
<tr>
<td>Possibility of studying while traveling</td>
<td>4</td>
</tr>
<tr>
<td>The Institution offering the course (PUCCAMP)</td>
<td>3</td>
</tr>
<tr>
<td>Faculty</td>
<td>2</td>
</tr>
<tr>
<td>Innovative experience</td>
<td>2</td>
</tr>
<tr>
<td>As a basis/material for thesis</td>
<td>1</td>
</tr>
</tbody>
</table>

(more than one answer possible)
Distance Education is not different than any other process, procedure, model of instruction in the sense that it is not perfect. It has its flaws and limitations also. Table 4 lists what the students perceived as weak points or aspects of the program.

As can be easily noted, there are fewer weak aspects than strong ones, and less subjects manifested about this point. The main difficulties encountered was with software and the computer system used, hindering the project. One student mentioned "lack of feedback from instructors". An interesting point, since research has demonstrated that Distance Education participants want to know how they are doing.

Student interaction and course materials are also important and valued as research results have been showed. Fortunately, these aspects were considered as weak points by only 1 subject.

TABLE 3
DISTANCE EDUCATION STRONG ASPECTS ACCORDING TO STUDENT'S PERSPECTIVES

<table>
<thead>
<tr>
<th>strong aspects</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research requirements</td>
<td>6</td>
</tr>
<tr>
<td>Develops one's discipline and motivation</td>
<td>6</td>
</tr>
<tr>
<td>Instructor constant monitoring</td>
<td>6</td>
</tr>
<tr>
<td>Quantity of class work</td>
<td>6</td>
</tr>
<tr>
<td>Flexibility</td>
<td>4</td>
</tr>
<tr>
<td>Access through Internet</td>
<td>4</td>
</tr>
<tr>
<td>Reading requirements</td>
<td>4</td>
</tr>
<tr>
<td>Availability of materials and resources</td>
<td>3</td>
</tr>
<tr>
<td>Course content</td>
<td>2</td>
</tr>
<tr>
<td>Quality of faculty group</td>
<td>1</td>
</tr>
<tr>
<td>Institution's infrastructure</td>
<td>1</td>
</tr>
<tr>
<td>Level of instructors' motivation</td>
<td>1</td>
</tr>
<tr>
<td>Level of instructors' dedication</td>
<td>1</td>
</tr>
<tr>
<td>Level of instructor's experience</td>
<td>1</td>
</tr>
<tr>
<td>Overall course level</td>
<td>1</td>
</tr>
<tr>
<td>Quality of disciplines offered</td>
<td>1</td>
</tr>
<tr>
<td>Group working virtually</td>
<td>1</td>
</tr>
</tbody>
</table>

(more than one answer possible)
TABLE 4
DISTANCE EDUCATION WEAK ASPECTS ACCORDING TO STUDENT'S PERSPECTIVES

<table>
<thead>
<tr>
<th>weak aspects</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebCT (software) eventual mal functioning</td>
<td>5</td>
</tr>
<tr>
<td>Inadequate Chat rooms</td>
<td>5</td>
</tr>
<tr>
<td>Lack of interaction with colleagues</td>
<td>1</td>
</tr>
<tr>
<td>Lack of course materials</td>
<td>1</td>
</tr>
<tr>
<td>Lack of uniformity amongst discipline structure</td>
<td>1</td>
</tr>
<tr>
<td>Inadequate student participation</td>
<td>1</td>
</tr>
<tr>
<td>Lack of interaction in the Web</td>
<td>1</td>
</tr>
<tr>
<td>Lack of feedback from instructors</td>
<td>1</td>
</tr>
</tbody>
</table>

(more than one answer possible)

This study also depicted what students considered as being Distance Education advantages and disadvantages of studying using the Distance Education model developed by the Institution. Many advantages were mentioned and only a few disadvantages. The advantages are reported in Table 5.

Once more "flexibility" is emphasized. It was mentioned as the main Distance Education advantage, followed by the benefits the Web entails and by the possibility to study at one's own pace and time arrangements. The use of technology and the motivational factor also received attention from several respondents.

The Internet is then seen as a facilitator channel of instruction bringing about the so highly valued flexibility, both in relation to time dedicated to research and study and increased access to information resources available.

Another highly valued aspect is interaction amongst students. This possibility was recognized by several subjects who actually demonstrated that they were benefited and realized that the constant contacts with professionals from other regions in order to meet the course requirements augmented their learning, professional and personal experience extending their knowledge horizons.
It is interesting to note that none of the advantages mentioned earlier in this paper as the ones valued by different authors was alluded by the subjects of this study. This fact only robust Distance Education as it increases the spectrum of this method's apparent advantages.

Defenders of Distance Education will be glad to know that only a few disadvantages were pointed by the respondents: lack of interaction, dependence on the student's interest level, group evaluation, and in this case, lack of legal government support.

All 34 students answered "NO" to the questions: "Did you encounter any barrier in achieving the expected learning experience?" and, "Did you feel hindered in relation to the level of content assimilation due to the EDMC model adopted? This is probably why 80% of the respondents affirmed that "taking disciplines using the EDMC model greatly satisfied my initial expectation" and 90% answered that they would "strongly recommend the model to colleagues".

The subjects were asked to rate on a Lickert scale from "very appropriate" to "highly inappropriate" several factors related to the Distance Education model (EDMC) being evaluated. Table 6 summarizes the answers.

TABLE 5
STUDENTS' PERCEPTIONS OF DISTANCE EDUCATION ADVANTAGES

<table>
<thead>
<tr>
<th>advantages</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>14</td>
</tr>
<tr>
<td>Possibility to use the Web to study from anywhere</td>
<td>10</td>
</tr>
<tr>
<td>No time constrains</td>
<td>10</td>
</tr>
<tr>
<td>Use of technology</td>
<td>8</td>
</tr>
<tr>
<td>Require high self motivation</td>
<td>8</td>
</tr>
<tr>
<td>Allows for learning at one's own pace</td>
<td>8</td>
</tr>
<tr>
<td>Promotes high interaction between professionals from varied regions of the country (even internationally)</td>
<td>6</td>
</tr>
<tr>
<td>Allows for great instantaneous instructor's response</td>
<td>6</td>
</tr>
<tr>
<td>Favour research</td>
<td>4</td>
</tr>
<tr>
<td>Favour work and learning experience</td>
<td>1</td>
</tr>
<tr>
<td>Promotes reading</td>
<td>1</td>
</tr>
<tr>
<td>Forces students to think harder</td>
<td>1</td>
</tr>
<tr>
<td>Develops one's interior</td>
<td>1</td>
</tr>
<tr>
<td>Well organized debate forum</td>
<td>1</td>
</tr>
<tr>
<td>Stimulates study discipline</td>
<td>1</td>
</tr>
<tr>
<td>Allows more time for research</td>
<td>1</td>
</tr>
<tr>
<td>Motivates one to seek new forms of learning</td>
<td>1</td>
</tr>
<tr>
<td>Forces one to study every day</td>
<td>1</td>
</tr>
</tbody>
</table>
Promotes resource sharing, better access to instructors, easier access to materials, improves curriculum, propitiates economy, and improves educational quality.

As can be easily observed, the data tabulated on Table 6 demonstrates that the great majority of the participants consider all factors presented as being "very appropriate" or "somewhat appropriate". Therefore, we can infer from those results that they are very satisfied with the EDMC educational model.

### TABLE 6
FACTORS AFFECTING THE EDMC EFFECTIVENESS

<table>
<thead>
<tr>
<th>factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructors' motivational level</td>
<td>19</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Level of content usefulness</td>
<td>16</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Level of motivation provided by the EDMC model</td>
<td>16</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EDMC model allowed understanding of contents</td>
<td>16</td>
<td>14</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Level of expectancy met by the EDMC model</td>
<td>14</td>
<td>14</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Teaching strategy favoured learning</td>
<td>13</td>
<td>16</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EDMC model favoured learning</td>
<td>13</td>
<td>16</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Motivation provided by the teaching strategy</td>
<td>11</td>
<td>18</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Level of TI structure support</td>
<td>9</td>
<td>16</td>
<td>19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Level of the WebCT efficacy</td>
<td>6</td>
<td>16</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EDMC favoured interaction amongst instructors</td>
<td>13</td>
<td>9</td>
<td>9</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Instructors' use of EDMC's full potential</td>
<td>9</td>
<td>13</td>
<td>9</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>EDMC favoured interaction amongst colleagues</td>
<td>6</td>
<td>16</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Two aspects were very highly regarded: the motivation provided by both instructors and the EDMC model per se. The other aspect was in relation to the course content presented, more specifically, its usefulness and its understanding.

The extent to which the model favoured and augmented the learning experience was perceived as being "highly appropriate" by half the respondents. Less than half thought it was "somewhat appropriate" and a few only regarded it as being "appropriate". These results are in accordance with Loyolla's & Prates' (2000, p. 3) thoughts when they argue that the "EDMC project, through its highly interactive technologies, critically launches doubt on the pedagogic efficiency used by the conventional educational system which requires the simultaneous presence of students and instructor."

Although the results of the present study do not help to clarify whether the traditional educational system is efficient or not, it does illuminated our understanding about the EDMC's efficacy regarding its potential and capacity to augment learning.

A higher number of students considered that the TI structure used and its accompanying computer systems and software could have had a better
performance. In this case, only about a forth considered this aspect as being "highly appropriate", but more than half indicated that the TI infrastructure was "appropriate" only.

Although according to Loyolla & Prates (2000) interaction is highly valued and it is one of the Distance Education main features, this study revealed that students were less satisfied with this aspect. They thought that interaction amongst colleagues and between them and instructors could have been better. Several students perceived the level of interaction as being "inappropriate" and one even indicated it as being "highly inappropriate". Actually, this was the only item in the Table which received this "score"

Since subjects have been exposed to both models of instruction, that is, Distance Education and Traditional classroom, they were asked to compare their motivation and dedication level when exposed to one and to the other. Actually, the answers can be grouped into 3 different categories:

Category 1: Distance Education Perceived as a Superior Model

The types of answers that reflect this category were in the lines of: Distance Education demands more dedication, and therefore adds more to one's learning experience and development, requiring harder effort and facilitates the search for parallel subjects promoting further investigation and so forth;

Category 2: There Is No Difference Between Both Models

The types of answers that reflects this category were in the lines of: development is the same in both models, therefore, does not make any difference, because motivation comes from the inside, requiring the same level of dedication;

Category 3: Traditional Instruction Seen as a Superior Model

The types of answers that reflects this category were in the lines of: the traditional instruction model adds more to one's dedication and learning.

Although subjects' answers reflected all 3 categories, 50% falls in the first, 37% in the second, and 13% in the third category. From this data we can infer that students involved in this study who have taken disciplines in both models, have a high tendency to regard Distance Education as having a greater capacity of installing higher levels of motivation and demands greater dedication than the Traditional Instruction model.

The last question of the questionnaire intended to leave the subjects free to express their learning experience using Distance Education. The list that follows summarizes their reflections:

- "It was a great experience - lots of reading, greater contact with other people and forced me to conduct many researches."
- "Above the expected and above pleasant"
- "Depends on the student's will power"
- "Excellent - I would like to take more disciplines in the future"
- "It was a good experience - the method applied exceeded my expectations"
- "Up to date topics; great motivation; excellent learning experience;"
- "Extremely interesting process and what I took out of it was sensational."

It is interesting to observe that, although some restrictions were identified in earlier commentaries, every single experience reported in this final question was totally in favor of Distance Education. In one way or the other, respondents defended its worthiness and value as a viable and highly motivating instructional process which contributes to enhance one's learning experience.
6. CONCLUSIONS

The accelerating speed with which Distance Education is evolving, taking shape and spreading beyond local boundaries, provenient from sophisticated computer network tools, is impelling discussion and urging action by educators in a variety of educational challenges. Many important issues need to be approached in order to launch Distance Education into further and safe horizons.

Without any doubt, evaluation is a key issue in this process. One should be very careful when planning, developing and implementing Distance Education programs. Evaluative mechanisms should be considered and designed to access and guarantee that these efforts reach the designed objectives with efficacy and quality.

Independent of the evaluation instrument and measures adopted, critical criteria should be made present, such as level of participants' satisfaction, level of learning development reached, instructors' support and interaction, programs' content and structure, informational technology's compatibility and adequacy, ease of access to information sources, flexibility, and instructors' performance level.

The evaluation procedure adopted in this study demonstrated that, in general terms, students who attended Distance Education disciplines in the PUC - Campinas' Information Systems Management Master's program were highly motivated.

My experience as a faculty member teaching several Distance Education disciplines demonstrate that this model actually motivates students in ways which I have not witnessed in the traditional instructional teaching model.

As explained before, the EDMC model developed and adopted in the Program provides for 4 student-teacher physical encounters in a Institution's classroom during the semester. These encounters are the richest in terms of discussion and the most exciting I've ever seen, demonstrating that students are highly involved in the learning experience - virtual interaction amongst themselves, virtual interaction with instructor, augmented research experience due to the many possibilities computational and telecommunications technology provides, and so forth.

The study's results also showed that Distance Education exceed the participants' expectations, allowing and even promoting their updateness with appropriate materials and information resources. Many students perceived the method as a strong learning catalyzer. Being able to study at any time from any where was also a highlight of the Distance Education program.

As any endeavor, this Program needs to rethink and improve a few elements: the IT structure and software program used; train instructors so they can use the computational system's whole potential; and improve interaction between students and instructors and amongst themselves.

Distance Education enthusiasts and promoters should not concentrate efforts and time discussing or speculating how this instructional model compares to the traditional classroom one or even if one is better than the other.

Rather, they should focus their research agenda and mental energies in how institutions and professors can take full advantage of the potential this "new" instructional process has to enhance and augment one's learning-teaching experience with the objective to improve the whole process in a way that everyone involved - students, institution, and instructors can benefit and grow.

More than 90% of the participants of this evaluative study stated that they would "highly recommend" the Distance Education model adopted in the Master's program. While reporting their learning experience, two of the student's reflections further summarizes the quality this EDMC project has reached and its level of impact:
"The program contributed to my personal and professional growth"

and "promoted my updateness changing my behavior in the company where I work."

After all, isn't this what education is all about?

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