

Information and Communication Technology and Distance Education in Brazil

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Abstract

The analysis of the different methodologies of education adopted by the leading universities in their distance education courses may instigate the interest of the professors involved with distance education, in the process of choosing the methodology that better assists the students who cannot or prefer not coming to campus.

For the universities that are introducing courses in the distance education one of the main challenges is to seek for the appropriate pedagogical language of learning carried on by multiple media available. The tutorship action is essential, being conclusive to the courses success. In this new model of education, the tutors act as a facilitator of the course rather than an specialized professor, because these courses are structurally less organized but focused on personalization, considering that the students are the responsible ones for taking care of its education.

The main goal of this paper is to create a conceptual model of analysis to identify how the information technologies and communication is being used in the distance education courses offered by high education institutions in Brazil. With the data gotten through research the objective is to present a comparative analysis capable to identify the interaction ways and support given to alike students among the universities, in other words, groups that have similar characteristics with respect to the pedagogical projects of its courses, its materials, courses structure, ways of interaction between professor and student, students attendance, public, adopted technologies and valuation systems as well.

Key words: distance education; information and communication technology; methodologies of education

1. Introduction

According to Drucker (1999) and Toffler (1990), in the knowledge society capital will no longer be represented by raw materials or goods produced and accumulated, but rather by knowledge. Thus, in the same way today we demand additional material assets, in this new society we will demand more knowledge. Information society synthesizes the emergence of a technical and economic paradigm in which information is the main raw material.

Lately, the expansion of the knowledge accumulated by society has been substantial. Thanks to the internet, people today have much greater and much faster access to information than they had in the past. Yet, as pointed out by Valente (2002), the fact of having abundant information does not mean people have more knowledge. Knowledge is the product of processing information. How can we encourage this processing and how does it take place?

For our nation to reach better levels of education, we have to establish the means to give people the chance to build knowledge. Consequently, we must increase the supply of education.

By applying technology to education, we can change this perspective, because the development of new technologies – which has triggered a silent revolution in society – has also changed the way in which people carry out their business and work with other people, and has enabled new possibilities of teaching and learning. New technologies brought about new forms of Distance Education, which combine well-known educational resources with tools provided by modern information and communication technologies (ICT).

In the past few years, the internet has caused many changes in education, whether by the technology applied or the manner in which the course content is presented. The changes can be perceived in the scope, the content and the provision of Distance Education. It is within this context that Distance Education has been rising as one of the most important tools to disseminate education and knowledge.

In Brazil, we see a growing demand for distance education. At the macroeconomic level, the interest of raising the population's educational level in the short term is associated to factors such as an increasingly globalized economy, in which a country has to be on equal footing with the international and global markets.

One of the main challenges faced by higher-learning institutions (UNIVERSITY) arriving in the Distance Education field is to seek a teaching language suitable for learning through the various media available. Course coordinators must closely supervise and monitor teachers, tutors, interns and administrative staff, because students will interact with the course through different means, all of them essential to successful learning. A close-knit, well-structured team comprised of experts in education and technology can ensure the students' successful learning experience.

2. Objectives

In spite of Distance Education existing for more than 150 years, it was only in the last two decades that academic studies and research systematically

analyzed this approach to disseminating knowledge, according to Maia and Abal (2001).

The main objective of this study is to create a conceptual analysis model to identify how information and communication technologies (ICT) are being used in Distance Education educational processes at universities in Brazil.

We will analyze the various characteristics and teaching methodologies applied by University Distance Education courses. This study will also present a comparative analysis to identify similar student interaction and support approaches among the different universities, i.e., groups that have similar characteristics regarding their courses' educational projects, the materials used, the structuring of the courses, the ways in which students and instructors interact, the support provided to students, the technologies used and the evaluation systems adopted.

3. Summary of theoretical references

The various models of Distance Education are built around the core components of the education process: presentation of content; interaction and ways of accessing the university, the other students and the resources; practical application; and evaluation. Each Distance Education model uses and combines technologies in various ways to address some or all of the above components. The various Distance Education models differ not only in regard to the type of technology used, but also how learning is controlled and where teaching takes place. In some models, the instructors and the institution have primary control, which is the case of the traditional classroom. In other models, this control is handed over to the students.

The Institute for Distance Education, at the University of Maryland University College (2005), provides three specific models or groups of Distance Education activity, when we analyze the general characteristics of Universities, considering all aspects, from learning environment to evaluation systems. The main characteristics analyzed in this model are the following: course design, regarding availability of material and the computer technology used; the learning environment, which covers the ways students interact with instructors and tutors; teaching, regarding the course structure; and the technology used, which includes the information and communication technologies used in each group. The groups are described as follows:

Group 1 – Distance Classroom

This model is structured on technologies capable of taking knowledge to different points of the country. The University in charge of the course controls progress and the location where it will be held. Classes involve synchronous communication: instructors and students agree on the time and place to meet. The Universities manage to handle a small number of students at each location. In this study, the institutions included in this group have 30 students at various "distributed classrooms".

Group 2 – Independent Learning

In this model, students can take the course regardless of where they are and they must not follow set class schedules. Students receive study material, which includes a course program. The university provides the student with a monitor or tutor, who will advise this student, answering questions and

correcting exercises. The monitor and the student interact using the following technologies: telephone, fax, chats, e-mail and traditional mail. There are no classes per se. Students conduct their studies independently, duly following the course program. Students can interact with the tutor and, in some cases, with other students. The course content is presented in printed form, CD-ROM or video.

Group 3 – Independent Learning + Classes

This model involves the use of printed material and other media, such as VCR tapes or computer disks, which enable participants to study wherever they wish. Other technologies involving students can also be used. Participants meet periodically in groups, at specific locations, to receive teaching support. In the classes, students discuss the course content, clarify concepts, carry out group work, conduct laboratory experiments, make simulations and perform other exercises associated to learning.

4. Investigation methodology and sources

When adopting a methodology, one must always consider the instruments currently accepted in the course's field of study. Mumford (1985) says that for research in information systems, best results are often achieved by a combination of methods. Thus, since this topic still has little accumulated and systematized knowledge, this study will adopt a combination of methods, to identify concepts and systematize Distance Education methodologies, to present the strategies of Universities that already offer Distance Education courses. The research strategy utilized in this study is that of case studies, consisting of multiple case analyses, of which each course, of each of the Universities analyzed, will be considered one unit of analysis.

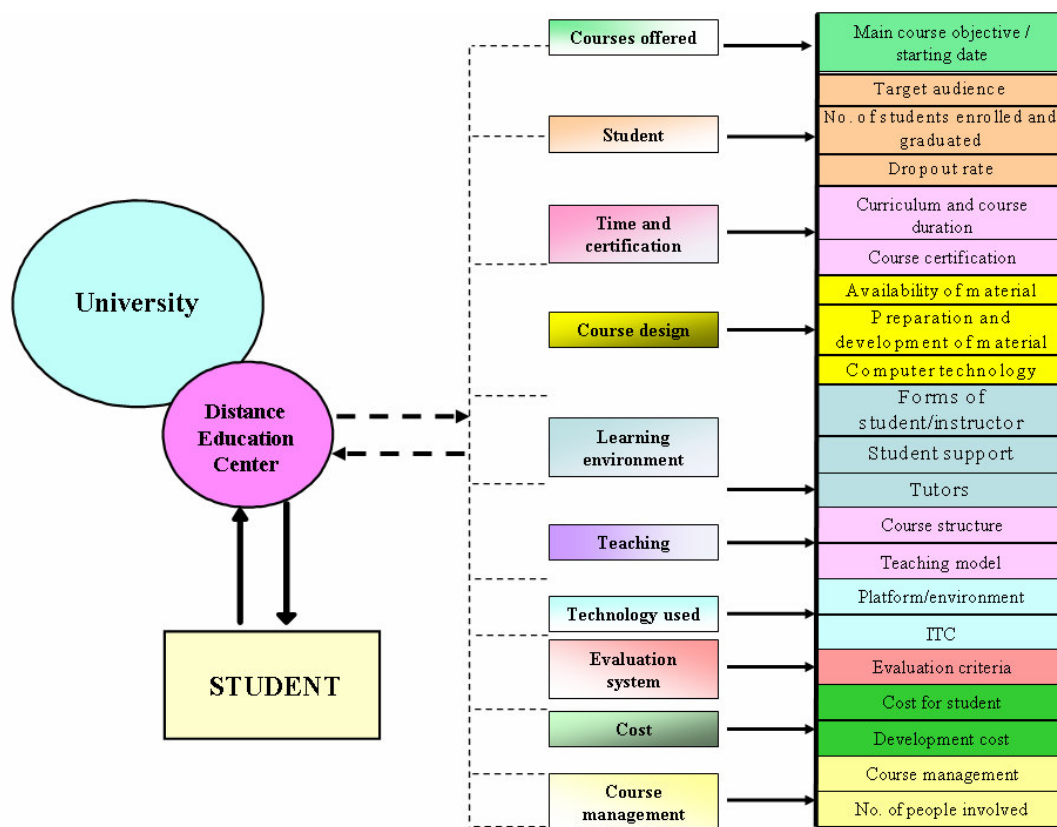
The specific component of this study is: "How to create a conceptual analysis model to identify how information and communication technologies (ICT) are being used in Distance Education educational processes at higher-learning institutions (universities) in Brazil?"

Considering that this study intends to help formulate an analysis model of the methods used in Distance Education in higher learning courses in Brazil, the focus of study will be Brazilian Universities that apply Distance Education methodologies in their courses.

The Universities invited to take part in this research were selected by crossing information from the Brazilian Education Ministry (MEC), more specifically the Brazilian Distance Education Secretariat (SEED), which has a database of courses certified and authorized to offer Distance Education in Brazil; information was also provided by the Brazilian Association of Distance Education (ABED), which has a list of Universities that provide Distance Education courses. Thus, we identified the Universities that offer Distance Education courses.

Conceptual analysis model

Considering the theoretical review prepared for this study in the systemic models suggested by literature on Distance Education, we proposed an analysis model (Figure 1) to base data gathering and the analysis of the courses investigated. The model consists of the main characteristics of a Distance Education center and of its main factors.

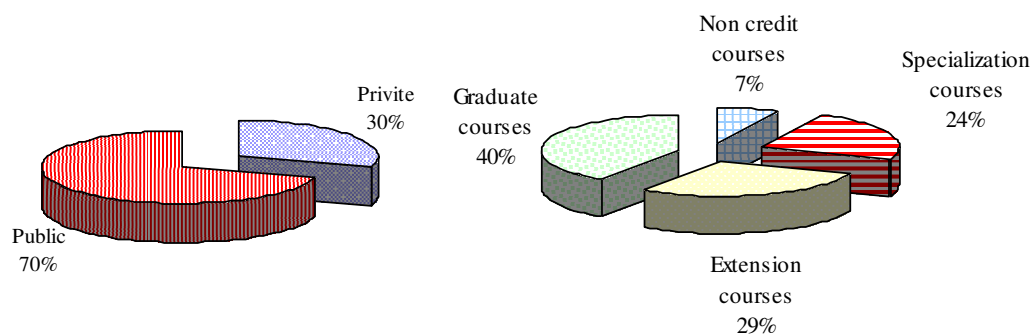
Figure 1: Suggested analysis model

5. Research results

The data collected at the 50 Universities studied were analyzed individually and later aggregated by similarity. This analysis of similarities took into consideration the basic questions proposed in the analysis model and in the case study protocol. By analyzing the data collected, we can draw a profile of the teaching methodologies adopted by Distance Education courses offered by Brazilian Universities.

Sample composition

The sample is composed as follows: 30% private Universities and 70% federal public Universities, as shown in Chart 1.

**Chart 1: Sample characteristics – type of UNIVERSITY and sample by region**

a) Courses offered

Regarding the area of knowledge of the courses analyzed, the sample is distributed as follows: Teacher training courses: 22; Business courses: 13; Technology courses: 7 and Other courses: 5.

The sample in question consisted of the following courses:

Table 1: Distance Education courses

Courses	No.
Improvement (non credit course)	4
Specialization	12
Extension	12
Undergraduate	18
Graduate	1
Total	47

Table 1 shows that undergraduate courses are the most frequent in this sample, representing 39%. Undergraduate courses are the most common.

The great number of distance undergraduate courses offered throughout Brazil can be explained by the demand brought by Law no. 9394/96, to train teachers for the initial grades (first to fourth) of the primary education level. This law provides that “*by the end of the Education Decade (2006) only teachers with college certificates or graduated through training in service will be admitted*”.

Students – number of students enrolled and graduated

The Universities analyzed have 80,929 students enrolled in Distance Education courses; most of these individuals attend distance undergraduate courses, a total of 68,640 students (about 85%). The undergraduate and specialization courses together account for close to 92% of all students enrolled. We see that among the courses analyzed, the most demanded distance courses in Brazil are extended courses, with more than 360 class-hours. This challenges the notion that Distance Education is mostly associated to fast training and short courses, in which students do not take part in any activities such as personal meetings with tutors or instructors, evaluations and such.

b) Teaching methodology and course design

Availability of material

We see that courses whose material is paper or CD-ROM-based are semi-classroom courses (Table 2), in which the material is distributed by the course tutor or instructor. We see that Universities prefer to distribute course content in printed form (53% of the sample). Some Universities provide material over the internet, in the form of virtual textbooks (24%) and the students decide whether to print the material or not.

Table 2: Material used and the different forms of interaction

Interaction	Internet, telephone and fax		Classroom, internet, telephone and fax		Classroom	Total
Availability of material	Internet	Internet and other resources	Internet	Internet and other resources	None	
Textbooks	6.4%	6.4%		10.6%		23.4%
Material	4.3%	4.3%	21.3%	21.3%	2.1%	53.2%
Nothing printed	6.4%	4.3%	6.4%	6.4%		23.4%
Total	17.0%	14.9%	27.7%	38.3%	2.1%	100.0

We see that the internet is already being used as a tool to convey information between the students and the Universities. In the last few years, we have seen that Distance Education has inexorably been drifting to web-based teaching. Yet what we see is that most of the courses still offer their students printed course material (about 68%), even though 97% of the courses use the internet to distribute their material and to have students interact with instructors.

c) Learning environment

Forms of interaction between students and teachers

When one considers that the best technology is that which reaches the students wherever they are, it is easy to understand why, at the participating Universities, the interaction between instructors/tutors and students is almost always (98% of the Universities) by internet, telephone or fax. What changes from one course to another is the possibility of having classroom interactions.

The means used for communication between instructor and student are many. Depending on the type of communication adopted, or the combination thereof, we have greater or lesser interaction between agents. Many articles state that the best strategy for a distance course is that which combines classroom learning with Distance Education. This is because people first establish personal relationships in the physical world and only then transfer this relation to the distance world, in a more efficient manner.

Student support

In all, 98% of the courses analyzed use internet for student / instructor / tutor interaction, regardless of this being a distance course or not.

Table 3: Computer resources and form of interaction between students and instructors

Computer resource	Internet, telephone and fax	Classroom, internet, telephone and fax
CD-ROM	12.8%	17.0%
Internet	17.0%	25.5%
Teleconference	2.1%	14.9%
Video	4.3%	10.6%
Videochat		2.1%
Videoconference	4.3%	21.3%
Video on demand		2.1%
Web-radio	2.1%	

In courses that are entirely distance, this interaction can take place in various ways (table 3), such as through videoconferences (4% of the sample) or web radio (2% of the sample).

Other than internet, the most common computer resources used are the following: CD-ROM, which is commonly used to distribute the course content; videoconference, in which an instructor is at a given location and the student at another remote site, but which enables synchronous communication between them; and teleconference, which works as a videoconference without synchronous interaction between participants.

The Universities that use teleconferences associate the use of this tool with the availability of a toll-free telephone line, through which students at far-away classrooms call the instructor and pose their questions. These questions are “filtered” and submitted to an instructor, who answers them. In the sample analyzed, nine Universities use this resource in this manner, or with some variations.

It is important to point out that hybrid classroom/distance courses are those that most extensively use the available computer tools.

d) *Technologies use – platform and environment*

Most of the universities (55%) use platforms they have developed internally, instead of purchasing off-the-shelf platforms.

In all types of courses studied, we find Universities that use their own internally developed platforms. Some of the projects for platforms to manage distance courses have been developed in Brazil.

WebCT is used by universities that charge the highest prices for their courses, an average of R\$9,400. On the other extreme, students of Universities using AulaNet pay the lowest prices, an average of R\$200. Free courses use their own platforms in about 60% of the courses. In this segment, in addition to the Universities’ own platforms, only AulaNet and LearningSpace are used in free courses.

e) *Evaluation criteria adopted*

In all, 77% of the courses analyzed have classroom final examinations. This is an Education Ministry requirement for certification, but also shows concern with the possibility of the person taking the course using a false identity. About 57% of the courses analyzed that have classroom final examinations also evaluate their students through their participation during the course, in chats, forums and other activities.

All courses that have classroom final examinations also compute the students’ final grade through a set of evaluations, which includes tests, chat and forum participation, exercises, classroom attendance and, finally, a final examination. This is true for all but one of the courses studied. In specialization courses, this final paper corresponds to a monograph.

Only 13% of the courses analyzed in this sample have a distance final examination. Short courses, such as extension courses, have at least one distance evaluation in 50% of the cases.

f) *Cost to the student*

The average cost of graduate courses is the highest of all, about R\$6,000. The specialization and undergraduate courses are also quite

expensive, if compared to the rest of the sample. The higher price of these courses is explained by the fact that they are longer, with more than 360 hours of class, which demands many hours for developing content and tutoring.

In our sample, about 40% of the courses are free.

If we analyze the distance courses offered and which comprise the sample, that with the highest cost for the student is the Bachelor's Degree in Business with major in General Business Administration, offered by Faculdade de Administração de Brasília – AIEC/FAAB. The overall cost for this course was R\$22,640 at the end of 2002. A total of 600 students are currently enrolled in this course. Extension courses are the shortest and the cheapest for the students. Free courses are found only among undergraduate and improvement courses.

6. Concluding remarks

The study's results show that the substantial rise in demand for distance courses in Brazil is attributable to factors such as the need for permanent adult learning, knowledge refreshment, greater specialization of expertise and better access thanks to lack of physical barriers between students and the Universities.

In the sample analyzed, we have 80,929 students enrolled in Distance Education courses in Brazil; most of these individuals attend distance undergraduate courses, about 85% of the total. The large number of distance undergraduate courses in all regions of Brazil can be explained by the demand brought by Law no. 9394/96, which required training for teachers of the primary level, from the first to the fourth grades.

The teaching methods adopted by some Universities are quite flexible: the students can take the course at home or any other place they choose; the course materials are developed by different teachers (tutors), not necessarily the instructor in charge of the course; the teacher (tutors) in charge of a particular group of students did not necessarily take part in the team developing course content; the courses are offered in different cities.

All Universities analyzed use teaching platforms or Learning Management Systems (LMS), which are designed to simplify course management. These tools help students in their individual planning of the learning processes, and allow them to collaborate with each other by exchanging information and knowledge. Most of the Universities (55%) use platforms they have developed internally, instead of purchasing off-the-shelf platforms. All tools are used in both hybrid classroom/distance courses as well as those entirely distance-based.

We clearly see that Universities prefer to distribute course content in printed form. Some Universities provide material over the internet, in the form of virtual textbooks and the students decide whether to print the course content or not.

Another important matter regarding the material and course content we should point out is the matter of copyrights. This is still an open issue between Universities and teachers who write course content, and it should be cleared up to avoid future claims.

Considering the current situation of higher education in Brazil, which demands more openings in the coming years, Distance Education could be

used as a tool to expand the reach of courses offered by Universities, providing chances of education to a greater number of applicants. Yet Distance Education should not be considered only a form of course delivery, which would not ensure quality education. It is necessary to seek an education language that is suitable to learning through the various media available. It should structure processes, define objectives and educational issues and should apply instructional design techniques. No technology can address all problems. Learning depends more on the way the technology is being used than on the type of technology itself. Thus, tutorship, interaction and student support are also essential and determining elements to ensure course success. A close-knit, well-structured team comprised of experts in education and technology can ensure the students' successful learning experience.

Yet nowadays one has to not only learn, but also learn how to learn. To achieve this goal, the educational relationship must be prepared based on the education and planning objectives of each course. The instructor must play a key reconstructive role in this process, because it is necessary to combine modern learning theories to help achieve course objectives. Since learning will become a lifelong task, we must create an environment in which experiences can be shared by all parties in this process, to encourage the creation of learning communities. The commitment of instructors and students involved in this process will be decisive in this learning process. Yet in spite of all existing and available technologies, we must never forget that the cornerstone of the whole process is the human element.

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