Developing a New Course at an Open University

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ABSTRACT :

Distance learning is a model of teaching-learning which has been playing an increasing role in higher educational institutions. This paper focuses on the establishment and monitoring of an IS (Information Systems) undergraduate distance course, offered by the UAB (Open University of Brazil). The course is under the responsibility of a Brazilian public university (Universidade Federal de S. Carlos - UFSCar) in a partnership arrangement involving city councils and the Federal Government via the Brazilian Ministry of Education. The main goals of the paper are: (1) to describe UFSCar's experience of establishing a new distance course (which started in 2007, simultaneously with four other) and give a broad view of the main variables and problems involved in the process; (2) to present and discuss the accomplishments as well the difficulties faced over the last five year period. The paper reports several refinements the process of establishing a new distance course has gone through, to be adjusted to the dynamic and flexible nature of the environment as well as to the fast and volatile characteristics of many of the computational techniques supporting the learning environment.

1. INTRODUCTION :

Distance education can be defined in different ways (see, for instance Greenberg, 1998 ; Teaster & Blieszner, 1999 ; Bollag & Overland, 2001 ; Buchanan, 2000 ; Christensen *et al*., 2001 ; Keegan, 1995). However, several basic characteristics of this teaching-learning model are shared among various definitions, such 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" (Greenberg, 1998); (b) "… its primary distinction is that the teacher and the learner are separate in space and possibly time" (Teaster & Blieszner, 1999) and (c) [a teaching-learning model] that frees the student from the necessity of traveling to a fixed place, at a fixed time, to meet a fixed person, in order to be trained (Keegan, 1995).

Particularly, the previous characteristics also apply to the distance learning environment described in this paper. Some of them, however, have their own particularities and have been adjusted to the specific knowledge areas related to the IS bachelor course.

The continuous technological advances particularly in computer power, computer mediated communications, human-machine interaction facilities, etc. have, in many ways, linked the success and the fast-spreading of the distance learning model to the advances of the computational area.

In spite of the many different learning strategies and techniques involved in establishing a distance education environment, a computer-mediated environment, with aggregated technological tools and facilities will be assumed, since this is the actual environment the bachelor degree in Information Systems (IS), the main topic of this paper is based upon.

Distance learning can be considered a teaching-learning model under development and construction and, as such, requires continuous monitoring and revision of its methods and processes, as well as periodical critical analysis aiming at its better adequacy and functioning, particularly in CS-related courses (Kleinman & Entin, 2002 ; Dias *et al.*, 2010).

The paper is organized as follows: the Methods Section presents the general characteristics of the distance learning program implemented by UFSCar after joining the Open University of Brazil. It also briefly describes the main motivations for offering an IS bachelor course at UFSCar. The Results Section focuses on the specificities of the IS bachelor course – it presents the main goals of the course and the professional profile aimed for the bachelor. It approaches the evolution of its Pedagogical Project and related curriculum since the establishment of the course. The Discussion Section summarizes the policies and various problems faced by the main stakeholders involved i.e. students, academic and technical staff. Finally The Conclusion Section presents some conclusions highlighting a few relevant lessons learnt from establishing a new distance course.

2. METHODS :

In 2005 Brazil started the Universidade Aberta do Brasil (UAB) (the Open University of Brazil). UAB is a university level education system established by the federal government in partnership with federal universities, state and city councils, in a consortia arrangement. The UAB system congregates public educational institutions aiming at providing higher education to interested individuals who qualify to enroll the UAB system. UAB mainly aims at individuals who, for several reasons but particularly due to their unavailability in time and/or space, cannot attend to traditional university courses.

After going through a long process of internal considerations and discussions, the

Universidade Federal de S. Carlos (UFSCar) joined the UAB in July 2006 (UFSCar, 2006) and started its activities by planning and organizing the necessary resources for supporting the initial offer of five undergraduate courses namely: Information Systems (IS), Environmental Engineering, Musical Education, Pedagogy and Technology in Sugar-Alcohol Production. Currently UFSCar congregates three campuses in the S. Paulo state namely S. Carlos, Sorocaba and Araras. By middle 2012 UFSCar will have its fourth campus (Buri) in the S. Paulo state starting its activities.

This section presents information related to several aspects of the distance learning model implemented by UFSCar, to contextualize the teaching-learning environment and describe some of its main functionalities. Unless otherwise stated, in what follows IS bachelor degree refers to the distance course offered by UFSCar, part of the Brazilian Open University and the word "*presential*" refers to a course that one must attend in person.

2.1 Organization of UFSCar Distance Learning System

By offering distance learning courses an educational institution becomes responsible for managing and monitoring all the related pedagogical activities as well as the academic development of the students. In order to accomplish its duties, UFSCar established by decree (No. 5,800/2006) the so called Presential Support Center (Polo de Apoio Presencial), referred to in this paper as Center. The idea behind its creation was to provide students of a particular region with a physical space with the necessary infrastructure and equipment, as well as human resources, aiming at the decentralization of some of the university's activities. Figure 1 shows a diagram with an hypothetical example of the relationship between centers and universities.

A Center can be approached as an 'instantiation' of the university customized to the courses that serve the demands of a particular region. It can also be said that in the UAB that a Center plays the role of an

academic environment for those who are unable to be at UFSCar main campus, when required. A Center is the physical implementation of a model proposed by the Ministry of Education – the model establishes a minimal structure a Center should have to be considered as such.

The structure and organization of a Center vary depending on the region's demands and the nature and pedagogical proposal of the particular courses the Center is physically located in. It is mandatory though, that a Center should have a library with the main reference material used in the courses, pedagogical laboratories, rooms for tutoring, coordination and academic offices, as well as classrooms and related environments relevant to the teaching-learning process, available.
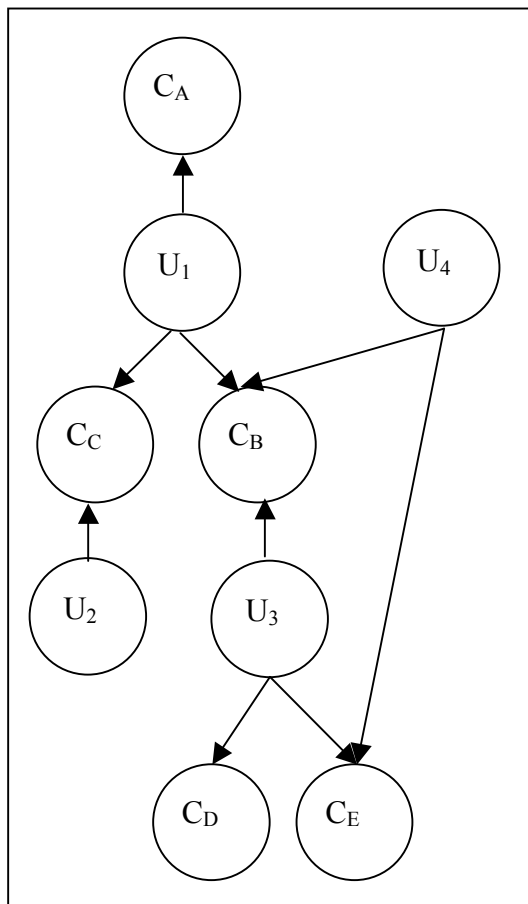

Figure 1 : A hypothetical diagram showing interactions among centers and universities

Figure 1 displays a customization of the model to a hypothetical situation where four different universities $\{U_1, U_2, U_3, U_4\}$ are served by five different centers $\{C_A, C_B, C_C, C_D, C_E\}$ in an arrangement for supporting 10 of their distance learning courses $\{Co_1, ..., Co_{10}\}$, as shows Table 1.

Table 1 : Ten Ongoing Courses offered by the Four Universities involving the Five Centers (as shown in Figure 1)

Courses	University	Center
Co_1	U_1	C_A
Co_2	U_3	C_D
Co_3	U_3	C_B
Co_4	U_2	C_C
Co_5	U_1	C_C
Co_6	U_3	C_E
Co_7	U_4	C_B
Co_8	U_4	C_E
Co_9	U_1	C_B
Co_{10}	U_3	C_D

This example tries to illustrate a few different possible scenarios: (1) a center exclusively supporting one course offered by a certain university (such as center C_A supporting Co_1 offered by U_1); (b) a center supporting more than one course offered by the same university (such as center C_D that supports courses Co_2 and Co_{10} offered by university U_3); (c) centers supporting courses from different universities (such as centers C_B (courses from U_1, U_3 and U_4), C_C (courses from U_1 and U_2) and C_E (courses from U_3 and U_4).

Currently UFSCar has arrangements with 14 Centers in S. Paulo state, all located in different towns (except for S.J Campos, a town which has two Centers, referred to as S.J.C 1 and S.J.C 2). The mandatory activities conducted at a Center include the

evaluations (tests and exams), those requiring the use of laboratories, specific pedagogical activities (individual or group), those related to internship, and a few others.

According to what has been established in the document that regulates UFSCar participation in the UAB system (UFSCar, 2006), at a particular center the working team related to a specific course is composed by the center coordinator and the (generally two) presential tutors per course.

The Center should also provide a technical support team for courses requiring the use of laboratories. At a particular center, the working team related to a specific course is composed of the center coordinator and presential tutors. Aggregated to this team there are two other teams: the technical support team and the administrative team.

Virtual interaction with students and support for the learning process are intensively conducted by virtual tutors (also known, in the literature, as online coach, e-trainer, tele-tutor, etc.). Virtual tutors play a fundamental role in the teaching-learning activities that take place in the distance learning environment implemented by UFSCar. A great deal of duties and tasks, conventionally under the responsibility of a lecturer, in live higher-education courses, have been assigned of virtual tutors.

In the five undergraduate courses offered by the UAB-UFSCar, the role of virtual tutors is, generally, played by students from presential master and doctorate university courses. A detailed description of the role played by virtual tutoring in two Statistics related courses can be seen in (Dias *et al.*, 2010). The lecturer's role is much more related to (a) providing (courses directives, contents, elaborating tests and marking them) and (b) supervising virtual tutors in performing their roles. In this sense, lecturers can be considered much more professionals who are closely monitoring and supervising virtual tutors to become lecturers. The interaction and articulation between all the participants is of fundamental importance for the success of a course. The contents related to each course is organized and made available in two or more media, besides the virtual.

The computer-supported virtual environment adopted by the distance learning program offered by UFSCar is provided by Moodle (*Modular Object-Oriented Dynamic Learning Enviroment*), a Course Management System (CMS) also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE), as stated on the Moodle Web page (Dougiamas, 2012). It is a free web application that can be used to create online learning sites. At UFSCar Moodle is supporting most (intra and inter) communication processes involving teachers, tutors, students and technical/administrative staff and used as a tool for developing online dynamic web sites for students.

2.2 The Establishment of the IS Bachelor Course

The initial proposal of the distance learning IS bachelor degree had three main motivations: (1) to collaborate with the governmental initiative of making high level education accessible to those in remote regions; (2) to contribute to the technical formation of human resources in a pervasive knowledge area characterized by a fast substantial development and (3) to continue to fulfill its purpose as a university, by contributing to spreading high level education to those in remote regions.

At the time UFSCar joined UAB, the fact that it had three well established traditional ongoing IS-related undergraduate courses namely: Computer Science bachelor, Computer Science engineering and Information Systems bachelor as well as all the necessary academic expertise in subjacent IS-related areas of knowledge was determinant for the proposal, creation and establishment of the IS bachelor degree.

Still going through recurrent adjustment phases, the IS course is supported by a solid and sound structure of teaching and knowledge, based on the expertise and experience gathered over the years in several presential courses offered by UFSCar. On the one hand, the experience of the academic staff in presential courses has

supported and paved the way for establishing the IS course; on the other hand, however, over the last five years, it has been observed that there has been an urge and need to adapt and customize the vast teaching-learning experience acquired in traditional courses to the distance learning model. Figure 2 shows a diagram of the centers related to the five classes so far (four ongoing and one already finished). The four ongoing IS classes are supported by 9 centers. Figure 3 shows the map of S. Paulo state where towns having Centers are marked.

Classes are named after the year they begun. The four ongoing classes of students engaged in the IS course are the 2008, 2009, 2010 and the 2011 class. The 2007 class finished at the end of 2011 although there are still 17 remaining students from this class who are in the process of completing the course.

Figure 2 : The IS bachelor classes, date they started, centers they are related to. The vacancy number per class in parentheses. Class 2007 finished in 2011
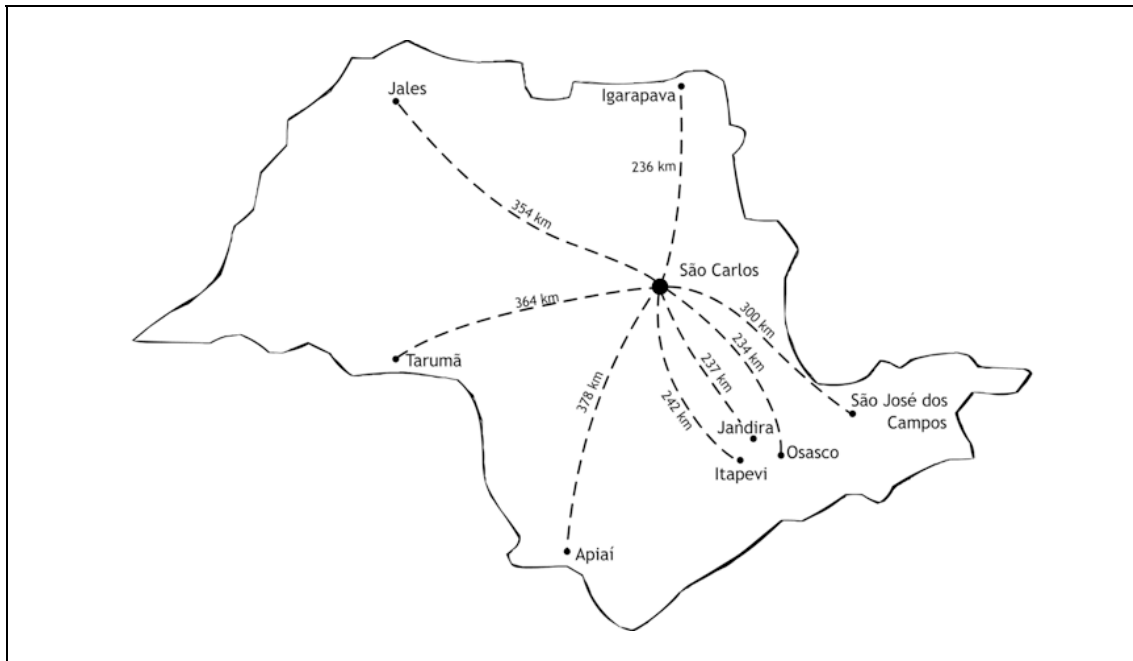

Figure 3 : Map of S. Paulo state showing distances between UFSCar main campus (in S. Carlos) and the nine Centers involved with the various classes of IS course.

3. RESULTS :

As pointed out by Toppi *et al.* (2010) "Information systems are complex systems requiring both technical and organizational expertise for design, development, and management. They affect not only operations but also the organization's strategy". As an academic area of study, Information Systems can be identified under a variety of different names which, somehow, reflect the historical development of the area, its several different characterizations and areas of emphasis which have been implemented by academic courses over time (see for example Pierson *et al.*, 2008).

3.1 Competences Aimed for the IS Bachelor

The UFSCar IS bachelor course gathers knowledge from three main areas, namely (1) Computer Science, (2) Information System and (3) Business. The main goal of the course is to approach and promote the use and development of computational techniques as a way to develop, use and maintain information systems in organizations (public or private). Its evolving pedagogical project and associated curriculum have been initially designed having a pragmatic focus in mind.

The technical contents of the IS bachelor course are mainly based on the specific knowledge of the three areas and also on some of the interdisciplinary knowledge shared among them. To a lesser extent it also requires the acquisition of skills and competences related to several human knowledge areas such as languages, communications, sociology, ethics, etc.

Given the substantial volume of knowledge related to each individual area as well as to the subjacent areas involved, the competence and skills intended for the IS bachelor have an accentuated, more pragmatic than investigative/theoretical bias. The IS curriculum aims at preparing students to become problem-solvers (and/or optimizers of the already implemented solutions), fully equipped with the required specific knowledge, whose main skills are

(a) familiarity with organizational processes; (b) capability of abstracting organizational processes as information systems; (c) ability to conduct critical analysis about organizational processes and promote discussions to suggest improvements and (d) creativity to design and implement new systems aiming at enhancing organizational performance.

3.2 Evolution of the IS Pedagogical Project and Associated Curriculum over the Last Five Year Period

Several factors motivated the pedagogical project (PP) and associated curriculum revisions of the five ongoing distance courses offered by UFSCar. The IS PP and associated curriculum have been through four minor revisions since the course started, as depicted in Figure 4.

The evolution of the pedagogical project and corresponding curriculum of the IS bachelor degree over the last five years, as shown in Figure 4, is clear evidence of the efforts made by the university to adapt contents and pedagogical methods to the distance learning model and, at the same time, to solve many new (particularly distance-related) problems.

The motivations for the revisions conducted are due to various factors, mainly related to the UAB system itself, such as: (a) UAB is a reasonably new university and, as such, lacks a history of previous experiences to take into account and support decisions. Decisions are mainly based on the history and experiences inherited from the traditional teaching-learning model followed by the participant universities which, not necessarily, suit the distance learning model implemented by UAB; (b) Brazil is a vast country and distances can be an issue. As pointed out before, a number of activities related to distance courses take place in Centers and, for many students, that implies having to travel; (c) the misconceptions and lack of information about the nature of distance learning courses and the degree of initiative, active participation and time.

The two first IS classes since the establishment of the course (i.e., 2007 and

2008 classes), started by following the original PP and associated curriculum. In July 2008, however, a commission was constituted for revising both according to the following guidelines: (a) to discuss the IS course pacing so far (b) to investigate and evaluate the possible causes of a few problems (e.g. several course subjects simultaneously offered, sometimes requiring the student to enroll in up to five of them) identified throughout the first year; (c) whenever possible, to propose adequate, feasible and easily implemented solutions for them and (d) to refine and adjust the curriculum.

The commission decided: (1) to adapt the original 2007 curriculum to contemplate (c), producing the Adapted 2007 Curriculum (for the ongoing 2007 and 2008 classes), trying to keep the changes to a minimum and also, confined to the first two modules of the course, aiming to maintain compatibility with the original 2007 curriculum and (2) to attend (c) and (d), to produce a new curriculum (2009), for the new starting class of 2009. At the end of 2010 all the distance learning courses offered by UFSCar along with their associated Pedagogical Projects went on global revision. As result, a 2010 PP and associated curriculum were produced for each of the five courses. Besides some minor adjustments, the main change was on the duration of the course which was extended from four and a half to five years.

It is important to stress that the IS bachelor course follows many of the recommendations contained in the document issued by the Brazilian Department of Education MEC (Ministry of Education, 1998) and also takes into account many of the suggestions and recommendations given by the ACM (Association for Computer Machinery) and AIS (Association for Information Systems) document (Topi *et al.*, 2010).
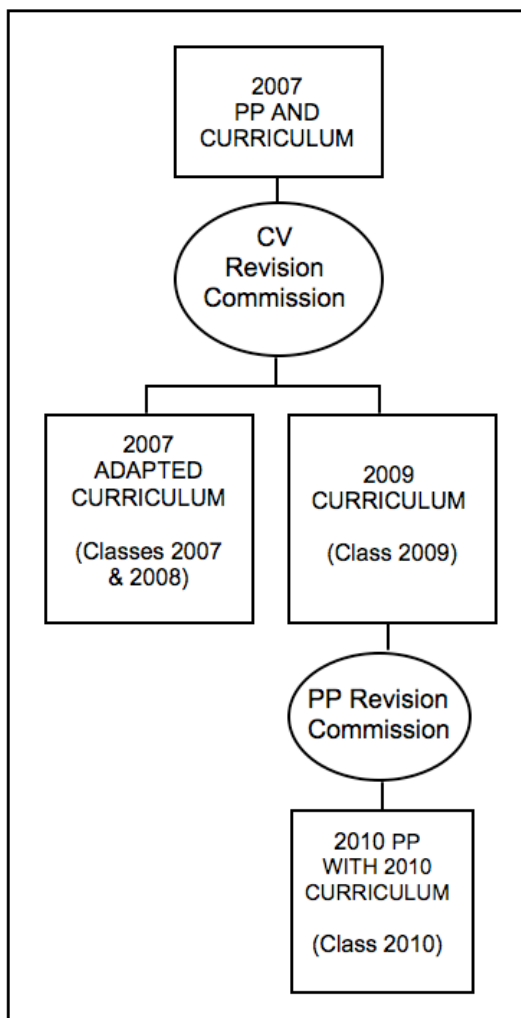

Figure 4 : Evolution of IS Pedagogical Projects (PP) and related curricula since the establishment of the course

4. DISCUSSION :

A particular problem which the IS bachelor distance course has been facing since its creation, back in 2007, is related to the speed in which technologies are changing and evolving. Obviously this problem also affects all the other courses, considering that the whole system is computer-supported.

However due to the inherent nature of computer science the changes can cause greater impact on courses related to the study and use of new computational trends and resources as IS courses. As pointed out by Topi *et al.* (2010), "The rate of change in technology suggests a rapid replacement cycle, with some technologies reaching obsolescence in less than twelve months".

While some of the technological needs of IS courses can be accomplished, it is a fact that the necessary infrastructure resources and human technical support at the centers are not always available and do not always conform to the speed of the changing computational technology in relation to both, software and hardware. Also, since the technical staff is under the responsibility of the city council, salaries are relatively low and a technical support position is usually filled with undergraduate students, many of them with no much experience/training and, sometimes, only superficial technical competence. On top of that, there is also a turnover of technical personnel, adding an extra difficulty to an already administrative-difficult task.

The nature of the UFSCar distance learning system, mainly characterized by flexibility and adaptation to potential town councils interested in joining the UAB can, sometimes, pose a very difficult administrative problem to deal with. The whole process of having a new partnership involves a considerable amount of administrative, technical and academic effort. A partnership, for instance, can remain only for the duration of a course and it involves many variables such as availability of the council in collaborating with the maintenance of a fully equipped Center, the number of individuals interested in certain course(s), local political biases, etc.

Similarly to what has been pointed out by Bof in (Bof, 2004), in relation to the distance learning certification course (Proformação), for providing training to 27,000 uncertified teachers in 15 Brazilian states, "… it is essential to have a well-defined legal arrangement to ensure each partner knows their respective areas of responsibility and parameters for fulfillment of such legal responsibilities. Moreover, it is most advisable to avoid, if possible, electoral periods and changes in local governments. A main problem in the implementation of Proformação, e.g., arose when some newly elected municipal governments did not abide by the agreement signed by the previous government." Moore in (2001) has identified the Proformação

initiative as the "distance learning program for the 21st century". The successes of Proformação (and also of a Mexican initiative related to distant classrooms called Telesecundaria) are attributed to print and television technologies and not the Internet (Bof, 2004) (Gulati, 2008).

To enroll any of the UAB courses students need to pass a national level exam. Particularly in relation to the IS course, in spite of passing the exam, many are quite unprepared and unaware of the technological challenges, level of abstraction, formal languages and logical reasoning to be dealt with during the course. On top of that, their success throughout the course is also heavily dependent on their own development of strategies and skills to adapt themselves to the distance learning model. In a reasonably short period of time they need to learn (a) basic functions a computer can offer; (b) the basics of UFSCar Moodle-supported teaching-learning environment; (c) to have an active attitude towards learning by interacting with colleagues, tutors and lecturers; (d) to develop a level of autonomy that allows them to effectively search support for their learning and (e) to learn how to monitor their own progress and learning achievements.

Many IS students start the course not having the rudimentary concepts involved in the use of a computer; this fact combined with the pressure to adapt to the new teaching-learning approach is one of the main reasons for the high dropout rate among students.

One of the main problems faced by IS distance learning course (also shared with several other courses) is related with the diversity of student's formation profiles attending the course. For instance, taking into account the IS students of the four ongoing classes, approximately half of them have finished high school while the other half have already finished an undergraduate university course. Data also confirm several of the characteristics attributed to distance-learning students worldwide: (a) in the IS course 35% of them are older than 35 implying higher student maturity than in presential courses ; (b) 95% of the students

work and (c) 35% have finished their previous studies before 2000 and 20% between 2000 and 2004.

There is a need to revise the role played by presential tutors and, also, to develop strategies and skills related to the distance teaching-learning process. Lecturers and virtual tutors need to develop an adapted professional repertoire customized to distance teaching-learning processes. Several strategies still being employed by them have been inherited from the traditional teaching-learning approach and are hardly suited to succeed in a distance-learning environment. At the end of 2011 only 11 students from the 2007 class completed their course; a remaining 17 students from this class are potential candidates to be finishing the course up to the end of 2012. So, from an initial group of 250 students that started the course back in 2007, in the best scenario 28 will finish it.

5. CONCLUSIONS :

In the turmoil of fast technological changes and advances that have been pushing educational methods and techniques to a rapid response and adaptation, the Universidade Aberta do Brasil (UAB) (The Open University of Brazil) commenced in 2005.

UAB is a university level formation system that consists of a joint and articulated enterprise between the federal government (Ministry of Education), federal universities, and state and city councils. The UAB system congregates public educational institutions aiming at providing higher education to interested individuals who qualify to enroll the UAB system. UAB mainly aims (not exclusively) at those individuals who, due to several reasons but particularly to their unavailability in time and/or space, cannot attend traditional courses.

The University Federal de S. Carlos became part of the UAB in 2006 offering five distance learning university courses, among them the Information Systems bachelor course. One of the main motivations for establishing the IS bachelor course was the existing technical and academic competence already available in the Computer S Science and in the Information Science departments could be articulated and aggregated to constitute part of the newly created distance course.

It is a fact that the fast technological advances promote the establishment of distance learning courses. However, such advances require constant surveillance and monitoring, to quickly respond to changes and frequent updates of technological resources, aiming to keep pace with technology and prevent the system from falling into obsolescence and/or collapse. It is a fact that the whole system is not as reactive to technological changes as it should be in order to be very efficient.

Also, in spite of the euphoria surrounding virtual teaching-learning, there are still many open problems and issues which have not been carefully addressed and analyzed. Njenga & Fourier in (Njenga & Fourier, 2010) discuss ten myths related the use of e-learning in higher education, and coined the term technopositivist ideology, defined as "…a compulsive enthusiasm about e-learning in higher education that is being created, propagated and channeled repeatedly by the people who are set to gain without giving the educators the time and opportunity to explore the dangers and rewards of e-learning on teaching and learning."

It is a fact though that to establish and maintain an ongoing distance learning system is a highly complex and costly process, due to many factors but mainly to the required tight control and monitoring of an incredibly high number of activities operating simultaneously, to the diversity of people involved, and to the ongoing learning process that needs to be carried out by lecturers and tutors, used to the presential system.

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