RESEARCH ARTICLE

The Construction of Knowledge Based in Online Education: A Study in a Brazilian Public University

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Abstract

The present study aimed to identify the perceptions of students, tutors and others involved in teaching and distance learning, on the impacts of the use of information technology and communications at the Federal University of Sergipe, in order to realize the how this use contributes to the construction of knowledge in distance education. The theme gets more space because of its specificity. In terms of its methodology, the study was described as exploratory and descriptive. Questionnaires were applied online and in person with students and distance tutors, and interviews with the ones involved with the direction and coordination of distance learning in Federal University of Sergipe. Through data analysis and perception of the sample, it was concluded that the use of information technology and communication applied in distance education contribute to the construction of knowledge, while stimulating the interaction between those involved in it; however, it was also perceived the need for clarification on this type of education so that the peculiarities of it in relation to mainstream education are identified and problems are solved.

Keywords: *Information technology and communication, Knowledge, Distance education.*

Introduction

The changes taking place in the world in recent decades require constant improvement and diversified knowledge among the population and generate numerous changes in the educational context in order to adapt the construction of knowledge to the environment and its needs. The knowledge acquired through continuous learning and modern technologies of information and communication becomes a key differentiator and a key part in the development of people and organizations. Thus, the use of information and communication technology (ICT) in the educational context grows considerably, in a great rapidity and globalized form, being related not only to the access and transmission of information, but also to the process of knowledge production and training skills.

Distance Education-DE emerges as a mode of education, which tends to democratize education and learning by making information available to anyone, anytime and anywhere. Moreover, it has been considered an effective way of teaching, at what cost, time and geographical distance can be reduced without jeopardizing the achievement of knowledge.

For the objectives proposed by DE to be met, ICTs act as facilitators in the transfer of information and communication between students, tutors and educational institutions. As stated by Moré, Moritz, Pereira and Melo [1] to be a proactive process, DE requires constant interaction between all involved, as well as a constant motivation for using the right resources and in an effective way.

In order to keep up with the increasing changes that are happening in the world, including progress towards ICTs, and make democratic forms of access to knowledge, the Federal University of Sergipe (UFS) introduced, in 2006, the Centre for Distance Higher Education (CESAD), through Resolution no. 49/2006/CONSU. With the creation of CESAD, the teaching offered by the university was becoming more comprehensive, contributing to a significant portion of Sergipe population could have access to quality higher education, already

known in the UFS classroom level, without the need to move from their municipalities [2].

Given this scenario, we sought to analyze the perceptions of students, tutors and others involved in the process of distance education (DE) in order to identify characteristics of students who seek to acquire knowledge from that distinctive form of learning, the roles of tutors in the transfer of information and the teaching institution itself, regarding the required adaptation for offering distance education courses and identify how the technologies employed contribute to knowledge building in DE.

Thus, the proposed theme, after this introduction, will be exposed as follows: the second section discusses the historical context in which distance education is embedded; the third section presents the interaction between students, tutors and educational institutions, while fourth displays aspects related to distance constructivism. The fifth section describes the methodological procedures used and then the results are presented. Finally, in the seventh section the final considerations are listed.

Historical Context of Distance Education

Among the authors who address the background of distance education many differentiate its work on the chronology of events and the number of generations that mark the evolution of distance education. Despite the discrepancies, coincidental information among authors exists in regard to the emergence of distance education, marked by the appearance of the media and the use of these as a means of spreading information and knowledge. For Chaves [3] writing was the first technology that involved DE: The invention of writing enabled people write down what they previously could only say, and thus allowed the emergence of the first form of distance education: teaching by correspondence.The New Testament epistles (aimed at entire communities) that have clear didactic character are clear examples of DE. Its range, however, was relatively limited - until they were turned into books.

As Moore and Kearsley [4] said, the evolution of distance education presented so far, five generations. These generations mark its evolution over time according to the technologies used to mediate the interaction between students and teachers and construction of knowledge, through the textual interaction, via correspondence to the virtual interaction with the use of computers and

the Internet.Table 1, based on Moore and Kearsley [4], displays the evolution of generations of distance education, dates and main characteristics of each one:

Table 1: Generations of distance education

Generation	Beggining	Characteristics
First	1880	Study by correspondence. Instruction through distance educators, with delivery of printed materials by mail.
Second	1921	Broadcast television and radio. Radio and educational channels. Telecourse.
Third	1970	Open Universities. Universities that used communication technologies to teach adults.
Fourth	1980	Teleconference. Use in groups, unlike the open universities or correspondence courses.
Fifth	1990	Virtual classes. Use of Computers and Internet in education.

According to the information contained in Table 1, it is seen that the history of distance education starts with instructional courses delivered by mail, which characterizes learning by correspondence, where people who had an interest to study, but could not attend classroom courses, could receive instruction by teachers from distance in any environment.

The second generation was marked by the use of new technologies, radio and television, in education, initiating educational programs aired on television and telecourses, mostly for adult education and with little interaction between students and instructors. According to Chaves [3], "the radio allowed the sound (especially the human voice) to be taken to remote locations," but the use of this technology to support distance education did not achieve much success. In contrast, educational television got more successful, both with the use of equipment in classrooms, as the transmission of educational programs both on cable and open television, called telecourse.

The Open University has emerged in the UK as the first national distance education university, increasing the number of students and offering courses through the use of various communication technologies, and then copied in other countries. As Belloni [5], open universities meet the specific demands of training and offer, in addition to regular courses, large variety of non-formal actions continuing education and training.

As described by Moore and Kearley [6], distance education emerged in the United States based on the teleconference, and because it was closer to the traditional teaching, in groups, attracted

many educators. The communication by means of satellites updated the conferences, making it possible to broadcast educational programs.

During the fifth generation, the one with the most recent start, the use of computer networks and the Internet for education boost the emergence of virtual classes and promote access to distance education. With personal computers, it became possible to add sounds, images, colors, graphics, tables, among other attractions that facilitated instruction. Educational softwares began to be created as well as networks and computer conferencing in order to connect multiple computers for group instruction and more interaction between teacher and student. "The main advantage of computer instruction is to be able to offer a high quality opportunity for the student to interact with the subject under his/her full control" [6].

The emergence of the Internet in the late 90s has enabled a new field to be explored by education. Universities have started using Internet-based programs, in addition to offering online courses, which brought increased visibility to distance education.

For Moore and Kearley [6], the use of integrated learning systems allow for the existence of synchronous (those performed simultaneously, in real time, between teachers and students) and asynchronous communications (those in which teachers and students communicate in separate times) on a platform (in the present study, *Moodle*) as well as access to a large number of material on the *web*.

Student-Tutor-Institution Interaction

Distance education has changed and is changing the ways of interaction between students, tutors and the educational institution. Mattar Neto [7] states: "the classroom [...] can be seen as the less conducive place to transmission and generation of knowledge." This information can incite reflection: knowledge can actually be generated and transmitted outside the classroom?

From the point of view of Moore and Kearsley [7], the basic idea of distance education refers to students and teachers in different locations during all or part of the time in which they learn and teach, depending on technologies to convey information and interact with, being, therefore, the enabling technologies in interaction and knowledge building in distance education. Thus,

for the authors knowledge can indeed be built outside of the classroom (in different places), since the interaction between students and tutors happen through technology.

In this new context, students have more autonomy to study, choosing time, place, and time of study within their means and preferences and institutions have become more interdisciplinary, offering courses in various areas in distance, and the figure of the teacher/tutor can be seen from numerous angles, but mostly as a link between the first two and supportive of learning and construction of knowledge by students.

For Moore and Kearsley [7], the distance learner needs to have different skills for the study and differentiated communication abilities. However, they also need different types of support and aid compared to students in traditional courses, such as learning environments, which unlike the students who attend classroom courses are not always classrooms.

Moore and Kearsley [4] and Belloni [5], characterize the student in distance learning courses as an adult, which can be of great importance for the understanding of the distance learner. Among the factors that favor the adoption of distance education for adult instruction, may be cited: control and autonomy in their learning, ability to define what, when, where and how the learning process will happen, greater motivation, interest in learning more about specific issues. According to Moore and Kearsley [4] the most common reason for adults to do a distance course is "to develop or improve the knowledge necessary for employment".

Leal [8] comprises the tutor's role as an academic category based on a commitment to training students to think and be able to discuss and develop knowledge, coming from him/her the power to stimulate the construction of knowledge articulated in the virtual space. It is for the tutor to create an environment where students can learn to control, manage, implement and engage with the technologies used, turning information into acquired knowledge.

Mattar Neto [7] considers the fear that the figure of the teacher to be extinct an important issue in distance education. However, the author states that the figure of the teacher is not being eliminated and it is not losing its place in education, but has new challenges and new tasks. Lévy (1999, cited by Mattar Neto) [7] states that

teachers carry out the monitoring and management of learning activities, stimulating, among other things, the exchange of knowledge.

Given the foregoing, it is necessary to realize that the role of the tutor does not exclude the role of the teacher in distance education; they have different and complementary roles. While the teacher prepares the course content and seeks ways of assessing students that promote the construction of knowledge, tutors act as liaisons between teachers and students and the institution, facilitating and enhancing learning, ie, teachers and tutors are distinct characters and should, in theory, work together in building the knowledge in distance.

It is up to the institution, as quoted by Moore and Kearsley [4], the decision about which courses that will be offered and implementation of these courses, training, monitoring and evaluation of academic and administrative staff, installation and maintenance of libraries, study centers and all technology used to inform students about the courses available and subsequent registration, admission procedures and assessment, among other decisions that can influence and assist in ensuring the success of a distance education program.

The use of various forms of technology, or learning objects, tends to create a new conception of learning through interaction between all that integrate distance education, being of great importance that the educational institutions know how to choose those that are appropriate and that can be readily used by participants of this mode of teaching and learning.

It is important to note that the interaction student/tutor can occur either virtually, mediated by suitable information and communication technologies, and in presence, with strong emphasis on tutor availability and support given by him/her to the understanding of content and knowledge generation.

Constructivism in Distance

In the opinion of Todescat and Santos [9], university is currently promoting advances in various fields, generating social, economic, cultural, environmental and technological changes that impact the development of society, through the flow of information and the creation, transfer and use of knowledge. Thus, it is necessary to find a way to adapt the university to the new economy and new society in constant change, and make it stand as a center of knowledge creation.

Gadotti [10] also states that "school is challenged to change the logic of the construction of knowledge, because learning now occupies our whole lives." This statement emphasizes that the need for continuous learning must exist on the part of educational institutions, media to innovate and change the ways in which knowledge is constructed.

In order to understand constructivism, it is important to know how the information differs from knowledge. Information is "the abstract representation of the facts", while knowledge is "what each individual constructs as product of processing, interpretation, understanding of information, something being built by each one, very unique and impossible to be passed."

The distinction between information and knowledge suggests different meanings to the concepts of teaching and learning, where learning, according to one interpretation cited by him, relates to constructing knowledge from the processing of information received. Therefore, two pedagogical approaches are up to the educator as they are seen by the authors as complementary views, the transmission of information and assistance in the construction of knowledge by students.

According to Jonassen [11], traditional conceptions of learning assume that knowledge is an object, something that can be transmitted from teacher to student. In contrast, constructivists believe that "knowledge is a human construction of meanings that seeks to make sense of their world, to explain ideas and new phenomena in terms of existing knowledge". Therefore, for constructivists, knowledge is constructed rather than transmitted; however, it can be shared.

The process of knowledge construction must start from a dissonance between what is understood by the student and what is observed in the environment. Being that knowledge personally constructed, it is personally owned and assigned. Table 2 aims to point out a comparison made between the characteristics of knowledge according to traditional and constructivist beliefs/conceptions.

Table 2: Constructivist beliefs confronted with traditional ones

Knowledge	
Tradicional conception	**Constructivist conception**
Regardless of experience	Emerges from the experience
Object possessed by learners	Built meaning
Objective, stable, fixed	Subjective, contextual, fluid
First what's elementary, then the applied	Built in action
Reflects the significance of the real world	Reflects personal meaning
Decontextualized	Built on experience
Very simplified, preconditioned schemes, rigid	Complex, flexible, integrated
Replicable	Applicable

Constructivist learning environments can be supported in distance education through a variety of technologies that are capable of improving the communication and integration and support processes of knowledge construction in distance environments, focusing education on the students and their perceptions about what is gained in terms of information, in order to assist the construction of knowledge on the pupils' part.

With that said, knowledge can be built in Distance Education, and the technologies used in the tutor-student interaction have great importance in this process, since it is from them that information that will be processed by the students are passed with the help of tutors, so that knowledge is built.

Methodology

As for its goals, the study in question was classified as exploratory and descriptive. It is exploratory, since the distance can be seen as an issue rarely addressed at the Federal University of Sergipe, in similar studies, but not in that specific context, involving a case study on the proposed topic.

It is descriptive, since its purpose, as stated by Gil [12], is "to describe the characteristics of a given population or phenomenon using standard techniques of data collection, such as questionnaires and systematic observation."

A case study allows a broad and detailed knowledge through deep and comprehensive study of one or a few goals, as Gil [12] explains. Thus a case study was used in order to understand and explain the problem researched in the Federal University of Sergipe.

The research in question is presented in a comprehensive manner, involving students, tutors and educational institution and the perception of each in relation to the construction of knowledge, both issues that can be quantified, as questions requiring interpretation are needed. Therefore, the research in question is defined generally as qualitative and quantitative.

Data were collected through questionnaires with multiple choice and open questions and interviews. Online and printed questionnaires to students and tutors of ODL courses, using two sampling techniques were applied.

The first technique used was convenience/accessibility sampling, which according to Malhotra [13] is left to the interviewer in the selection of the sampling units, due to its easy access, measurement and cooperation, and because it is less time consuming and the second, sampling snow-ball, in which, according to the author, a random initial group of respondents is selected and it is prompted to these to indicate others that belong to the same target population type.

The questionnaires were adapted by using *Web Integrator*, a tool built in Java that facilitates the development of applications for web. After adaptation a pre-test was made and the questionnaires were made available in the online form.

Two sample groups were selected for the questionnaires: one of them related to students of distance subjects/courses at the Federal University of Sergipe (UFS), whose population was located around 4400 vacancies offered in 15 centers in CESAD (Table 3); and the other, referring to DE former tutors and tutors in UFS, whose population consisted of 289 tutors.

Table 3: Universe and Sample

Universe and sample		
	Universe	**Answered**
Tutors	289	60
Students	4400	153

The sample of students was diverse, encompassing various courses offered in the regional CESAD centers. The distribution of courses by polis in Sergipe is shown in Table 4:

Table 4: Offering of courses at the polis

Offering of courses at the polis

County	Nome of the polo	Courses
Arauá - SE	UAB Polo Joaldo Costa Carvalho - Arauá	Biological Sciences, Physics, Gender and diversity in school, Geography, History, Portuguese Letters, Mathematics, Chemistry.
Areia branca - SE	Presence Support Polo of Areia Branca - UAB	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics, Chemistry.
Brejo grande - SE	Foz do São Francisco Polo - B. Grande/ SE	Biological Sciences, Geography, History, Portuguese Letters, Mathematics, Chemistry.
Carira - SE	Presence Support Polo of Carira	Gender and Diversity in School, Geography, History, Portuguese Letters, Mathematics.
Estância - SE	Senador Julio Cesar Leite Polo	Biological Sciences, Physics, Geography, Health Management, Public Management, Municipal Public Management, History, Portuguese Letters, Mathematics, Chemistry.
Japaratuba - SE	UAB Polo - Japaratuba	Biological Sciences, Physics, Gender and Diversity in School, History, Portuguese Letters, Mathematics, Chemistry.
Lagarto - SE	Presence Support Polo of Lagarto - Colônia Treze	Biological Sciences, History, Mathematics, Chemistry.
Laranjeiras - SE	UAB Polo - Laranjeiras	Public Administration, Biological Sciences, Physics, Geography, Gender and Diversity in Schools, Health Management, Public Management, History, Portuguese Letters, Mathematics, Chemistry.
Nossa Senhora da Glória - SE	UAB Polo - Nossa Senhora da Glória	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics and Chemistry.
Nossa Senhora das Dores - SE	Presence Polo Professora Lucia Santana oliveira	Geography, History, Portuguese Literature, Mathematics.
Poço Verde - SE	UAB Polo - Poço Verde	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics and Chemistry.
Porto da Folha - SE	UAB Polo - Porto da Folha	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics and Chemistry.
Propriá - SE	Pólo Prof Manoel Ferreira Rocha - Propriá	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics and Chemistry.
São Cristovão - SE	UAB/UFS Presence Support Polo - São Cristóvão	Public Administration, Media In Education
São Domingos - SE	UAB Polo - São Domingos	Biological Sciences, Physics, Geography, History, Portuguese Letters, Mathematics and Chemistry.
* Only approved and current offerings are shown		

Data collection took place in the following: through information provided on the CESAD site 199 emails of former tutors and tutors who work/worked at UFS were collected, where online questionnaires links of tutors and students were sent, asking them to be answer and route the questionnaires to other tutors and DE students, of which 60 responses from tutors and 153 responses from students were obtained.

Another instrument used was the interview, which according to Alves-Mazzotti and Gewandsznajder [14], "allows to deal with complex topics that could hardly be properly investigated through questionnaires, exploring them in depth." For purposes of this study, we formulated two tiered interview scripts and these were applied by two people responsible for distance education in the educational research institution in question – a member of the leadership and a member of coordination – selected due to their performance in CESAD and their availability.

Both virtual and applied in person questionnaires had their answers stored in the web application *'Qadmin'*, allowing their tab by using simple statistics. To finalize the analysis of data from the questionnaires, weighted averages, based on the intensity scale shown in Table 5 were used, drawn in base ten.

Table 5: Range of intensity

Scale	Average	Meaning
1	0,0 a 2,0	Terrible
2	2,1 a 4,0	Bad
3	4,1 a 6,0	Regular
4	6,1 a 8,0	Good
5	8,1 a 10,0	Excelent

Tables and graphs were interpreted, generating quantitative analyzes of both tutors as well as the students. Besides that, the results from the interviews generated qualitative analysis of the perception of the course coordinator and Vice-Principal. The interviews were transcribed and responses were grouped by level of similarity, highlighting the interviewees' statements.

Analysis of Results

In this section the data obtained through the questionnaires and the contents of the interviews will be analyzed and interpreted; for this reason it will be divided into two stages. In the first one, qualitative, answers to interviews will be commented and in the second, quantitative, data obtained from the questionnaires to tutors and students will be analyzed.

Qualitative Analysis

This step addresses issues related to implementation of Distance Education at the Federal University of Sergipe and opinions regarding the organization of CESAD, teachers' interaction, tutors and students in distance learning difficulties, technologies adopted, among others, according to the interviews with people directly related to CESAD, one with a member of the board and another one with a member of coordination.

At the Level of Direction

The respondent holds the position of deputy director of CESAD, which he has been operating for four years. According to the respondent, distance learning implemented by UFS follows the design parameters of Open University of Brazil (UAB), within which there are gaps to formulate their own strategies. In the case of UFS, "the courses of pedagogical projects follow the same model of the presence teaching system, including the duration and the provision of objects,"; for example, the biannual curriculum of a distance learner is the same as a classroom student.

Regarding his perception of the implementation of Distance Education at the Federal University of Sergipe, the respondent asserts that it was a bold action and makes a chronological approach to the facts prior to joining the UAB project, ranging from the creation of NUCE (Center for Communication and Education) in 1996, through the creation of CEAD (Coordination of Distance Education), in the Department of Education, in 1998, and finally, the creation of the Center for Higher Distance Education, through University Council's Resolution n. 49 in 2006. According to him, "it was a long way, but it already yields good results and new challenges."

According to the deputy director, the main difficulty occurred during deployment of Distance Education at the University was "the inexperience of all parties involved with the process at its beginning", and currently it is considered that all agents are broadening their understanding of the mode and this expansion should provide education with quality to students.

Regarding the institutional aspects of CESAD, the quantities involved in the Distance Education at the time of the interview, ie, in February 2010, were: 101 UFS effective teachers, 289 tutors (202 being Distance Tutors and 87-Person) and over 82 professionals including technical and administrative staff, interns, undergraduate courses, post-graduation scholarship students, assigned technicians from other institutions, CLT and specialized service providers, totaling 472 people in the service of UFS' distance higher education. According to the interviewee, unlike teachers, tutors do not belong to the staff of the University, they undergo a simplified selection process and are hired as fellows without employment contracts and therefore do not receive salaries.

Still on the CESAD aspects of the organization, according to the respondent there is not a limit of students per teacher or course, but a limit of distance tutors, which up to the interview date was 100 students for each tutor, but there was a claim that the amount was reduced. As the provision of training for teachers and tutors, the respondent asserts that teachers receive training from the production of printed educational material, the use of *Moodle* and other media.

Regarding the adaptation of distance education students, in the interviewee's opinion it is a little more demanding when compared to regular classroom education students, since they require greater autonomy in organizing their studies, including compliance with time, and have a greater amount of material to read. Any student who has been a regular student in classroom education can adapt to distance education. What is expected is that they have the capacity to build knowledge, not only to search for information, but also the permanent performance of teachers and tutors is necessary to reinforce what is taught. Regarding the levels of evasion of students, a study was being conducted by CESAD itself, but official figures were not available.

The study tools used to distance education at the University are the class books (printed materials), virtual learning objects and video lessons (teacher and subject presentation), and the CESAD aims to increase the demand for the last two items so that they are standardized. Among the difficulties encountered in this type of education three were categorized as they follow:

- Disbelief in the positive results that can be achieved with the DE - the interviewee highlighted some prejudices that exist, such as distrust in the ability of the internet to form and generate knowledge, and the fear that it may be the end of teaching;
- Structural difficulties - some of national character were emphasized, such as the quality of broadband service;
- Students, teachers and administrators inexperience with DE - the interviewee pointed out how the adaptation challenge students and teachers accustomed to classroom teaching model with teaching relationships in distance.

According to the respondent, in order to strengthen and consolidate the contact between students-teachers-tutors there are plans for the university to organize regular face meetings. Regarding the adoption of technologies (ICT) in the educational environment as a means to promote the construction of knowledge, the respondent states:

There is no technology that by itself contributes to the teaching-learning process. It is the use that teachers and students make of the technology that generates positive results. The black board is a technology, as is chalk and cardboard. If the teacher knows how to use this instrument he will do a good job. The computer, television set, DVD player and internet are not magic wands that like a magic will turn the class better and provide better student learning. If the teacher does not hold control over the technology it will be of no avail.

At the Level of Coordination

The respondent holds the position of coordinator of the Public Administration course and serves on the University for thirteen years and for two years in CESAD. Regarding the implementation of DE at the University, the respondent was optimistic, since, according to him, "the new teaching method has enabled a layer of society to enhance their education and get a college degree." The respondent also pointed out that one of the difficulties, in his opinion, occurred during deployment: the acceptance by some teachers of the new teaching method.

Regarding its functions, the respondent states that there are differences between management of coordination, ie, the coordinators do not operate in a standardized manner, due to the specificities of each course; in addition, he quoted some, such as: the definition of subjects, monitoring the coordinators of subjects (teachers) and coordinators of mentoring.

Regarding the interaction between students and others involved in the teaching-learning process, the respondent contends that the interaction was not accomplished because of the physical distance itself, but considers communication between CESAD, teachers and tutors as being reasonable.

According to the respondent, the level of adaptation of students in distance is good after the student takes full knowledge of the means, because "the student will have to learn on his/her own, and in a way, knowledge is deeper." In addition, the coordinator says that there are many related DE prejudices, including the non-recognition of distance learners as students of the institution and he cited the lack of knowledge about instruments to be used by the subject coordinator as a failure in the DE mode.

Gathering the responses from the director and coordinator, Table 6 shows the questions of the interviews that were common to both respondents and a level of similarity of answers when it comes to the difficulty in the interaction between the involved, due to existing physical distance and a deeper response, due to the position held by the director when it comes to the inexperience observed in all involved, used with the classroom model.

Table 6: Comparison between interviews

	Director	Coordinator
Implantation	Bold action; Yields good results and new challenges	Enables access to training and improvement of society
Difficulties in DE	Quality of broadband service; Inexperience of all involved	Lack of acceptance by some teachers; Non-recognition of distance learners as students of the institution
Interaction	Lack of adaptation to the pedagogical distance relationships; Actions to tighten and strengthen the contact between students-teachers-tutors	Average communication between teachers and tutors; Difficulty in interacting with students because of the physical distance
Role of ICTs	Teacher with control of the technology	Lack of knowledge of the means that can be used by coordinators

Quantitative Analysis

This step describes quantitative aspects related to perceptions of tutors and students. In relation to tutors, the profile, the functions and activities performed, the existence of performance evaluations, the use of resources of ICT, study materials, course content and assessments to tutor-student interaction and the level of students' satisfaction were investigated. In relation to the students, the analysis also highlights their profile, followed by evaluation of the course, study materials, ICT resources, student-tutor interaction and satisfaction levels.

Tutors Analysis

Considering the profile of tutors, it was observed that most of the respondents are female (60%), single (67%), their ages range between 26 and 30 years (45%), have other gainful activity (80%), have attended online courses/subjects (47%), attended all high school in public schools (48%), have some form of post-graduation, mainly specialization (37%) or master's degree (37%). Moreover, all of them have a computer (100%) and the vast majority (97%) have Internet access in their homes and access weekly for more than 26 hours (47%), including it as their main source of information on current knowledge.

With regard to the functions and activities performed, it was found that they are trained (98%), receiving training or courses for guidance on the duties performed. It should be noted that the Edict for Selection of summoned Candidates must attend the Training Program of CESAD, with dates and locations to be communicated by the Centre. The main activities of the tutors are: correcting assessments (90%), provide help to the student understand the course material (92%), motivate the student so that he/she can gain knowledge autonomously (92%), meet queries of the students (95%) and to stimulate critical reflection of students (83%).

As regards to the existence of performance evaluation of tutors, there is knowledge by the tutors (50%) about conducting a review of their handling performance, and opinions vary widely among tutors, demonstrating a lack of standardization between the procedures adopted. Similarly, 35% claim to have no knowledge about self-assessments required of students, 23% say they are never requested and the others divide opinion between always (10%), often (25%) and rarely (5%), again demonstrating the lack of standardization in procedures or difficulties in the transfer of information.

About the usage of resource information and communication technology, the vast majority of tutors (97%) stated that the materials are provided to students, such as books and handouts, which tend to facilitate the learning process. Regarding problems accessing content, it was found that 7% of the tutors said they always come across as a problem in accessing the platform, 46% responded that there is often a problem to access, while 42% said they rarely encounter some problem to access the content. Among the main problems encountered in accessing online content, the one cited as more frequent (60%) was related to content management tool, followed by problems related to connectivity (30%).

Regarding study materials, most tutors who responded to the survey (52%) state that the materials are always prepared in a clear and appropriate manner in order to facilitate understanding of the content. Furthermore, it was found that, according to the tutors (83%) of the materials used are standardized, according to requirement by the University through CESAD. However, to 43% of the tutors just some of the distance education courses/subjects are completed within the academic calendar, with 28% of the tutors saying they have no knowledge of this fact, 13% say that the courses are not completed on time and 12% claim that most of the courses are completed on time.

According to the tutors, course content or objects are often made available to students at the beginning of the semester (48%), with a significant percentage of claims that such contents are always available (43%) and some (7%) claim that the contents are rarely available at the beginning of the school year. They also consider that the courses/subjects are often completed within the dates specified in the academic calendar (62%). From the viewpoint of the majority of tutors (55%), course programs are often linked to the real needs of the students and, in relation to the feedback given to students about their grades and ratings, opinions are divided as part of them (48%) state that it is always given, other (35%) say that there is often feedback to students. To Kenski [15], giving feedback is among the skills developed through training provided to tutors of distance courses.

Regarding the evaluations and exams, it was attempted to identify three points: embodiment, types of evaluation, and by whom the correction is made. For the first point, embodiment, 85% of the respondent tutors claim that evaluations are

performed by individual students, while 10% say they can range from individual and group evaluations. For the second point, the types of evaluation vary between online and classroom evaluation (58%). Regarding the third point, correction, the results show that 96% of the tutors say the exams are corrected by the tutors, or the correction of exams is regarded as a function of the tutors.

Table 7: Evaluations and exams

Variables	Answer	Percentage
Embodiment	Individually	85%
Types of evaluation	Mixed (online and classroom)	58%
Responsible for correction	Tutor	96%

Regarding the interaction between tutors and students, there is a concordance (93%) that it is encouraged throughout the course, something important as the face communication is infrequent or nonexistent in some courses and tutors consider it satisfactory. Most respondents (68%) said they always solve the doubts of the

students. Moreover, it was noticed that tutors (85%) believe there is a motivation for students to consult the Internet as an information source. Regarding the incentive to search in libraries, tutors (74%) stated they encourage and assist students in finding information in libraries. This incentive becomes very important because the content provided requires complement, being the tutors the ones to indicate a theoretical framework to facilitate searches by students.

A relevant data shows that none of the tutors surveyed, according to their perception, considered that students are fully satisfied with distance learning. 65% say that perceive students partially satisfied, 27% perceive a partial dissatisfaction and 5% perceive students totally dissatisfied. When asked about the existence of suggestions, complaints or comments on DE in Federal University of Sergipe, tutors had some suggestions that were listed in Table 8:

Table 8: Suggestions to de in the perspective of tutors

Management	Physical structure	Students
Enhance the monitoring of tutors and students	To improve the logistics related to the distribution of material	Offer more training to use the Moodle platform
Improve communication with course coordinators and tutors	Create mobile libraries and labs	Observe basic level of knowledge in computer and internet
Improve payment of tutors	Resolve Moodle system deficiencies	Need to self-guide and self-regulate the learning process
Create public examinations to make tutors permanent employees		Monthly classroom feedback
Solve problems related to application of classroom tests		More contact with teachers and tutors
Optimize administrative organization		Establish more specific guidelines about distance education

To conclude the analysis of the responses of tutors' data, averages relating to the following items were analyzed: feedback on grades and evaluations, course content, preparing materials,

encouragement of searches in libraries, training of tutors, student satisfaction, completion of courses, performance evaluation for tutors and self-evaluation for students, as shown in Table 9.

Table 9: items and their averages – tutors

Items	Weighted averages
Feedback on grades and evaluations	7,87
Course content	7,78
Preparing materials	7,53
Encouragement of searches in libraries	7,12
Training of tutors	6,89
Student satisfaction	6,52
Completion of courses	6,26
Performance evaluation for tutors	5,17
Self-evaluation for students	4,47
Overall average	**6,62**

The obtained overall average was 6.62, a result that shows that the perception of the tutors about

the items cited is considered good, according to the intensity scale shown in Table 5 (methodology). Among the items, feedback on

grades and evaluations was the one with the highest average, 7.87, also considered good, showing that, for tutors, feedback given to pupils is satisfactory. The lowest average presented was 4.47, referring to self-evaluation of students, which is considered average.

Students Analysis

Regarding the profile of distance education students at UFS, it was found that most respondents are female students (61%), they are between 26 and 30 years old (26%), they are married (45%), work more than 20 hours per week (74%), do not have children (51%), attended the regular/traditional high school (65%) in public schools (59%), within the State of Sergipe (90%) and have complete higher education (65%). It was shown that there is a high level of education, which shows that students should get in Distance Education a complement to studies. Furthermore, the majority (93%) is students of Laranjeiras, São Cristóvão and Estância polos, they have basic and medium knowledge of informatics (81%), with internet access at home (73%) and have a weekly frequency Internet use up to 12 hours (59%). Another important aspect is that most distance education students of the Federal University of Sergipe (75%) previously attended online subjects or courses, including part of them (46%) attended courses/disciplines in the university itself.

In terms of the content presented in class, students consider that they are always (27%), often (37%) or rarely (24%) made available at the beginning of the school year. Moreover, according to the students' level of agreement, the contents learned during the courses are consistent with those presented in the syllabus (77%). Regarding the online content access, 52% of students stated that there is often a problem in access and 15% say that there is always a problem, while 26% believe that there is rarely a problem in access. According to most students (35%), the courses are rarely completed within the academic year, a rate that contrasts with the percentage of students (32%) who claim that the courses are often completed in the period. Another relevant fact is that although 37% of students think the course syllabus is often linked to their needs, 34% indicated that the programs have rarely bond with their real needs.

With regard to the materials used, according to 52% of students surveyed, printed materials are provided during the course, and 31% say they often are provided and 8.5% report that they are rarely provided. Also with respect to materials, it was realized that students consider that not all

materials are clear, appropriate and promote the understanding of the course. 36% believe that most materials possess these characteristics, while 33% say that only a few are clear, appropriate and promote the understanding of the course.

In terms of resources for information and communication technology, it was observed that the majority (61%) of the students think that the Moodle tool has friendly design and layout, making it easier to understand. It is worthy to notice that problems in accessing and navigating Moodle tend to cause difficulties in the learning and knowledge construction process, requiring the use of other forms of interaction between tutors and students, in order to enable students to use content management tool correctly or adopt another tool to facilitate accessibility. The majority of respondents considered that the students' tools to support distance education are adequate assistance in understanding the content.

Regarding student-tutor interaction, 39% of respondents stated that students communication often happens, while 37% claimed that there is rarely communication between tutors and students. According to most students respondents (36%), they are rarely given feedback about their grades and exams, and 16% claim to have never received any kind of feedback from tutors regarding their grades and evaluations; however, an equivalent number (30% of students) say they often are given a feedback. According to 47% of students respondents, tutors rarely respond doubts or questions in a timely manner, while for 33% tutors often respond in a timely manner. Moreover, most students (42%) say that replies submitted by tutors are rarely clear and objective, data that shows that students can be harmed by tutors not answering their questions in a timely manner and the lack of clarity and objectivity of the answers they receive. For 43% of students, tutors rarely use techniques that encourage and stimulate learning, while for 28% of the pupils, tutors often use these techniques and 16% say tutors never use techniques accordingly. Furthermore, for 34% of students, tutors rarely motivate the search for information in libraries and/or queries on the internet; for 30% of the students tutors often motivate this search for other sources of information besides the content presented. Regarding the promotion of discussions in Moodle, according to 42% of the students tutors rarely use the tool for this purpose; while 25% say that tutors often engage in discussions with students.

Aspects related to interaction between students and tutors indicate that, despite some contrasts, according to a large number of students, the interaction is rarely encouraged, as shown in Table 10:

Table 10: Interaction Student-tutor

Variable	Percentage
Communication	37%
Feedback	36%
Asnwers to questions/doubts	47%
Clear and objective answers	42%
Usage of techniques that favor and encourage learning	43%
Motivation to search for additional information	34%

Most students (32%) have no knowledge of any request for self-assessment of their performance, and item that can demonstrate both a deficiency in communication, as a variation in the methods of the tutors.

Regarding the levels of satisfaction in all variables, the students said they were partially satisfied, as it can be seen in Table 11:

Table 11: Partial satisfaction of students

Variable	Percentage
Course	61%
Moodle	50%
Relationship with the tutor	58%
Relationship with colleagues	42%
Learning	63%

The observed data show that the students are not completely satisfied with distance education, information that can be highlighted by the finding that students (58%) are not sure whether or not to enroll in other courses or subjects in the distance university, answering 'maybe' to the question, while 26% say they definitely would enroll in other courses/subjects in DE in UFS. In addition, students respondents (50%) indicate they always feel the need of classroom classes to complement the content presented in online class, 24% of students said they often feel this need and only equivalent to 1% said they never feel the need of regular classes as a complement. When asked about the existence of suggestions, complaints or observations, students made suggestions, some of which are listed in Table 12:

Table 12: Suggestions to de in the perspective of students

Management	Physical structure	Interaction	Others
Greater impairment of coordination	More appropriate classrooms	More contact with tutors in person and in distance	Revision before exams
Frequent contact from CESAD to inform and clarify doubts	Improvements in Moodle platform or training of students	Formation of study groups	Field research
Align the DE academic calendar with the classroom courses	Possibility of using laboratories on weekends		Timely delivery of materials, corrections of exams and activities and the dissemination of grades
			More time between exams

In order to finalize the analysis of data on student responses, weighted averages, based on the intensity scale shown in Table 05 (methodology) were used.

The averages were analyzed regarding the following indicators: the need for classroom classes, coherence of content and teaching plans, satisfaction with colleagues, Moodle, student-tutor communication, support tools, satisfaction with Moodle, the course program and student needs, motivation to search for information, interaction - online communication, interaction - questions, feedback on grades and exams, self-evaluation of students, learning stimuli, discussions with tutor, laboratories, equipment, as shown in Table 13.

Table 13: Items and their average - Students

Items	Weighted averages
Need for classroom classes	7,9
Coherence of content and teaching plans	7,27
Satisfaction with colleagues	6,19
Moodle	6,06
Student-tutor communication	5,84
Support tools	5,76
Satisfaction with Moodle	5,74
Course program and student needs	5,3

Motivation to search for information	5,18
Interaction - online communication	5,04
Interaction - questions	4,82
Feedback on grades and exams	4,57
Self-evaluation of students	4,57
Learning stimuli	4,16
Discussions with tutor	4,05
Laboratories	3,8
Equipment	3,76
Overall average	**5,29**

The obtained overall average was 5.29, which shows that the students' perception regarding the analyzed indicators is considered regular, according to the intensity scale. Among the items, those regarding the need for classroom classes (7.9) and coherence of content and teaching plans (7.27) had the highest average. Therefore, despite the coherence between content and teaching plans, students assert they feel the need of classroom classes. The items "labs" (3.8) and "equipment" (3.76) had the lowest average, ie, the perception of students is considered bad, confirming the inadequacy of the laboratories and equipment of CESAD.

Concluding Remarks

This study sought to identify the perceptions of students, tutors, coordination and direction of the Center for Higher Distance Education (CESAD) regarding the use of new technologies applied in distance education and their contribution to the construction of knowledge in the Federal University of Sergipe. The aim of the study was achieved while with its accomplishment it was possible to identify the profiles of students and tutors of distance learning courses at UFS, the functions performed by the tutors and the lack of standardization in the activities performed, the information and communication technology resources that are employed and the ones in need of settings for their usage, because it was not considered fully satisfactory. Moreover, the satisfaction of students in some aspects and information regarding the implementation of distance education at the university were investigated.

In the view of those responsible for managing and coordinating the implementation of distance education it was a bold action because it is of a deep character, but in general, they seem hopeful about the good results that can be generated by distance education, despite the difficulties and failures encountered. In the view of the students, it was found that even though they believe that DE is still incipient in the University, which has

numerous flaws and difficulties, they see themselves as a key part of this teaching modality and require that teaching is geared to their needs, the realize progress and are confident that the improvements that are still needed will come to reality. The tutors perceive the distance mode as something new, a perception that tends to justify the various failures exposed by them and, according to them, will only be resolved with greater educational and administrative organization.

Regarding the features of information and communication technology, according to the tutors there is a standardization of materials provided by the university, since, according to them, these materials are always prepared in a clear and appropriate manner in order to promote understanding of content. In contrast, students consider that not all materials have these characteristics, but the tools to support distance education are often appropriate. According to responses of tutors and students, it is noticed that in addition to materials available online, printed materials are provided for the students such as books and handouts.

When it comes to the interaction between students and tutors, tutors say that communication is always encouraged during the course, that feedback to students about their grades and evaluations are always given, that they address the questions of the students, and they often take suggestions from students into account. The students' perception makes some contrasting aspects, as these often claim that some communication happens and receive some feedback but only rarely tutors answer questions in a timely manner, provide clear and objective responses, use techniques that stimulate learning, motivate the search for additional information from libraries and/or queries on the Internet and develop discussions on Moodle.

None of the tutors surveyed believe that students are fully satisfied with distance learning, but realize that students are partially satisfied, data

that coincide with the opinions of students, who were asked about their satisfaction with the course, the Moodle platform, the relationship with tutors and relationships with colleagues and they claim to be partially satisfied.

The results show the need for improvements by students themselves for greater adaptation in the distance, as by the tutors to increased motivation and learning and monitoring and by the CESAD for greater interaction with others involved in distance education as well as encouraging interaction between tutors and students and among students themselves, adaptation of equipment, materials and platform to students' needs or training for better usage of these resources. Furthermore, the results make it possible to confirm that the information and communication technologies employed for interaction and transmission of information among those involved in distance education have fundamental importance to face barriers created by physical separation of the involved in DE.

However, despite the known importance of these resources, several critical problems in distance education were found, including problems in the interaction and transfer of information, which could be remedied with the proper use of available resources. It is noteworthy that these results deal with a reality of a research institution which may be different from other institutions, thus suggesting the development of other research and comparative studies in order to improve the structure of DE in the view of all involved, mainly its prime target, the students.

Thus, the following suggestions for improvement of distance education for the researched institution and others who face the same problems may be:

- Conducting preparatory meetings at the beginning of the academic semesters for new students to meet the specificities of this mode of teaching and learning, the platform used, the operation of DE, as well as tutors and peers with whom they will interact during the course/semester.
- Improvements in accessibility of Moodle and/or provision of training to students and tutors to use all available tools in the virtual environment;
- More interaction, both in distance and face-to-face, between management, tutors and students, so that problems are identified and resolved, for there to be a monitoring of the performance of students and tutors and that information can be transferred more quickly and efficiently;
- Best preparation and greater availability of tutors for clarification of questions, so that they are resolved satisfactorily and in a timely manner;
- Creation of libraries and laboratories, as well as encouragement from tutors for students to obtain external information (internet, libraries, videos, etc.), in addition to materials available, because even if the students are in an autonomous learning process they need motivation to continue their studies;
- Adoption and standardization of video lessons by teachers or tutors to assist and complement fixing the content covered;
- On-time delivery of printed materials, dissemination of materials onto the platform, correction of activities and dissemination of grades.

Although the proposed facilities are possible to be accomplished, distance education demands a differentiated student profile, with distinct capabilities to study and interaction skills; it opens space for the tutor, responsible for motivating and creating an environment where the student can, by means of ICT to transform information into knowledge received; so that communication is facilitated, feelings of isolation are reduced, the content addressed is complemented, doubts are resolved and information that will assist in the construction of knowledge is assimilated.

References

1. Moré RPO, Moritz GO, Pereira MF, Melo, PA (2010) Modelo de gestão para educação a distância: o sistema de acompanhamento ao estudante – SAE. Revista de Administração e Inovação, 7(2):104-125.

2. UFS, Centro de educação superior a distância – CESAD – UFS. Retrieved from: http://www.cesad.ufs.br/

3. Chaves EO (1999) Ensino a distância: conceitos básicos. Retrieved from: http://www.edutecnet.com.br/edconc.htm#Ensino a Distância

4. Moore MG, Kearsley G (2008) Educação a Distância: Uma visão Integrada. São Paulo: Cengage Learning p. 175.

5. Belloni ML (2006) Educação a Distância. São Paulo: Autores Associados.

6. Moore MG, Kearsley G (2007) Educação a Distância: Uma visão Integrada. São Paulo: Thomson Learning p.92.

7. Mattar Neto JA (2005) Metodologia Cientifica na Era da Informática. São Paulo: Saraiva, p.135.

8. Leal RB (2005) A Importância do Tutor no Processo de Aprendizagem a Distância. Revista Iberoamericana de Educación. Retrieved from: http://www.rieoei.org/deloslectores/947Barros.PDF

9. Todescat M, Santos N (2006) Universidade e a EaD na Sociedade do Conhecimento: Contemporaneidade Organizacional. Retrieved from: http://www.abed.org.br/seminario2006/pdf/tc038.pdf

10. Gadotti M (2000) Perspectivas atuais da educação. Porto Alegre, Ed. Artes Médicas, p.9.

11. Jonassen D (1996) O uso das novas tecnologias na educação a Distância e a aprendizagem construtivista. Brasília, p.3.

12. Gil AC (2007) Como elaborar projetos de pesquisa. São Paulo: Atlas, p.42.

13. Malhotra NK (2001) Pesquisa de Marketing: Uma orientação Aplicada. Porto Alegre: Bookman.

14. Alves-Mazzotti AJ, Gewandsznajder F (2001) O método nas ciências naturais e sociais: pesquisa quantitativa e qualitativa. São Paulo: Pioneira Thomson Learning, p.168.

15. Kenski VM (2007) Perfil de tutor de cursos pela Internet do SEBRAE. Retrieved from: http://www.biblioteca.sebrae.com.br/bds/bds.nsf/DowContador?OpenAgent&unid=E1BE65B911F65C8C83257278000069F1