

Comparative study of two pedagogical practices in distance education¹

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ABSTRACT

The article presents a comparative study between two distinct modules of the same technology undergraduate course in the distance education modality. Over the modules, different pedagogical practices (one innovative, another traditional) were adopted by the teachers in a virtual context with differentiated interactivity levels. From the evaluated and diverse topics such as the use of learning trails or routes, participation in discussion forums, download statistics and the comparison of the objective evaluation in each one, it was possible to notice that the module in which there was a greater interactivity, the evaluation results were better. In the view of that, it can be concluded that a teaching and learning process in distance education should not be based only on the content structure available to the students in learning management systems and on the premise of their autonomy, but extending to the pedagogical practice to a higher level of interactivity. It is evident, therefore, the need for greater involvement of the teacher in the students' learning.

Key words: Interactivity. Course evaluation. Distance education. Learning management system.

INTRODUCTION

Distance education has become a fast-growing teaching modality in the country in recent years. The expansion of courses offered in this modality has raised a series of questions concerning the quality of such courses, not as transparent as the benefits of economy of scale derived from the teaching institutions in offer of this modality. However, it cannot be ignored the importance of this implementation process of courses in the democratization of knowledge by expanding the reach of education to the less favored sectors of the population (MARTINS, 1991).

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Therefore, evaluating the quality of such courses in distance education becomes a task of paramount importance. The Ministry of Education, with the proposal of the ENADE - Exame Nacional de Desempenho de Estudantes²- progresses in a conception of measuring results, considering the formation that different higher education institutions provide their students when they graduate from their courses. Associated with the external evaluation of courses, this process serves as a good starting point for the higher education institutions to modify internally the pedagogical projects of their courses, toward higher quality standards and better results.

An evaluation process needs to be understood in three perspectives: diagnostic, formative and summative. In the diagnostic evaluation, the objective is to obtain prior information to the fulfillment of a course. The formative evaluation aims to know the students' view by means of criticism or reviews and even suggestions used in intermediate moments. The summative evaluation is the quite often used model in combination or not with the formative evaluation, by the end of the course, generally applied through the filling out forms by students (CARLINI and RAMOS, 2009; RODRIGUES, 1998).

Moore and Kearsley (2007) emphasizes that the data about the satisfaction of students are important and they can be obtained with relative ease. It is already a common practice this type of evaluation of courses in which the students are asked to evaluate the content, organization, teachers, didactic material and the system to communicate information. This can provide a minimum analysis of the quality of the courses in terms of the students' perception (Moore and KEARSLEY, 2007).

Gatti (2010) affirms that the research in education is covered with some specific characteristics due to the work with human beings in their own process of life. Knowledge generated in this area will be rarely obtained by a search strictly experimental, in which all the factors can be controlled. This statement can be extended to distance education, by deepening a series of issues in relation to the peculiarity of such modality of education.

² National Examination of Students' Performance – it is a national test that seeks to assess the students' performance.

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In a specific direction, the object of study detailed here is based on the comparative evaluation between two different modules in the same course that were conducted simultaneously with the same group of students. Depending on the degree of freedom in the use of resources available for teachers, it was possible the development of different levels of teacher-student interactivity. In the discipline using the innovative methodology, which henceforth it will be called "A", various interactive features were used in the fulfillment of the module, while in discipline "B" it was developed what was required in basic terms by the course design, the traditional model. The working methodology is described below, followed by the results, by the qualitative analysis that identifies some categories of the students' discourse and by ending with the final considerations.

Theoretical Frameworks

Praxis is the theoretical and practical action at the same time. It is not just the combination of theory and practice in order to verify the usefulness and/or applicability of a given knowledge, but the understanding that the processes involved in the construction and appropriation of scientific knowledge and other knowledge are not distinct from the social nature that has produced them in a synthesis of multiple determinations (VASQUEZ, 1968; SCHNEIDER; MEDEIROS and URBANETZ, 2009).

Due to the specific characteristics of the modality, the distance education needs a pedagogical model that contemplates such characteristics. From a constructivist proposal, the learning act on the part of the student must be more highly valued than the act of teaching by the teacher. The constructivism is based on the premise that the human being builds his/her perspective of the world from his/her own experiences and individual schemes (SCHUMAN, 1996). The modality of distance education structured in the form of classrooms in support centers must also assume a socio-constructivist approach. Under this approach, the student learns by constructing his/her own knowledge, influenced by culture and by interaction through of knowledge bases and by new social experiences (VYGOSTKY, 1978).

The available technological tools to distance education still maximize the cognitive development in a collaborative work, which has its basis in a situated learning in the social activity (LAVE and WENGER, 1995). The students participate in a community of practice when they share the interest on certain common themes and deepen not only the knowledge but also the experience through the interaction.

The courses are designed to follow the proposal of Bloom's taxonomy with transparent cognitive objectives on the learning paths of each classroom, divided among their resources. The Bloom's taxonomy is divided into: i) knowledge, the recall of information; (ii) the understanding of an idea; (iii) application of rules and principles; iv) analysis, the division of an idea into constituent parts and describe their relationships; v) synthesis, the summary of the parties in whole; and (vi) evaluation, the task of making judgments about the materials or methods.

In terms of distance education, the appropriate use of technology is an essential condition for the success of the modality. The institutions that work with distance education implant learning management systems. An LMS (Learning Management System) is a web platform that allows the management of learning processes in different perspectives: technical, administrative and pedagogical, by presenting some basic mechanisms of interaction such as e-mail (electronic mail), discussion forums or chats (discussion in real time) (PERES and PIMENTA, 2011).

The resources that can be found in a virtual learning environment - VLE, another name of an LMS, refer to the structure of the course, navigation model, area of announcements or notices, the class list and personal web pages, calendar, search tools, metadata, favorites, multimedia resources and area of folders to upload and download content (PERES and PIMENTA, 2011).

Regarding the communication, the web tools allow synchronous and asynchronous communication. Synchronous tools, such as chat, allow the simultaneous communication, while asynchronous tools like e-mail or discussion forums, the communication can be extended in time, in accordance with the student's pace or calendar (PERES and PIMENTA, 2011).

Thus, the LMS are software packages that aggregate tools for the generation, tutoring and management of activities presented in the form of courses. They are

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constructed through the use of different languages and means with the intention of providing not only the content availability, but providing full interactivity and interaction among people and groups, which allows the knowledge construction (SILVA, 2011).

The main function of the learning paths in the LMS is to organize the learning contents of the classes, by establishing a three-dimensional communication among student/teacher/knowledge, providing the pedagogical mediation among all the individuals involved in the process. The learning path presents itself as a deepening of the lesson plan, aiming at clarifying the desired path by the educational process, once the learning and teaching process in distance education is planned and not accidental. The communication by means of the new information and communication technologies represents a link between the content to be taught, the student's learning and the teacher who is the content communicator (SCHNEIDER, MEDEIROS and URBANETZ, 2011; SCHNEIDER, MEDEIROS and URBANETZ, 2010).

Regarding the definition of what interaction and interactivity are, according to Aurelio dictionary, **interaction** is "an action that is mutually exercised between two or more things or two or more persons". In relation to **interactivity**, it refers to the "capacity (of an equipment or communication system or computing system, etc.) to interact or to allow interaction". Silva (2000) proposes that interaction is a word with at least three interpretations: "a generic one (nature is made of physical-chemical interactions or, there is no human action separated from interaction), a mechanistic one, linear (systemic) and one marked by motives and predispositions (dialectics, interactionist)."³ Moore and Kearsley (2007) highlight three types of interaction: student-content, student-teacher and student/student. In Mattar (2009), there are the interactions described by Moore and Kearsley, in addition to the following types: teacher-teacher, teacher-content, content-content, learner-interface, self-interaction and vicarious interaction.

³ In Portuguese: "uma genérica (a natureza é feita de interações físico-químicas ou, nenhuma ação humana existe separada da interação), uma mecanicista, linear (sistêmica) e uma marcada por motivações e predisposições (dialética, interacionista)"

The description of the methodology

The present study was conducted in the second half of 2009, and involved two disciplines relating to an undergraduate course in Logistics Technology, applied to a group of 1051 students. The teaching modality of distance education foresaw - as basic model - the satellite transmission of the classes to be watched at the Classrooms Support Centers – PAP⁴, divided into the number of 6 (six); the textbook used in class as a didactic guide, physically delivered to the student; the transmission of a review class and the development of a supervised activity as a subjective part of the evaluation. At the end of each discipline, the students also did the objective test as part of the final evaluation of the discipline together with the supervised activity.

In discipline "A", however, the teacher sought a higher level of interactivity through the intensive use of the LMS resources. In table 1, the resources used for the disciplines are described. On LMS, the resources used were organized into learning paths, trails of resources in which the contents were aggregated by means of links that the student should follow as a suggestion for the study of each class in order to keep some control regarding the time limitation of the tasks.

Table 1 - Resources used in each discipline

"A"	"B"
Satellite classes (6 classes)	Satellite classes (6 classes)
Class review (1 class)	Class review (1 class)
Supervised activity	Supervised activity
Learning paths (6 paths)	Textbook
Interaction forums (6 forums)	
Tutoring on chats – (6 hours)	
Tutoring on web radio – (6 hours)	
Content fixation exercises	
Interdisciplinary synthesis exercises	
Textbook	

⁴ In Portuguese: Polo de Apoio Presencial.

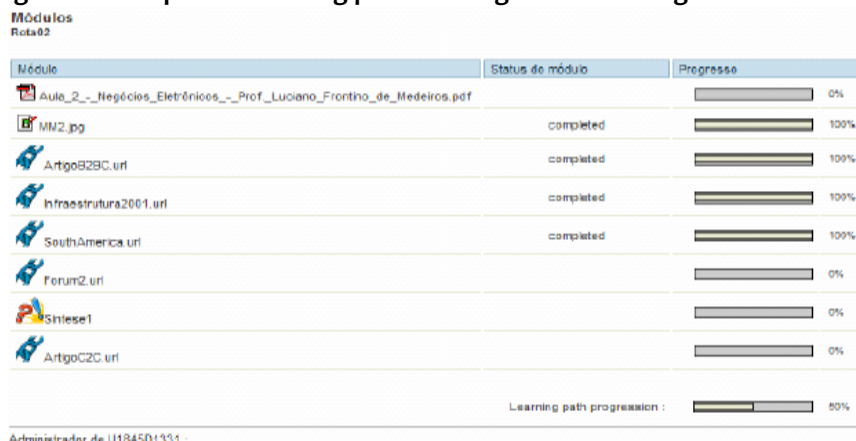
Learning Paths

The organization of the lesson materials on the LMS by means of the learning paths had the following structure:

- 1) **Theme:** it connects the subject or theme to the summary and the programming of the lesson plan;
- 2) **Objectives:** they were listed taking into consideration the Bloom's taxonomy;
- 3) **Contextualization:** it seeks to make the meaning of the theme to be studied within the discipline in general and also with the profession practice;
- 4) **Material classroom:** it organizes different resources in terms of readings of the corresponding chapter of the book, documents and slides and mind maps;
- 5) **Expansion of knowledge:** it deeps the theme from readings texts from links on the web;
- 6) **Interaction with the teacher, tutor and colleagues:** through the use of discussion forum asynchronously;
- 7) **Activities of reflection:** it contemplates exercises with question feedback ;
- 8) **Practical Application:** space for presentation of practical cases relating to the theme.
- 9) **Self-evaluation:** it motivates the student to produce his/her own text about the topic addressed in the learning path;

By its turn, the learning path allows monitoring the resources that were visualized by the student until a specific moment (Figure 1).

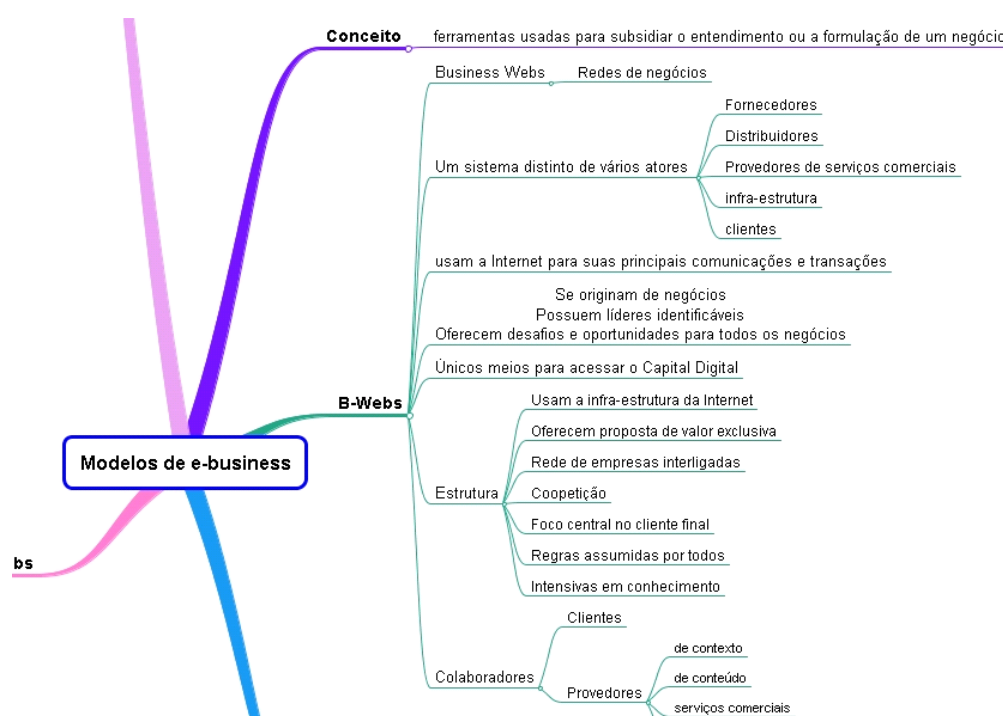
Figure 1 - Example of a learning path showing the monitoring on each resource



Source: Elaborated by the authors

By its turn, for each satellite class taught there was a learning path constructed by the teacher. The use of mind maps sought to summarize the concepts and terms discussed in the classes as an aid to memorization of content by students during their self-study moments (Figure 2).

Figure 2- Part of a mind-map on the content of the discipline



Source: elaborated by the authors

Discussion forums

The discussion forums are created in order to provide an asynchronous communication between the teacher and the student, or even the student-student interaction in relation to general questions of the discipline completion, or to the content worked. Some students do not actively participate in forums and chat rooms, but it does not necessarily mean they are not interested in the topics discussed. Most of the times, the student/learner feels more comfortable in the role of "spectator" of the themes for discussion, and in other moments they prefer actively participate in the process (SCHNEIDER, MEDEIROS and URBANETZ, 2011). A summary of the use of the forums in discipline "A" is shown in table 2.

Table 2 - Summary of the use of the forums in discipline "A"

Theme	Topics	Posts
General doubts	44	133
Importance of the Internet	26	137
E-Business practice	30	120
Integrated systems implementation	7	21
M-Business	9	16
Supervised activity	16	46
Total	132	473

Source: elaborated by the authors

Tutoring by chat and WEB radio

According to Lopes (2010), there is a potential related to the professional of education for the production of content to be broadcasted by means of radio stations on the web. It must be thought about the adequacy of content broadcasted by the media in question, respecting the language of the environment and the existing culture in receiving and understanding of the information transmitted.

Tutoring by chat room is a resource used on LMS for interlocution moments between the teacher and the student. Most of the tools offer communication screen via keyboard in virtual spaces called "rooms". The teacher schedules a one-hour period (relative to each class) to make the tutoring in a specific room with the possibility of other tutors' participation. The tutoring during the chat is recorded and made available for later access by the students. The qualitative analysis presented in the result section, some aspects relating to this moment as the feedback provided by the students are examined.

Fixation exercises

In the activities for reflection of the learning path, there are exercises for fixing the content which allow the students to perform activities for fixing the content. The

activities are composed of objective questions with commented answer key prepared by the teacher. Therefore, the student has immediate feedback about his/her mistakes and successes in the proposed activities (Figure 3).

Figure 3 - An example of the question of self-evaluation on the LMS

Questão 8

Neste tipo de criptografia, cada usuário possui duas chaves: uma pública distribuída livremente, e outra privada que é retida pelo usuário. Estamos falando de:

Sua Escolha	Escolha esperada	Resposta	Comentário
<input type="radio"/>	<input checked="" type="radio"/>	Criptografia assimétrica	Correto!
<input checked="" type="radio"/>	<input type="radio"/>	Criptografia simétrica	Op! Verifique o conceito novamente a partir da p.216
<input type="radio"/>	<input type="radio"/>	Criptografia privada	
<input type="radio"/>	<input type="radio"/>	Criptografia pública	

Múltipla escolha (Resposta única)

Source: SCHNEIDER, MEDEIROS and URBANETZ, 2011

Results

The results of the study are presented in a quantitative and qualitative way. The quantitative analysis was performed based on the objective evaluation performed by the students from the course in both disciplines. In the qualitative analysis, the transcription files of the tutoring via chat room and web radio programs were used in order to analyze the discourses contained in the dialogue with the teacher and find elements related to the feedback related to the comparison of the disciplines involved in the study.

The quantitative analysis

Table 3 shows the quantitative data relating to this comparison. The information was summed from the statistics provided by the LMS in each discipline, referring to the scores from the tests carried out by the students. While only 22% of the students obtained scores higher than 7.0 for "B", 46% of the students of the discipline of "A" obtained scores higher than 7.0.

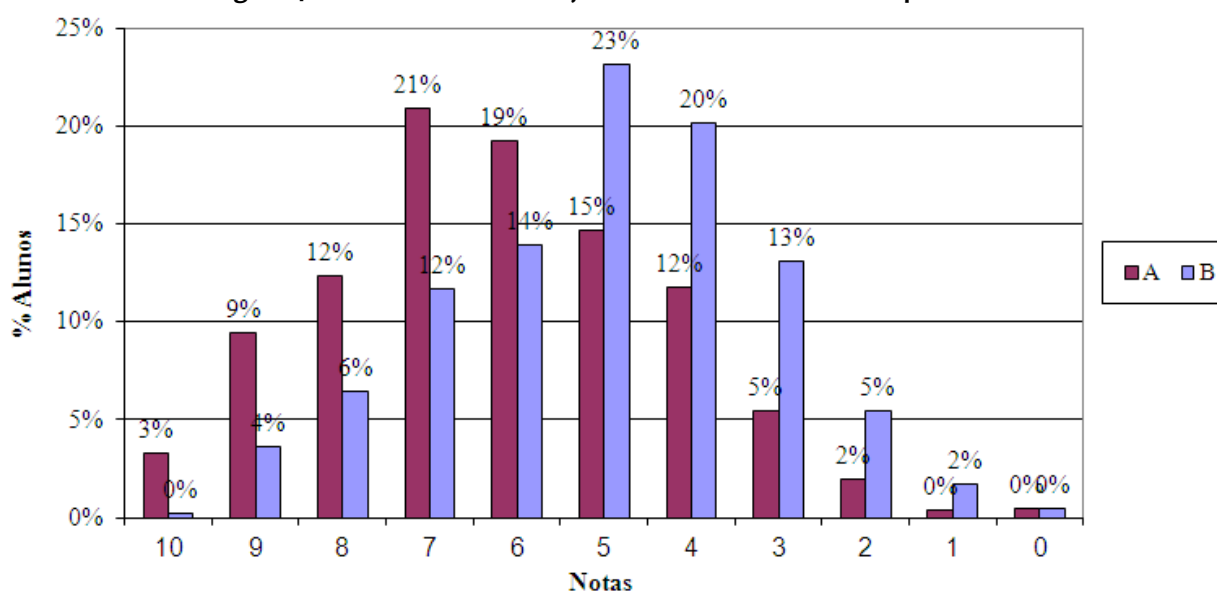
Table 3 - Comparison between the curves of scores of each discipline

Score	DISCIPLINES					
	"A"			"B"		
	Acum.	Quant	%	Acum.	Quant	%
10	35	35	3%	2	2	0%
9	134	99	9%	40	38	4%
8	264	130	12%	107	67	6%
7	484	220	21%	229	122	12%
6	686	202	19%	374	145	14%
5	840	154	15%	615	241	23%
4	964	124	12%	825	210	20%
3	1021	57	5%	961	136	13%
2	1042	21	2%	1018	57	5%
1	1046	4	0%	1036	18	2%
0	1051	5	0%	1041	5	0%
Total		1051	100%		1041	100%

Source: Data organized by the authors

Figure 4 shows the data from table 1 that indicates the top of the curve for "A" for the score 7.0 with 21% of students, while the top of the curve for "B" was for the score 5.0 with 23% of the students.

Figure 4 - Distribution of the objective evaluation of the disciplines⁵



⁵ "Alunos" means "students" and "notas" means "scores" in Portuguese.

The Qualitative Analysis

Due to the fact that the specific evaluation methodology of this course had not been implemented yet, small excerpts from the recorded transcription of tutoring via chat rooms and WEB radio programs were extracted. Such contents are of significant importance, and they consist of a rich repository for a future qualitative study. During the contact with the teacher in charge of the discipline, not only do the students ask questions relating to the content, but also they manifest certain opinions concerning the form of development and some difficulties related to adaptation to the teaching modality.

The excerpts are described below in tables 1 and 2, referring to parts of the dialogues of 16 students with the teacher of the discipline (not the tutor) only in tutoring by chat and then tutoring involving the WEB radio. Only spelling mistakes were corrected and the direct references of the names were hidden due to ethical issues. By virtue of the length of one hour for each type of tutoring, the total contents transcribed is extensive, so only one part has been selected in order to distinguish some interesting categories for reflection.

Table 1 – Excerpts from transcriptions of tutoring moments via chat room

A1: Professor, this didactics, this way of teaching is fantastic, congratulations!
A1: I have been 20 years away from school, for me the system is great!
...
A1: Professor, is it allowed communication between students for exchange of experiences?
A2: I am of Cruz Alta-RS, I am the only student here, it is good to know that I have several colleagues to clarify doubts.
P: Did you notice why this chat moment is important?
...
A3: The chat room is an interesting tool, it clarifies doubts that we ourselves don't know we have.
...
A4: Professor, I don't know if I looked at the right place, but do we have tests already scheduled?
...
A5: I'm a bit lost in the forum; I think I posted my comments out of order.
...
A6: The first e-mail I got from a professor of the logistics course was yours, thank you for your attention!
...
A7: Professor, I don't know either if I participated in the right order in the forum....
...
A1: The images of the maps are not very clear.
A1: During the radio program, it is possible to make some comments about service providers...
...

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P: Distance learning requires a greater student's autonomy...

A8: As students, we have to study more.

A8: It is good that all professors also make available (exercise), the way that you're doing with the path.

...

P: And the planning aspect is very important for the education quality in distance education, much more than in the classroom.

A1: Those who study at distance must be aware that the effort should be increased.

...

A10: Good evening, professor. I am increasingly excited about this subject!

...

A11: Professor, I always have a quick look at the forums, but to tell you the truth, I don't know how it works.

...

A8: I understand what the professor says.

...

A14: Professor, the exercises that are on the learning path, is there any deadline to do them?

It can be identified, from table 1, some categories related to:

- i) Students' doubts regarding the education system (A1, A2), referring to the possibility of interaction among students to exchange experiences;
- ii) Positive opinions regarding the development of the systematic of teaching in the case of the chat moment (A3), the possibility of direct dialog with the professor (A6), the motivation for the continuity of studies in the modality (A10) and the teaching modality itself (A1);
- iii) Difficulties with the systematic of teaching, including the ones related to other resources like the forums (A5, A7, A11 and A14).
- iv) Problems relating to the content, for the sharpness of the images of mind maps (A1);
- v) The student's recognition in relation to the distance education modality as being demanding (A8) with positive feedback on the part of the student.

Table 2 - Excerpts from transcriptions of tutoring moments by chat room and WEB radio program

A8: I'm going to listen to this recording again, because the content is very good!

A8: Here at home we are all admired with the interaction, teacher and student!

...

A9: Good evening, I can't visualize the web radio program link, can you help me?

A9: Professor, congratulations for your teaching methodology. It would be good if all the professors did the same.

A8: And the phone costs decrease with this!

A12: Some constructive criticism: updating the chat takes the focus off typing. It bothers a little the online communication. But I believe that the technical staff will solve it soon.

A13: I would like to congratulate the professors and the institution, because this moment is very good for the students to learn more by speaking with the professor.

A8: Professor, the answers to questions from colleagues helped me a lot.

A15: I've attended the course for almost a year and you are the first professor who explores the learning path as a whole. In your opinion, what is the reason the others do not use it? Because it is of great help for us!

A8: The activity is very interesting, but the participation on chat, forums and web radio, I hope the evaluation weighs a little, because everyone participates, demonstrates a great interest and dedication to the course.

A8: And even the consideration to the professor, who is very committed.

A8: Professor, I'm going to use the book more to work on my questions of the activity, ok?

A16: With all this technology, we are too stuck to it. What if one day this entire system collapses like last week when we couldn't access the LMS.

A16: Gee I'm happy that all this change was for the better ... it could be the same for our tests. ..less complex ...

A16: ... we could have access to the questions that we have done wrong so that we could study what the situation was for that question.

A16: ... with this, it is really possible to learn, right? Professor, because everything is too open..
...

A16: For sure, professor, I understand your point of view, but a lot of things we have studied aren't included in the test. Of course, studying everything is worth, because everything that we have learned is for the rest of life...

A16: Comparing to other colleges ... I admire the system of the institution, but as we are talking here ... we can still improve a lot ... the speed and clarity of information is one of them.

A16: I'd like to congratulate you for the classes, the explanation was wonderful, you showed that you really know the subject ... I only apologize if I do badly on the written test ..for not expressing myself properly with words ... rsr

In table 2, in which the professor's feedback is only spoken on the WEB radio program, the process is facilitated, releasing the professor from the keyboard. Some important considerations from the students:

- i) Motivation in relation to the possibility of reviewing (listening) the content later (A8);

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- ii) Technical difficulties regarding access and operationalization of the system (A9, A16);
- iii) Positive opinions regarding the method adopted by the teacher compared to others (A9), a deeper use of the learning path (A15), the teacher's commitment (A8), the methodology of the institution (A16), the teacher's knowledge on the subject recognized by the student (A16);
- iv) Criticism regarding the resource itself, i.e., the chat room as a tool (A12);
- v) Possibility of student-student interaction (A8);
- vi) Recognition of the need for improvement in the information flow (A16).

From the exposed on the sampling frames, it could be identified that the students perceived and reacted positively to the various achievements of the disciplines. Some statements indicate the relative improvement to the alternatives to study, while others put greater proximity between the professor and the student. The students themselves also perceive the difficulties involved regarding the study modality in distance education. The adaptation to the teaching style in distance education could also be identified due to considerations of new students in this modality. The tutoring moment is also configured as an open space for criticism on technical and methodological issues. Finally, the possibility of interaction among students, both in tutoring moments and in forums, shows the potential and the importance of a LMS adjusted properly to the needs of the proposal for teaching.

Final Considerations

The need for detailed studies to design good pedagogical projects with respect to the effectiveness of the teaching and learning processes is vital for the modality of distance education. The intention with this study is to provide a broader view on different forms of action and interaction/interactivity in the professor-student and student-student relationships. It is also a misunderstanding to underlie the success of the learning and teaching process only on a technological tool that allows communication in a wide

spectrum without the real exploitation of the full potential that can be obtained. The presence, even the virtual one, and the teacher's commitment with all that is involved in distance education, since the design of the course from planning to the evaluation moments becomes a significant differential.

The findings obtained in this study, when it comes to tutorials by chat rooms or Web radio programs allow identifying the importance of these means and media for learning. This model is currently developed in all the courses offered by the institution. Relations of this type of comparative study with other forms of institutional evaluation can be viewed in the enrichment of the processes on the part of the commissions of evaluation.

For its inherent complexity, a model for distance education must assume an efficient use of resources, including technology with regards to the LMS. The teacher training should not be just a way to pass on the knowledge of how to operate the tools available to the professor, but enthroning the issue to demonstrate effective uses and real cases and successful completion of the disciplines in an innovative way. Therefore, the role of the course coordination is vital to make the necessary connections of pedagogical projects of course with the lesson plans of the disciplines.

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