VLE and Conceptual Maps on Information System face-to-face teaching

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ABSTRACT

This article discusses a didactic experience that combines two methodological approaches in order to innovate the teaching of the course of Introduction to Information Systems Bachelor's degree in Information Systems from Fluminense Federal University. One of the approaches is related to the use of a VLE (Virtual learning environment), based on Moodle, as a strategy for improving learning relations between students and teachers. The other deals with the use of conceptual maps for the construction of basic concepts and definitions in the area of Information Systems.

Keywords: Conceptual Maps, ICT, VLE, Learning Methods, Information Systems, Undergraduate teaching.

1. INTRODUCTION

The requirement for a new look at the acts of the individual in the world is necessary when you look at the range of changes promoted by the introduction of information and communication technologies in the activities of the people daily life. All the complexity generated by the use of new forms of communication between individuals, organizations and societies highlights the great contradiction of permanence, in educational institutions, of educational practices based on the production line and, therefore, based on training, specialization and control.

The objectivist paradigm that shaped the XIX and XX centuries societies is ingrained and continues to be the designer of the educational system. In Brazil, like other levels of education, the public university, in its vast majority is characterized by being " the most complete example in modern society, of an institution that was entirely modeled by assembly line"[1].

It is through a simplistic configuration that the classroom, as a general rule, is structured in a model where students, each one sitting behind the other, in front of teachers, and this minimizes the interaction between individuals, the base of knowledge construction process. With the limited communication between members of the learning process, you lose all the richness from the interaction between individuals whose brains lead and connect an infinite number of complex information through their sensors.

> In this model the low student/teacher ratio is the result of maintaining a practice that, generally speaking, is a vertical structure of content transmission and that is far from what is meant by a truly educational situation. The discomfort in question is given insofar as this does not allow the student the employment of all of his intelligence - something that is not restricted to rational processes, but rather with the individual's ability to adapt to new situations - once he is not provided with the development of an educational process in which he can get the cognitive, biological and social dimensions inherent to his ability to learn independently and to socialize with the other [2].

The complex reality of a learning environment is far from simplicity, characterized by: considering only the real as intelligible; delete reality in order or in predetermined coherence; eliminate and deny everything that is not in accordance with the rationality or idealization of whatever is taught. It is necessary to understand the educational institution as a complex system the natural state of which is closer to chaos, since its complexity or simplicity is an inherent aspect to evolution, to interactions and not to the elements of that system.

The university, within this context, should seek to develop in a systemic mode a strategic approach focused on the use of information and communication technologies (ICT) - set of equipment, techniques and processes that enable the processing, communication and information, sharing in the form of image, sound and text - in order to assist in the improvement of these little explored educational relations. The benefits obtained by planned and coordinated introduction, in face-to-face mode of ICT for teachers and students in higher education disciplines, are directly linked to the ability to innovate the processes and the production activities and socialization of knowledge. This is primarily through the creation of a network of relationships between teachers and pupils, allowing expansion of the dialogue, which is essential in the construction of knowledge of the content covered. In addition, it is possible to diversify strategies in planning, implementation and evaluation of educational activities.

In the context of the universities, characterized by the predominance of the face-to-face mode in which still persists the content broadcast model, the restricted use of technological means is not justified. According to [3], the connected world generates creativity and generosity in the context of culture of participation, thus understood to be a fundamental recognition that ICTs are instruments of transformation to obtain significant

gains in educational programmes. The Web 2.0, the main point of which is collaboration, can help democratize the information, since it enables access to content, processing, sorting and reorganization, to enable the sharing of data and information, and assist with cooperative learning, allowing the collective construction of knowledge. It can be said, among those who believe in collaborative learning that individuals learn working in group, since the interaction with others constructs the knowledge.

Currently many experiments show that ICTs bring new dimensions to the process of teaching and learning, whether in proposals for distance education or in face-to-face mode. The AVAs (Virtual Learning Environments), as detailed in section 2, aggregate varied ICTs in a technology platform, enabling these dimensions at a higher level. The convergence of ICTs with social networking technology brings new opportunities and possibilities for the student's autonomous learning, as well as the collaborative construction of kowledge.

For a better understanding of the effectiveness of the use of ICTs in learning processes, this article, whereas a qualitative vision presents a case of their use in teaching the Course of Introduction to Information Systems Bachelor's Degree in Information Systems from Fluminense Federal University in the second half of 2011. Coupled with the use of ICTs, that experience describes the use of conceptual maps as a methodology to support the knowledge construction process of the contents of the discipline. The contribution of these approaches is presented for the improvement of the relationship between student and teacher.

The article is structured as follows: section 2 defines an AVA and focuses it on the Fluminense Federal University environment; section 3 makes reference to conceptual maps; section 4 shows the didactic experience with the methodology that encompasses the use of ICTs and conceptual maps; and the section 5 presents the conclusion through the qualitative aspects of the use of the methodology presented.

2. The face-to-face teaching mediated by AVA

The AVAs are technology platforms that allow the combination of a system of educational activities administration with a package of facilities dedicated to communication and presentation of content. This combination is designed to assist educators in teaching tasks and allows a significant transformation in relations students-teachers with views on improving the process of knowledge construction.

It is not difficult to prove that the higher are the chances of adding multimedia and interactive pedagogical tools, the more effective proposal is the students' learning. In this respect, the use of appropriate and effective AVAs is enough to provide access to a virtual space, provide content integration presentable through a variety of media (texts, images and sounds), synchronous and asynchronous communication tools (chat, forums) and authorship (blogs, wikis).

Based on Moodle (Modular Object - Oriented Dynamic Learning Environment), the AVA used in didactic experience described in address http://www.interagir.uff.br, was implemented to provide a new possibility of transformation of the traditional model of education practised in classroom courses at the Fluminense Federal University. This environment, which integrates face-to-face with virtual is available for teachers interested in innovating their educational practice with the introduction of ICTs.

This AVA, shown in Figure 1, offers the following facilities:

- Construction of proper spaces for creation of knowledge, by means of interactions and cooperations, made possible by the systematization and organization of ICT tools in order to provide the virtual to classroom disciplines pedagogical projects.
- Aid in the planning and development of didactic projects-innovative teaching by the use of synchronous and asynchronous tools, bases for the generation of information flows and communication dialog initiators.
- Identification of strategies and innovative practices in the face of traditional methodology of teaching.
- As a tool platform for reinforcement and extension of activities carried out in the classroom face-to-face mode.
- Providing activities and supporting materials to introduce the concepts of administration and meeting deadlines at the completion of the tasks of the disciplines.
- Use of socio-constructivists strategies in order to promote exploration, collaboration and reflection of the students by using the tools of work and collaboration provided by the system.

3. Conceptual maps as the methodology in the construction of knowledge about Information Systems

The use of conceptual maps as the methodology in the construction of knowledge about Information Systems comes from the conception that knowledege cannot be considered as something external that the individual acquires, but rather as something that he himself constructs. According to psychologist Ausubel, in his theory about significant cognitive learning, the structure is organized from abstractions from the individual's esperience.

Little is known about the processes of memory and about how knowledge is incorporated to the brain. However, several sources of research make clear that the brain works to organize knowledge in the form of hierarchies and that approaches that facilitate this process increase the learning ability [4].

Conceptual Maps, developed by Joseph Novak from the meaningful learning theory, are graphical representations similar to diagrams, which show relationships between concepts connected by words. They represent a structure that goes from the broader concepts to the least conclusive [5].

With the objective of promoting the construction of knowledge about Information Systems area, it was sought in the use of conceptual maps to promote the organization and integration of contents through the following stages of construction: a) the central concept identification; b) establishment of relationships with dependent concepts; c) establishment of relationships; d) review; e) illustration; f) determination of connections [5].

For the maps graphical construction it was used the authoring tool called CmaoTools developed by the Institute for Human and Machine Cognition - University of West Florida. This software not only makes it easy for users to build and modify

conceptual maps at the same level of word processors but also allows them to collaborate at a distance, publish them at Internet, get resources (images, pictures, graphics, videos, tables, texts, Web pages and other conceptual maps) and search on Web further information about the concepts represented [4].

Figure 1. AVA used in reported didactic experience.

In addition to the support given to learning, the conceptual maps can also aid in evaluation activities. There are research projects around the world working on creating better evaluation techniques, among which the conceptual maps are included [4].

4. Teaching Experience

The discipline comes in a context in which learning in universities cannot be disconnected from the real problems. In this context it was sought to transform the traditional model, which has in the teacher the single source of content. The proposed content in the discipline was presented through concrete actions based on the premise that we learn through dialogue. This dialogue is made possible by reflection brought by the content from the teacher and explicit knowledge sources: texts, vídeos and documentaries. To meet the goal of meaningful learning it was sought to build the body of basic knowledge on the proposal of the course, on the field of knowledge and on the area of operation of the Information Systems professional. Following this methodology, the development of the discipline was organized into four steps.

In the first step, it was tried to insert the student in the context of the Information Systems. Initially, students were presented to the virtual environment that served as a technological support to the face-to-face mode. The knowledge of the environment provided them inserting at AVA, allowing them to work with the combinations of synchronous and asynchronous tools. One of the tasks that are worth mentioning was the publication of the life stories of each one on a blog of AVA, which were initially reported by students in face-to-face classroom, as the excerpts presented in Figure 2. This task was a phase of socialization, aiming at the improvement of the interaction between students and teacher.

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The first year (as every one should know) was very difficult. I
didn't know how to adapt to a large and crowded region such as
the metropolitan area of Rio de Janeiro. Traffic jams,
insecurity, rush, all this was new to me. I also had to learn
to live alone. The clothes had to be washed, the food had to be
made and the house had to be cleaned. And my mother was far
away (rsss). This, added to the difficulties which I had right
away in College (something  that was unheard of for me), and my
parents' expectations, made my first year be one of the most
difficult in my life.
-----------------------------------------------------------------
I live in Rio with my mom and sister. My parents have been
separated for 15 years. Family ties have also been divided. I
have a girlfriend and soon we will be 2 years together. We
usually meet every weekend, and when possible a short break
from the routine between Monday and Friday. We have a ritual of
watching the Simpsons every Sunday, going to the movies,
hanging out with friends, partying, etc.
-----------------------------------------------------------------
As soon as we arrived, my parents enrolled me in nursery school
and then, when I was in kindergarten III, I went to a bigger
Salesian school, where I studied until junior highschool and
made several friends, with whom I have little contact today and
miss them very much. In the meantime I had several activities:
ballet, jazz, volley, English and Computer Science courses.
-----------------------------------------------------------------
One of my passions is football. especially my team, Fluminense.
I hate Flamengo as well as all who are Flamenguistas. If it
plays against the team of Mars I will cheer for the team of
Mars. I like esoterism a bit, fantasy, mythology, and such, I
love idiot comedy films, I like the color green, number 4, and
stare at the sea without even doing anything. I'm a bore to
eat, I dont like to go out at night, nightclubes and such.
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Figure 2. Excerpts of life stories written.

In the second step the theme presented was Conceptual Maps as an aid for the learning of the fundamental concepts in the area. For the construction, students researched texts, watched movies and documentaries that dealt with these concepts, so that, arranged in pairs they collaboratively built the conceptual maps. The choice of themes was bolstered by a justification. Figure 3 shows a map built by one of the pairs of students.

In the third step, the students were organised into groups of 2 members to discuss about the development of the project of an article. This project consisted of a theme to be selected and a working methodology to be used by the group. This step was intended to provide the students with the opportunity to expose their ideas in a critical and reasoned manner, allowing their critical positioning in face of a situation-problem and, in the light of the theoretical background, be able to examine, analyze, and interpret it. For its development, students were based on a model containing the following items: definition of a subject,description of the justification for the choice of theme, determination of goals and fundraising bibliography (considering the rules of reference to the time of writing).

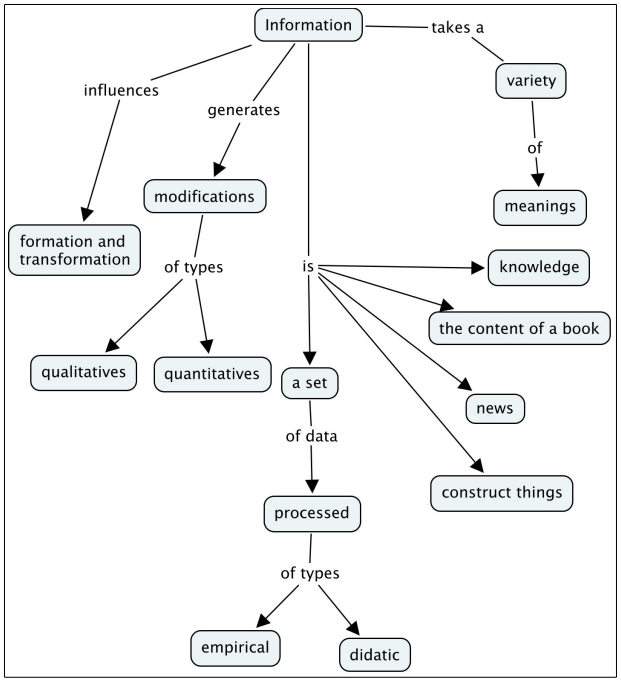

Figure 3. Concept Map constructed by one of the pairs of students.

Finally, the fourth step was the development of an article the model of which was determined by the teacher and accompanied periodically according to the presentation of progress made as well as the difficulties encountered. The end product was presented to the class on date scheduled by the teacher.

At all stages, the face-to-face and virtual modes were used, so that students could have met all of their questions in a timely manner. In addition to the software already described, pupils could also count on the support, in the virtual environment, of a trainee lecturer in the Master's Program in Computing of the Computing Institute of Fluminense Federal University, working as tutor under the guidance of the professor in the organization and preparation of teaching materials of the discipline.

The learning evaluation in the discipline consisted of process evaluation (which occurs during its development with the purpose of improvement of learning) and product evaluation (which happens at the end). To do so, behavior, productions and students' interaction were observed. In the list shown below a few examples of what was rated are listed:

- Considerations, reflections and issues identified on tops of lectures (classes), reading of texts, films, documentaries, etc., presented by the student during the class or on the platform.
- Student's active participation in the proposed activities, both inside and outside the classroom. (In the second case, detectable by demand of the student to the teacher or tutor in personal character or by platform).
- Quality of documents, articles, conceptual maps, etc., that were requested.
- Quality of presentation, being observed security, resourcefulness and posture demonstrated by the student in relation to the work.

5. Conclusion

The experiment concluded that the use of technological mediation in the development of the discipline innovated classroom education, by the possibility of improving the socialization of knowledge and the transformation of teaching, incorporating practices focused on networked communication and dialogue. The teacher who uses AVA becomes a multiplier when he passes to another teacher how much it is advantageous to mediate the face-to-face teaching with technology.

The use of conceptual maps was effective insofar as the students built the body of knowledge about the Information Systems area, which was the purpose of the course, since it is an introductory discipline. It was also important to make possible the elimination of the simplistic process of written tests, evaluation method that reduces the ability of interaction and that leaves out important aspects of the effective student learning.

It is important to note that the method of evaluation used was more effective than the traditional method characterized by application of two tests and an additional verification. In evaluation which requires the student's ability of memorizing the entire contents of a discipline presented in just over 4 months of classroom, it is not possible to assess the resourcefulness in speech, the surety of knowledge, how knowledge is constructed and understood. These and other issues can only be observed through the use of process assessment in conjunction with the product evaluation. The use of conceptual maps is a good alternative in lieu of written tests, since it is possible to observe the acquisition by the student of the major concepts presented and the understanding of the relationship between these concepts.

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