DESIGN, DEVELOPMENT AND IMPLEMENTATION OF A NEW TEACHING-LEARNING METHODOLOGY SUPPORTED BY TECHNOLOGICAL RESOURCES: A STUDY CASE

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C – Methods and Technologies
3 – University Education
B – Description of an In-Progress Project
2 – Innovative Experience

Abstract

The competition between private higher education institutions and the pursuit for improving the quality of education increased the use of technological resources applied to education. This article aims to present a teaching methodology supported by technology and interactivity that is being applied in traditional education in a private university in the Northeast, using as support tools to teaching-learning academic guides and educational portals. To conduct this research the whole experience of the methodology's design and implementation process was recorded, as well as the gathering of information through literature and documentary research, describing it as an action research. The results of this research can be considered as: a) the contribution to the valorization, organization and optimization of the study time of students; b) the leveling of the quality of the content used by teachers; c) the diversification of academic activities with educational gains to the process of teaching-learning in the development of skills and competencies for the professional of the 21st century.

Keywords: Education, Technology, Interactivity.

1 INTRODUCTION

In the last decade, in reason of the favorable environment in the politics and economy of Brazil, the area of higher education had great growth, particularly the private institutions. The private HEIs today face a very big competition, fact also noted in the Northeast and specifically in Natal/RN, where the number of HEIs increased by more than a dozen in the last 10 years, according to the Ministry of Education (MEC – *Ministério de Educação*).

According to Rosa (2001) the private HEIs are in an upward evolution in the national economic market, becoming not only organs of education focused on the academic and administrative practices, but also organizations with a an economically viable view. This competition highlights the competitiveness, the need for quality, the diversity of services offered, the diversified demands and other necessities for their stay in the market.

The expressive technological developments has also reached the HEI in its service management, as well as, in the way of teaching and are demanding technologies, management and support tools for the education, compatible with this new form of relationship with the market and its customers. The HEI are in the pursuit of a competitive advantage, researching and providing new methodologies and techniques for teaching-learning, where it is possible to achieve a more dynamic and interactive education. The technology has been of fundamental importance for achieving this goal, but there is the difficulty of integrating technology, with good educational projects, mainly because of the speed of technological advances, where academic efforts are needed to understand the best way to use them, either in terms of teaching or learning.

In search of competitive advantages, the HEI object of this study is making use of technology in their traditional education, creating a new methodology, supported by technology and interactivity, which offers students and teachers support tools for teaching-learning, such as: **Academic Guides** – condensed content of each discipline of the Law and Business Administration Courses that give a full picture of the universe of issues raised in each topic, besides it guides the students to the virtual space, through links at the end of each topic, leading them to specific content, exercises, cases and so on, and; **Educational Portals** – capable of meeting the demands of the whole community, professionals, teachers, students and/or anyone with an interest in topics in these specific areas.

2 EDUCATION AND TECHNOLOGY: challenges

Technology has had intense participation in the life of man over the years, since the Industrial Revolution, with the advent of the steam until the present day, with the most modern innovations in computing. The introduction of technology on humanity has brought huge changes in the social and cultural context, affecting organizations as well as personal life, with changes in attitudes, habits and ways of thinking. All this revolution challenged the Education to assimilate technology in its context, mainly forming individuals able to interact and take advantage of these new tools, adding them to their professional career.

Belloni (2003, p.53) says that one aspect is paramount in the analysis of the relationship between technology and education, the certainty that the use of technology (in the sense of a technical artifact) for the promotion of teaching

and learning needs a broader discussion of its use, “in the sense of knowledge embedded in the artifact and in the context of their production and use”. About Education, Belloni (2003) says that it has a complex historical process and that it uses the mediation of any kind of means of communication as a complementary or support tool to the interactive activities between teachers and students. The author also cities that “the classroom can be considered a ‘technology’ in the same way as the blackboard, chalk, books and other materials are educational tools (‘technologies’) that mediate between the knowledge and the learner”.

Moran (2008, p. 05), in his article entitled “Innovative teaching and learning with technology“, explains the changes that will occur in traditional education with the increase of technologies. The author explains that humanity is heading towards a “less centralized management, more flexible, integrated” and with different administrative structures (smaller, with greater participation of teachers, students, parents, community in the administration of the educational institution).

3 NEW ROLES OF STUDENTS AND TEACHERS

Belloni (2003) emphasizes that to live this new reality the teacher will require considerable upgrade in the specific scope of their discipline, as well as of the new teaching methodology and new technologies. The author confirmed that the role of the teacher is fundamental for the success of both the traditional and distance learning educational process. Blandin apud Belloni (2003) explains that multimedia training exhibits a new way of acting in the scenario of education.

Renner apud Belloni (2003, p. 81) says that the transformation of the educational process “of the teacher to the learner, from teaching to learning” needs to be done in a conscious and studied way, favoring “the creation of new methods for the work of teachers, innovative more appropriate practices to the characteristics of the learners and the social change, therefore more effective”.

As for the communication process, Moran (2008) says that they have a tendency to become more participatory and that the relationship between the teacher and student will be more interactive. The author also comments that “the important thing is learning and not imposing a single standard of teaching”. Moran (2008, p. 06) mentions that there will be a greater integration between the technologies and the methodologies for the oral, written and audiovisual work, complementing the citation that it will not be necessary to “abandon the already known ways of the telematics technologies, only because they are hot” , just integrate the new technologies to the ones already known. These technologies will serve as the mediation process that will facilitate the way of teaching and learning in a participatory manner.

4 EVALUATION OF THE CREATION OF EDUCATIONAL SYSTEMS

To evaluate the creation of educational systems (courses or educational programs) most organizations follow the guidelines set by the Instructional Systems Design – ISD, which emerged after the Second World War, with the need to create a more efficient training during the war period. The product has several theoretical perspectives in relation to learning and teaching (MOORE and KEARSLEY, 2007). The stages of the educational design involve: analysis,

formulation, development, implementation and evaluation. In the analysis stage of the professionals involved in the creation process should conduct assessment of the task, function or content (academic), and identify the characteristics of students and the learning environment, understanding what students need to know. In the formulation occurs the articulation of the students' performance with the required learning goals. The professionals in this stage will analyze what students need to learn and in what way this learning will be demonstrated throughout the course. In the development, those responsible for elaborating the design and production elaborate the instructional materials that show what is necessary to achieve the learning goals. These materials can be: "web pages, movies, study guides, books, tapes and teleconferences" (MOORE and KEARSLEY, 2007, p. 109). The teachers and staff involved in this stage may require training. In the implementation is the moment of contact (interaction) of the user (teachers and students) with the materials of instruction. The activities that take place in the evaluation include: continuing testing and classification (training). This evaluation also includes the effectiveness of materials and specific procedures of the course. The results of this formative assessment can influence the procedures of analysis, design and development, but mainly the stage of implementation. All of this leads to improvements in all phases of the proposed model.

5 RESEARCH METHODOLOGY

The article was classified as an action-research, that according to Thiollent apud Gil (2002, p. 55) can be defined as:

> a kind of research with an empirical basis that it is designed and carried out in close association with an action or with the resolution of a collective problem and in which the representative researchers and participants of the situation or the problem are involved either in a cooperative or participatory way.

The method applied in this article was the study case. For Santos (2002) the study case is a thorough and comprehensive study of one or a few objects, enabling its broad and detailed knowledge. Goode and Hatt apud Ventura (2008) say that the study case is a way to organize data, maintaining the unity of the studied object. Stake apud Ventura (2008, p. 384) complements saying that a case is "a specific unity, a defined system whose shares are integrated". Yin (2001) says that this type of study is an empirical question that investigates a contemporary phenomenon with its real life contexts, when the boundaries between phenomenon and context are not clearly evident, and where multiple sources of evidence are used. As aspects observed in this article, the study of a unit bounded and contextualized.

For the construction of the theoretical reference, a bibliographic survey, which in terms of technical procedures can be performed through bibliographical and/or documentary material, was used. Facchin (2005, p. 125) states that bibliographical research is a "set of human knowledge gathered in books". Its main goal is to "lead the reader to a particular subject and provide the production, collection, storage, reproduction, use and communication of the

collected information for the performance of the search". (FACHIN, 2005, p. 125)

Gil (2002) cites that the documentary research includes documents that did not receive any analytical treatment, exemplifying with the documents held by public entities and private institutions, research reports; companies' reports; statistical tables and other.

6 METHODOLOGY SUPPORTED ON TECHNOLOGY AND INTERACTIVITY

This methodology supported on technology and interactivity is being applied in a private university in the Northeast. This process went through a logical sequence of steps outlined below:

6.1 MOTIVATION

6.1.1 Differential: The current scenario of higher education in Brazil, due to the number of private HEIs, has a fierce competitiveness that leads to a flood of marketing actions that disclose differentials, which actually, are very similar. Thus, concrete actions that result in benefits to the academic community, capable of promoting, in an impressive way, a real significant differential in the provision of higher educational courses were thought up.

6.1.2 Training more effective professionals: The proposed methodology aims to achieve a more consistent job training, so that the student can reach the labour market better prepared, with the intention of facilitating their integration, increasing the employability of the graduates.

6.1.3 Modernization of teaching-learning: In general, the practice of teaching-learning on a day-to-day provision of courses is far from the technological reality of the students and teachers experience in their personal and professional relationships. These characters, in their everyday, are immersed in activities supported by modern technology facilities that allow the very opposite of what usually is practiced in the classroom. The methodology quoted comes with the proposal to minimize this distance, without causing discomfort or embarrassment to those involved with its use which have technological limitations, since it is based on the foundations that promote a systematic organization of a provision of content and tools to prioritize the didactic and the easy use, encouraging its use.

6.1.4 Semi-presential activities, complementary activities and clock hour: All actions done by the students are recorded by the system that controls the portal and are made available through reports. This way, these activities can be counted as semi-presential activities, corresponding to the 20% permitted by the Ministry of Education (MEC- *Ministério da Educação*), with the potential to answering a possible need to offer the courses, referenced to clock hours, or as complementary activities, which together with trainee programs, also correspond to 20%.

6.2 FEATURES

6.2.1 Not invasive: The design of the project followed the reasoning that in higher education, so that a methodology is well accepted by teachers, it is necessary for it to be simple to use, to provide very explicit benefits and for the teaching material to have quality. But, also, it is necessary for it not to be invasive. So it does not require them to reformat their daily-life practices, subtracting from them the freedom to conduct their classes. The teacher must perceive this methodology as a valuable support, naturally increasing the

interest for its use, as they understand it is not a treat to their freedom on how to conduct their discipline, and that actually this will significantly minimize their efforts in terms of class preparation.

6.2.2 Modern and Innovative: During the development of the methodology, something truly modern and innovative capable of revolutionizing the practice of higher education, was strived to be created, giving more consistency to the vocational training of students and continuous valorization of the graduates. The systematic organization of the content supported by modern technological means, although simple, presents itself as a differential educational resource for the higher education.

6.2.3 Time Value: The methodology developed subtracts, significantly, the time that students and teachers spend in the search for content, allowing its conversion into more study time.

6.2.4 Support to the graduates: The student, even after the completion of the course, continues having access to the resources made available by the methodology, which continuously prepares them for a better placement in the labour market.

6.2.5 Integrity of the information and the didactic organization of the content: Due to the current reality, in which the internet user has access to an excessive amount of information without having guarantees of the integrity of such content, the project was based in two pillars: 1st) Only carefully chosen content with integrity and that truly provide benefits for the construction of knowledge will be available on the portal. 2nd) Format the organization of the content for each discipline, dividing them into “essential” activities and “advanced” activities. The first field, “essential activities”, provides content classified as necessary for a consistent study. In this case, the amount of content was designed so that a student, with reasonable effort, can explore the entire universe of information in a timely fashion to keep up with the pace imposed by the teacher of that discipline. In the case of the “advanced activities”, the methodology makes available ample content, since the users, who access this field, probably, will have availability of time in addition to interest.

6.2.6 Collaborative and interactive: Based on the certainty that the internet users are changing their profile, increasingly wanting to give their personal opinion, some mechanisms capable of meeting these needs where provided, allowing students and teachers to participate, in a collaborative manner, contributing to the maturation and enrichment of the content. These mechanisms are: a) students and teachers can publish scientific articles on the portal as well as custom attach comments to the news and scientific articles; b) teachers have access to a content-management tool that will enable them to create and promote the maintenance of individual “blogs”. This content, available to all users, can also be reviewed by them. c) The availability of tools such as forums, institutional and between institutions chats, and also, an specific space to send questions of an academic nature, to facilitate the interaction between students, teachers and guests.

6.2.7 Dynamic and diversified: The methodology, in question, provides content on the internet. Thus, its update can be constant and immediate, just amending them as necessary. This way, all users have the information updated

and diversified, in order to meet the needs of the professionals and the academic community in each area.

6.2.8 Applicability: The methodology is designed to be applied in traditional courses, but also offered in courses from a distance. For its use in traditional courses, the methodology presents itself as a support resource. In case of from a distance courses, additional teaching resources are needed to be created.

6.3 DESCRIPTION OF TEACHING METHODS

The methodology developed consists in an academic guide for each discipline that provides content plans for them, in a condensed way. Each guide is linked to a group of links, called “academic links”, which direct the user to a portal, developed specifically for a course using this methodology.

This systematic organization of contents, listing for each discipline, academic guides, academic links and a web portal, allows students and teachers to have access to a broad universe of information, carefully selected, that value in a significant way the provision of higher education courses, and consequently the professional training of the students. Below, the description of the three pillars of this methodology.

6.3.1 Academic guides: Printed material in a graphic, with high quality that contains a summary of the contents of each discipline. The contents in each guide are divided into chapters, which present at the end an “academic link” capable of guiding its readers to the website, allowing access to a range of information that expand the scope of the content discussed in the chapter.

6.3.2 Academic links: Each academic link is available at the end of each chapter of the guide, directing the student to the portal that provides, through a standardized structure, specific information related to the contents addressed in the corresponding chapter. For each academic link, the organizational structure follows a pattern that aims to standardize the reasoning of the users of this methodology, facilitating its use. The content presented in the academic links are divided into essential activities and advanced activities. Bellow an example of a standard structure of content organization developed for the Law Degree is described. It is good to point out that all the items present bellow are related to the content presented in a single chapter of the guide.

Essential activities: Legislation (allows, in a simplified form, the access to all legislation corresponding to the matters addressed in the chapter); Doctrine (for each chapter, doctrines that illustrate the theoretical concepts relating to the chapter themes; Jurisprudence (provides access to cases that exemplify the practical reality of the matters in question); Practice (depending on the nature of the discipline, a few legal pieces are provided, exemplifying the models practiced); Transversal themes (which provide articles written by professional of other areas that enable students to see the same topics addressed in the chapter with the point of view of a different profession; Essential exercises (for each theme explored in each academic link, objective questions that were used in public legal contests or in examinations of the Brazilian’s Advocates Order (OAB – *Ordem dos Advogados do Brasil*) are provided. This way the students can test their knowledge of the issues discussed in that chapter, with automatic correction in the portal providing feedback. The results of each student are available in specific reports); **Advanced activities:** content and exercises with a greater degree of complexity.

6.3.3 Portal: The portal is a content management system with diversified information and tools. The information provided is carefully chosen aiming to cover the entire universe of knowledge in which the course is inserted. The portal is designed to meet the academic community and the legal professionals of the area, already inserted in the labour market. The structure developed for the portal of the Law Degree was used as an example.
a) For the professionals in the legal area: News; scientific papers; Brazilian's Advocates Order (OAB – *Ordem dos Advogados do Brasil*) public biddings; contests in the legal area; legislation; cases;
b) Academic community: Edit profile; academic links; place to send academic questions; forums; chats; tests with online correction; leveling; videos on demand; contact us.
6.4 TAKEN ACTIONS
6.4.1 Project design: Driven by the intention of creating something new which could, in fact, cause a significant impact in the provision of the higher education courses, several trips to HEIs in evidence throughout the country were made, seeking to see the differentials practiced by them. The objective was to develop a methodology that could subsidize the provision of higher education courses with educational resources and technological tools that could enhance the teaching-learning relationship, promoting a significant contribution in the training of the students.
6.4.2 Development: For the development of the new technology, a group of 30 professionals was necessary from the education and technology areas, responsible for the development, update and maintenance of the content in the portals.
6.4.3 Implementation: The process of implementation of the methodology was designed to follow the steps of: training, monitoring, evaluation and feedback. **a) Training those involved:** the training of students and teachers were held at different times. The methodology was presented and made available to the directors and teachers of the courses the first day of the academic planning week, in which the teacher plans the content of the discipline for the next semester, developing the educational plan and schedule, allowing the use of this methodology. As for the students, training over the first few weeks of the 2008.2 semester, through the presentation of the methodology and the technological online resources, visiting each class in their own room, during the classroom hour, in the presence of the teacher. **b) Monitoring:** To promote the monitoring of the methodology use, the following steps were necessary to be taken: b.1) Developing a support structure: a support structure for students and teachers was developed to centralize the services for its users. The structure consists on an institutional e-mail created to analyze and forward criticism, suggestions, descriptions of problems and praises sent by the users. b.2) Continuing Training of the users: A structure of continuing training was developed to make possible for questions about the portal to be answered, through a phone call or in a face-to-face manner. A tutorial available on the web was also provided, which explains the methodology, as a complementary action to the continuous training of the users. b.3) Provision and analyses of access reports to the portal: The portal is able to monitor and record the users' access, during the whole time they are online, and also show the history of the excises they do. This way, any and all actions performed by students and

teachers in the portal, are registered and can be made available to the users and those responsible for implementation. b.4) Visits to the classrooms: Throughout the semester, with the help of the course directions involved, visits to the classrooms where made, to identify with the students the acceptance of the methodology with the students and teachers. b.5) Teachers meeting: During the academic semester, taking advantage of the previously scheduled meetings between the directions and the faculty, items about the implementation of the methodology were added to the agenda. b.6) Meetings between the Rectory and everyone involved in the implementation of the methodology: Specific meetings with the participation of the Rector, the course Directors that use this methodology, the team from the Distance Education department, the faculty and all other staff involved were done. At each meeting, usually once a month, a report showed the most relevant data collected during the monitoring actions mentioned in the previous items. Then, a summarized action plan was made, listing the actions, deadlines and the respective people responsible for these goals, which allowed the direction and monitoring of the next steps for the whole team, during this process. **c) Evaluation:** An evaluation mechanism that uses online "evaluation instruments" was organized using a system developed by the "Standing Committee of Evaluation" (*CPA – Comissão Própria de Avaliação*), capable of collection information from students and teachers and generate numerical and graphical reports. These instruments were programmed to be applied in two different periods during the academic semester, so that the students and teachers answer, necessarily, their specific forms. The reports generated from each application of the evaluative instruments are scheduled to be distributed to all involved in the process. **d) Feedback:** Due to the results of all the actions described, mainly the evaluative process and systematic meetings with all involved in the implementation process of the methodology, the necessary adjustments were defined, planning short term and long term goals, aiming greater efficiency and effectiveness in achieving the expected results and the success of this venture.

7 CONCLUSION

It is known that the implementation of technological resources in higher education, although nowadays has a favorable current scenario, constitutes itself as a task of great complexity, given the need to create a distance education culture, in a context where there is an emphasis on the figure of the teacher and the presential aspects of the classroom. It is also necessary to establish the choice of the content, its ordination, presentation, update and forms of use in a very delicate manner. However, seeing the level of satisfaction in this beginning process of the study case, it appears that the steps described, planning and continuous evaluation of the process were fundamental to the success of this project. Further studies should be developed so that more consistent results can be achieved, for example, the use of proposed activities in the described methodology to add to the curriculum of the clock-hour. In this stage the methodology can be considered to: a) contribute to the valorization, organization and optimization of the study-time of the students; b) level the quality of the content used by teachers; c) diversify academic activities with educational gains for the teaching-learning process in the development of the skills and competencies for the professional of the 21st century.

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