

VIRTUAL TECHNIQUES APPLIED TO THE EDUCATIONAL PROCESS – AN EXPERIENCE THAT WORKS

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Abstract. Nowadays, engineers face the challenge of continuing training to keep up with the technological development as one of the ways of guaranteeing their competitiveness and keeping their place in the market. Thus, the challenge of such option falls on the compromise to form multidisciplinary teams involving technologists, managers, evaluators, producers of instructional material and specialist teachers. The application of new educational process paradigms forces professionals to use technological means in the new instructional projects focusing the whole process on: enabling the student “to learn how to learn”. Therefore, the Distance Education of the Federal University of Itajubá has been developing a project to motivate teachers, offering them the possibility to experience this virtual reality. The premises and difficulties relative to this initiative will be described in this paper, as well as the techniques used in such implementation.

Keywords: Virtual environment, Implementation strategy, Distance education, Paradigm change

1. Introduction

The interaction with the technological developments enables the new generations to deal routinely with all of this technology. It is already a part of this culture the well-known intelligent and interactive electronic games, the Internet, computational programs, satellite information, cable TV, robotics, just to name a few. We can highlight, among these development, the so called communication and information technologies very applicable and necessary to the educational field. Thus, it is in this context that youngsters get to the university thirsty for information and with a certain level of demand. On the other hand, this same technology, when required, makes available resources that aid teachers in transmitting knowledge in a more attractive, motivating and interactive way, transforming the student into agent of his/her own learning.

The Distance Education (DE), according to Decree 2494/1998 (which regulates article 80 of the *Lei de Diretrizes e Bases* 9394/1996) is defined as: “A form of teaching that enables self-learning through teaching resources systematically organized, presented in different support of information, used separately or combined and diffused by the different means of communication”.

Lévy (1993) places DE as a teaching modality, which explores certain techniques favoring the emerging of a new style of pedagogy, at the same time it favors personalized and collective learning in network. The teacher becomes an animator of the intelligence instead of supplying direct knowledge. It is necessary to understand that it is not enough to have the technical control of the content or even of the media, but also to invest in pedagogical issues that meet the didactic requirements to involve completely this new virtual student.

2. History of the DE of the Federal University of Itajubá

The Distance Education of the Federal University of Itajubá began its activities in December 2000, with the nomination of its coordinator Prof. Lucia R. Horta Rodrigues Franco representing the institution at UniRede – Virtual Public University of Brazil. From then on, the first actions were aimed at the elaboration of a cooperative project, which was submitted (and later approved) to the Fundo Setorial Verde-Amarelo, where 10 technology teams from different teaching institutions (UFV, UFMG, UFSC, UFPR, CEFET-PR, UFRJ, UECE, UFPA, CEFET-RS and UNIFEI) got together to stimulate the implementation of distance education networks aimed at the technological education for innovation. Its objective was to check the regional and sector's needs and to assess the capacity to offer courses in terms of the educational technology available in Brazil, as to direct the following national governmental actions in this methodology. The project *EDUTEC - Rede de Educação Tecnológica para a inovação: análise das demandas, competências temáticas e tecnológicas a distância* was implemented from January 2002 to January 2003. One of the main measures of this project was the implementation of the DE infrastructure in each participating institution. As a

first initiative, the group searched for information on platforms to manage the DE courses and during this experience took part in many courses offered by institutions and companies using different platforms. As a result, it was possible to assess the indispensable characteristics of these platforms and their relative costs, as well as the whole theory related to the didactic-pedagogical change of this new methodology. From this point on, the chosen platform was TelEduc, developed by the NIED – Núcleo de Informática Aplicada à Educação of UNICAMP. This platform was then installed in the institution. A team was in charge of understanding it in order to give support to problems of users' access and other versions updating. With actions coordinated by the management of the institution and by the coordination of the project, it was implemented the current room of the DE containing electric installation and network, the equipment paid by the EDUTEC project (microcomputers, server, switch, no-break, air-conditioning, printer etc.) with the free software of the LMS- Learning Management System TelEduc (responsible for the viability of all of the management of the virtual or traditional courses with the support of virtual resources offered through the Internet by the institution, internal and externally) and all of the necessary furniture. It was then created the site www.educacaoadistancia.unifei.edu.br. The human resources involved in the activities during the implementation of the project were paid for by CNPq through RHAЕ scholarships. The training of this group reached a point that, nowadays, open tools are being developed and made available to TelEduc and other partners.

With this platform defined and installed, the group focused on teacher training. At this moment, the greatest difficulties sprang: the association of the old correspondence courses with the DE methodology and their poor results. This association led to an instant aversion to the subject by those teachers worried with the quality and results of their courses. The lack of interest hindered many times even their participation in the discussions of the theme. To convince them about the viability of offering a good quality distance course was the greatest barrier.

Already at that time, the Directive of the Ministry of Culture and Education 2253 of October of 2001 (currently replaced by 4059 de 10/12/2004) gave incentives to the Institutions of Superior Learning to gradually introduce in their pedagogical and curricular organization courses, in part or as a whole, that made use of the non-present method including methods and practices of teaching-learning that would embody the use of information and communication technology. This directive was the first incentive for teachers to search for new paths in this direction, although they did not know anything about it or did not feel totally at ease with this modality.

Thus, it became the final objective of the project offering a course to higher education public institutions of the country (sponsored by the project itself and for free for the participants). The course was given totally through the Internet, for 40 teacher trainees from the institutions involved (two participants per institution) and consequent transmission of the methodology called "Virtual Environment Training for DE". The success of the course motivated the continuity of it being offered through the Internet as an extension course. It has been taught, up to now, to 15 classes, with students from Brazil and abroad.

Many traditional and distance courses have been given by the DE group to teachers and those under their supervision interested in the development of the virtual didactic material. It should be noted that the teachers who attended the course as students prepared their own courses afterwards and still now are committed to preparing quality virtual material.

Later on, besides giving support to the new courses through the installation, updating and management of the TelEduc environment, the team also developed material for the courses of Teacher Training. Priority was given to the diffusion of this methodology in the institution.

In July, 2004, the DE team of the University promoted a Workshop on DE via WEB with many lecturers, renowned external guests and also guests from the institution itself who reported enthusiastically their experience with the new adopted methodology.

3. Paradigm Change

Researches carried out proved that in order really profit from a course, some premises should be adopted. According to the National Training Laboratories, it was observed that a percentage of what one absorbs of knowledge is related to the way it has been transmitted, resulting in the following list:

- 5% - through presentation (the teacher or lecturer speaks and the person in question hears);
- 10% - through reading;
- 20% - through a multimedia resource;
- 30% - through a demonstration;
- 50% - through Group Discussion;
- 75% - through practice;
- 90% - through the exposure of the content elaborated by the person interested him/herself or by its immediate application.

It is the roll of the teacher to relearn the best and easiest form for the human being to learn.

The transition of education from a traditional to a virtual environment requires a good didactic planning able to build solid and reliable relationships through the involvement student-teacher ((Vaccaro and Viali (2003)). Actually, the didactic-pedagogic principles are the same for DE as well as for traditional teaching, even though they have developed

greatly over the last few years. However, a course given in the DE virtual modality requires much more care and should follow special criteria. To make students sit in a classroom attending a traditional class looking at a teacher is traditionally easy, even if thoughts completely different from the class content are going through their minds. The presence in 75% of the course load is mandatory, so the student is physically present but not always his/her mind and reasoning are tuned in what is being presented. However, to keep a distance education student (probably at home, next to the TV, bell and/or telephone ringing, with the sounds coming from the streets or even made by neighbors or their own family members at home etc) reading a continuous content that is not interactive in the computer screen for more than ten minutes is certainly impossible. Thus, the virtual environment should offer condition for the interaction to supply the necessary dialog for the development and continuity of the process, without unmotivating the student. The learner should be stimulated to become agent of his/her own learning process acquiring new attitudes, postures and taking responsibilities. The teacher should be a facilitator of the learning process so the student, by him/herself, builds his/her own knowledge.

The instructor should then: reinforce the classroom content; suggest complementary readings, optional or not; follow up and evaluate the student's performance in a personalized form, clearing any doubts the student have, whether they have been directly asked or have been identified by the teacher. All of the outcome of the course will be associated with the learner's participation. To motivate the class through interactivity and more attractive material is a challenge for the teacher.

Whenever possible, the instructor should lead the student to the construction of his/her knowledge, planning activities to sediment what has been learned. In order to make the course more dynamic and to entertain the students, the teacher should mix multimedia resources, propose a discussion among students or groups, make use of digital movies, propose the elaboration of a presentation by the students on a theme etc. The process will only be positive if those involved are open to changes and innovation.

The advantages of the use of this teaching methodology the following should be mentioned: the speed knowledge is spread by DE, reduction of training time compared to traditional courses (especially if classes are large and students are not focused) and, finally, more people can benefit from the course with the same investment and resources of those taught traditionally. Another important factor to be taken into account is the flexibility of the schedule to be devoted to the course. Each individual has this own cognitive style, learning rhythm and necessities that should be taken into consideration and be respected according to Carvalho and Scheer (2003). The DE allows for this flexibility and the teacher should provide the content in a variety of ways taking into consideration these different profiles.

4. Implementation Strategy

To break the barrier imposed by teachers to change their courses in order to be used at DE, nothing better than the demonstration of the material from other courses and their good results. This was the strategy used then by the group in charge for the implementation of DE in the institution. Many tools started being elaborated to aid the creation of the multimedia material, enabling the use of links, dynamic figures, sound, exposition on video, exercises with automatic evaluation etc. Appearance was valued (but never forgetting that content is the key point). Everything is presented and worked in a very attractive way to keep the students interested.

Although other courses of continuing education had already been made available by the team for the community, as a strategy to diffuse the DE modality among other teachers, the first course "Virtual Environment Training for DE" was created. This course was taught totally on the Internet for teachers wanting to know more about this new modality, in a concentrated form every weekday for four consecutive weeks. The major interest came from teachers of outside institutions, and only a few teachers from the institution took part. The outcome of the course was so good that, since the first class, every 45 days a new class has been formed in the national market. Thus, this started to call the attention of newcomers inside the institution and as each class graduated, always a new teacher would get involved and offer part of the material used by him/her in the traditional classes. Some of these teachers, having identified themselves with the methodology, became members of the team and are currently working actively to the spread and development of DE inside and outside the institution. On the other hand, the faculty itself that has the opportunity to take part in a course containing some topics developed by DE has enjoyed it and, many times have wondered why many have not yet adopted this methodology.

As an immediate positive result, there is the award of a prize to one of the courses elaborated inside one of the tools developed by the team – our digital textbook – in the contest PAPED 2003 – *Programa de Apoio e Pesquisa em Educação a Distância* of CAPES. This course was elaborated for the discipline "Economic Engineering" taught in the undergraduate level.

From the positive analysis of the results, new courses have been planned and elaborated, allowing theoretical and practical improvement through the gradual construction of knowledge. However, without any doubt, the course strategically chosen to be the cause of these changes was carefully planned to reach the main goal: to show how active techniques directed at the student and technologies promoting interaction can lead to a better performance.

During this year of 2005, a Concentrated Program for DE Training in the institution has been designed and three courses are being offered (in sequence for a better pedagogic performance and assimilation of the content).

The first course, “Virtual Environment Training for DE”, with a total load of 40 hours, aims at introducing the person in question to the virtual environment, teaching him/her to navigate through the tools responsible for creation, production and management of the distance courses. With a team of instructors attentive to each participant, the motivated student experiences this methodology and moves on to elaborate his/her own virtual course.

The second course, “Planning an DE Course for the WEB”, with a total load of 30 hours, aims at informing the participant about the theoretical basis of DE; presenting some didactic methods for the construction of knowledge; discussing the learning process and its challenges; presenting the laws, directives and decrees that regulate Distance Education in the country as well as other laws applicable to DE copyrights and, finally, leading the participant to the detailed planning of this virtual course – many students rework the virtual course elaborated in the first course offered, adapting it to the new concepts learned.

The third course, “Developing Courses for the WEB Focusing on the Learning Process”, with a total load of 30 hours, presents the theoretical and practical aspects of tutoring, vital for the active participation of the student during virtual courses. It is discussed the importance of the multimedia material choice, individual and group strategies applicable to DE, multiple intelligences, the different learning styles and their consequences in the elaboration of a plan (always with the supervision of the tutors and instructional designer). It is important to note that the participant can rework once more the plan of this course, elaborated in the previous course, so he/she can apply new concepts acquired in this new course.

5. The Courses

The courses are monitored in the learning environment TelEduc. The tools allow for interactivity and are easily handled; among them, it is worth mentioning: “Support Material”, “Readings”, “Schedule”, “Activities”, “Chat”, “Discussion Forum”, “Mail”, “Logbook”, “Exercises” and “Notice Board”. The course planning had the objective of enlarging the horizons of those experiencing this modality for the first time. From the evaluation of the courses previously offered, experience was acquired and the team identified that the greatest difficulty for the participant was how to manage his/her own time. The idea of a flexible schedule in DE leads to a false premises that the student can do the course whenever he/she is free or wants to. To be organized and not leave things for the last minute is vital for the good performance in the course and for the gradual construction of knowledge. For a better synchronism among all participants, a fix schedule was adopted, made available everyday, with a few activities and set due dates. Situations that required the active participation of the student are proposed providing cooperative environment of knowledge construction.

The learner is told at the beginning of the course that in the evaluation of his/her performance it will be taken into account his/her synchronism with the class. The instructors make use of the tools “Intermap” and “Access” to evaluate the student’s participation, assiduity and interactivity.

As to standardize the material presented in the courses of the Federal University of Itajubá, it was developed a Digital Textbook by the DE team of the institution and made available in “Support Material”, according to Fig. 1.



Figure 1. Digital textbook developed by the DE/UNIFEI team

Some screens will be presented in relation to the *Concentrated Program for DE Training*.

Figure 2 shows one of the screens of the first course “*Virtual Environment Training for DE*”.



Figure 2. Schedule of the course “Virtual Environment Training for DE” – Class 15

Figure 3 illustrates one of the screens of the course “Planning an DE Course for the WEB”.

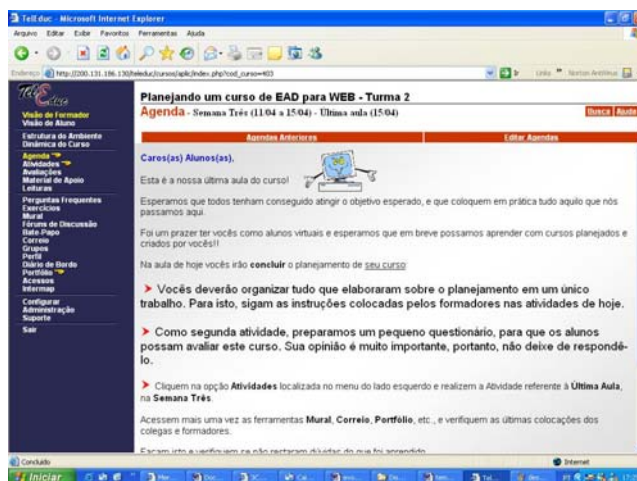


Figure 3. Schedule of the course “Planning an DE Course for the WEB” – Class 2

Figure 4 shows one of the screens of the third course “Developing Courses for the WEB Focusing on the Learning Process” and Fig. 5 illustrates the growth of all of the DE courses offered by the University since 2002.

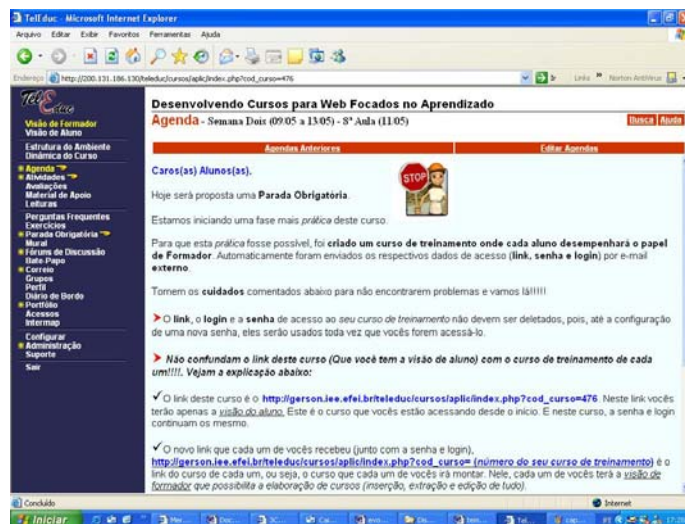


Figure 4. Schedule of the course “Developing courses for the WEB focusing on the learning process” – Class 1

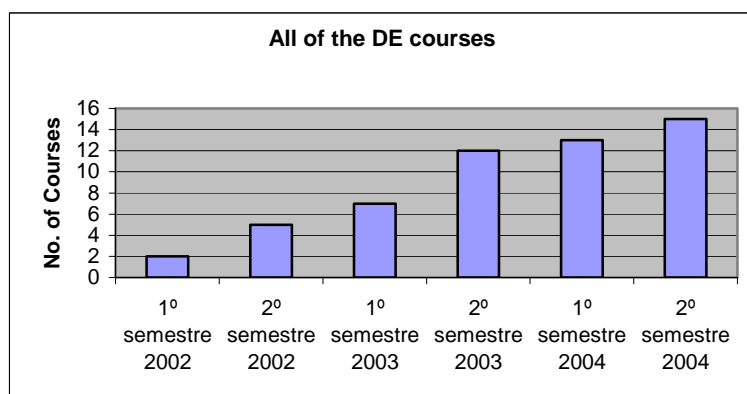


Figure 5. Graph on the number of courses offered by the DE of UNIFEI

6. Final Considerations

The DE modality is currently being diffused, not only as a form to reach a greater audience but also those who are far away from centers of excellence. Technology has developed fast and we need to pay attention to this important fact. Professionals have to be able to build knowledge because, after leaving a higher education institution, their knowledge might be already detached from reality. Thus, the teacher must be updated, keep the content of his/her course available in the simplest way, keeping up with the developments. There is no more space and time barriers, information may be as close as a click in the link of a browser. The job market looks for professionals with the power to lead, able to relate to everyone, with a cooperative spirit, with the ability to work and to make a difference.

It is a hard task to: acknowledge that it is time to change; to find new ways of directing the students so they can walk by themselves; to reformulate the traditional courses; to apply them to a virtual modality reaching satisfactory results. The success of this modality of education will occur when both parts, the elaborator of the course content and the student, have the courage, curiosity and are apt to face these challenges.

7. Acknowledgements

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