

A Course of Teaching Qualification: The Search of an Innovator and Flexible Form of Teaching and Learning

José NICOLETTI FILHO

Rubem Mário Figueiró VARGAS

Marilú Fontoura de MEDEIROS

Pontificia Universidade Católica do Rio Grande do Sul-Av. Ipiranga 6681 Prédio 30 – FENG Porto Alegre RS, CEP 90619.900. e-mail: nicoletti@puers.br, rvargas@puers.br, marilu@puers.br

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ABSTRACT: *In this work, a course project of teaching qualification is presented, which intends to get up to date of Engineering Faculty (FENG) professors of the Pontifical Catholic University of the Rio Grande do Sul (PUCRS) based on the change of position in the meaning of dealing a new pedagogical propose tied to reorganization curricular process in the related College. Inserted in the FENG strategical planning, this project considers to deal to created demand, which is to model and to make available, of increasilly form, virtual environments of learning in the presence education of the Engineering Courses using other technological and techno-pedagogical resources in daily work of teachers dedicated to presence modality, aiming the improvement of conditions and quality of teaching and the learning in the Institution. The project was created in partnership with the PUCRS VIRTUAL, academic unit responsible for actions in University distance education, to promote the qualification of professors in the sense of virtual culture instauration like a form of support to the presence modality of teach-learning. It is grounded, in such a way, in a bigger project of curricular reorganization of the diverse courses of PUCRS Engineering and, as such, assumes three source, which is: the autonomy profits by professors and students, the students' auto-development and the extra-classroom activities promotion.*

1 INTRODUCTION

This work presents a project which, in the strategy planning adopted by the School of Engineering at PUC-RS (FENG), in a partnership with PUCRS VIRTUAL, aims at to support the docent capacitating, by establishing a virtual culture to assist the presential mode of teaching and learning. The present proposal is anchored in a wider project of curricular restructuration of several courses in the School of Engineering that is based on three assumptions: increased autonomy to students and faculty; student's self-development and the promotion of (apparently) unrelated activities to broaden activities and experiences. In this way, the project attends one of the strategy actions listed in the School's global planning, which is to increasingly modelize and to make available virtual environments for presential teaching in the Engineering Graduation Courses. The process intends to broaden the utilization of other technological and techno-pedagogical resources in the everyday work of teachers dedicated to the presential teaching, aiming at better conditions and quality of teaching and learning in the Institution.

2 THE ENGINEERING'S CURRICULAR RESTRUCTURATION AND THE STRATEGY PLANNING

Write the names of all authors in a required order, always the first name(s) first and then the surname in capital letters. Separate the individual authors by semicolon. If all the authors are from the same organization, do not specify them by numerals. If the authors are from different organizations, use separate paragraphs followed by the author's address.

The FENG has initiated the implantation of new curricula in all its presential courses from the semester 2003/1.

The preparation and implantation of Curricular Restructuration quests, more than to build a new and broader curriculum, to change FENG's posture in all the spheres (teaching staff, managers and students). Much beyond a mere review of contents and approaches, the present proposal constitutes a pedagogical

restructuring in engineering, with the macro-objective of re-structuring the resumes of the several courses in the School.

The specific objectives are:

a) To graduate engineers able to fit the modern world's dynamics, characterized by quick changes and advances;

b) To graduate engineers able to act in the society and the industry, with actions and contributing to the scientific and technological advance, as agents of development;

c) To constitute the professional profiles inherent to the several Engineering's branches.

The teaching staff that acts in the initial periods are, most of them, involved in the process of pedagogical capacitating offered by the University (SEDIPE/PROGRAD); a significant fraction of the FENG faculty has developed courses and actions with PUCRS VIRTUAL, in an activities program that contemplates subjects as: the modern times' challenges in relation to University teaching; the multiple learning concepts, actions and marks; the use of technology in the docent action and in learning's evaluation, etc.

This initial experience leads to the identification of the support needed to face the new challenges posed by the new proposals adopted.

The proposal presented by the FENG's curricular restructuring team is, by its own nature, mediated by a theoretical and practical process supported by the emancipation, the autonomy and the interactivity, translated by the interactive classroom environment, in which the teacher interrupts the tradition of speech and dictate. He constructs a set of territories to be explored by the students and make the co-author and multiple connections available, allowing the student the "do-it-yourself". The student, by its turn, changes from a passive spectator to an actor, playing both as the emissary and the receptor in the inter-comprehension process. The education may pass from a product to become a process of interchanging actions that generate the knowledge and not only reproduces it. This posture co-operates with the necessities revealed by the entities in the professional market, in which technical competence is no longer the only quality considered, but also the ability of interpersonal relationship.

One of the orientating questions, common to all segments of engineering now involved in the project, refers to the professional approach in the different resumes, from the beginning of the courses. There's a clear concern in the way to conceive resumes that translate a constructive process fully integrated, both horizontal as vertically, putting down the classic rupture between the "basic" and "professional" cycles. Such measure translates actions that favor that the student is involved in his professional preparation since he enters the University. Another measure was taken to reduce the time with classroom activities.

In view of the above explained, docent's difficulties were observed, in relation to the summary's workability in real time, now significantly reduced. From this indication, a diagnosis was conducted to study means and alternatives to suppress the pointed difficulties.

Regarding the orientating questions for learning at distance and, as a consequence, the expressive technological advances and the paradigmatic change experienced by the PUCRS VIRTUAL activities, in full development inside the University and the School, it's natural and expected that they also develop in the virtual environment, aligned with the teaching proposal here depicted. This development may be partial and always harmonic with the presential activities.

The Institutional Strategy Plan that involves the FENG concentrates efforts in the different areas, trying to offer courses and services, to act with the community and to develop internal competences linked to management and the institutional performance.

3 VIRTUAL ENVIRONMENTS

The constitution of learning environments starts by their planning and installation; the teacher and the team that shares the planning is responsible by this step. This set of people guarantees the availability of individual and collective work and the social-individual construction of knowledge.

The planning and installation of learning environments is supported by the technology, including the use of integrated media; and by paradigms, in the search for the transition from a traditional teaching proposal to another one, focused on the learning.

In the learning environments idealized and performed by the PUCRS VIRTUAL, educators and students trades roles and functions. The learning becomes, in itself, the core of the process, favoring the

change of focus in relation to the exclusive emphasis in the information and concentrating the efforts in the building of the knowledge. This is achieved by the monitoring of the planning, development and student's evaluation actions. The cooperation is obtained "(...) by the coordination of different points of view, by the operations of correspondence, reciprocity or complementarity, and by the existence of autonomous rules of conduct, based on mutual respect", [Schlemmer. E. 2001].

These environments can give birth to virtual learning communities that are self-defined electronic communication networks, organized around shared interests or causes. In these communities, the supporting basis consists of individual responsibility, opinion making and judgment, all lying on an extensive exchange and share process. According to [Schlemmer. E. 2001], a strong social moral also develops among the participants in the virtual communities, a set of non-written laws that rule their relations, especially regarding the property of the information circulating inside the community. The rule of thumb is, generally, the reciprocity, what means that, if one learns reading the messages posted, it's expected that it can also express its knowledge when questions are made.

The learning environment's modeling must foresee the privacy of the students in the course. A hierarchical structure is utilized to present the information in two levels: the first one is fully available and the information there contained can be consulted by visitors by the Internet. The second level has a password-protected access and the students only receive the password in the registration.

It's not enough to build a website, nor to organize sets of activities by objectives. The fundamental point is to promote the process core transposition from the teacher to the student, and the establishment of virtual learning communities. It's necessary to stimulate the understanding, to instigate the curiosity, to establish moral pacts, to manage cognitive conflicts that lead the students to think and to understand their own thinking process.

The modeling of learning environment consists of the elaboration of a modeling project by a team coordinated by the teacher, [Franciosi et all, 2002]. This modeling is divided into steps, to build the framework as described below.

First step: (organization of the website) The modeling of learning environments takes the course plan as a basis. From this plan, the concepts introduced and discussed in the course are identified and organized in a conceptual map. By its turn, the map orientates the organization of the course themes in units, to whom contents and objectives are associated. Then it's possible to begin to plan the hypertext that will be associated to the course and that will constitute a website.

Second step: (production of the WWW-supported environment) In the course plan also the production models and relations are described, as well as the learning situations. This information enable that the more adequate ways of communication at distance are identified. Until this step, all one has in hands is a website with Internet tools and communication services. The progression from website to web-based environment takes place as resources as warning board, online feedback, monitoring, self-evaluation and cooperation are included. It's assumed that environment's management strategies are defined. To make this management easier it's recommended the utilization of a system for environment's management. In this moment, the evolution from a structural level to a real learning environment, a management process, based on a exchange reality with decentralized spaces and hetero-hierarchical possibilities in the life of teachers and students.

Third step: (production of the environment supported by integrated media) This step is constituted by the integration of the media available in the web environment with those available in the mediation via satellite. Teleconference and videoconference are added to the web-supported environment and strategies are defined to integrate media as, for instance, the proportion of tele/videoconferences in relation to the tasks related to individual study.

Fourth step: (production of the learning environment based on the use of integrated media) The connection of the environment supported by integrated media with the teaching methodology, as defined in the course plan, as well as putting its base on a paradigm that poses the emphasis on the learning dimensions and it permits that the teaching environment, based on the use of integrated media, is delineated. In this step, the environment's elements are organized in categories according to the nature of the process they induce, i.e., individual work, group work and support. It's important to highlight that in this step the process' core is still associated to the teacher.

Fifth step: (production of learning environments based on a teaching environment) The production of learning environments is supported by the paradigm's dimensions and by the teaching environment based on the use of integrated media. In the paradigm, the dimensions remit to participation, intervention, authoress and co-authoress (interactivity); independent action (autonomy); individual and collective authoress (cooperation); thinking processes (cognition); thinking of the own learning process (meta-cognition); dimension of the knowing what one is and knowing how to live with the other (affection/desire). By its turn, the methodology of the use of the teaching environment leads to the rizomatic communication of processes that are networked, constituting the learning environment's tissue. Thus, this environment is essentially centered on the student.

4 AN BETWEEN-PATH IN THE SEARCH FOR THE NEW

In the present moment, we're under the light of a libertarian paradigm and, moreover, a paradigm that invites to unusual, non-thought devires, collectively and individually built as ways of being, thinking and acting, exploring the fields of possibility to, even in a virtual plan, to reach a real proposal that attend the needs that are more urgent in the context of Strategy Planning and, even more important, in relation to the virtualization of the teaching-learning processes in the Engineering School.

The professional capacitating courses arise as a need imposed by the modern times, in which the technologies cross the human life in an inexorable and irreversible way. The migration to a world more and more networked, the culture that it's established is independent of individual (or homogeneous group's) will undoubtedly pose the need of one to introduce itself in the process, to be an active agent of the today.

Thus, such condition clearly crosses the docent way of making, what leads to the exigency for courses that lead to an teachers' awakening towards a new society, represented by students fully impregnated by this new cultural state, and that somehow asks from the teacher that he communicates inside its marks. Besides, all the learning process must awake the student's interest, towards the objectives established in the fields of teaching knowing, to take place. Thus, more conventional educational routes become unattractive to the students and oblige those who really intend to exert their teaching profession to transform themselves, in the name of their main objective, which is to facilitate the learning to the disciples.

The course for docent's capacitating is a strategy for the creation and implementation of a virtual culture. Teachers receive training in technological processes, computer-aided mediation and processes involving tele and videoconferences. Thus, they're put in front of the challenges represented by the media virtual features that get together to facilitate the management of processes involving interaction, cooperation and increases in autonomy. More important that in a technological dimension, the teachers in capacitation are invited to live and to share another way of being.

Notwithstanding, it's clear for many people that if, indeed, the appropriation of computer resources is relatively simple, to assume that "it's enough to transfer the classes developed for a presential scheme to the technological structure of virtual education is a mistake, an illusion that the teacher only can realize. The magnitude of the changes introduced turns upside down all the control over the traditional teaching "modus operandi" employed in the presential scheme.

The educational paradigm, as a basis, remains as virtuality, in a potential state and configures an educative action when it updates itself, in the dimension proposed by Deleuze. From this interpretation, the educational paradigm behind the pedagogical projects in the FENG can be faced as a problem to be solved, as one is face to face with a resolutibility field, i.e., update oneself in the docent work and to become updated. Such a paradigm is understood as a meta-theory that orientates, by multiple paths, the construction and reconstruction of every day. The FENG's thought adopts as a theoretical-practical frame the ideas by [Vygostsky, L. 1984], [Habermas, J. 1987], [Deleuze, G. & Guattari, F. 1995] and [Morin, E. 1996], besides of support by [Lévy, P. 1999], by means of what was assumed as communication gaps, tries to reflect its material character on the creation of learning environments that promote multiple interactive dimensions, as well as cooperative processes, processes focused on the development of the autonomy, of argument-based actions and the promotion of cognitive and meta-cognitive actions. In coherence with the support theories, the pedagogical actions are separated by themes, reconstructed, individual and collectively, based on arguments. Besides, they're deconstructed based on the

detritorialization of old truths or, better said, of truths assumed “a priori”, changing to truths felt and constructed inside the group.

The incorporation of new technologies of information and communication in the education medium facilitates the development of cooperative actions aiming at the individual and collective growth and the interactive actions that aim at the subject’s initiative, flexibility and autonomy. These dimensions express needs beyond the teaching-learning relation centered in the teacher and in the transmission of knowledge. They lead to questions about teaching and learning, as they’ve been traditionally practiced and accepted.

In the other hand, if one knows that Education at Distance can promote the self-learning and even the individualism, it’s also known that the search for support in methodologies that are proposed to cross the limits of knowledge transmission or reproduction can rescue a change in the focus, towards a facilitated process of social interaction between teachers and students [Andrade et al. 2001] and to the acquisition of new abilities to both groups. This implies that the individualist identity matrix must be overcome by non-isolated actions, from the point of view of the media, the interactions and the constructions, in which, all the parts respected, the work comes from the everything, with the everything and to the everything [Medeiros et al. 2001]. The belief in the construction of the subjectivity and the critical and reflexive inter-subjectivity, by means of a double-hand communication is also a fundamental tool, by including in one deductive-inductive-deductive dimension the multiple relationships and interactions established among diverse entities. There’s a lot to do in this docent fieldwork. It’s valid to emphasize that both teacher and student’s actions must radically change in order to a change in the educational culture takes place. It’s not a technical mechanism of professional consciousness like “the teacher comes by a traditional door and leaves by a virtual portal”. More than this, it’s a gradual and permanent change in what refers to the self-improvement. The improvement in the practical docent knowledge can come in any time, because the logical order isn’t the same as the phenomenological one.

5 A LINE OF POSSIBLE CAPTURED: THE BUILT PROJECT

The procedures to attend the School’s strategy planning, in relation to the defined main action, are related to gains in student’s autonomy and study outside the classroom, what made that the quest for the creation of virtual learning environments would become imperative to the proposal’s consecution. Such procedures were structured in the following actions:

- a) To conduct a diagnosis to identify the uses, by the teaching faculty, of the virtual learning resources;
- b) To establish requirements and specifications necessary to the implementation of learning environments;
- c) To modelize virtual learning environments to be used in the presential scheme in the Engineering courses;
- d) To make the educators able to be inserted in a virtual culture and the consequent modeling of learning environments;
- e) To customize and to implant the proposed virtual learning environments, according to the teachers and the Institution’s specific needs;
- f) To monitor the implantation of multiple environments, aiming at to future improvements;
- g) To monitor and to evaluate the degree of learning facilitation built by the student along the process;
- h) To implement the improvements identified by the monitoring of the implantation process.

This Project represents, to the authors, an alternative able to support the innovative pedagogical proposal of the Engineering presential courses, based on a flexible assumption that gives potential to autonomous actions from students, teachers and even from the administrative staff. So, the construction of virtual learning environments reveals itself as an important supporting tool to the quality in the presential teaching of engineering. The creation of the learning environment’s architecture arises from actions developed with the PUCRS VIRTUAL, a partner to FENG in this specific search for the tuning between the new proposal and its assumptions, plus the context variables. The FENG/AVA Project (Virtual Learning Environments, in Portuguese) is divided in operational steps, as described below.

First Step: Analysis of requirements and environment’s specification

The first step foresees a diagnosis that involves the description and selection of the tools and services available to the teachers and students, in the constitution of virtual learning environments, more the needs for docent capacitation. This step aims at to recognize the state-of-the-art of the virtualization processes constituted so far and the further establishment of requirements and specifications needed to the implementation and modeling of the environments.

Second Step: Docent Capacitation and environment modeling

The second step is focused on the docent capacitation, aiming at to provide the docent staff with the conditions to the effective environment modeling, exploring the inherent characteristics of the different branches of knowledge. Technological and social-pedagogical processes are included and the last ones assure the educational nature to the project.

Third Step: Environment implantation

The main objective in this step will be the spreading of a virtualization culture, translated as the amount of docents effectively capacitated and the users of learning environments in their docent practice. The docent action is supposed to facilitate the autonomous learning and to make new productions, from students and teachers, more flexible.

Fourth Step: Evaluation of the developed actions and the project's dissemination

This step is dedicated to the monitoring of actions that are inherent to the project's implantation in its domains, as well as the degree of the facilitation of the knowledge gained in the process. From this management of processes, people and knowledge, the necessary adjustments are promoted.

The expected results that must, somehow, to furnish indicators to the monitoring are:

- a) Incorporation of communication and information technologies in virtual learning environments, in the docent praxis, to the presential Engineering courses;
- b) Use of communication and information technologies as a trigger to the potential learning process characteristics;
- c) Instauration of a new culture, in which the teacher assumes the management of a learning process, where the student is responsible by its own learning, taking into account the reduction of hours in the classroom and the realization in extra-class timetables;
- d) Promotion of two annual editions of capacitation courses in virtual learning environments as a support to the presential learning scheme;
- e) Capacitation of 30 teachers per year with, at least, 15 teachers effectively using the virtual learning environments.

The course was outlined in modules according to the Table 1. Each module has a relation of 4 hours of presential work with the presence of the teacher and the EAD team, more 4h of Oriented Actions (AO), which can be synchronous or asynchronous. In this AO hours, the teacher-student can participate in workshops with the support of EAD monitors, as well as asynchronous production with/of the use of services and tools for the construction, in a short and medium term, of its virtual learning environment as a support to the action in the presential scheme.

MODULE 1: insertion in DE (Distance Education) and AVA, presentation of DE resources, possibilities and availabilities. Creation of websites, without emphasis in the instrumental, although the capacitation is centered on the tool.

MODULE 2: AVA, implantation of virtual learning environments, theory and practice.

MODULE 3: WebCT and support/tools, towards the construction of virtual learning environments

MODULE 4: hipertextualization and proposals of multiple browsing, the use of hypertext as a didactic resource, theory and practice. Work with images for the composition of an attractive and challenging website. Work with animations.

MODULE 5: plan and virtualization of the whole in AVA, search for the dimensions: autonomy, cognition, meta-cognition, interactivity and cooperation in the created environments.

Table 1. Scheme of the course

MODULES	hours	PERIOD
Module 1	4h	First week
Module 2	4h	Second week
Module 3	4h	Third and forth week
Module 4	4h	Fifth week
Module 5	4h	Sixth week

6 CONCLUSIONS

In a quadrature real - possible – virtual – current, a line of possible was captured, took a shape in the proposed course that, even in the virtual context, is ready and fully to update the docents. It's valid to highlight that, in the updating process of the docent capacitation project considered, changes may occur, as always, when one idea is transferred from the real to the current plane. In this sense, it's strengthened the power that the foundations exert on the basis, even though they were generated by it.

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