

Teacher education in the PUCPR MATICE project.

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Abstract

This work describes the results of the experience in continuous online training of teachers in the MATICE (Methodologies for Educational and Information and Communication Technology-based Learning) program. This experience was centered on the pedagogical relationship in which the action of the educator becomes decisive. Updating teachers takes on strategic importance for the university in a scenario of constant educational and social changes. The study was carried with 3 classes of teachers from the PUCPR continuous training course in 2006. The procedures adopted for the study were as follows: a review of the literature; building, implementing and following up the project to train teachers in the MATICE program; drawing up and applying the questionnaires; and analysis and discussion of the data obtained. It was decided for this research to carry out a case study. The results of this study show that the continuous teacher training experience was relevant and able to respond to the demands imposed by a new knowledge society; furthermore, it represents a possible way forward for virtual education in PUCPR.

Key-words: Continuous teacher training, teacher training, distance learning

1. Introduction

The signs of technical and scientific progress in today's world and the way in which everything is interconnected and made interdependent by it can be easily observed - in biotechnology, information technology, mechatronics (automation and the use of robots), in new materials (fiber optics and semiconductors), in new forms of energy (laser) and in telecommunications (telematics). Indeed, we believe that *"no serious reflection on the future of contemporary culture can ignore the extensive*

presence" of technology, particularly in the electronic media and in information technology (Levy, 1993, p.1,7).

Technology is action-creation, a concept rooted in two ideas: knowing how to do and knowing how to understand. It is also understood to be the social process, the mode of production, of which the technology – the apparatus consisting of the physical resources, equipment, instruments, procedures, devices and inventions – is merely the most obvious part (Marcuse, 1999, p.73).

However, a technology does not appear on its own: functionally, technologies are related to the prevailing culture. Indeed, we are able to distinguish the different periods in the history of humanity by the technologies (i.e., by the ways of doing things) and are able to recognize that the link between technology and science emphasizes the link between science and production. Thus, *"the material and ideological basis on which globalization discourse and practice are founded are grounded in its current version as a technoscience"* (Santos, p.140 – 141).

Various authors assert that a new "post-industrial" (information, post-modern, post-capitalist etc.) society inspired by the rationality of communication and information technology may be in the process of being built. This transformation (mutation?), rather than a technological revolution, is *"communication, information and education synergy, creating a new reality, which we pompously designate [...] knowledge space but which represents precisely that"* (Dowbor, 1997, p.21 – 46).

It is worth noting, furthermore, that the process bringing about the transformations is not strictly new. What does appear to be truly novel is the stunning speed *"with which the so-called new 'technologies' expanded in the last third of this century, making men and goods discardable in an ever-greater process that gained intensity following the long-lasting structural*

crisis that began at the end of the seventies" (Gadelha, 1998, p.35).

Indeed, that the new technologies associated with the development of information networks are having a major impact on human activities, affecting not only those activities associated with production and work, but primarily those associated with education and training, can neither be denied nor avoided. In light of this, it would be naïve to imagine that schools and education would remain unaffected.

There can be no doubt that these new technologies represent an unparalleled opportunity to provide a quality response to a constantly growing and diversifying demand and that they also offer a range of possibilities and advantages in the field of pedagogy.

Unesco is thus right to insist on the importance and urgency of schools placing themselves *"at the center of this profound transformation affecting society as a whole"*. Now, to achieve a commitment such as this requires first and foremost continued training of educators, which is an urgent and exhaustive process encompassing *"post-school training derived from the educator's professional occupation, which implies the acquisition of knowledge, attitudes, skills and behaviors intimately associated with the professional field"* and presupposes constant *"scientific, psychopedagogical and cultural"* updating *"to complement and extend the initial training"* (Imbernón, 194, p.13).

To this end, the teacher needs to be able to identify and analyze his/her actions in school and put them into practice taking while into account the internal environment, the external environment (the political, social, economic and cultural context) and even the confrontation between these two variables (cf. Falcão Fº, José Leão; in: Pinto. F.C.F., Feldmann G., Silva R.C. (org.), 1997, p. 181-191).

The continuous training program can also, and should, make use of *"in-service distance learning"* programs that use Internet/Intranet resources as well as classroom-based teacher training projects, which have been very well developed to date.

Clearly, this will not happen by magic. First and foremost, an information and semiotic technologies 'culture' must be created. With a view to creating this "culture" and encouraging teachers to overcome whatever resistance they may have to the use of new information and communication technologies, the Distance Learning Directorate at PUCPR has proposed a continuous training course for teachers.

This study presents the results of this experience of online training of teachers in the MATICE project.

2. Continuous teacher training

Continuous teacher training in the use of new information and communication technologies is centered on the pedagogical relationship in which the action of the educator becomes decisive.

In times of such profound and far-reaching changes, particularly in the way that knowledge is conceived and the world is viewed, updating teachers takes on strategic importance. Indeed, the effectiveness with which educational technologies are used in the university will primarily be determined by the quality of the training body within the university. It is only in the broader context of the social function of continuous training that the issues relating to the professionalization of teachers can be most clearly seen and most effectively addressed, especially as teachers cannot become autonomous without developing a permanent interest in understanding reality, in so far as human emancipation is considered a priority.

By continuous training we mean that derived from the professional occupation embarked on following graduation as a teaching professional; its aim is thus improvement rather than the acquisition of basic knowledge. This concept, namely, that of the acquisition of competencies very closely related to the professional field, corresponds to the concept put forward by UNESCO. The specific training subsystem, however, includes the set of "all the processes involved in the cultural construction of a population throughout its life and presupposes complementary scientific, psychopedagogical and cultural updating," including basic training, known as permanent education (Imbernón, 1994, p.13).

The continuous teacher training and pedagogical practice proposed by the Distance Learning Directorate, which extends beyond simply using new information and communication technology, is based on three dimensions that characterize an emerging paradigm, in which teachers must be able to identify, analyze and put into practice their actions taking into account the variables within the school system and the form in which they are present on a day-to-day basis; the variables surrounding the system (the political, social, economic and cultural context) and the form in which they are present in schools in practice; and the conflict between these (Falcão, 1997, p.181-191). Thus, the teacher - the formative figure - in his or her role as philosopher and investigator of human nature, cannot just be a professional who falls into a hole while walking with his gaze fixed on the stars. However, to be "in a hole without ever having got out is much worse. This is what would happen were one to remain, in a positivist sense, attached to facts merely as facts and to phenomena pure and simple, as though worshipping idols" (Imoda, 1996, p. 53-54).

This observation implies an approach to continuous training that prioritizes a broader treatment of pedagogical knowledge as a project informed by solidarity and fueled by the search for greater depth and by constant convergent confrontation; and that prioritizes knowledge as personal production and collective construction, while accepting learning in terms of its emotional, affective and relational implications. This imposes an obligation on the university-level institution to provide its teachers with the opportunity to develop their ability to select the

best media available for each teaching-learning situation as well as the relevant knowledge in accordance with the needs and potentials of the learning subjects, who are also agents in the system.

To achieve this, competencies must be developed in line with the knowledge, qualities, skills and aptitudes that enable teachers to consider, and take decisions about, everything connected with their responsibilities. It necessarily presupposes knowledge that has a solid basis and that must go hand in hand with the personal virtues that are indispensable when carrying out decisions that have been made and can only be recognized in a given situation. They are therefore inseparable from the action (Ropé and Tanguy, 1997, p. 16).

The term competency, which has its origins in the world of the organization of industrial labor and personnel management, is both laden with multiple meanings and vague, as indeed are so many other elusive terms that, through widespread use, give rise to confusion. The use of this word is a warning call to us about a type of opportunism, very common nowadays, that transforms words into slogans that are often at the service of ill-defined interests; indeed, that are the influence of a commercial culture that transforms everything into goods. Because of this, continuous teacher training in the use of new information and communication technologies also takes into account the ethical action that develops with critical judgment, the collective use of knowledge and social and cultural openness.

Care must also be taken to establish a connection between "culture" and the teacher's role as mediator. The less well-educated a formative agent is, the more he will depend on factors or elements outside the sphere in which he acts, and the better-educated or more interested he is in this sphere, the more easily he will be able to become independent in his work (Imbernón, 1994, p.19-58).

It is worth stressing that, by insisting on the importance of continuous teacher training, one is in fact primarily insisting on the need to permanently educate a person who is reading and writing a life experience and must read the world and be aware of himself as "reflected, evaluated, recreated" (Christov, 1998, p.34). After all, a teacher's view cannot be limited to staring at the finger that points; rather, he must broaden his perspectives to what the finger is pointing to: a panoply of new possibilities born inside an extraordinary metamorphosis that produces life and enchantment but that feeds off fright and degradation. For this to happen, new knowledge with new objectives and ways of learning and mediating must emerge through the development of a new cartography of relevancies that acts as a radar capable of analyzing a changing reality.

In short, an underlying assumption of the Distance Learning Directorate's approach to continuous training in the use of new information and communication technologies is that the minimum conditions needed to critically exercise formative action must ensure that

meaningful knowledge is incorporated, developed and appropriated, by providing the teacher with:

- a theoretical basis that avoids him becoming a technician trained exclusively in a mechanical and bureaucratic routine based on information transmission;
- pedagogical action that becomes effective as a result of conditions that allow a critical analysis of the situation to be carried out, which presupposes that a fragmented curriculum, which separates knowledge and understands it to be a chain of information, can be overcome;
- development of the ability to research as a means of knowledge production;
- continued in-service training, which does not do away with, but rather reinforces, a permanent personal study program.

In order to address these requirements, the Distance Learning Directorate is considering a series of different, systematic and organically structured procedures intended to constantly develop and update teachers at the university. These procedures are also intended to consider these agents as humans in their totality and help develop their full professional, biophysiological, intellectual, emotional, spiritual and social potential.

3. From Eureka to the MATICE Project

Since the initial investment by PUCPR in online education in 1995, the university has been undertaking research to create the virtual learning environment known as Eureka. This environment is an interactive one and the interactivity can be extended according to the way the processes in the virtual classrooms are developed by the teachers, who become mediators in this classroom and fundamental figures for the virtual classrooms to be successful. Technology in itself does not ensure learning, but with the active participation of the teacher as mediator it is a decisive factor in the success of the activity being undertaken.

Because of its interactive nature, the environment allows skills to be developed efficiently and quickly. Content matter, activity planning, timetables, virtual discussions, e-mail, virtual forums and the library of links for research activities can easily be browsed. All this encourages participants not only to become involved in the work process but also to collaborate safely with the logistics of knowledge.

The process should take place naturally, with the mediator acting as a catalyst for integration by bringing together the different points of view. With this in mind, following are some aspects related to virtual learning environments, and Eureka in particular: the ability to perceive what the group involved is communicating

about its experiences; leadership in the sense of being able to maintain feedback with the group; competence to present significant, relative examples that are helpful for the experience of the course; the ability to undertake self-assessment in the sense of collaborative and participative exchange; and the way that the individual relates to tasks and people. Eureka is a virtual learning environment with tools that can be used for collaborative activities, where the teacher can produce knowledge in partnership with his/her students. The environment is used in a pioneering way to support classroom-based academic activities, an innovative approach that uses the Internet to open up new avenues for pedagogical exploration. PUC seeks, in its undergraduate programs, continuing education, postgraduate courses and also through partnerships with companies and institutions, to develop competencies in new forms of university-level teaching.

Figure 1 - Notice Board



In 1999, EUREKA had become established as a support tool for teaching staff at PUCPR. By the end of 2000, there were already 10,000 users registered in the system, a figure that had risen to 20,000 by the end of 2001, when there were 600 rooms open.

July 2002 saw the start of development of the MATICE project (Methodologies for Educational Information and Communication Technology-Based Learning) following approval by the Office of the Dean for Academic Affairs at PUCPR.

A small group of teachers who had previous experience using the EUREKA environment were invited to form a team to follow up the project and develop activities to monitor pedagogical actions in EUREKA; investigate difficulties involved in using the environment; check that the timetable was being followed; monitor student participation; investigate the use of EUREKA tools and how this use evolves; monitor the statistics supplied by the environment; regularly review the report created by the tool itself; and find out what the students' opinions of MATICE were.

By the end of 2002, MATICE had been set up, and it was established by the teachers taking part and the work group that some subjects would use this resource at the beginning of the first semester of 2003. Since 2004, students who fail in classroom-based subjects can repeat them as semi-classroom-based subjects.

This new pedagogical approach is intended to go beyond the simplistic use of computers as tools to distribute and transmit knowledge and endeavors to find solutions that promote learning in order to produce knowledge. In 2006, 651 classes, involving 1225 students and 356 teachers, are in operation.

4. A Brief Research Report

In this section we describe the procedures involved in the methodology adopted in the study and briefly discuss the data that was obtained.

The design of the project and the quantitative and qualitative research were developed with three groups of teachers at PUCPR in 2006. The procedures adopted for this study were a review of the literature; design, implementation and follow-up of the project for the teacher training in the MATICE program; development and application of the questionnaires; and analysis and discussion of the data obtained. In this research, we chose to develop a case study (a type of descriptive study) as the basis for this small data-collection study to help elucidate and analyze perceptions and information supplied by teachers. A non-probabilistic convenience sample was used.

The study involved teachers from various PUCPR centers, and the classes were divided as shown in the table below:

Table 1

Class	Teacher Tutors	Number of enrollees	Total who finished the course
CCBS CTCH	12	26	16
CCET Londrina Toledo	12	27	12
CCSA CCAA CCJS	12	27	09

The study population was defined based on an exploratory strategy. Thus, the data that were collected relate to a homogeneous population of 27 teachers taking part in the continuous training that answered the questionnaire sent.

The quantitative and qualitative analysis was based on data obtained by means of a convenience sample. This type of sample uses population units that are

convenient. According to Malhotra, in this type of nonprobabilistic sampling, “selection of the sample units is left largely to the interviewer. It is not uncommon for interviewees to be chosen because they are in the right place at the right time” (Malhotra, 2001, p.306).

A questionnaire was sent to all the teachers, who replied of their own accord. The qualitative analysis was based on a selection of relevant data and observations chosen to complement and provide greater depth to the interpretation of the data from the questionnaires.

There was little variation in the age of the teachers, with the average age being 40.5 years. As can be seen in Table 2, most of the teachers were men.

Table 2 -

SEX	FREQUENCY	
	Abs.	%
Female (n)	12	44.44
Male (m)	15	55.56
TOTAL	27	100.0

The majority of the teachers (67%) have a significant amount of classroom-based teaching experience and have been teaching for more than 5 years.

5. Research Scenario: Introducing the course “Enhancing teaching in the MATICE system”

The aim of this course was to provide teachers with a theoretical and practical basis to enhance their use of Communication and Information Technology in their work. The organization of the course was mirrored in the organization that was proposed for the MATICE classes in which the teachers took part. The course was therefore organized as 18 units in one teaching semester plus the classroom-based sessions within these units, exactly as happens with the students during the semester. The course was divided into 3 modules with 6 study units in each.

In addition to the mirrored organization, all the EUREKA functionality was used during the continuous training course so that the teachers could gain experience of using the different EUREKA tools in the teaching-learning process first-hand.

For teachers to take part in 2006 depended on their being recommended by the course director, who was also encouraged to take part in the training. The teachers had 2 hours a week, paid for by the institution, to take part in the course. The course took place over one semester and lasted a total of 30 hours.

The continuous training was given by the teacher-mentors, who were responsible for working with the MATICE classes, and was supported by the whole Eureka technical support team.

6. Some circumstantial considerations

Considering the premises of this study as well as the data obtained in multiple concrete situations, the following considerations are pertinent:

- The use of information and communication technologies in university-level continuous teacher training still represents a methodological challenge. The pedagogical possibilities are endless, particularly if the intention is to go beyond the conservative paradigm of teaching in which the central tenet is the reproduction of knowledge.
- The majority of the teachers have broadband Internet access in their homes, and there is general, albeit timid, willingness to use new information and communication technologies.
- The high level of involvement of the teaching staff in the information and communication technology continuous training course is evidence of the possible potential for expanding subjects online.
- The experience that the teaching staff underwent and their high degree of participation in the activities made available during the week may suggest new methodological approaches for them to take advantage of the technological mediation resources in EUREKA, specially those that neutralize the physical and temporal distance and bring the agents in the teaching-learning process closer together by means of the support provided by the pedagogical communication.
- Communication via EUREKA, whether coordinated by the teacher-mentor or not, is an objective resource for pedagogical mediation between all the actors in the formative process, as shown by the intensive and extensive use made of the synchronous and asynchronous communication tools available in the environment.
- The most noticeable negative aspect concerned the difficulties that the student teachers had organizing their study time. These difficulties may have limited the number of opportunities for interactive experiences, although the student teachers were sometimes contradictory in this regard.
- The fact that the proposal was validated in three classes with student teachers who had experience in different knowledge areas allowed us to hypothesize that the model is suitable for continuous training for university-level teachers.

It was found from the results of this study that the continuous training experience in the MATICE program was not only important but also able to respond to the demands imposed by a new knowledge society; furthermore, it represents a possible way forward for virtual education in PUCPR. The experience proved to be a pedagogical advance for 3rd-generation distance-learning programs, as it overcame traditional methods of knowledge production and developed the independent attitude of a researcher in the teachers who took part in the continuous training process.

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