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Godehard Ruppert

University of Bamberg and Bavarian Virtual University (Germany)

The Bavarian Virtual University (virtuelle hochschule bayern - vhb) – Structural Configuration and Key Success Factors

The vhb in the German and European context

In the Federal Republic of Germany, the whole range of education from primary schools to the universities lies within the exclusive jurisdiction of the 16 states ("Länder"). This explains why there is no federal "German Virtual University".

The Free State of Bavaria is the second largest of the 16 German states with an area of 70,000 square kilometres and a population of 12.5 million. Although the network of institutions of higher education is quite dense and the demand for distance and online education is not as high as e.g. in the United States, Mexico, Canada or in the Nordic Countries, the Bavarian Virtual University (vhb) has recently been identified as one of Europe's mega providers of higher education online in an ongoing research project financed by the European Union[1]. This proves the relevance and the success of the vhb's overall concept which will be outlined in the present paper.

Key facts about the vhb

The vhb was set up in May 2000 by the Bavarian Ministry of Higher Education ("Ministry of Science, Research and the Arts") in cooperation with all nine state universities and all 17 state universities of applied sciences in Bavaria. A further five universities in Bavaria outside the jurisdiction of the Bavarian Ministry of Higher Education have also become members. The function of the vhb is regulated by a special ordinance of the Free State of Bavaria.[2]

The aim of the vhb is to complement the programmes of the traditional universities, not to replace them. With the support of the vhb, students can earn credit points in individual courses, but they obtain their degrees at their home universities, as the vhb does not offer complete courses of study. (Neither should the activities of the vhb be confused with distance education offered by some of the member universities. These courses of study generally include face-to-face elements and serve for the most part the further education needs of people in employment.)

The vhb supports its member universities in providing high quality education for growing numbers of students in times when state funding does not grow proportionally. The vhb courses help the students to organise their individual studies in a more flexible way, which is especially valuable for non-traditional students. The vhb courses also help students to complete practical courses and trainings as well as studies abroad without extending the duration of their studies.

In the academic year 2006 / 2007, 180 different courses were available. Most courses are offered each term ("semester"), some courses are offered once a year. In both terms of the academic year 2006 / 2007 combined, 340 courses in total were conducted. In these 340 courses, there were more than 46,000 enrolments by more than15,000 individual students. The following figure shows the growth of student enrolment over the past years:

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[1] See http://www.nettskolen.com/in_english/megatrends/the_project.html
[2] http://www.VHB.org/dokumente/downloads/verordnung_VHB_2005.pdf

Stand: 16.08.2007
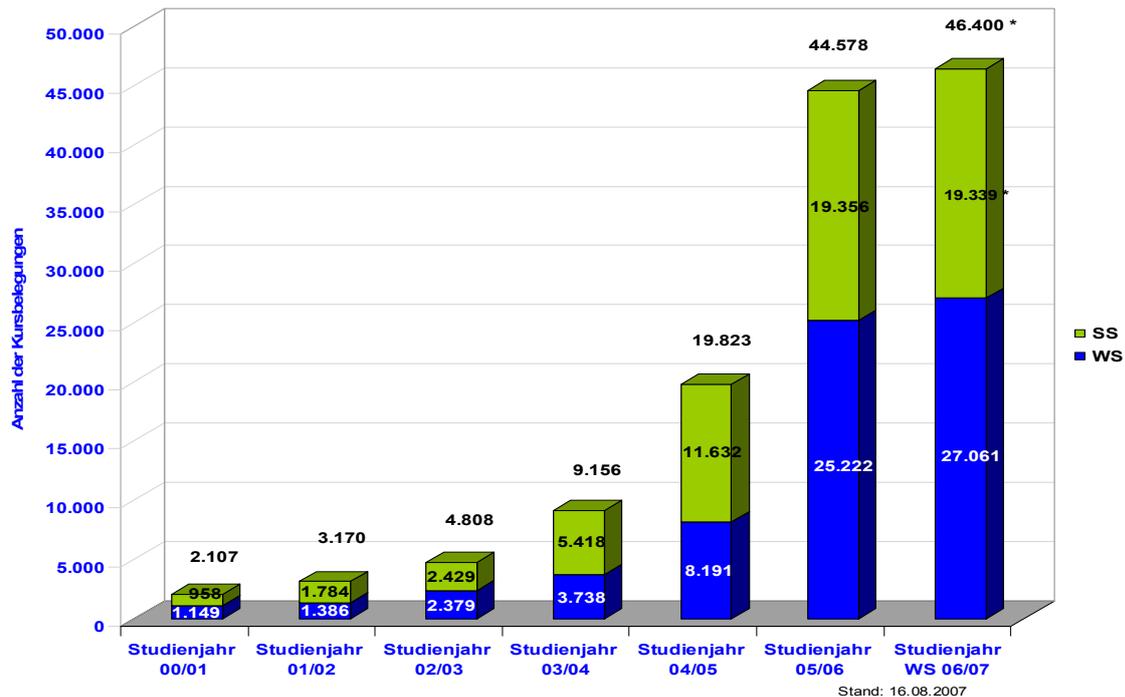
The vhb employs neither academic staff nor tutors. Teaching is offered by professors of member universities who work within the vhb either as part of their workload or in addition to it. For day-to-day course work, professors usually employ tutors. The remuneration of the tutors is supported by the vhb.

Until now, the vhb has been financed almost exclusively from state funds; member universities have contributed indirectly through their infrastructure. Starting from summer 2007, member universities contribute financially in relation to the number of students they have. Students of the vhb's member universities do not have to pay any fees for the vhb's courses. Students from other universities and persons interested in lifelong learning can also be admitted on payment of a fee.

The vhb focuses on member universities and their students as its "market" for online education. At the moment, the member universities have about 250,000 students. This figure is expected to rise to about 320,000 by 2012.[1] This increase in times of strained state budgets necessitates the restructuring of university teaching. The need for change is intensified by the Europe-wide Bologna Process with its focus on modularisation and with the multiplication of the number of examinations the new degrees require.

In addition, within the framework of the new Bavarian University Law[2] and with the help of global budgeting, the universities acquire more room for manoeuvre. In this situation, various combinations of web-based and face-to-face teaching and learning ("blended learning") are part of the solution to the current challenges. When we speak about "blended learning", we should be aware of the fact that this concept can be interpreted in different ways. Within the vhb, blended learning on the macro level plays a key role.

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[1] cf. Wissenschaftsland Bayern 2020
[2] http://www.stmwfk.bayern.de/downloads/hs_hochschulgesetz_hschg_gvbl102006.pdf

Macro-level blended learning as a key success factor

What do we understand by "blended learning on the macro-level"?

After the collapse of the initial "e-learning" euphoria, "blended learning" became the common concept for the integration of computer- and web-aided elements into teaching and learning. By "blended learning", many experts mean the combination of face-to-face teaching and web-based teaching *within a single course*. We call this type of blended learning "*micro-level* blended learning". While micro-level blended learning has many pedagogical benefits, it does not necessarily make full use of the economic effects of e-learning. Teachers who use single e-learning elements in their courses do not necessarily gain additional teaching-time, and micro-level blended learning is hardly a remedy e.g. against the shortage of lecture rooms many universities face. For the students, this type of blended learning offers only limited flexibility. In many cases, especially when the web-based elements concerned are exploited only by one professor at one university, micro-level blended learning seems to offer higher quality or added value at additional costs.

By contrast, the vhb concentrates on *macro-level* blended learning with the purpose to offer high-quality teaching at lower costs than face-to-face teaching.

By macro-level blended learning we understand the integration of single online courses into courses of study or curricula which otherwise (and for the most part) consist of "traditional" face-to-face courses. Thus, students can earn some credits in online-courses, but not the complete degree. This combination of face-to-face courses with courses that are delivered completely online (possibly with the final examination face-to-face) allows the students much more flexibility than micro-level blended learning. At the same time the students enjoy all the benefits of a traditional face-to-face university. Therefore, macro-level blended learning minimises the dangers of social isolation often associated with e-learning.

Moreover, if online courses are developed once at one university, but exploited at several universities, the comparative cost-effectiveness is obvious. Universities can "import" courses from other universities, including even the support of their students by tutors of the "exporting" university. By contrast to micro-level blended learning, this kind of import also helps universities to compensate a possible lack of teachers as well as eventual room shortages.

Macro-level blended learning combines the social and pedagogical benefits of face-to-face teaching and learning with the economic effects of online teaching and learning, and it is therefore one of the responses to the challenge of growing student numbers in times of strained public budgets. The cost effectiveness of macro-level blended learning, in turn, is the major motivation for the Bavarian Ministry of Higher Education to finance the necessary structures and the development of new content.

However, it should be pointed out that neither Ministry nor vhb see macro-level blended learning as a means to reduce the overall cost of education. On the contrary, investment in education will have to be raised considerably, and face-to-face teaching and learning will continue to be dominant in higher education. Macro-level blended learning is a means to limit the *additional* costs of better education for more students.

To achieve the goal of cost-effectiveness, courses must be developed to the demand of the universities. To develop new courses exclusively according to the pedagogical and other preferences of individual teachers would not ensure the amount of student enrolment necessary for a noticeable contribution to the total teaching load of the Bavarian universities. This, in turn, would seriously challenge the use of the vhb for both the state and its member universities, that is, for the institutions on which the funding of the vhb depends.

Technical issues

In the vhb with its more than 30 member universities, a variety of learning management systems (LMS) is in use. This variety is a consequence of the variety of the subjects taught as much as of the history of the vhb, which in the year 2000 started with 36 courses prepared for different subjects by different universities. No central server is used; all courses are on servers of member universities, and they are administered by the responsible persons, i.e. by professors of the member universities or by members of their staff.

It has been argued that this might not be the most effective solution, but as far as can be judged from the students' evaluation, this plurality of LMS and platforms does not constitute a problem for the students. Critical remarks related to specific features of specific systems (which were then improved) do not refer to the fact that a variety of systems is used. Besides, the transfer of the existing courses to a single system would not be economically sound. The gradual introduction of a central LMS has been discussed by the member universities, but the vast majority is not in favour of such a solution.

While unification of LMS does not seem to be an urgent issue, the establishment of an authorisation and authentication infrastructure (AAI) is on the agenda. As a first step, a way of data exchange has been established with all important member universities that makes online-registration with the vhb possible. Data on participation in examinations and on their results are a sensitive issue. These data are exchanged directly between the examining university and the students, and between the students and their home universities, not via the vhb.

Courses

In the "Wintersemester" 2007/08 (September 2007 to February 2008), the vhb will offer courses in the following fields of study (the number of courses is given in brackets):

- Business Sciences   (24)

- Computer Science   (14)

- Engineering   (24)

- Health   (26)

- Key Qualifications and Languages   (26)

- Law   (20)

- Social Work   (11)

- Teacher Training   (16)

Sometimes the question of the "onlineability" of different subjects is raised. Within the vhb, successful online courses have been developed for various subjects and with different pedagogical concepts. Of course, some subjects appear to be especially suitable for online treatment (as opposed to traditional paper-based distance education) because of the additional *pedagogical* benefits which electronic communication and multimedia elements provide. On the other hand, the *economical* benefits of offering courses online instead of paper-based or face-to-face solutions can be just as significant and important. The decision to develop and offer an online course should be based on pedagogical as well as economical considerations.

As synchronous communication places severe limits on flexible start-up and progression, teaching and learning in most of the vhb's courses is based on asynchronous forms of communication.

The courses of the vhb are developed at individual universities; there is no central production unit. Generally, within the universities (or within their institutes which provide online education) there is a clear division of labour. Content is usually provided by professors, who then employ skilled staff for the transformation of that content into an online course. In some cases (mostly at universities of applied sciences), professors also take part in the technical implementation.

Quality management

Evaluation and quality assurance play a central role in the vhb's overall concept. Before it is accepted by the vhb, every new course is evaluated by experts from Bavarian and other universities. Any problems in the sphere of tuition can usually be solved by contact between the central service unit and the individual teacher. If the maintenance of quality requires additional investment in either content or software, the vhb provides the necessary money, provided that the course is still in sufficient demand. Moreover, every course is evaluated again by experts from outside Bavaria after five semesters, i.e. 30 months.

For all evaluations by experts, a standard evaluation sheet[1] is employed. The elaborate and effective quality management has contributed significantly to the success of the vhb. Pedagogical research on e-learning is conducted by individual professors on the basis of their courses. In 2005, the vhb was evaluated by an international group of experts.

Furthermore, the vhb supports competence development by financing courses for online-tutors. The courses are organized by Munich University's Institute of Pedagogy. All tutors working on vhb-courses are encouraged to take part in these courses.

Organisational structure

At the outset, the vhb's structure was modelled after the (then dominant) model of the German *Gremienuniversität*, comprising a variety of assemblies, boards and committees. Over the years it turned out that this model constricted the ability to act quickly and effectively, an ability which is pivotal in the world of online-teaching.

Since the end of 2005 a new organisational structure applies. The main body of the vhb now is the Assembly of Member Universities, in which each member university is represented by a commissioner, who in turn is the key person for all vhb affairs within her or his home university. The commissioners usually are members of the governing body of their university. The Assembly elects the Steering Committee and the Programme Committee.

The Steering Committee consists of three persons. Both the President and the two Vice-Presidents are presidents of member universities and in this function represent the vhb in the Conference of the Presidents of the Bavarian Universities and the Conference of the Presidents of the Universities of Applied Sciences. The Programme Committee consists of eight persons. Five of those must be Vice-Presidents for questions of teaching and studying at their respective universities.

While all offices mentioned so far are held by professors as part of or (mostly) in addition to their ordinary workload, the Managing Director and the employees of the Office work for the vhb full-time. In the Office, 16 employees work in the areas of finances, project management, public relations, student registration and technical support.

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[1] The evaluation sheet can be downloaded from:
http://www.vhb.org/dokumente/downloads/vhb-QS-Kriterienkatalog_Englisch.pdf

The following diagram gives an overview over the organisational structure as it is today:
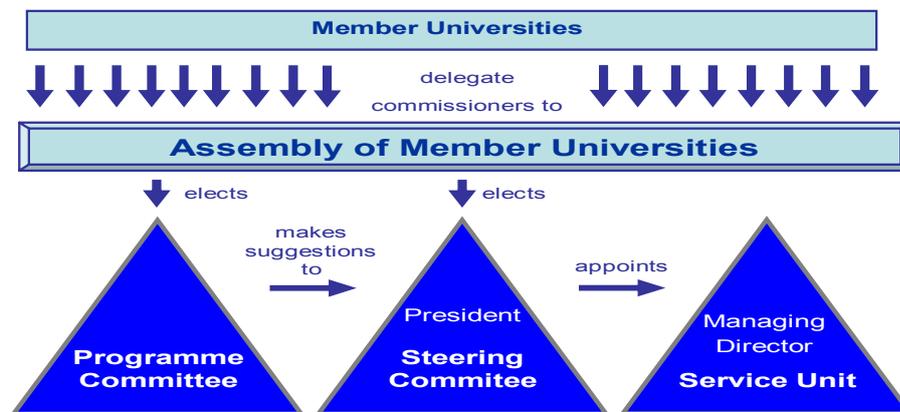
Comparative cost-effectiveness

Up to now, no universally accepted method or standard exists to measure the cost-effectiveness of higher education. What is the output of education? To what extent should the large costs of the universities' infrastructure be taken into account, how should these costs be divided between teaching and research?

What can be undertaken (with some limitations) is a comparison between online and face-to-face education. As far as university teaching is concerned, online teaching can be more cost-effective than face-to-face teaching, at least if it is organised at a level larger than the individual university. If universities use online courses provided by other universities, they can redistribute some of their capacities to intensify teaching on subjects which are in particular demand (and possibly less suitable for online education). Also, they can provide their students with teaching on subjects not covered by their own staff. Professors can to some degree concentrate more on subjects they prefer to teach face-to-face.

A prerequisite for the economical soundness of this approach is the strict orientation to the demand of the universities. That means that a new course is funded only if a sufficient number of universities are willing to replace part of their face-to-face teaching by this course. To identify this demand, the member universities are encouraged to form groups for individual courses in demand, and to apply for the funding of these courses. Corresponding to the means at its disposal, the vhb then chooses which courses to fund and offer.

Conclusions

The success of the vhb depends on its ability to serve the needs of four target groups: students, teachers, universities and the state. The fact that the needs and interests of these four groups are not always identical makes the shaping of the vhb's policy an especially interesting challenge.

Students profit from the flexibility of online teaching. Flexibility is especially important for "non-traditional" students. Therefore, the vhb concentrates on asynchronous forms of communication.

Students of the member universities do not have to pay fees, and they should have no additional costs when using our courses.

The quality of our courses is assured by a three-step system which makes the quality of online teaching much more reliable than the quality of face-to-face teaching.

The possibility of developing e-learning literacy while studying a subject which is part of the curriculum enhances the employability of the students without requiring additional effort.

Teachers experience a wider range of pedagogical possibilities. Many of them also appreciate the possibility of reaching more students with their teaching. Where online teaching is accepted as part of the professors' workload, they also profit from the flexibility online teaching permits.

By offering teaching on standard subjects online with tutors, teachers can concentrate on face-to-face teaching of more advanced or specialised subjects. This can be both more demanding and more satisfactory for the teacher.

Working within the vhb network is also attractive for professors because of the grants by which the vhb funds the development of online courses and their improvement and because of the financing of tutors.

Universities profit from the vhb in several ways:

By setting up the vhb as a common institution and by using its courses jointly, universities considerably enhance their teaching capacities. Not only can they offer additional subjects, they can also release teaching capacities which may be used for other purposes, e.g. for teaching subjects less suitable for online teaching.

Generally, universities face a time of greater competition. But this does not exclude cooperation. On the contrary, in order to survive in a world of growing competition, universities will have to cooperate not only in research, but also in teaching. The vhb is an excellent means of establishing and developing such cooperation. One of the positive effects of this cooperation is the establishing of common quality standards for online teaching.

The vhb avoids competition with its member universities. In particular, the vhb does not develop its own special courses for further and continuing education against payment.

From the point of view of the *state*, the situation can be characterised by the following considerations:

1. Public budgets will continue to be strained, because debts and deficits must be reduced.

2. The number of students will rise considerably at least until 2012. Later, demographical factors indicate a gradual decline. On the other hand, Germany needs to boost the proportion of her population with university-level education, and wants to attract more students from abroad. This could also mean growing numbers of students after 2012.

3. As far as we can see, higher education will continue to be basically state funded. The fees introduced from 2007, with a maximum of €1,000 p.a. per student, will not fundamentally change this situation.

4. Therefore, additional high-quality education must be provided in a cost-effective way. The development with public money of similar online courses in different universities would be economically unwise.

5. Online education which is financed, organised and exploited on a level that encompasses all universities within the responsibility of the Bavarian Ministry of Higher education appears to be an appropriate and necessary response to these challenges. Of course, it cannot be the only response.

To achieve its present position, the vhb had to concentrate on the following key factors, and it will go on doing so in order to continue its successful development:

- continuous improvement of courses and of administrative processes in order to reach maximum user-friendliness

- strict orientation towards the demand of the member universities

- cost-effectiveness

- development of quantity at a high quality level; when in doubt: quality before quantity

- close cooperation with universities and the ministry

- drawing upon the competence in the member universities, using their infrastructure as much as possible

- transparency in all decisions, especially in funding

- lean organisation, simple structures

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"La Metarmorfosis de la Educación a Distancia en el Tercer Milenio. Instituciones, Pro-grammas, Tecnologías, Roles..."

Panel Oct 5th 2007

"La Reconfiguración de las instituciones que ensenan a distancia. Universidad Abierta, Universidad a Distancia y Universidad Virtual".

Teacher education in the PUCPR MATICE project.

Ricardo Tescarolo - PUCPR
Mestrado em Educação, Pontifícia Universidade Católica do Paraná
Curitiba, Paraná, Brasil
rtescarolo@pucpr.br

Patrícia Lupion Torres - PUCPR
Doutorado em Educação, Pontifícia Universidade Católica do Paraná
Curitiba, Paraná, Brasil
patorres@terra.com.br

Elizete Moreira Matos - PUCPR
Mestrado em Educação, Pontifícia Universidade Católica do Paraná
Curitiba, Paraná, Brasil
elizete.matos@pucpr.br

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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