



## FROM BLACKBOARD TO MOUSE PAD:

### A Case Study of the Effectiveness of E-Learning and Technology In Teacher Education Programs

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#### INTRODUCTION

At the dawn of the new millennium, teacher education programs face numerous challenges: the growing diversity of student profiles, the arrival of new technologies, the reform of the curriculum, and the students' lack of motivation. According to Gadbois<sup>1</sup> (1989), "*Of all things that ail society [...] the most important is the lack of interest for any activity that doesn't offer short-term personal profit. This attitude is manifested by a great number of young people in their lack of motivation for schooling and for their no-preparation for an eventual social role.*" (Gadbois, 1989: 32)

Our changing society, now more and more centered upon information and communications technologies (ICTs), is giving rise to new educational needs as well as to new teaching methods. The arrival of Web-based courses and other Web-based resources presently appears to be one of the great focuses of pedagogical innovation at the university level. Furthermore, as these types of innovations greatly augment the possibilities of network implementation and of individual or group learning, the most basic teaching theories and principles such as those of Thorndike (law of effect and law of exercise), of Dewey (learning through action), of Piaget (construction of knowledge), and of Vygotsky (learning as a socio-interactive process) can be applied more readily and especially more frequently (see Grégoire, Bracewell and Laferrière, 1996<sup>2</sup>).

#### TRAINING TEACHERS FOR THE NEW MILLENNIUM

Universities and education faculties play an essential social role and are often perceived as a model or source of innovation. However, in terms of the integration of technologies, the opposite is often the case. Bibeau actually asserts that ICTs are present in every area of society *except* education.<sup>3</sup> Several studies<sup>4</sup> highlight that, while new teachers do have a certain degree of knowledge with regard to ICTs, they have little know-how or *technopedagogical* ability with which to

integrate those technologies into their teaching practice. This assertion is not limited to Canada; it applies equally to future teachers in the United States and Europe. The international nature of the problem reinforces the relevance of studies or pilot-projects dealing with this particular aspect of teacher training.

Elementary and high schools are also victims of the gap between teacher-training and a society immersed in technology, as they are subject to the influence of newly trained teachers and graduates of teacher-training programs. According to many, the difficulties encountered when ICTs are introduced into schools could be due in part to the absence of models for future teachers. Duchâteau, on the other hand, contends that the failure of technologies in schools results from the disparity between reality and the promises of over-enthusiastic promoters who often launch technologies in schools while the school system and teaching practices remain unchanged and therefore unprepared for this transition.<sup>5</sup>

In a world where the explosion of numeric technologies is outpacing the means of accessing knowledge, the integration of ICTs in university pedagogy has a major impact. It leads to a modified task for the teacher-trainer, an altered teaching organization, and a change in the framework for learning and the student's approach to knowledge acquisition.<sup>6</sup> Until recently, education has dealt mostly with learning about technologies instead of working with them in the context of leaning experiences. However, we argue that ICTs should not be considered an extension of the traditional classroom, but rather a tool promoting the use of learning strategies, notably within epistemological perspectives such as those brought forth in the context of constructivism.<sup>7</sup>

#### INTEGRATING ICTS INTO TEACHER EDUCATION PROGRAMS: PROMISING PILOT-PROJECTS

Aware of the challenges stemming from university teaching, particularly those pertaining to the students' motivation to

learn and to the development of richer technological environments, it was decided to implement four types of Web-based courses as well as develop other Web-based resources in a teacher education program in a Quebec (Canada) university:

- a 100 % Web-based course (the only compulsory, “*totally*” Web-based course in teacher education programs in Canada);
- a 50 % Web-based course in which a Web-based approach or Web-based modules were combined with “regular” in-class teaching;
- a regular-classroom course with Web-based resources and compulsory activities and assignments; and
- a Web-based resource for students during their field experiences in schools (*practicum*) within the teacher training program.

### GOAL

The goal of this experiment was to study and better understand the various effects of the implementation of various types of Web-based courses and resources in a teacher education program. Our starting hypothesis was that Web-based courses and other Web-based resources, with their nature promoting self-determination, feelings of competence and affiliation (Deci and Ryan, 2000<sup>8</sup>), would have a positive impact on the motivation of student teachers and on their learning. As well, we expected this Web-based course to have a positive impact on the student teachers’ willingness to use new technologies during their practicum (field experience in the schools).

### METHOD

#### Subjects

All students enrolled in the various types of Web-based courses developed, as well as all students in their third or fourth year of a four-year teaching program were selected to participate (n = 429). They had a mean age of 21.

#### Quantitative measures and analyses

An adapted version of a motivation scale developed and validated in Canada, the Motivation in Education Scale by Vallerand, Blais, Brière and Pelletier<sup>9</sup> (1989), was administered three times to all students who were participating in the Web-based courses. The first measure of motivation took place at the beginning of the first class. The second measure was taken after the third week of the course, when students were fully informed of the particular nature of their learning environment. The third measure was taken in the twelfth week of the course.

#### Qualitative measures and analyses

Interviews were conducted with students (n = 46). The results are also a product of the analysis of electronic mail received (n > 5300), messages posted on an electronic (Web-based) billboard (n > 1200) and transcripts of conversations held in “chat” (synchronous) mode (n = 52). It appears important to mention here that the qualitative analysis of such data would seem to be an increasingly promising means for dealing with qualitative data in education, especially in light of the teaching methods and the learning environment offered to the students taking “virtual” courses held on the internet (Winiecki, 1999<sup>10</sup>).

### RESULTS OF ONE PROMISING PROJECT

The results presented are based on the analysis of data collected during the 18 months of one pilot project (Project #1, a “100 %” Web-based course).

- analysis of more than 5300 e-mails received;
- analysis of synchronous conversations (chat); and
- analysis of interviews conducted with student teachers who participated in the project.

A total of 12 groups of 35-55 students took part in this one-semester course offered several times between January 1999 and December 2000. The analyses conducted highlight that students in the course were faced with two important challenges, while also benefiting from several significant advantages.

While it is easy to presume that the technological aspects of the course would represent the most serious obstacles for the student teachers, the results of our analysis demonstrate that this was not the case: problems related to information technologies came in second. The main difficulty encountered by students seemed to be their lack of autonomy or the trouble they had in learning by themselves, in managing their own learning. In other words, as noted by Lamontagne, the students had the most trouble in learning anew to learn.<sup>11</sup>

Despite these obstacles, analysis of the transcribed *chat* conversations and of the e-mails received exposes the advantage of integrating ICTs into teacher education programs. The pilot-project experienced in Quebec (Canada) has enabled us to note the change that occurs among future teachers when they are confronted with ICTs in their practical training: a change in their motivation to learn using ICTs, as well as in their attitude towards learning to use ICTs -- learning with ICTs and learning about ICTs. The experience they undergo as learners, when faced with the integration of technologies in the context of a compulsory university course, is likely to shed a positive light on the integration of ICTs in general. It may also create favorable conditions and incentives for further integration of ICTs in their own teaching, either during a practicum or during their professional teaching endeavors.

Technologies are then perceived as learning tools with which the learners become more autonomous and more analytical in the face of dilemmas; they must find credible and relevant sources of information in order to answer their own questions. Other advantages have also been identified.

- Elimination of physical limits traditionally imposed by the classroom, leading to new, more open access to learning.
- Greater access to information and knowledge.
- Increased motivation to learn for future teachers.
- Better learning, which in turn is more likely to sustain the cognitive development of learners.
- More effective and custom-made teaching.
- More efficient teaching management (for educators).
- Improved and more frequent communication (among educators and learners, among the learners themselves, and also among the educators).
- Enhanced development of critical thought, thanks to increased communication.
- Greater autonomy for future teachers.

## CONCLUSION

As Gutenberg redefined access to knowledge with the invention of the printing press, today's society has the potential to make a giant leap forward. In this study, student teachers confronted with the integration of technologies in their learning were required to view their relation to time and space differently; they had to acquire a new way of learning that seemingly provided them with increased motivation. However, integrating new information technologies in university pedagogy represents an enormous challenge, and the disturbances that will inevitably follow must be met with both enthusiasm and wariness. The pilot-projects implemented in Quebec have allowed us to ascertain that there are substantial advantages in integrating ICTs in teacher education programs, although there remains a large and considerable gap between the "real" university classroom and the virtual, technology-enhanced university classroom.

<sup>1</sup> Gadbois, L. (1989). Des classes spéciales pour élèves motivés : vers la formation d'une nouvelle élite. *Prospectives*, Avril : 67-72.

<sup>2</sup> Grégoire, R., Bracewell, R., Laferrière, T. (1996) L'apport des Nouvelles technologies de l'Information et de la Communication (NTIC) à l'apprentissage des élèves du primaire et du secondaire, *Revue documentaire*. Ottawa: Réseau scolaire canadien (RESCOL). <http://www.fse.ulaval.ca/fac/tact/fr/html/apport/apport96.html>

<sup>3</sup> Bibeau, R. (1999). L'élève rapaillé. Montréal : Université de Montréal. Document électronique téléaccessible à l'URL : [http://netia59.ac-lille.fr/Ref/pedagogie/Robert\\_Bibeau/rapail2.htm](http://netia59.ac-lille.fr/Ref/pedagogie/Robert_Bibeau/rapail2.htm)

<sup>4</sup> See Karsenti, T. & Larose, F., (2001). *Les TIC...Au cœur des pédagogies universitaires*. Québec : Presses de l'Université du Québec.

<sup>5</sup> Duchâteau, C. (1996). Pourquoi l'école ne peut intégrer les nouvelles technologies ? Contribution au symposium 'L'école de demain à l'heure des technologies de l'information et de la communication, Colloque du REF, Montréal, septembre. Document électronique téléaccessible à l'URL : <http://bigbox.det.fundp.ac.be/~cdu/articles/ref2.html>

<sup>6</sup> LeFoe, G. (1998) *Creating Constructivist Learning Environments on the Web : The Challenge in Higher Education*. ASCILITE 1998 : Flexibility, the next wave, Wollongong (Australie), 14-16 décembre. Revue électronique téléaccessible à l'URL : <http://www.ascilite.org.au/conferences/wollongong98/asc98-pdf/lefoe00162.pdf>

<sup>7</sup> Haughey, M. (2000). Pan-Canadian Research Options : New Information Technologies and Learning. *Pan-Canadian Education Research Agenda, June*. Toronto : Canadian Association of Education (CEA), pp. 121-136. P 121

<sup>8</sup> Deci, E.L., et Ryan, R.M. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55 (1), 68-78.

<sup>9</sup> Vallerand, R.J., Blais, M., Brière, N., & Pelletier, L. (1989). Construction et validation de l'Échelle de Motivation en Éducation. *Revue canadienne des sciences du comportement*, 21, 323-349.

<sup>10</sup> Winiecki, D. (1999). Studying and Analysing Asynchronous Conversations in Distance Education. Communication présentée lors du First International Interdisciplinary Conference Advances in Qualitative Methods (Edmonton, mars).

<sup>11</sup> Lamontagne, D. (1999). L'autonomie des apprenants à distance. *Infobourg, La revue de la pédagogie branchée*, 2 (1) : 24.