

Do Canadian prospective teachers have the abilities to teach with technologies?

INTRODUCTION

Despite the many studies in the last decade showing that ICT are effective learning tools, not all teachers use them on a regular basis in the classroom (Bauer and Kenton, 2005). Nor do they integrate them into the curriculum. Is the fact that teachers make little use of ICT about to change? Will Canadian teachers-in-training be well prepared to integrate information and communication technologies into the classroom in 2008? To answer this question, an extensive investigation was undertaken. The objective was to gain, in the province of Quebec (Canada), an overview of the level of mastery of one of the twelve professional competencies that teachers-in-training must acquire by completion of the education program: the ability to integrate information and communication technologies (ICT).

ICT and the training of Quebec's future teachers

To grasp the context for this study, a brief explanation of the role of ICT in Quebec's teacher-training system is required. In 2001, the education ministry of Quebec created a frame of reference for teachers-in-training. Twelve professional competencies were established for teacher training under the four-year bachelor of education program. Firmly based on a philosophy of professionalism and a cultural learning approach, the guidelines aimed to improve training, with consequent higher student graduation rates, an issue in Quebec (over 30% of students do not complete high school).

Of the 12 competencies identified by the province, this study focuses on the pedagogical use of information and communication technologies (ICT) in teacher education programs: "Integrate ICT in the preparation and delivery of teaching/learning activities, and for instructional management and professional development purposes."¹ These six components will be presented in detail in the conference.

METHODS

Participants

This study was conducted at nine French-language universities in Quebec that offer teacher-education degrees. A total of 2065 students (prospective teachers) in the third and fourth years of the four-year undergraduate program participated in the study up to 2006. They had to pass each of the four years in the program, with practice teaching hours increasing in successive years. Third and fourth year students were selected for their lengthier classroom experience, particularly in teaching internships. Third-year students had completed about 60 days of teaching practice, and fourth-year students had completed up to 120 days. Thus, they had substantial experience in the classroom.

Measuring instruments and data analysis

To achieve the study objective of gaining an overview of the level of mastery of the professional competency, (i.e. to integrate information and communication technologies), questionnaires were administered and group interviews were held. Questionnaires were divided into three sections: 1) general information; 2) general ICT skills; and 3) use of ICT for instructional purposes (during internships). The questionnaire comprised Likert-scale, closed-ended, and short-answer questions. Five group interviews were held with 34 participants to complete the data collection.

Statistical analyses were performed using SPSS 14.0 on the data obtained from the Likert-scale and closed-ended responses. Qualitative data obtained from the group interviews and short-answer responses to questionnaires were analyzed using N'Vivo and FileMaker Pro, respectively, following the content analysis approach recommended by Van der Maren (1995).

¹ MEQ Professional Teaching Competencies, *ministère de l'Éducation du Québec*.

RESULTS

Certain results were subdivided into two categories: teachers-in-training for primary² and secondary³ schools. This was intended to highlight some interesting differences in the findings. Results on access to technologies are presented first, followed by results on general technical skills. Second, study results are presented in relation to the research objective. Thus, in order to gain a more accurate picture of the professional competency of ICT integration, results are presented according to the six above-mentioned components.

Teachers-in-training are more connected than average

Results show that 98.8% of teachers-in-training enrolled in the primary education program (PEP) and 97.8% of those in the secondary education program (SEP) had access to a computer at home, and 92.1% (PEP: 93.3%; SEP: 91.4%) were connected to the Internet.

Strong basic software skills; development needed on more specific uses

The data show that teachers-in-training have largely mastered the basic software that they regularly use at university and at home. For example, on a 6-level Likert scale (none, beginner, fair, good, very good, excellent), over 95% felt they were good or excellent at word processing, email, Internet navigation, and search engines. Moreover, over 70% felt they had mastered presentation software (good, very good, or excellent), while about 68% felt similarly qualified in the use of diverse communication tools (forum and chat). Other results also illustrate that they were far less comfortable with other technological tools that would be highly useful for instructing and learning.

Components of the professional competency to integrate ICT

In this section, results are presented according to the six components of the Quebec education competency. Data were obtained from questionnaires and group interviews.

Component 1: Critical judgment regarding ICT in a social context

A result among others shows that the group interviews revealed that teachers-in-training appear to have developed good critical judgment regarding ICT. They realized the many benefits of integrating ICT into the classroom, mainly for instructional purposes (access to resources, class management, preparation of teaching materials, management and distribution of teaching materials, variation in teaching methods).

Component 2: Increased use of email: disinterest in other communication tools

Results emphasize that teachers-in-training regularly use email to communicate. In fact, 65% of PEP and 74.3% of SEP students used email to contact colleagues almost daily, and in connection with their course work. Other communication tools such as forums and chat sites were little or not at all used for professional purposes (respectively 30.2% and 22.9% for PEP, and 39.2% and 27.1% for SEP).

Component 3: Assesses the instructional potential of ICT to develop competencies: awareness needs improvement

Teachers-in-training must consider relevant instructional resources that are linked to the school program and critically choose appropriate software to ensure the best educational quality. Resources should allow students to develop their intellectual and relational skills. Results on the discussion groups show that teachers-in-training appear little inclined to use ICT to promote diverse skills development in students. They seemed aware of the benefits of ICT to facilitate learner access to resources and generate enthusiasm for learning, but only slightly aware of the potential of ICT to develop students' skills.

Component 4: Heavy use of ICT to research information and solve problems

Communication is at the heart of the expression "information and communication technologies," and equally at the heart of the changes ICT have brought to education, more precisely, since the arrival of the Internet. Some results in this study are highly encouraging in terms of teacher training and the teaching profession, particularly concerning the effective use of ICT to research, interpret, transmit information, and solve problems. Of the PEP and SEP

² The Bachelor of Education, Pre-primary and Primary, confers the qualification to teach students aged approximately 4 to 11 years.

³ The Bachelor of Education, Secondary, confers the qualification to teach students aged approximately 12 to 17 years.

students, 99.7% and 99.3% respectively used Internet research engines to seek information. Thus, the Internet has become the primary information source for teachers-in-training.

Component 5 : Uses ICT for professional development?

The fifth component involves using ICT for professional development. Teachers-in-training must be prepared to use ICT effectively to build exchange and continuous education networks in their teaching area and practices. Results show that 72% (PEP) and 72.9% (SEP) said they used ICT (i.e. Internet resources, teaching sites, official sites, and exchanges using ICT) for professional development. This reveals that they indeed use technologies, particularly communication tools, for professional development.

Component 6: Guide students in the use of ICT at school

The sixth component is to guide students in the use of ICT to learn. However, results indicate that teachers-in-training use ICT mainly for lesson planning. Around 78% (PEP: 79.5%; SEP: 77.3%) regularly used ICT to plan daily and/or weekly lessons. During the group interviews, one participant said that all lesson plans were prepared with a computer, since changes were easy to make.

The least encouraging result of this study, and in line with the vast majority of international inquiry results in the field (see, e.g., the OECD inquiry, 2004), shows that technologies are still rarely used in the classroom by teachers-in-training, whether primary or secondary. In fact, barely 15.6% (PEP) said they regularly used ICT in class. This result is all the more disappointing because all of Quebec’s primary schools have been connected to the Internet since 1999, and have been equipped with computers for many many years. On top of that, in a good number of primary schools, computers are part of the curriculum, and have been a mandatory subject for several years. In secondary school, the results are even more worrisome. Barely 6.8% of teachers-in-training said they used ICT regularly in the classroom (Figure 1).

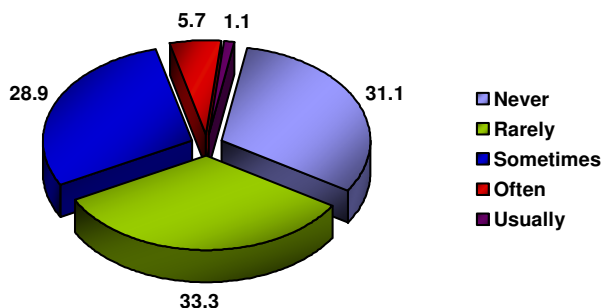


Figure 1. Percent uses of ICT in the classroom among primary teachers-in-training.

As to their ability to guide students in the use of ICT in class, results again show that the competency level is insufficient. Only 67.9% in the PEP category guided students in the use of ICT for educational purposes, and only 53.4% in the SEP category.

Inferential statistical analyses were also performed to better grasp the factors liable to explain this low use of ICT in the classroom. The findings reveal that those who took an ICT integration course during the degree program ($M = 2.79, ET = 0.96$) were significantly more likely to guide students in the use of ICT than those who had not taken such a course ($M = 2.45, ET = 1.01$), $t(2021) = 5.88, p < 0,001$. When it came to preparing learning activities that used ICT, teachers who had taken the course ($M = 2.63, ET = 0.93$) were significantly more likely to plan learning activities that used ICT than those who did not take the course ($M = 2.30, ET = 0.93$), $t(2032) = 5.83, p < 0,001$.

CONCLUSION: WINNING CONDITIONS, AND CHALLENGES TO OVERCOME

Overall results are encouraging in many respects. Although they concur with several studies (e.g., Bennett & Daniel, 1999; Brinkerhoff, Ku, Glazewski & Brush, 2001; Swain, 2004, 2006) that underscore the basic technical skills of teachers-in-training to the detriment of their ability to integrate ICT in the classroom, results of the present study seem somewhat more promising. In Canada (Quebec) prospective teachers have access to both the equipment they need to familiarize themselves with ICT and mastery of the basic tools. The data also indicate that they regularly and critically use ICT to communicate, research information, solve problems, and develop professionally. Although it is true that these factors are essential but insufficient for full pedagogical integration of ICT, they are still winning conditions, and a positive scenario in the near future may be contemplated.