

What are the Factors Related to the Successful use of ICTs by Student-teachers at the Elementary-school Level?



[New Search](#) [Print Abstract](#) [E-mail Abstract](#) [Full Text](#) [Save to My Collections](#) [Export Citation](#)

[Login or register](#) for free to remove ads.

Ads by Google

[Teachers Strategies](#)

[Study Habits](#)

[Teachers Lessons](#)

[Students](#)

Villeneuve, S. & Karsenti, T. (2005). What are the Factors Related to the Successful use of ICTs by Student-teachers at the Elementary-school Level?. In P. Kommers & G. Richards (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005* (pp. 2726-2731). Chesapeake, VA: AACE.

Retrieved from <http://www.editlib.org/p/20494>.

[OpenURL Link](#)

[Share on Twitter](#)

Pages You've Visited

Abstracts

[The impact of online teaching videos on the development of self-efficacy...](#)

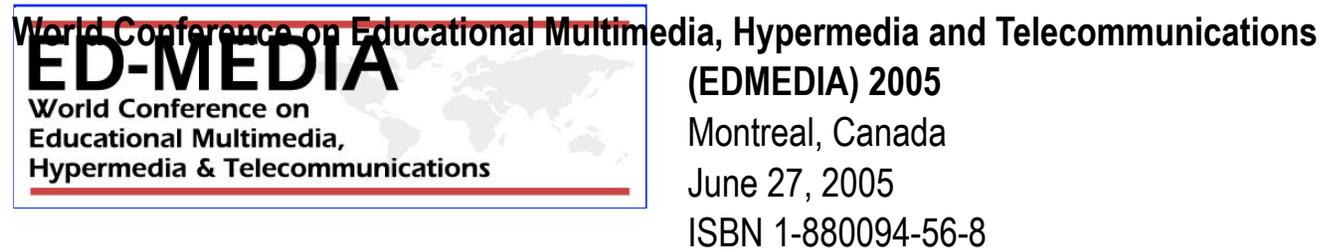
[Analysis of Advantages and Disadvantages of Two Asynchronous Communication...](#)

[Can ICTs Help Student Teachers Overcome Teaching Challenges Encountered...](#)

[The Development of an Eportfolio for Student Teachers](#)

[The efficacy of](#)

Conference Information



Piet Kommers & Griff Richards
AACE

[More Information on EDMEDIA](#)
[Table of Contents](#)

Authors

[Stephane Villeneuve](#), [Thierry Karsenti](#), University of Montreal, Canada

Abstract

The present study was conducted in the province of Quebec (Canada). Almost 7000 students completing their bachelor's degree in education were surveyed. This study was implemented in order to understand which factors contribute or facilitate the greatest amount of use of information and communication technologies (ICT) by teachers. More precisely, the objective of

[eportfolios ...](#)

[ICT for quality
education: Lessons
from pioneering
schools in Africa](#)

Feedback and
Suggestions please email
info@editlib.org.

EdITLib is a development
of Global U - Learning &
Technology Innovation
Sponsored by the
[Association for the
Advancement of
Computing in Education](#)

© Copyright 2005 - 2010
[Global U, LLC](#)

What are the Factors Related to the Successful use of ICTs by Student-teachers at the Elementary-school Level?

Stephane Villeneuve, M. Sc.
Universite de Montreal
Department of Psychopedagogy and Andragogy
Canada (Quebec) H3C 3J7
s.villeneuve@umontreal.ca

Thierry Karsenti, Ph. D.
Universite de Montreal
Department of Psychopedagogy and Andragogy
Canada (Quebec) H3C 3J7
thierry.karsenti@umontreal.ca

Abstract: This study explored the factors that contribute the most to the use of ICTs by prospective teachers during their internship. The study took place in Canada (Quebec) and was comprised of close to 7000 student teachers in all teaching programs, including elementary teaching. Our results show that the number of computer in classrooms connected to the Internet, the year of education, the use of ICTs by mentors and the self-efficacy perception are the most important in using ICTs during internship. The use of ICTs by mentors was the factor with the greatest weight; when mentors were using “often” to “always” ICTs in their teaching, student-teachers had 336 more chances to use ICTs in their internship. These factors should be taken in consideration when elaborating policy or curriculum in institutions where teachers are trained.

Introduction

According to Meece (1993), current educational problems go beyond declining achievement scores: Most schools today face a crisis in student motivation. Student motivation is critical for learning and several researchers have found a positive and robust correlation between motivation and achievement (Pintrich and Schunk, 2002). Among the various learning contexts that can enhance student motivation, information and communication technologies (ICTs) are often known to fascinate children as highlighted by the *ICT and pupil motivation* report from the British Educational Communications and Technology Agency (BECTA, 2002). Moreover, many studies and governmental reports show that ICTs are more and more an integral part of children’s lives... in their homes. But what about the use of ICTs in schools? Recent studies demonstrate the lack of ICT use by teachers :

Major investment outlays over the past 20 years have brought modern Information and Communications Technologies into nearly all schools in the most advanced OECD countries, but the extent to which computers are in day-to-day use in these schools remains disappointing, according to a new OECD report [...]. Educational use of computers is in fact sporadic across all countries [...]. On average across the countries surveyed [...] a minority of teachers across countries regularly use standard computer applications (OECD, 2004).

This result is not necessarily surprising when most teachers are often only encouraged to acquire basic knowledge on ICT use (Eurydice, 2004).

Objective

We decided to conduct this study in order to determine which factors may contribute or facilitate the greatest amount of use of ICTs by teachers. More precisely, the objective of this study is to understand which factors contribute the most to the use of ICTs by prospective elementary-school teachers during their internship (*practicum*).

Theoretical Framework

According to Snoeyink & Ertmer (2001), scientific literature reveals that the key barriers to using ICTs can be grouped into two main categories: External and internal factors. External factors are related to the teaching context of educators. These include the lack of access to appropriate ICT equipment, the lack of training time, exploration and preparation, the lack of theoretical models of good practice in ICTs (often during initial training, but also during professional development training sessions), unreliable equipment, lack of technical, and administrative and institutional support.

Internal factors are mainly related to the teachers themselves. They include negative attitudes or motivation towards the use of ICTs in education, frail self-efficacy beliefs in the use of computers (especially among elementary-school teachers), significant computer anxiety and fear of change, or a lack of personal skills involving change management.

Method

The present study was conducted in the province of Quebec (Canada). Almost 7000 students completing their bachelor's degree in education were surveyed. Among these, close to 3500 prospective elementary-school teachers. The administered questionnaire consisted of five sections, namely "General information" (gender, age, etc.), "Mastery of ICTs", "Motivation towards ICTs" (this section of the questionnaire consisted of a motivational scale based on Deci and Ryan's, (1991) self-determination theory), "University or Academic experience with ICTs", and finally, "ICT use during internship".

A logistic regression analysis method was used to predict the use of ICTs. The logistic regression analysis method consists of a statistical procedure developed for the analysis of multivariate models with dichotomous outcome measures (Menard, 1995). Parameters estimated ($\text{Exp}(B)$) by a logistic regression model can be converted easily into odds ratios. The odds ratio represents the odds of using ICTs by elementary-school teachers during their internship as a function of each factor found in the model (Tabachnick, 2001).

Our study differs from previous ones in many ways. First, we conducted a survey on a very large sample of prospective teachers. Second, the type of statistical analysis used might help us understand which factors play a significant role on the use of ICTs by prospective teachers, and also the weight of their respective impact.

Results

The results of the analyses conducted reveal that ten variables were significantly related to the use of ICTs by prospective elementary-school teachers during their internship.

External factors

Among the most important external variables influencing use of ICTs during internship (Tab. 1), we found that the number of computers connected to Internet present in the classroom was ranked 3rd over 7 external factors and revealed that the presence of 5 personal computer (PC) available in classroom promoted the use of ICTs by over 20 times compared to an absence of PCs. The results also reveal that the year of education play an important role. In fact, as students progress in their studies more they are inclined to integrate ICTs in their practica. Specifically, in their last year of study, students were 40 times more likely to integrate technologies than those in the first year. By far and one of the most significant factors which emerged from this study, was the use of ICTs by the associate-

teacher in classroom. In fact, students who had associate-teachers that included ICTs in their teaching were 336 times more inclined to use them during their practica.

| | Wald | df | Exp(B) | Comparison value |
|---|--------|----|--------|------------------|
| University | 22.81 | 8 | | I |
| A | 0.04 | 1 | 0.83 | |
| B | 0.85 | 1 | 1.59 | |
| C | 1.92 | 1 | 2.47 | |
| D | 0.68 | 1 | 1.74 | |
| E | 9.26 | 1 | 5.62 | |
| F | 7.02 | 1 | 5.24 | |
| G | 0.57 | 1 | 0.61 | |
| H | 0.00 | 1 | 0.99 | |
| Year of education | 50.82 | 3 | | First year |
| Second year | 4.14 | 1 | 3.20 | |
| Third year | 12.96 | 1 | 8.91 | |
| Fourth year | 33.98 | 1 | 40.03 | |
| Excel | 14.60 | 4 | | Inexperienced |
| Average | 2.29 | 1 | 1.69 | |
| Good | 13.66 | 1 | 4.54 | |
| Very good | 4.17 | 1 | 2.84 | |
| Expert | 0.93 | 1 | 3.79 | |
| Number of PCs in classroom | 11.67 | 4 | | 0 |
| 1 to 2 | 4.83 | 1 | 0.31 | |
| 3 to 4 | 1.10 | 1 | 0.52 | |
| 5 to 6 | 2.64 | 1 | 7.19 | |
| 7 and more | 2.18 | 1 | 0.03 | |
| Number of PCs in classroom connected to Internet | 17.66 | 4 | | 0 |
| 1 to 2 | 14.89 | 1 | 4.93 | |
| 3 to 4 | 9.34 | 1 | 11.01 | |
| 5 to 6 | 0.10 | 1 | 22.01 | |
| 7 and more | 1.86 | 1 | 21.67 | |
| PC laboratories access | 31.56 | 5 | | Never accessible |
| No laboratories | 0.11 | 1 | 1.42 | |
| Rarely accessible | 0.80 | 1 | 2.70 | |
| Sometimes accessible | 0.92 | 1 | 2.72 | |
| Often accessible | 5.97 | 1 | 12.60 | |
| Always accessible | 2.26 | 1 | 5.17 | |
| Mentor ICT's utilisation | 102.37 | 2 | | Never to rarely |
| Sometimes | 47.86 | 1 | 11.83 | |
| Often, Always | 97.01 | 1 | 336.05 | |

Table 1: External factors

Internal factors

Self-efficacy, that is “people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986) influenced the use of ICTs. In particular, student-teachers

who felt more competent with ICTs were 6 times more likely to integrate ICTs during their practica than those who considered themselves to be “Not at all” or “Occasionally” competent with the use of technologies. Personal use of ICTs by student-teachers to do their homework also played a secondary role (Tab. 2).

| | Wald | df | Exp(B) | Comparison value |
|---|-------|----|--------|--------------------|
| Self-efficacy | 35.88 | 1 | 6.24 | Never to Sometimes |
| Personnal ICT use in school work | 10.39 | 2 | | Never to Sometimes |
| Often | 0.51 | 1 | 0.67 | |
| Always | 1.31 | 1 | 1.82 | |
| Mentor ICTs perceived competencies | 17.68 | 4 | | Very weak |
| Weak | 0.23 | 1 | 0.81 | |
| Average | 2.19 | 1 | 0.50 | |
| Good | 11.90 | 1 | 0.14 | |
| Excellent | 8.00 | 1 | 0.10 | |

Table 2: Internal factors

Discussion

At the elementary-school level, an important study observing 20 years of ICT use in English and Scottish primary schools revealed that the use of ICTs is the weakest aspect of professional practice (Robertson, 2002). The Eurydice report (2004) also states that ICTs specialized elementary-school teachers are extremely difficult to recruit. Also, only 50% of European countries have an obligatory ICT component in their training teaching programs. In Canada, though computer courses are part of teacher education programs since 1994, it is only in recent years that these courses target the pedagogical use of ICTs, and not only the mastery of ICTs.

The results of our study show that some factors play an important role in the use of ICTs by prospective teachers. The large sample allowed us to clearly identify which factors play a significant role in the use of ICTs by elementary prospective school-teachers (Fig. 1).

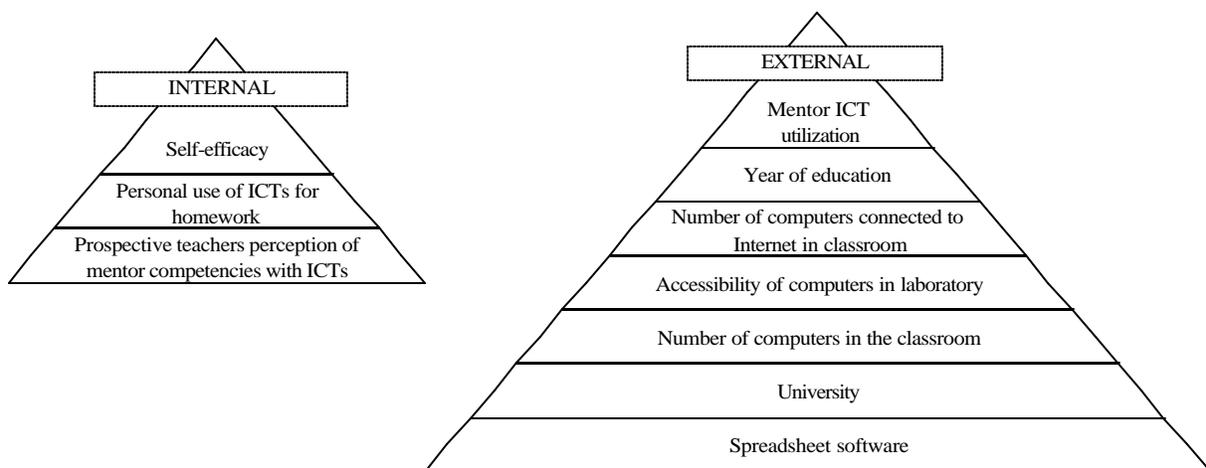


Figure 1: Internal and external factors influencing use of ICT during internship of student elementary school-teacher.

The number of computers present in the classroom and connected to Internet influence the use of ICTs during internship more than only having unconnected computers in the classroom. It appears that student-teachers use ICTs more enthusiastically when Internet is present, worrisome result knowing the variety of pedagogical software available that do not require the use of Internet.

The results also revealed that the year of education play an important role. The fact that students at the end of their education will be more likely to use ICT during their profession is encouraging. It shows that an evolution is taking place throughout the years. One must question, however, if institutions should put more emphasis on ICT courses in the first years?

The use of ICTs by the associate-teacher in classroom must not be neglected. The findings confirm the fact that the mentors have a significant impact on their intern students. Conversely, there are difficulties stemming from the fact that mentors, in large proportions, are from a generation where there were fewer ICTs. In fact, this generation of teachers close to the retirement, seems to not be the ones who integrate ICT the most and that are less at ease using them (Editor, 1999; Plüss, 2002)

“My thoughts lead me to feel that I needed to place some control on the extent to which I would allow my students to use the web.... I was a bit jealous how little time it took them to do background research for a paper they were writing compared to what I had to endure” (Editor, pp. 2-3)

Finally, we think that continuous training should be given to actual teachers. This maybe an important key in the development of ICT use by their interns thereby perpetuating the knowledge to a future generation of teachers.

The most important internal factor among the three in our study was self-efficacy. Results showed that student-teachers who feel more competent with ICTs are 6 times more likely to integrate ICTs during their practica compared to their counterparts (low self-efficacy perception with ICTs). This result should influence de development of curricula for universities. In fact, to improve self-efficacy in student-teacher's, there is a need for more practice, and to gain more practice, more practical courses seem to be in order. For instance, Quebec policy has tended to remove ICT courses assuming that ICTs will be integrated for each subject throughout the curriculum. However, given that there is currently no way to ensure the use of ICTs by professors, there may be consequently fewer role-models for student-teachers.

Future studies should therefore examine the impact of such policy changes on ICT use. Moreover, given the extent to which present teachers are role-models for student-teachers concerning ICT use, it would be important to observe how present teachers are actually integrating ICTs during their practice. Finally, according to our results, pedagogical software not related to the Internet is often neglected. Studies examining the factors facilitating the integration of such software are needed.

References

- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social & Clinical Psychology*, 4(3), 359-373.
- Becta. (2002). ICT and pupil motivation. Retrieved on March 2, 2005, from http://www.becta.org.uk/page_documents/research/wtrs_bibs_motivation.pdf
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New-York: Plenum Press.
- Editor. (1999). From inkwells to an electronic learning community. *Journal of Technology*, 10(2), 2-3.
- Eurydice. (2004). *Key data on information and communication technology in schools in Europe*. Bruxelles: Eurydice.
- Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology*, 85(4), 582-590.
- Menard, S. (1995). *Applied Logistic Regression Analysis*: Sage Publications.

OECD. (2004). *Completing the foundation for lifelong learning: An OECD survey of upper secondary schools*: OECD. Retrieved on March 15, 2005, from http://www.oecd.org/document/1/0,2340,en_2649_33723_27443329_1_1_1_1,00.html

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and Applications (2nd Ed.)*. Columbus, OH: Merrill-Prentice Hall.

Plüss, M. (2002). Beyond the Generation Gap and Learning Technologies. Retrieved on March 10, 2005, from http://hsc.csu.edu.au/pta/gtansw/publications/itupdate/Digital%20Divide_files/gtaboom.pdf

Robertson, L. J. (2002). The ambiguous embrace: 20 Years of ICT in UK primary schools. *British Journal of Educational Technology*, 33(4), 403-411.

Snoeyink, R. & Ertmer, P. (2001). Thrust into technology: how veteran teachers respond. *Journal of Educational Technology Systems*, 30 (1), pp. 85-111.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using Multivariate Analysis* (3rd ed.). New-York: HarperCollins College Publishers.

Acknowledgements

We wish to thank the Social Sciences and Humanities Research Council of Canada (SSHRC), grant no. 410-2001-0397.