

## ICTs Click! ☺

Stimulating students' interest through the integration of ICTs in the classroom<sup>1</sup>

By Isabelle Cabot and Marie-Claude Lévesque

**In 2011, François Guité stated: “If the school system does not know how to integrate ICTs, ICTs will integrate education.” Rather than understand this techno-educational wave, we preferred to surf it by exploring the potential of ICT use in a class of French Reinforcement (which we could have done in a class of mathematics or of a different subject). It is known that the failure rate of the French Reinforcement course is a real problem in colleges and that the list of the causes of failure is long; however, the lack of motivation of the students appears to be the main problem. Furthermore, the theory of the development of interest by Hidi and Renninger (41(2): 111-127) leads us to believe that by creating a connection between something that students of the current generation enjoy (such as ICTs) and something that they dislike, even hate (such as a French Reinforcement class), an interest for what they dislike may appear and result in better performance of the students... On this theoretical basis, a PAREA study offered us a great opportunity to attempt an innovative approach!**

### Digital Technology, Success and Motivation

The youth of Generation C (for *Communication, Collaboration and Creation*) differ from their elders in that, being born after the digital revolution, they have integrated the use of this technology as naturally and intrinsically as they would have done a mother tongue (Ken Robinson). This mutation is so complete that Thierry Karsenti, appointed to the Canada Research Chair on ICT in Education, states: “The absence of ICTs could [...], in the medium-term, have a negative impact on the motivation of students, especially on that of boys because the difference between the presence of ICTs in society and the presence of ICTs at school would be too large.” (31). Since the 1980's, the educational community has known the pedagogical potential of ICTs and, between the delirious enthusiasm of some and the excessive distrust of others, has been attempting to update the variables that determine a relevant and successful educational integration of these now indispensable tools. Several studies done in Quebec and elsewhere in the world were intended to provide a framework of reference: generally, they agree that the pedagogical principles, the learning environment, and especially the teacher will take precedence over ICTs in importance, (it is agreed), as ICTs are mere tools. Thus, their effect on success is not intrinsic: it is only insofar that they contribute to certain determinants, such as active learning, interest, feedback, and metacognition that ICTs are likely to have some effect.

With respect to the impact that ICTs have on motivation, it also varies greatly depending on their use by teachers. According to Thierry Karsenti, it is important that ICTs support the teaching practices that take into account the determinants of motivation. Among these determinants, the *sense of control* should particularly be taken into account. The “winning” ICTs should also enable the student to exercise greater control over his or her learning (time, pace, place, and content) and offer him or her the possibility, if he or she wishes, of repeating an exercise and of making mistakes without feeling judged by another human being (which, in the context of a reinforcement class, is a significant advantage). In addition, the *sense of*

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<sup>1</sup> The work reported here was supported by grants from the PAREA of the MESRST.

*competency* of the students (another important motivational “motor”) is very important with respect to the use of ICTs (CEFRIO; Poelhuber et al.). That is why we thought that it would be appropriate to integrate them into a discipline where, on the contrary, the students feel less competent. Finally, the majority of college students prefer courses where ICTs are present and perceive their usefulness as much in their school life as well as to adequately prepare for the reality of the labour market; hence, the *sense of purpose* is positively correlated with interest. The literature also reports that ICTs have a positive impact on *affective commitment* (a concept similar to that of interest): students show a more positive attitude at school and perceive their learning in a more positive manner when technology is present in the classroom (Passey et al.). Finally, the novelty of the medium is likely to arouse *situational interest*, which is like a “spark plug” for interest. However, in a traditional French class, ICTs are sparsely used: there are few opportunities to exploit, for example, word processing software and correcting software (which may come as a surprise since they are the basic tools for writing as soon as the threshold of French classroom is crossed...). The effect of novelty here was therefore relatively easily to stimulate...

## **Method**

A study was planned that involved an experimental group (EG; 2 class groups = 55 students) and a control group (CG; 2 class groups = 52 students) who attended their French Reinforcement course in the autumn of 2012. The CG was taught in a traditional manner (Lévesque and Cabot), namely in a regular class where only the teacher had access to a computer connected to a projector. The students, for their part, worked using reference books and an exercise book in paper form. As for the EG, the course was taught in a computer lab where each student had access to his or her own station with a computer connected to the Internet (this connection could be controlled by the teacher using LanSchool software if necessary). Each station was equipped with the word processing software Microsoft Word, the correction software Antidote, as well as the software Word Q, which offers a word prediction function when typing and speech synthesis of the text provided throughout the writing process. At the beginning of the session, the students received basic training for all three of these computer programs; interestingly, some students, who because of a learning disability had already practiced using these programs in high school, provided invaluable assistance throughout the session, as other students would spontaneously ask them for help when they experienced technical difficulties. Thus, the status of these students went from “students experiencing difficulties” to that of “experts”, a role they assumed with obvious pleasure... a collateral benefit that we did not anticipate!

Every week, the teacher filed the entire content of the courses for the week on the platform Moodle; this included the theory presented in the form of PowerPoint documents, links to online exercises, exercises to be printed, as well as the instructions for the formative assignments. This approach offered several advantages by displaying the “daily menu” in its entirety. First of all, although theoretical concepts were generally briefly presented to the students, they were free to learn these concepts on their own in different ways. For example, some plunged straight into the exercises adorning their headphones and preferring to listen to their music via YouTube rather than patiently listening to the teacher’s presentation (who, of course, must not take being ignored by a part of the group personally...). When the students were “stuck” on a problem, they could simply find the specific passage in the PowerPoint presentation with the explanation for the problem. Thus, the students could select relevant

information without necessarily reviewing all of the theory (note that in French Reinforcement, much of the theory has already been covered in high school, or even elementary school; often it is only to refresh or to complete partial knowledge of a concept). Others raised their hand when they had a problem to ask the teacher to provide them with an explanation; still others preferred to ask a classmate. In short, each student had the opportunity to learn the material in his or her own way and, whenever possible, to choose amongst the various exercises (digital and paper) those which met the student's needs. The creation of a learning record (worth 30% of the final mark of the session) ensured that a minimum number of exercises were done every week.

Making the entire course accessible through the Internet, a daring bet, was not without arousing some concerns, in particular that of creating an explosion in absenteeism in the EG (indeed: what is the point of going to class if the entire course is on the Internet?). However, no significant difference was observed between the EG and the CG regarding absences. So it seems that students have a rather gregarious instinct regarding their learning: they prefer learning with their classmates and (dare we to believe!) with their teacher to studying alone...In addition, throughout the session, several students took advantage of the accessibility of the course contents on the Internet to avoid falling behind if they missed a class. Thus, they were able to attend the following class with the work done and without having to ask the teacher for help by e-mail or at the office. The possibility of such autonomy was greatly appreciated, notably by a student mother and a student suffering from chronic health problems: they were not afraid that they would "lose track" in the case of multiple absences. This could explain why only 6 students dropped out of the EG whereas 12 dropped out of the CG: even if with two or three consecutive absences, it was still possible to catch up to the rest of the group. And, the teacher could also take advantage of this when, one snowy morning, she was running down the hall several minutes late (and was convinced given the lack of noise coming from the classroom that the students had all left long ago...), rushed into the classroom to find the entire group, with headphones on, already immersed in the assigned work: they had simply started without her...

Writing texts is an important part of the French Reinforcement course. In addition to the word processing software, we deliberately chose to give the students free access, at all times and to all students, to tools generally considered as "accommodations" strictly reserved for certain students with a learning disability, such as correcting software and speech synthesis. Indeed, we, although supposedly experts in French, use them extensively to write and find them to be eminently useful: why deprive those who would benefit the most from them? We also relied on previous studies, especially those of Caron-Bouchard et al. and Ouellet, which suggested that the use of a correcting program by the students, in order to have a really positive impact on the quality of the students' French, should essentially, be part of the *time*. That is why, from the first week of the session and throughout it, the students were encouraged to use it (although they were never forced to use it). Thus, the majority of them used it every week. The speech synthesis also proved to be very popular, including for reading some texts in the program, placed on Moodle in Word format. Surprisingly, the majority of the students of the EG preferred to simultaneously activate the speech synthesis while reading the text on the screen. We believe that this was especially helpful for reading extracts of literary works dating back more than a century: the complexity of language and the use of antiquated expressions and phrasing can hinder and

slow the reading of the text, and even lead to simple errors in interpretation. However, the Word Q narrator (which, although being a robot, has a fairly lively intonation) smoothly progresses through the text without making the slightest mistake. This may help facilitate the reading and the understanding of the text.

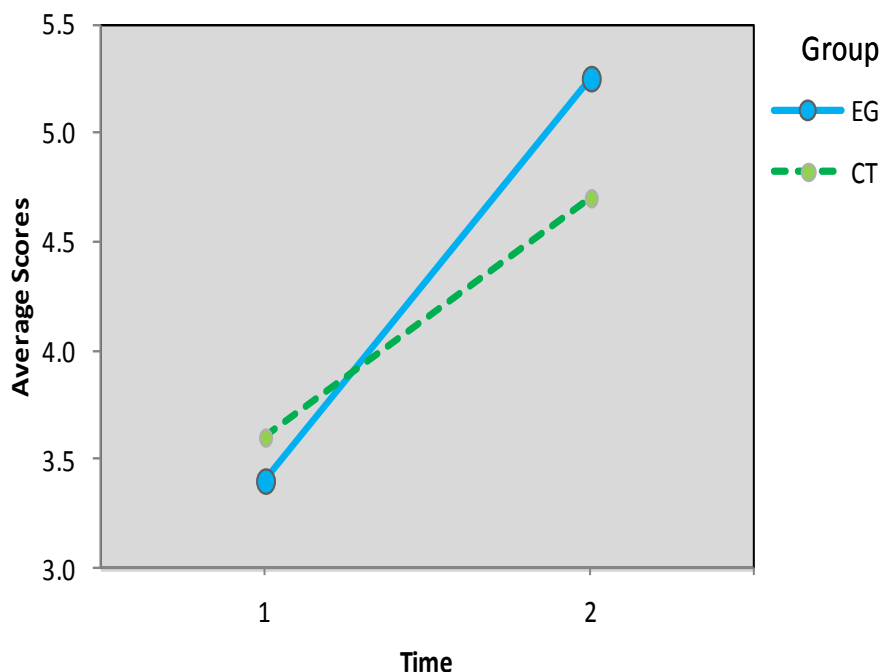
Another educational value of ICT use is the ability to more easily offer personalized feedback to students. In this course, an audiovisual technique was developed for correcting written work (the necessary tools and procedure were exhibited in the communication *Practical ICTs*, presented at the last AQPC conference, the PowerPoint presentation is available on their website). We were largely inspired by the work of Julie Roberge on audio correction. Thus, the students sent their work to the teacher by e-mail to which she replied with a link to a video where they could see and hear their teacher correcting and commenting on their work in real time. This method of communication led to many enthusiastic comments from the students who, they said, understood “way more” than when they were simply given back their work with handwritten comments on it. This method also enables the teacher to show (literally) the student where to click, how to verify this or that information on the Internet, in short to educate the student in a very personal way and this, without really lengthening the correction time.

### **Evaluation Method of the Impact of Pedagogy on Interest and Performance**

The general interest for French courses of all 107 students at the start of the session was measured and then their general interest for the Reinforcement course at the end of the session (the instruments used and statistical analysis are described in detail in the PAREA research report entitled *Integration of ICTs and Motivation in French*). An analysis of covariance (ANCOVA) was carried out on this data. In addition, the appreciation of the French teacher was measured at the end of the session because the two groups were from two different colleges in order to avoid contamination of the approach among the students. Given the well-known influence of the educational relationship on student performance, we made sure that this variable would not bias our results. Therefore, we integrated it into our analysis. At last, the final marks of the students for this course were obtained after the end of the session in order to determine the impact of the experimental condition on the success rate of the course, the main problem associated with the course (for both participating colleges, this rate is about 50%, year after year). A variance analysis (ANOVA) was carried out on this data.

### **Results**

No difference was found with the data for the appreciation of the French teachers: the EG teacher and CG teacher were equally appreciated in both groups which leads us to believe that this variable did not bias our results. The results from the variables for interest showed a significant positive effect ( $F(1,73) = 4.78; p < .05$ ) of the experimental learning environment on the interest of the students in the EG for the French Reinforcement course ( $n = 42$ ; average interest score = 5.22;  $SD = 1.28$ ) compared to the interest reported by the CG ( $n = 33$ ; average interest score = 4.65;  $SD = 1.21$ ). This result is illustrated in figure 1.



**Figure 1 Scores of general interest for French courses obtained before the experiment and scores of general interest for the French Reinforcement course obtained after the experiment, according to the group.**

As for the final marks for the course, there is also a significant difference ( $F(1, 106) = 9.53; p < .01$ ). The students of the EG performed better ( $m = 62.4; SD = 20.0$ ) than the CG ( $m = 49.4; SD = 23.6$ ). Furthermore, refining the analysis taking into account gender, it was found that the average final mark of the boys of the EG ( $63.5; s-t = 4.4$ ) was about 30 points higher than that of the boys of the CG ( $44.7; SD = 4.9$ ), which represents a significant statistical difference (Kruskal-Wallis test:  $p = .001$ ).

Finally, the success rates resulting from the final marks indicate that 37 of the 55 (67%) students in the EG successfully completed the course, while 24 of the 52 (46%) students from the CG were successful. The result of a chi-squared test indicates that this difference is significant ( $\chi^2(1) = 4.86; p < .05$ ). Moreover, an examination of differences of the success rate between the sexes revealed that the success rate of boys in the EG (75%) was 31% greater than that of boys in the CG (44%), which is statistically significant ( $\chi^2(1) = 4.39; p < .05$ ). The success rate of girls in the EG (63%) is 15% higher than that of the girls in the CG (48%), although this difference is not sufficient to be statistically significant.

### Discussion

The ANCOVA results having assessed the students' interest towards their French Reinforcement course at the end of the session revealed that, even by taking into consideration their appreciation at the start of the French courses and their expectations in the beginning, the students from the EG appreciated

their French Reinforcement course more than the students in the CG. This result is in line with Viau's assertions according to which ICTs influence motivation when their integration promotes the determinants (such as interest), for example, by providing the students with an activity that is meaningful to them.

Using open-ended questions, the students were asked to explain their appreciation of using ICTs to learn. One of the major reasons that they expressed is the autonomy that they offer: learning at their own pace, being able to do the exercises in the order they wished and returning to some elements when they wanted, including outside the classroom. It appears that these responses refer to the concept of sense of control, a condition generally accepted as essential to the successful integration of ICTs in the classroom. The appreciation expressed by the students that participated in the study towards activities in which they control the progression corresponds to the results of the Poelhuber et al. study on the technological habits of college students, in which 49% of respondents said they love or love to learn using computer programs in which they are in control.

As for the performance of the participants in French, it is noted that 67% of the students in the EG are proficient enough in the language to be admitted to the 601-101 course (Writing and Literature), compared to only 46% of the students in the CG. Furthermore, the experimental context seems to have benefited boys more as 75% of the boys from the EG passed their French Reinforcement course, versus only 44% in the CG. This finding is very interesting considering that it goes against what is reported in the literature and reports of the MELS which indicate that boys, compared to girls, with the same overall averages from high school, are less likely to pass their courses in their first session of college. Therefore, a pedagogical integration of ICTs could be a promising avenue to address the problem of the success rate of boys.

## **Conclusions and Recommendations**

This study responded to a research proposition formulated by a committee of experts from the MELS on the learning of writing, which recommended conducting "research in order to better adapt the teaching of writing and its evaluation to the technological environment of the youth, for whom IT is a normal tool for the production of written work, and so that the numerous tools that help in writing, correcting, and revising texts are used effectively." (MELS Recommendation N<sup>o</sup>16). Also, it addresses a concern of the Conseil supérieur de l'éducation which recommended the development of a quality virtual environment which takes into account the interest of students and their achievements in the use of technology (CSÉ).

Likewise, this study addresses the criteria of improvement of the social condition in college since the mere fact of having access to text correcting software may sometimes be sufficient to meet the needs of students with learning disabilities (even undiagnosed). Therefore, it is no longer necessary to place them in a situation of exclusion in relation to other students. The intention of the Universal Design for Learning (UDL) is thereby adopted, which aims to provide everyone with the same opportunity to succeed notwithstanding a handicap. The UDL also aims to provide equal opportunities to everyone, regardless of their socioeconomic status. For a student to obtain the right to use correcting software for his or her exams, he or she must have a diagnosis from a professional outside of the college: the cost can reach

\$1400. Obviously, not all students needing this can afford it. Since it is suspected that there are a large number of college students with undiagnosed learning difficulties (Mimouni), a pedagogy that allows unrestricted access to correcting software for everyone would prevent students from prejudice, that is to say, to be likely to fail their course because of their socioeconomic status.

Overall, the pedagogical integration of ICTs allows both students and teachers an appreciable flexibility in their way of learning and allows every individual to choose the one that best suits his or her needs. Offering this freedom of the choice of means and tools apparently cannot hurt, and on the contrary, seems to offer multiple advantages...in the interest of everyone!

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## **Biographies**

Isabelle Cabot has taught psychology at Cégep Saint-Jean-sur-Richelieu since 2004. She holds a doctorate in educational psychology from the Université de Montréal. Her main interest in research focuses on the academic motivation of college students experiencing difficulty in successfully passing their courses. She has developed expertise in assessing the impact of different teaching methods on the motivation and success of college students.

Marie-Claude Lévesque has taught French and literature at Cégep de Sorel-Tracy since 2004 and was in charge of the French Help Center there for five years. The course she prefers to teach is French Reinforcement: the unique challenges that this has brought her in her quest for innovative solutions, paying particular attention to learning disabilities and the educational integration of ICTs.