

Student Motivation and Distance Education on the Web: Love at First Sight?

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Abstract

The goal of the present research is to study and better understand the motivational impact of the implementation of two courses held on the Web. Our starting hypothesis was that these courses, as their nature promotes self-determination (Deci and Ryan, 1991), would have a positive impact on the motivation of the students and on their learning.

While the analysis of the results reveal the positive impact of a course given on the Web on the students' motivation to learn, the analyses conducted also unveil the fact that all students may not be ready to handle such autonomy or self-determination, and that the gap between the university classroom and the virtual classroom is substantial, often difficult to bridge. This gap is particularly evident when we observe the significant decrease in the students' motivation after only four weeks of the course. Many years ago, Gutenberg redefined access to knowledge through the arrival of printing. In the same vein, today's society has been given the opportunity to leap forward (Laferrière, 1997). The integration of new information and communications technology in university teaching presents an enormous challenge and the disruptions inevitably entailed must be faced with both dynamism and caution. For instance, Marton (in press) highlights that "virtual" courses on the Web are often created without sound pedagogical basis. Unfortunately, many resort to such pedagogical innovations because of their newness and the societal interest they generate, without putting forward any learning objectives. There is definitely a need for attractive Web-based courses at the university level that are both motivating and instructive, but care must be taken not to allow the fireworks of technological teaching environments to take away from the course content. As noted by the Conseil de la science et de la technologie (1998), sciences and technology are the engines of innovation and are at the heart of the economic growth of modern societies: they are destined to increasingly gain in stature at the core of any citizen's basic training.

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Introduction

At the doorstep of the next millennium, university education faces numerous challenges: the growing diversity of student profiles, the arrival of new technologies, the multiplicity of university programs, as well as the students' lack of motivation. According to Gadbois (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 (Basque and Rocheleau, 1996). Distance education, in particular the arrival of courses held on the Internet, appears presently to be one of the great focuses of pedagogical innovation at the university level. Furthermore, as these types of distance courses 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 often (see Grégoire, Bracewell and Laferrière, 1996). Aware of the challenges issued 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, at the University of Quebec in Hull (UQAH), a distance education course, based on the Web, in the teacher training program.

It should be noted that UQAH is a medium-size university, and has never housed such an experiment in the past.

Goal

The goal of the present research is to study and better understand the motivational impact of the implementation of three courses held on the Web. Our starting hypothesis was that these courses, as their nature promotes self-determination (Deci and Ryan, 1991), would have a positive impact on the motivation of the students and on their learning.

Theoretical Framework

Motivation and the Integration of ICTs to University Pedagogy: the Case of Web Courses

Motivation, a force that energizes and directs behavior toward a goal (Eggen & Kauchak, 1994), could certainly be perceived as one of the most important psychological concepts in education. In fact, 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 to prove it (Urugoglu & Walberg, 1979; Vallerand & Senecal, 1993).

Since the beginning of the twentieth century, the concept of motivation has been studied according to a variety of perspectives (Overton, 1984; Weiner, 1992). In the last thirty years, many models, approaches and theories have inspired researchers studying motivation and education. According to Pintrich and Schunk (1996), many are the result of modern conceptions of human beings and of the way in which they learn. In addition, three important educational schools of thought seem to guide modern theories of motivation: behaviorism, cognitivism, and humanism. Among these approaches, Deci and Ryan's motivation theory (1985, 1991) stands out.

Motivation according to Deci and Ryan (1985, 1991)

Deci and Ryan's motivation theory seems more complete than others as, on the one hand, it emphasizes the dynamic relationship between the individual and his environment and, on the other hand, it is very relevant for educational research (Vallerand, Blais, Brière and Pelletier, 1989). According to the theory of cognitive evaluation (Deci and Ryan, 1991), an individual's motivation is mainly determined by his needs for self-determination and competence. The authors emphasize that there also exists in individuals an important need for affiliation and that this need complements that for autonomy, and is also necessary for the development of self-determined motivation. In fact, according to Deci and Ryan, everything which is likely to influence these three factors, that is to say the feelings of self-determination, competence and affiliation, would thus have an impact on student motivation.

Feeling of Self-determination: the Determining Principle of Motivation

In reality, feelings of self-determination correspond to individuals' perception of the origin of their action. If a person believes that they have chosen their behavior, his feelings of self-determination will be heightened. The context in which the task is achieved is then perceived as promoting autonomy. Conversely, if an individual believes that his behavior is a result of external induction, his feelings of self-determination are weakened and the context in which the task was accomplished will be perceived as controlling. A stronger feeling of self-determination will have a positive impact on the development of a student's academic motivation, whereas the opposite will have a negative impact.

Feeling of Competence: Second Determining Principle of Motivation

According to Deci and Ryan (1985, 1991), the second determining principle of motivation is the perception or feeling of competence. This element may be defined as a complex affective state, which is

relatively stable, lasting and linked to an individual's representation of his aptitude, of his competence in regards to a given activity. Events which help an individual to feel competent increase his self-determined motivation. On the contrary, events which undermine an individual's feelings of competence decrease his self-determined motivation. Many contextual factors can affect students' perception of competence and consequently, their academic motivation "curriculum, class structure and the teacher represent the sources of influence which may influence motivation." (Vallerand, 1993; p.267)

Justification for and context of experimentation

In the theoretical perspective of Deci and Ryan (1991), it seems that a student's academic motivation is modulated by his feelings of self-determination, competence and affiliation, and that what influences these three factors may also have an impact on motivation. But what of the influence of the pedagogical approach used at university and the learning environment offered to students? Are feelings of self-determination, competence and affiliation promoted? Can we really blame university students for being unmotivated by a learning environment and teaching methods which have failed to profit from the newfound enthusiasm created by social changes and the arrival of new information technology? Can we blame them for not having taken the traditional academic route in their relationship to knowledge, a route which is not the way of the future? Is the integration of new information technology as a teaching method and as a learning environment likely to sustain the development of greater student academic motivation?

In order to answer these questions, an experimental Web class was designed and put forth at the UQAH. This was a first at the university, and the context for a study of the impact of a Web course on student academic motivation seemed favorable.

Creating a Web Course at the UQAH: Between class notes and Liberate

We developed the Web-based *Introduction to Educational Research* course, drawing inspiration from a number of recommendations made by Boshier, Mohapi, Moulton, Qayyum, Sadownik and Wilson (1997) in their study of Web courses. This was an extensive study on the quality of Web classes, analyzing a total of 127 courses according to an encoded grid encompassing 43 criteria. In their conclusion, the authors clearly state that not all Web classes gain the interest of students. The results of their research suggests that, among other things, there exists incredibly boring classes which are nothing more than class notes posted on the Web. On the other hand, there are also classes which are overloaded with hyperlinks, animation, flourishes, artifice and enchanting decor which would impress Liberate himself. Moreover, they point out that "virtual" courses are often created without any pedagogical basis. Unfortunately, for the most part, universities resort to Web classes for their modern edge, for something new rather than for specific educational objectives (Marton, 1999). At the UQAH, we needed to develop a course which would be both captivating and motivating, without overwhelming the message (content) with the medium (McLuhan, 1972).

Summary description of the virtual course created at the UQAH

In addition to the importance of promoting student motivation, it was essential that the Web course designed at the UQAH be well structured, that there be a logical and coherent presentation and that a technical information page be available and easy to find (software to download for easy navigation in the Web course). Furthermore, we felt it important to include softwares which would allow students to communicate on the Internet in a chat room, through an electronic bulletin board, or by email, and a feedback page to allow students to ask for help on-line. Finally, the integration of strategic teaching principles to the class was deemed essential, in order to allow students to acquire better, autonomous, organized and structured learning methods. For Tardif (1996), this rigorous pedagogy, aimed at integrating new information technology to education, is essential for greater learning.

Method

Subjects

Three groups of 36, 48 and 52 university students (85 females and 51 males), in their second year of a four-year teaching program and enrolled in the Web-based course were selected to participate. They had a mean age of 20 years old.

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 (1989), was administered three times to all students who were participating in the project. The results of the analyses conducted indicate that the internal consistency of all subscales of this scale is excellent, ranging from .80 to .92. With respect to validity, the present results are also very encouraging. A factor analysis highlights the five-factor structure and thus provides some support for the factorial validity of the scale. The first measure of motivation took place at the beginning of the first class, before the students were told that this course was to be given on the Internet. 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

Drawn not only from the results of the motivation tests and from interviews conducted with students, results are also a product of the analysis of electronic mail received ($n > 850$) and transcripts of conversations held in "chat" (synchronous) mode. 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).

The analysis of the qualitative data was conducted using an approach greatly inspired by those of L'Écuyer (1990), Sedlack and Stanley (1992) and Huberman and Miles (1991, 1994). We have adopted a content-analysis type of approach. According to Sedlack and Stanley (1992) and L'Écuyer (1990), analysis of content is a "method of classification or codification of different elements of the given material, allowing the user better to know its characteristics and signification" (L'Écuyer 1990; p.9) As can be seen in Table 1, this author proposes a six-step model for the analysis of content, and it is to this table in particular that we referred in our analysis of the data collected.

Step	Characteristics
I	Reading of the data collected (transcripts of interviews, emails received, transcripts of conversations held in CHAT mode)
II	Definition of classification categories for data collected
III	Process of categorization of the data collected or final classification of the data collected (according to the three determinants of motivation)
IV	Quantification and statistical data processing (not presented in this text)
V	Scientific description of the case or cases under investigation (course developed at UQAH)
VI	Interpretation of the results outlined in Step V (in this step, L'Écuyer (1990: 23) speaks of "discovering the hidden meaning, the latent content" of the data collected)

Table 1: General Model of the Different Steps in Content Analysis (adapted from L'Écuyer, 1990)

Presentation and Analysis of Results

Quantitative measures

The results obtained by the students enrolled in the Web-based course, in the first motivation test, are relatively equivalent to those of other university students enrolled in "regular in-class courses" at the beginning of the semester (Figure 1).

Figure 1: Self-determined Motivation of Students enrolled in Web-based Courses Compared to Self-determined Motivation of Students enrolled in "regular in-class courses".

The students' average score for the second motivation test, at a time when they were completely aware of the organization of the Web-based course, is significantly lower than the average score obtained in the first test ($p < 0,0001$), as shown in Figure 2. This result is evident and more or less equivalent for the three classes (Figure 3).

Figure 2: Representation of Students' Average Self-determined Motivation Score in Week 1 and Week 3.

Figure 3: Representation of Students' Average Self-determined Motivation Score in Week 1 and Week 3.

The average score obtained by the students in the third motivation test, administered in the twelfth week of the course, is significantly higher than the average score in the first ($p < 0,0001$) and second tests ($p < 0,0001$). This fluctuation is illustrated in Figure 4.

Figure 4: Representation of Students' Average Self-determined Motivation Score in Week 1, 3 and 12.

The students' results on the motivation tests seem to highlight the resistance felt and hardships encountered at the beginning of the implementation of the course held on the Web. Nonetheless, these results also show that the motivation of students at the end of the course was much higher than when the course first began or in the second week when a certain effort was required simply to get adjusted to this new kind of "Web-based university teaching".

Qualitative measures

The results of the students in the three motivation tests were corroborated by the qualitative analyses. The analysis of the interviews conducted with the students, the transcripts of conversations held in CHAT mode and the emails received also highlight the way in which a Web-based course promoted the students' feelings of self-determination, competence and affiliation. It is therefore in reference to these three determinants that the results are presented.

How the Course Promotes Self-determination

Many researchers, such as Relan (1992), have shown that using virtual learning environments can be a determining factor in promoting feelings of self-determination. Analysis of the data from this study demonstrates the many ways in which the UQAH Web course impacted this determinant of student motivation. Among other things, such a learning environment seems to have allowed students to:

- work at their own pace
- structure and manage their knowledge acquisition
- choose their workplace
- be active in their learning by making their own choices

A Permanently Accessible Classroom

The comment which is most often found in the data is that the classroom (the class Web site) is accessible at all times and from anywhere. It is among the elements which seem to have been most appreciated by students. Many underscore the advantage of such accessibility and indicate that the flexibility of the learning context helped them regain the desire to attend university.

"A class like this has allowed me to appreciate university anew. I work part-time [...], but I've always given priority to my studies [...] This class gave me a lot of flexibility" (interview excerpt; student)

"Sir [...] I'm writing to tell you how much I appreciate the Internet class. Having access to the classroom 24 hours a day is a great advantage for me. I find it really modern and it really motivates me to apply myself in my work [...]" (student email excerpt)

"For me, the greatest advantage of the Internet class is that I can do my assignments when and where I want [...] I'm no longer constrained to the class schedule or the classroom. If I feel like going to class on the weekend, I go [...]" (interview excerpt, student)

Long Distance Education: When Access to Class Is No Longer Restricted by Geography

For many students living in outlying regions, this class has allowed for greater autonomy, which in turn promoted an increase in the time spent on study. Students no longer had to travel to get to class as the latter was accessible from any location.

"This class also allowed me to give more time to my studies. Driving from Papineauville to Hull (about 75 km) takes up two hours a day. With this introduction to research class, I could be at school and at home at once." (interview excerpt; student)

"[...] usually, I live with my aunt during the week and I go back home to Mont-Laurier on the weekend [about 300km from UQAH] . When we go on internship, mine is in Mont-Laurier, so it's more complicated because I travel a lot more between Hull and Mont-Laurier . With this class, I don't have to be in Hull or Mont-Laurier. No matter where I am, I can do my homework and follow the class. It's very handy for me, it lets me independent and I waste less time [...] That way, I spend more time on schoolwork." (interview excerpt; student)

"Hello Sir, I'm sorry there were no accents in my work [the email was originally written in French which requires some accents such as é, à, ê]. I can't find them as I am writing to you from the United States on my father's computer. I think it's fantastic to be able to attend class while I vacation here [...]" (student email excerpt)

Conversation Excerpt in Chat mode (synchronous mode)

Student 1: [...] *It's actually the first time I can attend class from home in Montreal. It's fabulous.*

Professor: *It's one of the advantages of a virtual course. Class can happen anywhere.*

Student 2: Lucky you. I'm still at University. I had other work to [...]

Student 3: *It's true that it's convenient. No need to worry about taking the bus, going somewhere else. It leaves more time to do the work.*

Professor: *Exactly... the purpose of this meeting is to [...]*

Learning at One's Pace: Reinforcing Feelings of Self-determination

This course seems to contribute to the development of students' feelings of self-determination, as they are neither hurried by faster students nor slowed down by slower students. They can thus progress at their own rate, independently, within exercises and activities which promote learning. This fact is particularly important when this type of course is compared with traditional courses given in classrooms. Thus, for example, students who are ahead can finish the course within a few days, while others can finish it more slowly, according to their ability to meet the objectives.

The individualized pace afforded by a virtual course reveals an important motivational factor and seems to be perceived as an advantage by all the students.

"Hello, it's the end of the class and you wanted some comments [...]. Here are mine [...] In general, I really enjoyed the course. There was a lot of work, that's true. But, for the first time in a while, I was really able to learn at my own pace. This was the most positive aspect of the class for me. In regular classes, I drift off a lot. Sometimes, it's because I don't understand and the prof goes too fast, other times it's because I'm bored and the prof asks too many easy questions. With an Internet course, I could go at my own pace, and for me, this was a great source of motivation [...]." (Student email excerpt)

"The idea of being able to go at your own pace, I think it's great. In the past, I've dropped out of university classes because the prof went too fast. At the beginning of each course, the very first class, that's what I'm afraid of. If it's going too fast and I don't know anyone, I immediately feel like dropping out. With the Internet course, I worked a lot, but I never felt hurried. I could take my time [...] the time I need to do the work [...]" (interview excerpt; student)

Conversation Excerpt in Chat mode

Student 4: *We can do the work when we want?*

Professor: *Yes, as long as you hand it in before the deadline.*

Student 4: *Does that mean I can finish the class in 4 weeks if I want?*

Professor: *If you meet all the course requirements, yes.*

Student 5: *That's good. Has anyone ever finished one of your classes in one week?*

Professor: *This is the first Web class at the UQAH, so it's hard to answer.*

Student 5: *Well, that motivates me to try it with my team. We'll send you our work...*

Self-Management of Learning and Knowledge: a Pedagogical Environment that Opens the Door to Autonomy and Active Participation

The design of the virtual course is centered on the development of students' feelings of self-determination (Deci and Ryan, 1991), both from the standpoint of deadlines and of personal investments required from students. Indeed, once on the course site, the student plans his learning process by using the class calendar. Globally, this calendar allows him to fix goals and deadlines of his own while adjusting the pace at which he works. Conversely, a student in a traditional course—in a classroom—has

the same constraints and deadlines as his colleagues imposed upon him, leaving little room for autonomy. However, the nature of the course does not promote autonomy unilaterally: the learning method proposed to students requires self-determination and self-management, all while emphasizing the development of the student's sense of competence.

Nevertheless, for a few students, the autonomy granted them at the beginning of the course seemed difficult to manage, particularly during the first few weeks where they thought that in the absence of a strict framework, regular class schedule and actual classroom where one must be present weekly, that *"the work can be done at the last minute"* (student). Some students then stated that they were not *"used to learning by themselves"* (student) or that they may not have been ready to work in a class where *"you have to be the one to discipline a student (me) who doesn't work [...]"* (student) or that the fact they had *"so much autonomy, all at once, demands a lot of discipline, and at first, I wasn't ready"* (student).

However, even if many students weren't used to managing their own knowledge acquisition, many indicated that this was one of the course's positive aspects. Others even stated that having more responsibility pushed them to work harder and participate actively and that it allowed them *"to learn how to learn"* (student).

"[...]at the beginning, I wasn't used to disciplining myself. But after a few weeks, I thought it was really good. It was the first time in a long while that I felt responsible for what I was learning." (interview excerpt; student)

"[...] I enjoy the course structure. Besides learning educational research methods and how to use new information technology (and this wasn't easy, believe me), we learn a work method or strategy. While at first I found the practical exercises really hard (I wrote you a note three weeks ago), well, they're not that complicated. It's just that usually, I don't really know how to say this, we have a sense of being more rigidly followed and directed. Not that we're not in the Internet course, it's just that we have more autonomy in this class. In other classes, for the assignments, the answers are really set (except for teaching projects). Here, it's like we're being pushed to learn by ourselves. At first, it's not easy, but in the end you like it (and I'm not just speaking for myself). Finally, I think that it's very good [...]"
(student email excerpt)

"[...] what was interesting in this class was that we could work when we wanted and at our own pace [...] It's as if we had a lot more freedom. At first, I thought that I wouldn't have to work and that this would be an easy class. However, when our team met, we decided to finish the whole course as quickly as possible [...] but to do it well too. And then, we were surprised to see how hard we worked and that sometimes, we even did more than what was asked, as in the gathering of data [...] and we practically finished the whole course in less than two weeks, except for the research project [...]. Having more autonomy was better for us. We worked really hard and we enjoyed it." (interview excerpt, student)

How Does the Course Promote Feelings of Competence?

Shin's works (1998) suggest that a Web course stimulates students' feelings of competence. As for Christoph, Schoenfeld and Tansky (1998), they have shown that university students registered in a virtual course (n= 164) had acquired a significantly greater feeling of self-efficiency than students registered in the same class taught the traditional way (control group, n = 231). In their conclusions, these authors also highlight the fact that students registered in the Web course generally felt more competent than their colleagues in the control group.

A Process Which Promotes Feelings of Competence and Allows for Better Knowledge Acquisition: A Strategic Approach

The UQAH Web course was conceived according to two of the Quebec (Canada) Ministry of

Education's (1997b) priorities, which were described in its latest plan of action: *A New Direction for Success: Ministerial Plan of Action for the Reform of The Education System*. These priorities are as follows: the development of intellectual abilities and the acquisition of methodological skills. This virtual course advocates a strategic approach centered on knowledge acquisition through the elaboration and completion of an actual research project in a school setting. We choose this approach as it is most likely to promote the acquisition of theoretical and methodological knowledge, as well as to favor the acquisition of a rigorous scientific epistemology. These are crucial for the student who wishes to bring his scientific research project to fruition, this project being the culmination, the result and product of his work and what he has learned.

Virtual Problem Solving and Feelings of Competence

Within each "learning module", the student proceeds to plan his work with the table of contents, the summary and the statement of target abilities. This is the stage of "reflection before practice" where the student evaluates which strategies he needs to employ in order to complete the assigned tasks. This approach mainly seems to promote greater knowledge acquisition. Indeed, according to Stice (1987) and Tardif (1992), problem solving is one of the most important manifestations of critical thought, of intelligence. For Gagné (1985), problem solving can be found at the top of knowledge taxonomies.

Life-long Learning Comes from Motivation to Learn

Having acquired theoretical, practical and technical experience in the first part of the course, the student will then call upon his methodological skills to consult databases and multimedia tools. The project he and his teammates undertake will have to be completed in an affiliated school and the student will have to present a research report consistent with the scientific community's publication requirements.

The student will have to show some initiative in his choice of a relevant research problem, autonomy in his assessment of essential information and critical thinking in evaluating the validity of existing literature.

In order to execute his research project in a school setting, the student acquires the basic methodology which allows him to continue to learn and he experiences the motivation to bring it to completion. Through this experience, the student significantly integrates methodological skills which will prove indispensable in his professional practice and which will contribute to his feelings of competence.

In addition to getting to know the school setting where the research was executed, the completion of the research project gives the student practical and methodological skills, as well as a deep valorization of his approach. Consequently, the ensuing motivation and great personal satisfaction he feels can but promote, beyond the development of scientific rigor and an appreciation for active research and continuing education, students' feelings of competence and self-determination.

The collected data also highlights the role of the strategic approach and project-centered pedagogy in the promotion of the Web course students' feelings of competence. Indeed, many students appreciate that the way in which the course and its activities were organized facilitated the learning process, and that the approach takes learner's previous knowledge into consideration. As well, for many, the course demystified educational research and made it more accessible to future teachers.

"[...] with the theoretical experience and the practical exercises, it's like there's an evolution and it seems easier. [...] in addition, the practical exercises allow us to move forward with our final project. If we do them according to our own (research) theme, we get to the end of the chapters and the project is already almost finished. [...] This structure makes the class easier and helps us learn more." (interview excerpt, student)

"[...] I wanted to thank you for publishing our research projects on the course site. I must admit that we worked really hard for this class and that we were happy to see our efforts"

thusly rewarded. [...] Following your suggestions, we'll make the necessary changes and send our article to Vie pédagogique [a professional journal for teachers in Quebec] to see if they are interested in publishing it. We are very excited at the thought that it might be published (even though you did tell us that very few articles are chosen and that even if we're not...) [...]" (student email excerpt)

Conversation Excerpt in Chat mode

Student 5: I used to think educational research was something done in a lab and that it would be nothing but theory.

Professor: As you can see, it's possible to execute a small research in a school setting and apply what you studied in the modules.

Student 6: That's true. I also thought that researchers or university professors were the only ones who did research. It seems weird to say that I'm doing one too.

Student 7: I didn't think I could do it. But it's interesting. It makes for a different kind of contact with the students.

Student 8: When they ask me what I'm doing at school, I tell them I'm doing research [...].

"[...] what I liked about the course was that I started from what I already knew. When I read the objectives and the summary, I'd tell myself 'I know this, I don't know that'. That way, I knew what to expect [...]. It was easier to learn [...]. It was also easier to be interested [...]. But what I liked best, I think, was that I got to do a small-scale research at a school. I had the feeling that the principal from whom I had asked for authorization no longer saw me as just an intern [...]. Also, the principal wants me to present the results at the next teacher's meeting. [...] I'm giving teachers a presentation and I'm not even done my B.Ed. [...].

"(interview excerpt, student)

Finally, many enjoyed acquiring the skills to use new information technologies. Some have even stated that it was like completing two courses, one on new information technologies and one on research methodology.

"[...] honestly, I learned a lot in this class [...] but I also worked really hard [...]. I even feel like I did two classes. One on research methodology, the other in new information technologies. [...] I learned to use email, to chat on line and to send my assignments as attached files. At first it was hard to email and I was really rushing, but at the end, it was easier because I had fewer technical problems. "(interview excerpt: student)

How Does the Course Promote Feelings of Affiliation?

Distance Education: When Students Are Linked by Virtual Bridges

It might be easy to think that a virtually-taught, on-line course is impersonal and that students will feel removed and distanced from their virtual peers in the class. However, the opposite was true. Students in the Web class always have opportunities to communicate with peers, the technical support team and the professor. While the student develops personal autonomy for his work and research methods, he is not isolated as he can also count on feedback from his peers. Indeed, this course was designed to promote an optimal exchange of ideas and information, the confrontation of opinions and viewpoints and the creation of a support system, something which is not always possible in traditional classes which are, for the most part, lectures.

From Chalk to Mouse: An Array of Means of Communication

Through a wide array of means of communication (phone, electronic, paper, and so on), the availability of resource persons to answer students' questions is, in a way, increased. What traditional class allows the student to ask the professor a question 24 hours a day, seven days a week (of course, the answer does not always come instantaneously...)? What other class format allows students to know which member of their group is currently working on or has completed the assigned chapter (this is made possible in the Web class by the use of ICQ)? Which course can claim to offer unlimited class access, anytime of day or night, without time or space constraints, without having to leave the comforts of home, thus facilitating all aspects of student activity?

The qualitative analyses just presented highlight the way in which a distance education course given on the Web eventually assists in the development of the students' motivation to learn. Through such a course, the students and the professor were required to think differently of their relation with time and space and they were challenged to make their own this new approach to teaching and learning.

Conclusion

While the analysis of the results reveal the positive impact of a course given on the Web on the students' motivation to learn, the analyses conducted also unveil the fact that all students may not be ready to handle such autonomy or self-determination, and that the gap between the university classroom and the virtual classroom is substantial, often difficult to bridge. This gap is particularly evident when we observe the significant decrease in the students' motivation after only four weeks of the course. Many years ago, Gutenberg redefined access to knowledge through the arrival of printing. In the same vein, today's society has been given the opportunity to leap forward (Laferrière, 1997). The integration of new information and communications technology in university teaching presents an enormous challenge and the disruptions inevitably entailed must be faced with both dynamism and caution. For instance, Marton (in press) highlights that "virtual" courses on the Web are often created without sound pedagogical basis. Unfortunately, many resort to such pedagogical innovations because of their newness and the societal interest they generate, without putting forward any learning objectives. There is definitely a need for attractive Web-based courses at the university level that are both motivating and instructive, but care must be taken not to allow the fireworks of technological teaching environments to take away from the course content. As noted by the Conseil de la science et de la technologie (1998), sciences and technology are the engines of innovation and are at the heart of the economic growth of modern societies: they are destined to increasingly gain in stature at the core of any citizen's basic training.

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