



# Comparative evaluation of two applications for delivering a multimedia medical course in the French-speaking Virtual Medical University (UMVF)

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**Summary** This paper describes a comparative evaluation of two applications delivering a multimedia course: a conventional web server (WS) and an integrated e-learning platform in the form of a virtual campus (VC). We used a qualitative method for comparing their acceptance of the on-line course provided by the two different interfaces. The two groups were globally satisfied. However, a decrease in satisfaction was noted at the end of the experimentation in the VC group. This may be explained by a more complex graphic user interface of the VC and some constraints which do not exist with the WS. Students from both groups also had limitations about the multimedia environment.

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## 1. Introduction

The main goals of the French-speaking Virtual Medical University Project (UMVF) are to give access to validated resources within a national federative structure. Most e-learning platforms are built on an integrated framework which provides both publication of resources and teaching follow-up [1]. However, a high number of functionalities are gener-

ally accompanied by greater complexity. In order to evaluate the VC's relevance, it was compared to a conventional web server.

## 2. Material and method

### 2.1. Material

#### 2.1.1. Course contents

A multimedia course on "inflammation" for fifth year medical students was chosen for this experimentation. The course was divided into seven

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**Table 1** Description of the characteristics of the experimental conditions: VC vs. WS

| Content                                | Virtual campus   | Web server  |
|--|--|---|
| Courses and tests                      | Restricted access to the dedicated material of one session   | Free access to all material of the three sessions |
| Tests                                  | MCQ and clinical cases with interactive display and real-time scoring                                | MCQ and clinical case in free text                |
| Contextual interface (functionalities) | Login, home page, agenda, personal archive, forum, introducing content pages, connecting pages, etc. | Home page, connecting pages                       |

components (five chapters and two tests) and three sessions: 2 h was allocated for each session, once a week.

### 2.1.2. Description of the two applications

The two applications gave access to the same three sessions. The differences are listed in Table 1. The VC required an authentication. The student was guided solely to his "task for the day" (one of the three sessions). Tests had an interactive display with real-time scoring. Results were saved and available for the teacher. But access was restricted to the dedicated material of one session. It was not possible to read a chapter from a previous session and tests could be performed only once.

No authentication was needed in WS. All students had the same interface during the three sessions. Students were advised to follow the order of the chapters, but they were free to select the chapters and tests of their choice during each session.

### 2.1.3. Subjects

Eleven volunteers participated in the study. They were arbitrarily divided into two groups (VC = 5 subjects, WS = 6 subjects). At the beginning of the first session, subjects were asked to fill a questionnaire assessing their familiarity with computers and Internet techniques. The VC group had a 10-min learning session at the beginning of the first session in order to compensate possible negative effects of a more complex interface.

## 3. Method

### 3.1. Records of the sessions

Portable material was used to record the session: a converter and a microphone linked to a video tape recorder captured the screens and recorded all the subjects' actions on the computer as well as their verbal expressions. Also the subjects were asked to think aloud while performing their

tasks. The protocol analysis identified time spent on chapters, tests, contextual interface, problems encountered and the verbal comments of the subjects.

### 3.2. Questionnaires and interviews

Students had to answer the same questionnaire at the first and at the last session. This questionnaire evaluated their opinion concerning the ease of accessibility to course content, global satisfaction and their comments about strengths and weaknesses of the application. Subjects were interviewed at the end of each session. They were asked to give their reaction to the use of their interface.

## 4. Results

### 4.1. Records of the sessions

Overall time spent on the course was larger in the WS group than in the VC group. However, time spent on prescribed (VC group) or recommended (WS group) contents is similar in both groups. The difference comes from the liberty left to the students in the WS group that allows them to anticipate the next contents or to return to already consulted contents. This liberty was used by five of the six students. One student quickly consulted all the previous week's courses before starting a new session. Another one searched for precise information in previous contents. The three others looked at the contents of the next session at the end of their session.

Time spent on the contextual interface was more important for the VC group than for the WS group (Fig. 1). The VC group spent more time on connecting pages and they spent time on the specific pages of the VC. This contributed to disorientation, multiple trials and errors, especially with average computer experience students.

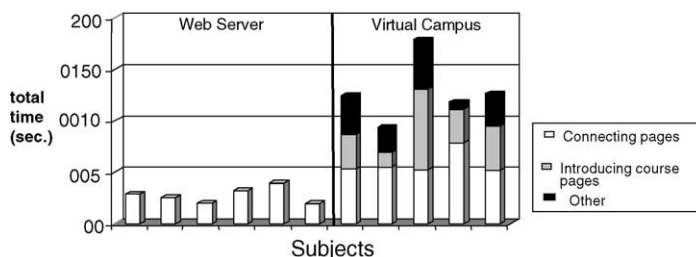


Fig. 1 Time spent on the contextual interface for each subject.

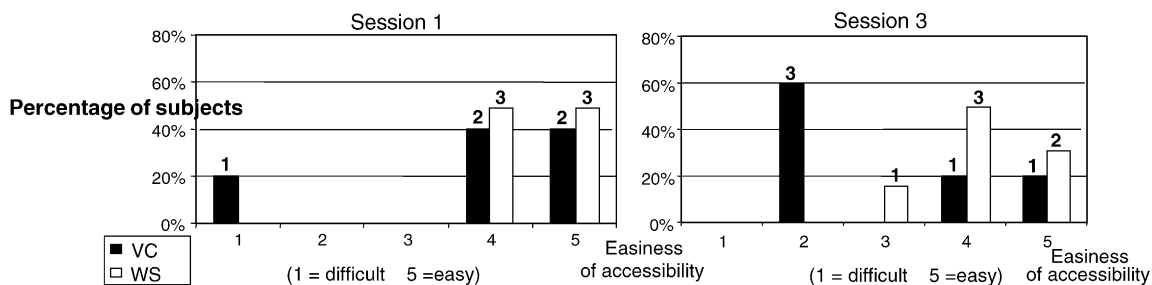


Fig. 2 Comparison between the two groups (sessions 1 and 3) for the ease of course accessibility.

### 4.2. Questionnaires and interviews

Overall satisfaction was good in both groups after the first session. Results were homogeneous for course accessibility (Fig. 2): students found it easy. Only one student found it difficult. He was confused by the VC interface and asked for the help of a facilitator. After the last session, only VC students changed their opinion and tended to find it more difficult than in earlier sessions. Moreover, four of the five students were frustrated by the impossibility of consulting the contents of previous sessions and performing the tests several times.

Most of the free comments concerned the multimedia environment of the course rather than the contextual interface. Students first described the multimedia environment as more attractive and more stimulating than the reading material.

But at the end of the study, they said that the multimedia environment was insufficient to learn a course and that the time required was larger than with conventional material. They felt a lack of practice with multimedia and they wanted to preserve access to reading material.

### 5. Discussion

We limited our study to the acceptance by the students of an online course provided by two applications: a conventional web server and an e-learning platform (Campus Virtuel®). However, it was not

clear what the needs of the students were and which factors influenced their acceptance. For this type of study, it is recommended to use a small group of subjects, with a large number of qualitative data [2]. It has been demonstrated that a quantitative study with more subjects would not give more information and that two groups of five subjects detect 85% of the usability problems [3].

The students from the two groups were able to follow the entire contents of the course and were globally satisfied. The decrease in satisfaction at the end of the experimentation in the VC group may be explained by several reasons. The VC interface is complex. Students wasted time with useless links and spent more time reaching the contents than with the WS. It was also noted that the subjects needed some time to readapt to the VC interface at the beginning of a new session. Students also felt frustrated by the constraints of the VC. They wanted to be able to go back-and-forth in the contents and to perform the evaluations several times. This is probably a strong need for our students as their colleagues used this possibility in the WS interface.

As a consequence, we do not see a real advantage in using the VC rather than a WS for providing a short course (equivalent to 4 h of a classical classroom lecture) to our students in the medical school.

However, this conclusion should not be generalized to all e-learning platforms: the Campus Virtuel® from Archimed is a powerful and complex platform designed for organizing pure e-learning trainings of large groups. Lighter e-learning plat-

forms are now available and have several advantages over the complex systems. Their simplified interface will not disorient the student [4].

We learned another important point from this study. The students were not really concerned by the specificities of the interfaces. Most remarks dealt with the multimedia environment. They like it at first, but rapidly they realize that following a multimedia course takes them much more time than the reading of the textbook. They advice to limit the use of animations and videos to specific points where they help with understanding. They consider a complement rather than a replacement of the reading material. The clinical cases and multiple choice questions at the end of the course were very much appreciated by the students, but without any real advantage for the interactive form of the VC over the free text of the WS. Other authors have made similar findings [5]. The multimedia environment suffers from a lack of appropriation by the students who cannot mark an item or write their comments [6]. It is also difficult to get a quick overview of the contents and reading on the screen of a computer is uncomfortable [7]. Teachers are currently spending a lot of time and effort in converting their teaching material for use in a multimedia environment. But, it may be not so urgent to convert all their material. They could work first with courses where animations, sounds, videos are important for understanding and memorization. The remaining material could be put on line in a conventional form (text, slideshow, etc.) with the advantage over the current textbooks of an easier update and access.

## 6. Conclusion

The goal of the UMVF is different from that of most virtual Universities. We look for ways of helping medical students during their normal curriculum with the facilities provided by Internet-based techniques and we are not planning to train these students on a pure virtual mode. In these condi-

tions, the limited advantages of a powerful and complex e-learning platform over a conventional web server do not balance the difficulties for the students. Furthermore, our students had reserves about the multimedia environment. Nevertheless, all our students agreed on the need for having access to their educative material through the Internet.

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