Original Article

Digital learning objects: an assessment of a tool for the practice of nursing education*

Objeto educacional digital: avaliação da ferramenta para prática de ensino em enfermagem

Objeto educacional digital: evaluación de la herramienta para la práctica de enseñanza de la enfermería

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ABSTRACT

Objective: To describe the opinions of students regarding the use of technology, educational practices experienced, support for the learner and learning results achieved through the virtual environment. **Methods:** This is an exploratory, descriptive and qualitative approach, performed in a School of Nursing, with the participation of 43 students, of the discipline Human Care Fundamentals I, who responded to a questionnaire, evaluating the process used. **Results:** Data showed that the evaluation of the proposed activity on vital signs, using a computer, was positive regarding the use of technology, the educational practices experienced, the learner support and the results achieved, by learning through the virtual environment. **Conclusion:** The technology energizes the classroom teaching and allowed the development of skills in the area of computer science and in methodology for solving problems.

Descriptors: Education, nursing; Educational technology; Computer-assisted instruction; Problem-based in learning

RESUMO

Objetivo: Descrever as opiniões de estudantes quanto ao uso da tecnologia, as práticas educacionais vivenciadas, o suporte ao educando e os resultados atingidos na aprendizagem por meio de ambiente virtual. **Métodos:** Trata-se de um estudo exploratório descritivo com abordagem quantitativa realizado em uma Escola de Enfermagem, com a participação de 43 alunos da disciplina de Fundamentos do Cuidado Humano I que responderam a um questionário, avaliando o processo empregado. **Resultados:** Os dados apontaram que a avaliação da atividade proposta sobre os sinais vitais, mediada por computador teve concordância positiva quanto ao uso da tecnologia, das práticas educacionais vivenciadas, do suporte ao educando e dos resultados atingidos na aprendizagem por meio do ambiente virtual. **Conclusão:** A proposta dinamizou o ensino presencial e proporcionou o desenvolvimento de habilidades na área da informática e na metodologia de resolução de problemas.

Descritores: Educação em enfermagem; Tecnologia educacional; Instrução por computador; Aprendizagem baseada em problemas

RESUMEN

Objetivo: Describir las opiniones de estudiantes en lo que se refiere al uso de la tecnología, de las prácticas educacionales experimentadas, del soporte al educando y de los resultados alcanzados en el aprendizaje, por medio del ambiente virtual. **Métodos:** Se trata de un estudio exploratorio y descriptivo con abordaje cuantitativo realizado en una Escuela de Enfermería, con la participación de 43 alumnos de la disciplina de Fundamentos del Cuidado Humano I que respondieron a un cuestionario, evaluando el proceso empleado. **Resultados:** Los datos apuntaron que la evaluación de la actividad propuesta sobre las señales vitales, utilizando un computador, obtuvo una concordancia positiva en lo que se refiere al uso de la tecnología, de las prácticas educacionales experimentadas, del soporte al educando y de los resultados alcanzados, en el aprendizaje por medio del ambiente virtual. **Conclusión:** La propuesta dinamizó la enseñanza presencial y proporcionó el desarrollo de habilidades en el área de la informática y en la metodología de resolución de problemas.

Descriptores: Educación en enfermería; Tecnología educacional; Instrucción por computador; Aprendizaje basado en problemas

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Received article **17/03/2009** and accepted **04/06/2010**

INTRODUCTION

Computer technologies permit interactivity, collective knowledge production and observance of different learning times and spaces, characteristics that are fundamental for the effectiveness of the educative process, provided that they are supported by pedagogical approaches. These aspects have been observed in previous studies, as the use of digital material in Nursing alone does not guarantee more significant learning when compared with presential activities in class or in a teaching laboratory[1-4].

In the production of learning objects by the Virtual Nursing Teaching Laboratory at the School of Nursing, Federal University of Rio Grande do Sul, experience from previous studies permitted demonstrating that the pedagogical framework plays a fundamental role not only when conceiving the material, but also when applying it to the students[3-4].

The term learning object characterizes didactical material elaborated with the use of multimedia and interactivity with computer and communication technology resources[5]. These digital resources are elaborated following a planning integrated with the learning process and are outlined in a pedagogical perspective[6].

In Nursing Education, the development of digital learning objects is a resource to support presential teaching, respecting the students' autonomy, as it permits extra-class study through the virtual learning environment[3]. Thus, based on virtual simulations, the students can anticipate contact with reality[7]. Thus, knowledge construction occurs when situations analogue with reality are presented, preparing students for what they are going to face in their training areas[8].

The Problem-Based Learning – PBL method aims to develop real problem solving skills together with the students, in a critical and analytic way, integrating different theories. McMaster University in Canada proposed this method in the 1960's, but it can also be applied in the development of learning projects. This approach has been put in practice to makes nurses more autonomous and skilled to make decisions, to formulate hypotheses in view of daily problems, and to make them receptive to the idea that learning is a process that occurs across the lifetime[1,9-10]. Assessments among nursing students and teachers who have already used the method highlight skills development to solve practical issues faced in nursing practice scenarios as a quality, generated on different occasions, besides the development of students' autonomy, as they become responsible for their own learning[10-12].

In view of the above, the following question was asked: are new undergraduate nursing students prepared to actively and autonomously engage in computer-mediated activities? Therefore, a study was carried out, based on these students' assessment of computer use in teaching and learning about vital signs through the PBL pedagogical method, integrated in the virtual learning environment TelEduc. The latter was developed in the Group of Informatics Applied to Education and the Institute of Computing at Campinas State University. Applied to the subject Fundamentals of Human Care I in the Undergraduate Nursing Program, the proposal involved an active pedagogy that joined presential activity at an informatics and teaching laboratory with the use of the virtual learning environment, in which the teacher is concerned not only with the contents, but essentially with why and how the students learn.

This paper aimed to describe the students' opinions on the use of technology, educational practices experienced, support to students and results achieved in learning through the virtual learning environment.

METHODS

A descriptive and exploratory study was accomplished with a quantitative approach.

The place of study was the School of Nursing at the Federal University of Rio Grande do Sul, focusing on the course subject Fundamentals of Human Care I. The goal of the subject is to initiate new students in the concepts of care, health policies, historical contextualization of the profession, their ethical and legal commitments, as well as basic first aid notions, including the verification of vital signs.

Considering 50% of the subjects who consider the usability of the digital learning object favorable, with a 95% confidence level and 30% error margin, approximately 43 subjects are needed. Based on this sample calculation, 43 students in the first phase of the Undergraduate Nursing Course, enrolled in the subject Fundamentals of Human Care I, assessed the digital objects on vital signs.

The software was created in the Digital Learning Objects for Nursing project, supported by the Virtual Nursing Teaching Laboratory at the Federal University of Rio Grande do Sul. This digital material comprises five digital learning objects (DLO), called: Temperature, Heart Frequency, Breathing Frequency, Pain and Blood Pressure. Each object contains videos, animations, a quiz with questions and answers, hypertexts and drawings, besides the presentation of a case study on each of the vital signs. This research entailed a discussion about a computer-supported nursing teaching practice that had not been used yet with students at the university under analysis.

The 48 students participated in theoretical-practical classes about vital signs, involving the following activities: knowledge on the virtual learning environment TelEduc

and getting familiar with the tool; exploration of the six digital learning objects (verification of axillary temperature, heart frequency, breathing frequency, arterial pressure, pain assessment and exercise quiz) produced in FlashMX®; group solving of case studies, including presentation before peers; and practicing the accomplishment of the techniques in a teaching laboratory. The hour load of the activities was 15 hours. At the end of the module, all participants were invited to answer a questionnaire aimed at assessing the activities in the virtual environment, addressing technology use, educational practices experienced, support to the student and achieved results. The questionnaire comprised 15 closed questions, using a Likert scale, aimed at evaluating agreement or not with proposed assertions. Through the instrument, information could also be obtained about the participants' socioeconomic characteristics, informatics knowledge and place to access the virtual environment.

Out of 48 students enrolled in the subject, 43 voluntarily answered the data collection instrument.

The quantitative data present in the questionnaires were processed in SPSS®. Descriptive statistics were used to analyze the information, with occurrence measures like central rend (mean, median) and the respective dispersion measures (standard deviation and percentiles), as well as frequency (relative and absolute). As this is a descriptive and exploratory study, the statistical analysis did not surpass the descriptive limit and did not advance into inferences.

Approval for the project was obtained from the Research Ethics Committee at UFRGS (No 2007672). The study was considered ethically and methodologically adequate and in compliance with Resolution No 196/96 and complements by the National Health Council. Participants signed a Free and Informed Consent Term. Their identity was preserved and they were guaranteed anonymity, in line with Resolution No 196/96.

RESULTS

Participants' socio-demographic characteristics

Out of 43 participants, 40 (93%) were female. Ages ranged from 17 to 26 years, with about 29 (67.4%) participants between 17 and 21 years and 14 (32.6%) between 22 and 26 years. The subjects' mean age was 21.48 years. As for the knowledge level on informatics, 16 (37.2%) answered that their knowledge was basic, 23 (53.5%) intermediary and only 4 (3%) advanced. With regard to the place to access the virtual learning environment (TelEduc), 19 (44.2%) accessed it at the university, followed by 15 (34.9%) at home and at the University, 7 (16.3%) at home only and 2 (4.6%) at home, at the University and at work.

Assessment of teaching and learning process

In the figures below, the mean scores are shown, standardized on a scale from 0 to 10, with 0 (zero) representing the lowest and 10 (ten) the highest agreement level.

The results indicate the students' positive answers on the use of technology and the educational practices they experienced, which were approved in about 90%. Hence, other relations between the variables were not needed.

Figure 1 reveals that most participants, with score 8.1 and a significant agreement level, think that computer use optimizes learning time and agree that they are skilled to use the computer in teaching activities. Score 7.6 (Figure 1) was found for participants who believe that the computer contributes to learning.

In Figure 2, results are presented for presential activities and in the virtual learning environment. Participants displayed high agreement levels (score 8) when asked about their active participation in discussions involving learning and in discussions of ideas with the teacher and monitor about the contents of vital signs. Most participants managed to associate specific concepts on vital signs with general concepts, relating them to solve the case studies presented in the virtual learning environment.

As shown in Figure 3, when asked about the material used, whether it respects different learning modes, the students agreed (score 8.4). Most of them (score 8.29) felt responsible for their own learning and the knowledge gained through the activity in other subjects. Agreement

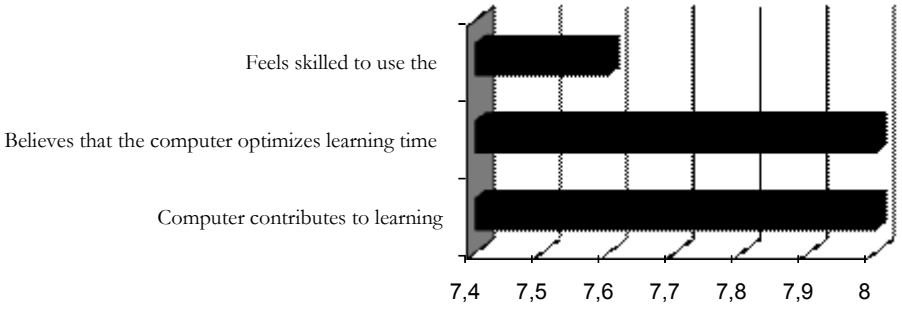

Figure 1- Frequency distribution of undergraduate Nursing students' answers regarding technology use. Porto Alegre/RS (2008)

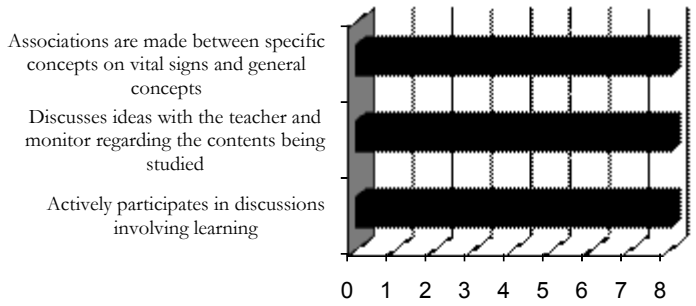

Figure 2- Frequency distribution of undergraduate Nursing students' answers regarding the educational practices experienced. Porto Alegre/RS (2008)

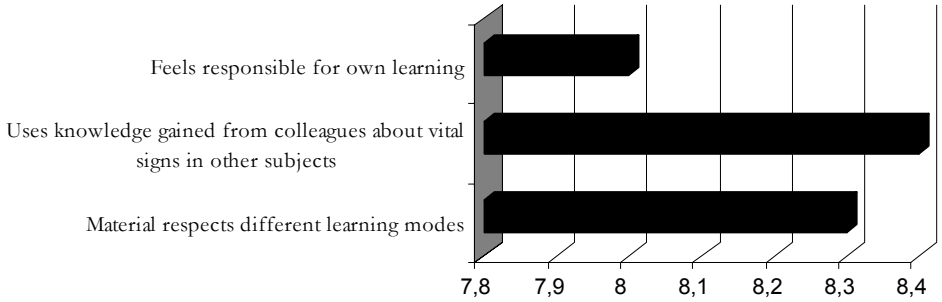

Figure 3 – Frequency distribution of undergraduate Nursing students' answers regarding the material used and learning. Porto Alegre/RS (2008).

was also found (score 8.3) when the student answered the question about feeling responsible for one's own learning.

DISCUSSION

Informatics has been considerably used as a tool in the teaching and learning process in higher education institutions. Thus, students and teachers strongly need to get familiar with this technology[1,14-16]. Research groups have been investigating the best practices in online Nursing education, considering technology use, educational practices, student support and results[1]. Based on these study findings, a correlation was observed between the educative practice used, connectivity and satisfaction, as a result of the process.

In the students' opinions, in line with the results, the learning object inserted in TelEduc satisfied users, is adequate, generates precise results or according to expectations, interacts with the specified systems, is in accordance with standards, conventions or rules and presents access security as a strong point, in compliance with ISO/ICE 9126[17].

The same standard ISO/ICE 9126[17] states that a software's reliability can be assessed by the frequency at which it presents errors, as well as by the software's reaction when an error occurs and by the capacity to recover data in case of error and/or re-establish the desired performance level and recover data in case of errors. Regarding the program's adequacy, the menus allow users to freely navigate, in a non-linear and flexible structure. In line with other studies, the researchers believe that the users' possibility to go wherever they want inside the software increases their interest and stimulates learning[18-20].

As for the learning results, most students agree, which is in accordance with other reports on positive experiences when this approach is used, employing computer-mediated activities described in literature[1,4,11,18-20].

The association between the problematizing pedagogical method and digital learning objects allows students to develop their analytic and critical capacity in problem solving, integrating the different theories based on real situations[18]. Moreover, like in other studies, the definition of the objects contributed to achieve better results in the form of their use in teaching[18-20].

CONCLUSIONS

The results indicate that the students positively assessed the learning project on vital signs in PBL. The fact that the students are young and have previous informatics knowledge collaborated to avoid difficulties for its use in the virtual environment.

Qualities the students highlighted include the optimization of study time, the students' awakening to learning autonomy, help from informatics to accomplish the case study, besides the fact that the active method enhanced problem solving and debates on the theme.

This research permitted assessing that the usability of learning objects in a virtual learning environment is a resource that can be used in nursing education. Undergraduate nursing students are prepared and willing to use informatics resources in teaching. It is the role of their nursing teachers, however, committed to teaching quality, to acknowledge the role of communication and information technologies. This means considering that, although it is a versatile and powerful instrument, the presence of the computer alone does not guarantee an effective educational process.

The virtual learning environment is a resource that optimizes in-class dynamics, enhances students' use of theoretical contents, which gain attractiveness, personalizing their learning to the extent that they can access the environment wherever and whenever they are available.

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