

# Digital educational materials in nursing: assessment by professors from an undergraduate course

OBJETOS EDUCACIONAIS DIGITAIS EM ENFERMAGEM: AVALIAÇÃO POR DOCENTES DE UM CURSO DE GRADUAÇÃO

OBJETOS EDUCACIONALES DIGITALES EN ENFERMERÍA: EVALUACIÓN POR DOCENTES DE UN CURSO DE GRADUACIÓN

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## ABSTRACT

This study addresses the use of digital learning materials in the format of hypertext, educational games and simulations about oxygen therapy with professors of an Undergraduate Nursing Course. It is a cross-sectional exploratory study that was carried out at the Federal University of Rio Grande do Sul in 2006 with 10 intentionally selected professors. Data collection was performed by means of a questionnaire, using a *Likert* scale to assess the suitability of the content, visual presentation and use of learning materials. Descriptive statistics was used to organize and process the data. Results showed that the professors approved of the presentation of educational materials, they agreed with the suitability of the contents presented and with using the materials with the content regarding oxygen therapy. There was no significant relation between the professors' opinion and their age group, nor with their computer technology knowledge, their time in teaching and the addressed contents.

## KEY WORDS

Education, nursing.  
Education, distance.  
Educational technology.  
Computer-assisted instruction.

## RESUMO

Trata-se de investigação sobre a utilização de objetos educacionais digitais nas formas de hipertexto, jogo educativo e simulação sobre o tema oxigenoterapia junto a docentes do curso de graduação em enfermagem. Estudo transversal do tipo exploratório, com 10 docentes selecionados de forma intencional, realizado na Universidade Federal do Rio Grande do Sul em 2006. Para coleta de dados foi utilizado um questionário, utilizando-se uma escala do tipo *Likert* para avaliar a adequação dos conteúdos, da apresentação visual e a utilização dos objetos educacionais. Os dados foram organizados e processados pela estatística descritiva. Os resultados apontaram que os docentes foram favoráveis à apresentação dos objetos educacionais, assim como à adequação dos conteúdos mostrados e a utilização dos mesmos com o conteúdo sobre oxigenoterapia. Não foi significativa a relação da opinião dos professores com a faixa etária ou com o seu conhecimento em informática, assim como o tempo de docência e os conteúdos ministrados.

## DESCRIPTORIOS

Educação em enfermagem.  
Educação à distância.  
Tecnologia educacional.  
Instrução por computador.

## RESUMEN

Se trata de investigación sobre la utilización de objetos educacionales digitales en las formas de hipertexto, juegos educativos y simulación sobre oxigenoterapia junto a docentes del curso de graduación en enfermería. Estudio transversal del tipo exploratorio con 10 docentes seleccionados de forma intencional, realizado en la Universidad Federal de Río Grande del Sur en 2006. Para recolectar los datos fue utilizado un cuestionario, utilizándose la escala de tipo *likert* para evaluar la adecuación de los contenidos, de la presentación visual y la utilización de los objetos educacionales. Los datos fueron organizados y procesados por la estadística descriptiva. Los resultados apuntaron que los docentes fueron favorables a la presentación de los objetos educacionales así como a la adecuación de los contenidos mostrados y a la utilización de los mismos en el contenido sobre oxigenoterapia. No fue significativa la relación de la opinión de los profesores con el intervalo de edad, con su conocimiento en informática, así como con el tiempo de docencia y los contenidos ministrados.

## DESCRIPTORIOS

Educación en enfermería.  
Educación a distancia.  
Tecnología educacional.  
Instrucción por computador.

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## INTRODUCTION

Distance Learning is a teaching-learning modality that, mediated by digital technological support, can be used in in-site, hybrid or at-a-distance environments. There have been questions about the professors' role in this context; they are no longer a simple transmitter of information, but rather an agent who organizes, activates, and guides the students' knowledge construction in addition to assigning them the critical and active position in the world of information they are submitted to on a daily basis<sup>(1)</sup>.

New technologies are being applied in nursing education, in accordance with National Curricular Guidelines for Undergraduate Nursing Courses, which state that nurses should be skilled in communication and information technologies<sup>(2)</sup>. Examples of these technologies are the Internet, different software, virtual learning environments, and digital educational objects, which can be used in nursing education to provide teaching-learning processes that are more flexible, creative, dynamic, interactive, and that encourage students' active and collective participation in knowledge acquisition.

Professors should know the possibilities and limitations of these tools so as to adjust the contents better to the specificities and needs of the different student groups<sup>(3)</sup>.

However, it should be considered that nursing professors find it difficult to use informatics resources in their educational practices; for example, this type of teaching is undervalued, there is a lack of encouragement to use informatics in teaching, in addition to other aspects like the fact that informatics has no priority in the institutional budget, and that there is no infrastructure and specialized technical assistance<sup>(4)</sup>. These barriers might hinder professors in developing proposals for using informatics in nursing education. The factors pointed out as facilitators for applying informatics in education are also stated, such as the implementation of a policy that values teaching, directing financial and technological resources to this area and training professors to use different tools, in addition to having specialized technicians to support the activities<sup>(5)</sup>.

As mentioned before, educational or learning objects are some of the existing computer resources used as support tools in nursing education. There are many definitions regarding these tools. Some state that they are

[...] blocks of self-contained educational contents (with a certain independence of the content), referring to other blocks and possible of being combined or sequenced to form educational interactions<sup>(6)</sup>.

This definition permits to understand that educational objects mediate and facilitate the construction of new knowledge.

Other sources report their characteristics, stating that they are [...] *digital resources that can be used, reused, and combined with other objects to form a rich and flexible learning environment*<sup>(6)</sup>. When designing an educational object, special attention should be given to its standardization, which permits the transference between platforms and environments easily found on the *web*, increasing the users' power of choice and making them more flexible<sup>(6)</sup>.

Institutions that produce and use digital educational objects are concerned with evaluating the quality of e-learning activities. Therefore, they propose a broad analysis of the whole learning process, including an analysis of the goals and the students' results, interaction, communication, feedback, teaching material, such as interface layout and design, and course management<sup>(7)</sup>.

As demonstrated, digital educational objects are materials produced in a pedagogical context and directed to a specific audience. When evaluated, they should be analyzed considering the whole process they are part of.

To disseminate and encourage the use of informatics in nursing education, a group of nursing professors and students from the College of Nursing at the Federal University of Rio Grande do Sul (UFRGS) developed digital educational objects in the area of Nursing Fundamentals.

In 2005, with support from the UFRGS Distance Learning Secretary, the Nursing-Virtual Teaching Laboratory and the Interdisciplinary Center for New Technologies in Education produced twenty digital educational objects – eight hypertexts, eight educational games, and four simulations – addressing nursing care issues in oxygen therapy, placement of urinary catheters, gastrointestinal catheters and enteric catheters, venous puncture, and drug administration. These educational objects are available in the CESTA project (<http://cesta.cinted.ufrgs.br/form.consulta.result.sacca.php>).

In 2006, the material was made available to senior nursing students enrolled in the Human Care Fundamentals class. After completing the class, the students participated in a study about the use and adequacy of this digital material<sup>(8)</sup>.

The purpose of this report is to present the data obtained by means of a study about content adequacy, visual presentation and the use of digital educational objects in the form of hypertexts, educational games and simulations about oxygen therapy with nursing professors at the studied institution.

The results obtained through the research permitted to review and improve the educational objects, available in repositories or virtual libraries, which can be used by other classes or institutions in teaching or for support.

Professors should know the possibilities and limitations of these tools so as to adjust the contents better to the specificities and needs of the different student groups.

## METHOD

This is a cross-sectional exploratory study that aimed to perform a systematized investigation of the professors' opinion about digital educational objects in oxygen therapy in the nursing area.

The intentional sample consisted of ten professors who met the following inclusion criteria: taught disciplines that addressed oxygen therapy in adult care (Human Care Fundamentals III, Adult Care I, Adult Care II) and agree to participate in the study.

Data collection occurred at the facilities of the College of Nursing (UFRGS) after the project had been approved by the institution's Research Ethics Committee (number 2005482). A questionnaire containing 16 closed questions was applied, using a *Likert* scale (never, rarely, sometimes, often, always) to evaluate three educational objects on oxygen therapy recorded on a CD-ROM. The objects were presented to the professors in the form of a hypertext (general concepts, anatomy-physiology review, the equipment and its purposes, procedures, review questions, and links to supporting articles on the Internet), an educational game about preparing the tray, and a simulation of placing the oxygen catheter. The evaluation involved the three selected items for this study: visual presentation, object use, and content adequacy.

The evaluated items that comprised the questionnaire aimed at addressing the components of the methodology used to design the learning objects, which was the instructional design system (IDS) consisting of the stages of analysis, design, development, implementation, and evaluation (ADDIE)<sup>(9)</sup>.

For the analysis, the data were organized using SPSS 13.5<sup>®</sup>. Statistical analysis was performed by frequency distribution, central tendency (mean), and variability (standard deviation) measurements. The chi-square test ( $\chi^2$ ) was used to verify the association between variable groups, adopting a level of significance at  $\alpha=5\%$ , since it is an intentional sample. In addition, the Cronbach's Alpha coefficient method was used to evaluate the quality of the research instrument. The instrument scored 0.9328 on the Cronbach's Alpha test, and the coefficients in the three areas comprising the questionnaire ranged between 0.8920 and 0.9135, suggesting good internal consistency.

## PRESENTATION AND DISCUSSION OF THE RESULTS

All professors in the study were female, and their average age was 44.2 years ( $\pm 10.68$ ). The participants' mean time as professors was approximately 15 years with a confidence interval ranging from 8 to 22 years. In terms of the contents taught by the professors, they were: Adult Health Care (70%), Nursing Fundamentals (50%), and Nursing Service Systematization (30%). The professors' evaluation of their knowledge in informatics was advanced level (20%), intermediate level (60%), and basic level (20%).

The satisfaction analysis refers to the items of visual presentation, use of the educational objects, and the adequacy of the contents about oxygen therapy in the hypertext, educational game, and in the simulation of placing the oxygen catheter.

The professors attributed high scores to the visual presentation of the educational objects on oxygen therapy: *always* (66.7%) and *often* (33.3%). Studies have shown that the digital material should be designed according to items referred to as digital literacy, which means paying close attention to the design of the material that is made available to the students, especially because they will use it directly without any help from the professor. The text should be formatted in a reader-friendly way, avoiding serified fonts, colors should not be tiring to students, and the images should blend in with the text presentation so as to avoid visual saturation<sup>(10)</sup>.

As for the use of the digital educational objects, consisting of six variables, the professors rated the categories as *always* (70.5%) and *often* (25.6%). It should be highlighted that the variables *material easily saved on the computer* (12.5%) and *browser button actions clearly indicate their function* (11%) were the only items that received *sometimes* answers from the professors.

The fact that the users had some problems to save the objects on the computer indicates their difficulty to handle *FLASH® plugins*. It should be clarified that, when the professors received the CD-ROM with the objects for evaluation, the researcher instructed them about the need to install the *plugin* and how they could do it. A previous study about the same digital educational object, performed with nursing students, found the same difficulty to save the material on the computer<sup>(8)</sup>.

Some users apparently did not fully understand how to navigate through the hypertext, since the professors attributed the answer *sometimes* (11%) and *often* (33.3%) to this variable. Similarly, 50% of the professors attributed the answer *often* to the variable *there is logic in the navigation of the educational objects*, which supports the idea that users did not feel completely informed about this item.

The use of digital educational objects, either in the at-a-distance or the in-site modality, requires different skills than those used in face-to-face teaching, because there is no direct transposition of the material from one modality to the other. One example is reading the hypertext, which follows the logic of multiple paths, and this characteristic differs from the linear characteristic of printed texts. Therefore, professors and students who are not accustomed to the particularities of virtual environments and their particular forms of communication and expressions feel there is a strong difference in terms of the teaching and learning standards they were accustomed to<sup>(11)</sup>.

There was a positive evaluation of the variables regarding content adequacy, which received *often* and *always* answers. It should be emphasized that the variables *the end-of-unit activities are in line with the material's proposition*

and links to the texts on the internet are in line with the educational propositions of the material, with 100% positive answers.

One of the principles for better online education practice is the possibility of having interactive activities, attached references or links that would permit students to find additional contents related to the presented material<sup>(12)</sup>.

As demonstrated in the analysis of each variable group, the professors considered the digital educational objects on oxygen therapy to be satisfactory. The items regarding content adequacy received, on the average, the highest concentration in the *always* category, obtaining the highest mean score ( $\pm 4.84$ ). There were no significant differences when the following variables were crossed: age group, time as professors, level of informatics knowledge or contents taught.

## CONCLUSION

The nursing professors made a positive evaluation of the digital educational objects about oxygen therapy, considering the categories of visual presentation, use of the objects, and content adequacy. No relation was found between the professors' opinion and their age, or with their informatics knowledge, time as professors and contents taught.

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