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Digital educational objects for women's health

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Introduction

The evolution of digital technology has encouraged educators to use technology creatively to invest in the skills that are essential for nursing practice (CIESIELKA, 2008, p. 473). Nursing education also occurs outside of the conventional classroom in virtual environments using telecommunication technologies via computer and the aid of *intranets*, *extranets* and the Internet (HANNAH et al., 2009, p. 280). The available tools and digital media include learning objects, concept maps and wikis.

This technology has proliferated within a technological system in which governments, organizations and people are integrated to maximize efficiency and rationality. The combination of technology and science will continue to thrive, and professionals must be increasingly prepared to direct and stay abreast of technology use and development to promote the convergence between human and technological developments (MARTINS, DAL SASSO, 2008).

Coscarelli (2004, p.1) described learning objects as small, mostly digital, tools that can be reused, such as videos, images, pictures, graphics and other forms of presentations that aid student learning.

Digital objects have other benefits, such as accessibility, interoperability and durability, which may be incorporated into multiple applications (TAROUCO et al., 2003; TAROUCO, 2010). These authors suggest that digital objects are *accessible* in that they provide access to educational resources in a remote environment for use in various places. Digital objects exhibit *interoperability* in that components that are developed in one location can be used with sets of tools or platforms in other environments with other tools and other platforms. Finally, digital objects are *durable* in that they facilitate the continued use of educational resources as the base technology changes without redesign or recoding.

Educational practices in nursing education are enabled by computing technologies and subsidized by active teaching approaches, an approach that achieves effectiveness through interactivity, the production of collective knowledge and the learning that occurs at different times and locations (LASHLEY, 2005; SILVA, 2006; COGO *et al.*, 2007).

Based on the abovementioned characteristics, learning objects that utilized problem-based learning (PBL) were created in the area of women's health. PBL has been established for more than 20 years, and it provides a framework for medical education (Weiss, 2000, 1082). Medical students who use PBL acquire relevant knowledge in an integrated manner through the use of clinical cases to develop and improve their problem-solving, diagnostic and clinical reasoning skills. Kuzma et al. (1997) provide a practical example of the improvements in reasoning. Students who participated in the integration of PBL into the women's health curriculum identified more relevant learning problems in the outpatient setting compared with students who were not involved in the curriculum.

The importance of a pedagogical framework in the development and application of the material with students has been demonstrated by LEVI-Enf in the production of digital educational objects in nursing.

Such features as the ability to 'browse' as desired and respect learning times have been addressed in the production of educational or learning objects (TAROUCO et al., 2003, p. 4). These features can be observed in the preparation of instructional materials using multimedia and the interactivity of computer technology and communication resources (TAROUCO et al., 2003, p. 2).

The Nursing Digital Learning Objects Project Version III (Projeto Objetos de Aprendizagem Digitais em Enfermagem Versão III - PROADE III) was developed to address women's health. The Project arose from the lack of learning objects for nursing that were adapted to Brazilian reality. The Project was grounded in PBL to create problematic knowledge that students encounter in their daily lives, including hypothesis formulation and the integration of course content with women’s nursing care. Digital materials were prepared to encourage student exploration, relate questions about procedures to potential actions and provide students with the necessary tools to perform nursing consultations with a focus on women's health during pregnancy. The digital material included seven learning objects: three objects of a theoretical nature (hypertext), three objects with clinical cases (simulations) and a quiz with integrative questions. The materials contained animations and hypertext and presented scenarios that simulated real situations of practical training. This project provides continuity with digital materials that were developed by the Laboratory of Virtual Education - Nursing (Laboratório de Ensino Virtual – Enfermagem- (LEVI-Enf)) of the School of Nursing, Federal University of Rio

Grande do Sul (Universidade Federal do Rio Grande do Sul -UFRGS), which supports the presential teaching of nursing (DAL SASSO et al., 2011, p. 120).

This article presents a developmental method for digital learning objects based on PBL that was constructed in PROADE III for women's health.

Method of development of digital learning objects

The financial resources of Distant Learning (Educação à Distância – EAD) UFRGS supported the development in LEVI-Enf of digital learning objects for nursing consultation for pregnant women (Figure 1), vaginal flow (Figure 2), smear collection (Figure 3) and two clinical cases (Figures 4 and 5). This program was developed to contribute to nursing student education at UFRGS in the Nursing Care of Women. A learning object on breast cancer (Figure 6) and a *quiz* on contraceptive methods (Figure 7) were subsequently developed in 2009.

Figure 1 - Layout of the digital object learning object on nursing consultation for pregnant women

Figure 2 - Layout of the digital learning on vaginal flows.

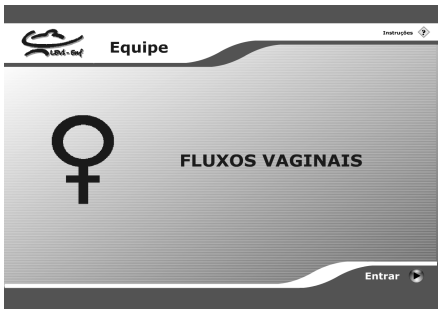

Figure 3 - Digital learning object layout on cervical smear collection.

Figure 4 - Layout of the digital learning object on a clinical nursing consultation case for women.

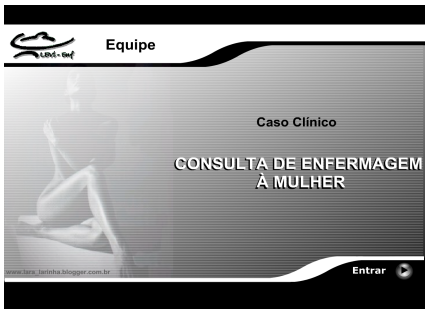

Figure 5 – Digital learning object layout on a clinical first prenatal consultation case.

Figure 6 – Layout of the digital learning object on breast cancer

Figure 7 - Layout for *Quiz* on contraceptive methods

The characteristics of Tarouco et al. (2003, p. 4) were used as a base to produce objects that would create a more dynamic and attractive working subject, arouse student interest and curiosity and inspire them to seek additional materials and sources of knowledge on the studied subjects. Hypertext, video and animation were included in the objects to provide interactivity.

The developed materials included hypertext, video and animation and covered a wide range of themes, such as stages of pregnancy, procedures (uterine height and exams) and guidelines for the clinical care of pregnant women. For example, these features assist in the demonstration of cervical smear collection (CP) and the assessment and differentiation of leucorrhea.

The Learning Objects products went through five stages of development, which often overlapped. These steps followed the ADDIE model (*Analysis, Design, Development, Implementation and Evaluation*), which is widely used for the preparation of instructional materials (MICHAEL, 2003).

Information in the analysis phase was provided for the design of the learning object. This phase included analyses of the proposed content to identify problems and solutions in the theoretical framework for the development of the material. Materials such as a women's health care polygraph and links to databases, referenced bibliographies, tasks, film, chats, support centers, textbooks, web pages and materials provided by the Ministry of Health, were used.

The design phase planned the educational goals to be achieved. Storyboards were used to develop a script to be followed and provide a theoretical and visual grounding for the development phase. PBL was chosen as the teaching method for these materials because clinical problems arise from everyday situations. The user must reflect on clinical practices in which possible problem resolutions are presented based on the selected options during the exploration of the material (VALIATIS et al., 2005, p. 2). The advantages of this teaching strategy include the possibility of reuse, interoperability and object durability.

The development phase created the learning objects. Lesson plans and teaching materials were included in this development. These materials are didactic and interactive, and they were designed using multimedia resources. The graphic design was performed using *Macromedia Flash CS3® software*, image editors, such as *Fireworks®,* and videos, such as *Windows Movie Maker®*. *Macromedia Flash CS3®* offers extensive animation features and smaller file sizes compared with other software. *Flash CS3®* offers huge advantages for possible future modifications, and it is easy to learn.

In the implementation phase, the objects were used by students in the Methods in Research, which is part of a technological undergraduate course in Planning and Management for Rural Development (Planejamento e Gestão para o Desenvolvimento Rural- PLAGEDER) that is offered by UFRGS as a distance learning modality. The objects are available in a *Moodle*® virtual learning environment.

The evaluation phase of the objects is being performed as a research project under the approval of the Research Ethics Committee (Comitê de Ética em Pesquisa- CEP) of Health Sciences Federal University of Porto Alegre (Universidade Federal de Ciências da Saúde de Porto Alegre – UFCSPA -No. 1241) and the Research Ethics Committee of UFRGS (No. 19974)

according to the evaluation needs of the objects (LINSEY and TOMPSETT, 2007). The evaluation of materials to address issues relevant to vaginal flows, cervical cancer and cervical smear collection are currently in use by primary health care professionals. These professionals are linked to the Rio Grande do Sul Center of Telematics and Telemedicine Project in support of Primary Health Care (PHC) in Brazil. Their objectives are to improve the quality of the Unified Health System (Sistema único de saúde – SUS, the primary health care system) in the cities and countryside of RS and Porto Alegre by expanding the training of family health teams using technology to promote tele-education and tele-health (DIAS et al., 2010, p. 1). These results will be tabulated, analyzed and published in a scientific paper.

The produced objects were applied in the required disciplines within the nursing course and evaluated by students, whose criticisms and suggestions were returned to Levi-Enf. These data will improve the materials with minimal physical and human resources.

Discussion and Conclusions

The developed learning objects cover a wide range of issues in nursing education. These objects begin in the 6th stage of the course, and they are available for the remaining semesters. The objects that were developed by LEVI-Enf can be used in the continuing education of nursing professionals in the basic health network, hospitals and academia.

The developed projects demonstrated the advantages of integrated computer technology in nursing education (COGO *et al.*, 2010; TANAKA *et al.*, 2010; SILVEIRA *et al.*, 2010). The use of computer technologies will hopefully facilitate the implementation of more creative teaching processes and provide students with opportunities for more engaged learning. This form of digital material production is also a viable alternative for public universities because of its decentralized nature and the low cost of the technological resources.

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