An educational proposal to teach a pressure ulcer management course online to students and nursing professionals*

Proposta educacional on-line sobre úlcera por pressão para alunos e profissionais de enfermagem

Propuesta educativa on-line sobre úlcera por decúbito para alumnos y profesionales de enfermería

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ABSTRACT

Objective: To develop an educational proposal to teach a pressure ulcer management course online to students and nursing professionals using a virtual learning environment. **Methods:** This was an applied technological research production technology. Steps of design, planning, and development characterized by a set of procedures, documentation, information technology, and digital images were used. Interactive educational software included the Cybertutor and the Virtual Man. **Results**: The educational proposal to teach pressure ulcer management online was divided into modules composed of list of discussions, case studies, and other didactic resources such as photos and utilization of the Virtual Man. **Conclusion:** The new educational course using online technology can promote effective knowledge on the management of pressure ulcer for undergraduate nursing students and practicing nurses. This has significance for clinical practice since the management of pressure ulcer continues to be a challenge for health care professionals and health services.

Keywords: Nursing informatics; Education, distance; Education, nursing; Pressure ulcer/nursing

RESUMO

Objetivos: Desenvolver uma proposta educacional *on-line* sobre o tema úlcera por pressão para alunos e profissionais de enfermagem. **Métodos:** Pesquisa aplicada, de produção tecnológica, composta pelas etapas de concepção/ planejamento e desenvolvimento, caracterizadas por um conjunto de procedimentos, documentação, digitalização de informações e de imagens. Foram utilizados recursos computacionais didáticos interativos como: o *Cybertutor* e o Homem Virtual. **Resultados:** Desenvolvimento de uma proposta educacional virtual sobre úlcera por pressão (UP) dividida em módulos de aprendizagem, contendo lista de discussão, estudos de casos e recursos didáticos, tais como fotos e o Homem Virtual.**Conclusões:** Utilizou-se de novas tecnologias educacionais, com a finalidade de promover o aprendizado sobre UP a estudantes de graduação de enfermagem e possibilitar a educação continuada de enfermeiros, uma vez que as UP representam um desafio aos profissionais da saúde e aos serviços de saúde.

Descritores: Informática em enfermagem; Educação à distância; Educação em enfermagem; Úlcera por pressão/enfermagem

RESUMEN

Objetivos: Desarrollar una propuesta educativa *on-line* sobre el tema úlcera por decúbito para alumnos y profesionales de enfermería. **Métodos:** Investigación aplicada, de producción tecnológica, compuesta por las etapas de concepción/ planificación y desarrollo, caracterizadas por un conjunto de procedimientos, documentación, digitalización de informaciones y de imágenes. Fueron utilizados recursos de computación didácticos interactivos como: el *Cybertutor* y el Hombre Virtual. **Resultados:** Desarrollo de una propuesta educativa virtual sobre úlcera por decúbito (UD) dividida en módulos de aprendizaje, conteniendo una lista de discusión, estudios de casos y recursos didácticos, tales como fotos y el Hombre Virtual. **Conclusiones:** Las nuevas tecnologías educativas fueron utilizadas con la finalidad de promover el aprendizaje sobre UD de estudiantes de pregrado de enfermería y posibilitar la educación continuada de enfermeros, dado que las UD representan un desafío para los profesionales y servicios de salud.

Descriptores: Informática en enfermería; Educación a distancia; Educación en enfermería; Úlcera por presión/enfermería.

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INTRODUCTION

Information and communication technologies (ICT) are characterized as processes of data transmission through electronic devices and optical resources. When incorporated into teaching, it enables an increase in access to information using the integration of multiple media, languages and resources, making it possible for an interactive educational process to be developed. This process articulates theory, practice and research that can be applied to both the initial academic qualification and continuous professional development. Thus, ICT can be incorporated into educational processes as a structural element of a new pedagogical practice, which determines qualitative differences in these processes[1].

During the learning process, while exploring the proposed contents, the student finds situations of decisions to be made on the paths to follow and practices the exercise of autonomy to manage their own study times.

As regards digital learning environments, they can be defined as computer systems that are available on the Internet and in software programs and have the purpose of providing support to ICT-mediated activities. These environments enable the integration of media, languages and resources; the development of interaction with the students; the availability of information in an organized way; support in production design and socialization to achieve educational goals. Furthermore, they enable student participation management, once the paths followed, productions and interactions can be recorded[2].

Although many studies do not distinguish a digital environment from a virtual one, the term "virtual learning environment" was selected, as it characterizes the dynamic movement of knowledge building, which occurs by means of the teacher-student, student-student and student-group relationships[3].

In Brazil, the use of computer resources in nursing teaching began in the 1990s. The national overview of application and development of virtual nursing learning environments, between 1998 and 2006, reveals that 31 studies associated with public higher education institutions in nursing were performed as dissertations and theses. The educational materials developed are aimed at academic and professional qualifications in nursing, especially nursing care[4].

In view of what has been exposed here, the importance of designing a virtual nursing learning environment, aimed at the promotion of distance learning, is identified. This promotion is achieved through new technologies that enable collaborative and flexible learning for academic and professional nursing qualifications in pressure ulcer, which has great relevance in the area of health.

The concept of pressure ulcer was reviewed in 2007 by the National Pressure Ulcer Advisory Panel and defined as a localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction. Innumerable contributing factors or contusion factors may be associated with pressure ulcers; the meaning of such factors, however, has not yet been clarified[5].

The present study aimed to develop an online educational proposal for pressure ulcer for nursing students and professionals.

METHODS

This study was comprised of an applied research project on technological production. The final result was the development of a product related to an online educational proposal for pressure ulcer (PU), in a virtual learning environment, for nursing students and professionals.

The applied research project aims to create new products or increase the efficiency of already existing products[6]. It is the type of research that works with immediate objectives, once the investigator requires instant results from the applied resource; in addition, already existing laws, theories and contributions make use of this type of research, which is centered around the discovery of solutions for immediate problems[7].

In this case, the objective of the present study was to develop a product that could contribute to the nurses' professional qualification in pressure ulcer, aiming at the improvement of patient quality of care.

The methodology, based on a scientific study, was comprised of two stages: conception and planning; and development, characterized by a set of procedures, documentation, and digital processing of images and information[8].

Thus, the stage of conception and planning comprises the definition of theme and target audience, preparation of educational goals, selection of available resources and definition of instructional design. The storyboard technique was used to organize the material, once it enables the content sequence, navigation structure and interfaces to be detailed. The development stage is characterized by the production or digital processing of media used in the virtual environment[3].

Conception and planning

The selection of the subject of pressure ulcer is justified by studies that show high PU incidence and prevalence indices, especially in certain high risk populations. Thus, this represents a challenge to health

professionals, when implementing preventive and technological advance actions for treatment[9].

Another relevant factor for the selection of this subject is the fact that PU incidence assessment has been used as indicator of health service quality of care since 1987, with the creation of the Joint Commission for the Accreditation of Health Care Organization, the institution responsible for health service assessment and accreditation in the United States[10].

The target audience selected was comprised of undergraduate students in nursing and nurses, aiming at students' academic qualification and nursing professionals' continuous education on this subject.

The definition of educational goals followed the cognitive, affective and psychomotor domains(11), considering that, when graduating, the student will be able to:

- Organize and plan their learning process by themselves;
- Recognize skin anatomy and physiology, associating this with pressure ulcers and nursing practices to prevent and treat them;
- Understand PU physiopathology in its complexity, which involves several stages, according to the classification proposed by the National Pressure Ulcer Advisory Panel;
- Distinguish stage 1 PU from contact dermatitis and reactive hyperemia;
- Analyze risk factors for PU development;
- Understand the importance of risk assessment for PU development, from the application of the Braden Scale;
- Reflect and propose nursing interventions to avoid PU development;
- Implement adequate nursing care and treatment of different PU characteristics;
- Express, through verbal and written language, learning and nursing practice experiences about this subject, using available communication technologies (discussion list and video conferencing).

As regards human resources, two nurses participated – Masters in Nursing and specialists in Nursing in Stomatherapy – Ostomies, Injuries and Incontinence – at the *Hospital Universitário da USP* (São Paulo University Hospital) preparing the theoretical content, describing the layout of virtual objects and assessing learning in different ways.

In addition, there was the technical support from the Discipline of Telemedicine of the *Faculdade de Medicina da Universidade de São Paulo* (FMUSP – São Paulo University School of Medicine), with the collaboration of technicians specialized in digital material processing and graphic designing to create 3D graphic animation.

Cybertutor was the support environment selected to develop the educational proposal and the *Projeto Homem Virtual* (Virtual Man Project), with the construction of virtual learning objects, was adopted as interactive resources to complement learning about PU. These computer resources were developed by the FMUSP Discipline of Telemedicine, which includes, among its actions, participation in research and development of new means of communication and iconography for educational purposes.

Cybertutor is an application developed with the purpose of allowing information to be made available in an interactive way and where each student can be followed. This environment enables communication among students and between students and professor through a discussion list[12].

The *Projeto Homem Virtual* is a dynamic and guided method of communication, consisting of a 3D graphic representation of specialized information, in an interactive, dynamic and objective way. Furthermore, it is an efficient resource to pass on knowledge about anatomy, physiology, physiopathology and molecular mechanisms by facilitating and speeding up students' understanding about a specific subject[13].

As regards the definition of the environment design, the contextualized instructional design method was adopted, divided into five pattern levels (information and supplementary, essential, collaborative and immersive), with an emphasis on content, activities and communication[14].

The instructional design is a process that involves activities and tasks according to individual rhythms, access to external information and teaching organization, electronic monitoring of each student's performance, and collective knowledge building[14].

The information and supplementary pattern emphasizes content and contains information about Cybertutor, with the course objectives, activities to be performed using a schedule of activities, welcoming messages and the hypertext. The essential pattern, with an emphasis on activities, integrates graphic presentations, the preparation of case studies and that of knowledge assessments. The collaborative and immersive pattern, emphasizing communication, comprises socialization activities associated with the student's profile and participation in discussion lists and video conferencing.

Development

This stage was comprised of content preparation and description, as well as the production and media digital processing in the virtual learning environment. The storyboard technique was adopted to organize content and images to be digitally processed, as it enables detailing of content sequence, navigation structure, interface and screen layout[3].

A bibliographic survey was conducted on the *Literatura Latino-Americana e do Caribe em Ciências da Saúde* – LILACS (Latin American and Caribbean Literature in Health Sciences), Medical Literature Analysis and Retrieval System Online – MEDLINE, Scientific Electronic Library Online – SciELO, and Cochrane Library databases, aiming to identify national and international studies on PU prevention and treatment to be the basis of the theoretical framework, used in the content of the educational proposal.

In this process, requirements of images, links and animations were surveyed, aiming to better understand the material. Meetings with specialists were held to describe the content, where contents, links, animations and photographs to be used in the learning environment and associated with the educational goals and contextualized instructional design were selected.

Thus, some images were photographed by the team of researchers and others were provided by specialists in this subject, who had an image bank related to PU treatment. These images were recorded, respecting ethical principles of confidentiality and consent from individuals, based on an Informed Consent Form to use images for academic purposes.

Each module of the *Homem Virtual* was developed in partnership with researchers and specialists, who followed the creation process with the graphic design team, aiming to help them identify the relationship between the internal graphic human body structures and the educational goals established.

In this way, meetings were held with the technician responsible for the development of the *Homem Virtual* graphic resources, where detailed guidelines on the content and structures to be created were provided.

RESULTS

The course is available on Cybertutor at the following link: http://www.estacaodigitalmedica.com.br/teleenfermagemeeuspct.

Students who wish to have access to the course need to sign up, providing information such as their name and password, which will be made available for them to log in.

Following the contextualized Instructional Design methodology, the course presents five modules that contain: a discussion list and knowledge assessment, with closed questions about the subjects studied or with clinical case simulators.

In the assessment methods, all choices of each question contain commentaries about the items covered, which help students to adequately direct their studies. In case a student does not get a question right, they can go back to the proposed content or discuss the answers with other students or the professor through a discussion list.

In addition, the modules show bibliographical references that include links to websites consulted, where students can navigate and deepen their knowledge about the subjects covered.

The modules are arranged in such a way that students alone are allowed to advance, after completing the previous module, participate in the discussion list and answer knowledge assessments and clinical cases correctly. Access to the following modules will be possible after students have fully completed the previous ones.

The hypertext was subdivided into five modules that deal with the following subjects:

- Module 1: Skin Anatomy, Concept, Physiopathology, Regions vulnerable to PU formation and Bibliographical References (Figure 1);
- Module 2: PU staging, Stage 1, Stage 2, Stage 3, Stage 4, Tissue Necrosis, Debridement and Bibliographical References;

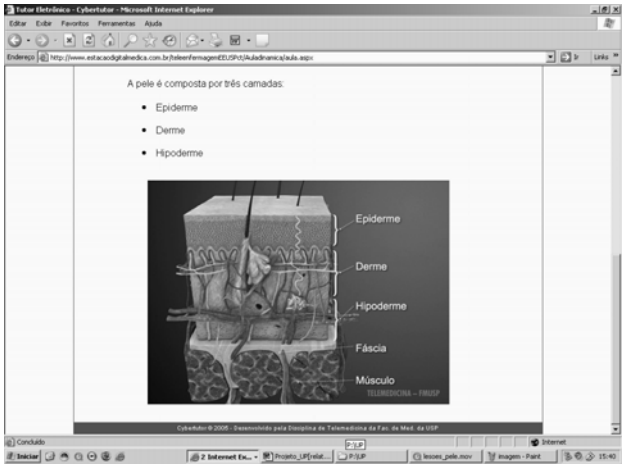

Figure 1 - Module 1: Skin anatomy – Screen showing skin layers

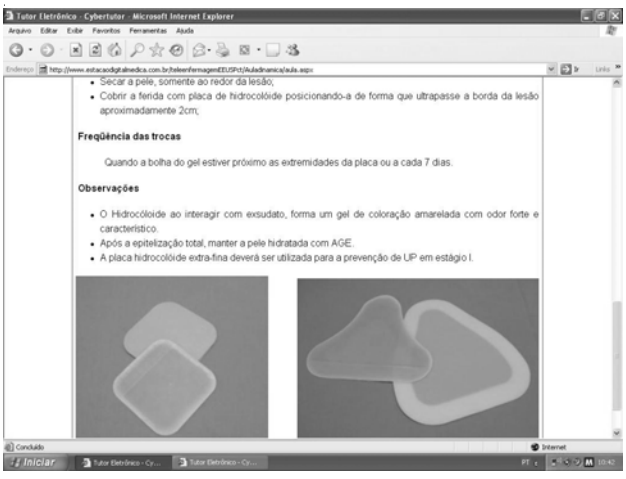

Figure 2 - Module 5: Nursing care - Treatment

- Module 3: Risk Factors and Bibliographical References;

- Module 4: Braden Scale and Bibliographical References;

- Module 5: Nursing Care, Nursing Diagnosis, Prevention, Treatment and Bibliographical References (Figure 2)

DISCUSSION

The technological product developed will open new perspectives to undergraduate courses in nursing and professional qualification for nurses with the use of virtual learning environments in nursing.

The incorporation of several types of media which enable learning, based on students' multiple potentialities, abilities and interests, can individualize this learning and contribute to collective learning building.

In addition, virtual objects developed with 3D applications using the *Projeto Homem Virtual* will be able to strengthen one's grasp of knowledge through spatial and visual abilities. Finally, they can be incorporated into virtual or face-to-face teaching about converging and similar subjects.

FINAL CONSIDERATIONS

The objective of this study was achieved with the technological production of an educational proposal for pressure ulcer, applied to a virtual learning environment.

Project development enabled several hypermedia tools to be applied, following the contextualized Instructional Design methodology, with an emphasis on content, activities and communication, aiming to provide individualized, flexible, interactive and collaborative learning.

It is important to emphasize that the educational proposal will be assessed by judges from the areas of health information technology, nursing teaching and stomatherapy and assisting nurses, aimed at the stage of assessment and adjustment of pedagogical (content, activities and interaction) and technical aspects (response time and interface quality).

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