Virtual educational proposal in cardiopulmonary resuscitation for the neonate care*

PROPOSTA EDUCACIONAL VIRTUAL SOBRE ATENDIMENTO DA RESSUSCITAÇÃO CARDIOPULMONAR NO RECÉM-NASCIDO

PROPUESTA EDUCATIVA VIRTUAL PARA LA ATENCIÓN DE LA REANIMACIÓN CARDIOPULMONAR EN EL RECIÉN NACIDO

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ABSTRACT

The purpose of this study was to develop an educational proposal using virtual multimedia resources, to innovate, stimulate and diversify areas of communication and interaction, facilitating nurses' autonomous and reflexive process of teaching and learning. This is an applied research, following the cyclical and interactive phases of designing, planning, developing and implementing. The educational proposal was developed on the TelEduc platform, using specific tools for content organization and communication between students and administrator. The teaching modules were on the following themes: Module 1 – Fundamentals of the heart anatomy and physiology in newborns; Module 2 – Risk factors for the occurrence of cardiorespiratory arrest in newborns; Module 3 – Planning nursing care; Module 4 – Medications used in cardiopulmonary arrests in newborns; and Module 5 – Cardiorespiratory arrest care in newborns. This study may contribute to innovating teaching in nursing from a virtual educational proposal on the important issue of newborn cardiopulmonary resuscitation care.

KEY WORDS

Nursing informatics.
Education, nursing.
Educational technology.

RESUMO

O objetivo deste estudo foi desenvolver uma proposta educacional virtual, utilizando recursos multimídia, visando inovar, dinamizar e diversificar espaços de comunicação e interação, favorecendo o processo de ensino aprendizagem autônomo e reflexivo do enfermeiro. Este trabalho constitui-se de uma pesquisa aplicada, seguindo as fases cíclicas e interativas de concepção e planejamento, desenvolvimento e implementação. A proposta educacional foi desenvolvida na plataforma TelEduc, utilizando ferramentas de organização, de conteúdo, de comunicação, do aluno e do administrador. Os módulos de ensino referiram-se as seguintes temáticas: *Módulo 1* – Fundamentos de anatomia e fisiologia cardíacas do recém-nascido; *Módulo 2* – Fatores de risco para ocorrência da parada cardiorrespiratória no recém-nascido; *Módulo 3* – Planejamento da assistência de enfermagem; *Módulo 4* – Medicações empregadas na parada cardiorrespiratória no recém-nascido; e *Módulo 5* – Atendimento da parada cardiorrespiratória no recém-nascido. Este projeto pode contribuir com a inovação do ensino em enfermagem a partir de uma proposta educacional virtual sobre um tema de relevância que é o atendimento da ressuscitação cardiopulmonar do recém-nascido.

DESCRITORES

Informática em enfermagem.
Educação em enfermagem.
Tecnologia educacional.

RESUMEN

El objetivo de este estudio fue desarrollar una propuesta educativa virtual haciendo uso de recursos multimedia, pretendiendo innovar, dinamizar y diversificar espacios de comunicación e interacción, facilitando el proceso de enseñanza y aprendizaje autónomo y reflexivo del enfermero. Este trabajo se constituye de una investigación aplicada, siguiendo las fases cíclicas e interactivas de concepción y planeamiento, desarrollo e implementación. La propuesta educativa fue desarrollada sobre la plataforma TelEduc, utilizando herramientas de organización, de contenido, de comunicación, del alumno y del administrador. Los módulos de enseñanza se refirieron a las siguientes temáticas: *Módulo 1* – Fundamentos de anatomía y fisiología cardiaca del recién nacido; *Módulo 2* – Factores de riesgo para la ocurrencia de paro cardiorrespiratorio en el recién nacido; *Módulo 3* – Planeamiento de los cuidados de enfermería; *Módulo 4* – Medicamentos utilizados en el paro cardiorrespiratorio del recién nacido, y *Módulo 5* – Atención del paro cardiorrespiratorio en el recién nacido. Este estudio puede contribuir a la innovación en la enseñanza de la enfermería a partir de una propuesta educativa virtual referida a un tema de alta relevancia como lo es la atención de la resucitación cardiopulmonar del recién nacido.

DESCRIPTORES

Informática aplicada a la enfermería.
Educación en enfermería.
Tecnología educacional.

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INTRODUCTION

In a country with vast educational needs, as the case of Brazil, and considering the dispersion of people in several geographical locations, it is mandatory to supply the educational needs in a society that has a growing demand for knowledge.

In the information society, characterized by the exponential growth of knowledge, the education model should propose dynamic teaching that looks at students as active subjects capable of determining their self-learning, in addition to favoring experimentation, critical thinking and raising hypotheses, using interactive and participative strategies[1-2].

In this view, educational strategies must be adopted and should allow for having interactive learning and offer the necessary conditions for developing skills for research, deve3lopment, technical-scientific dissemination and knowledge development.

Information and Communication Technologies (ICT) are strategies that permit innovations in the educational process and to articulate theory, practice and research. These technologies can be used from initial student education to their entrance to the work market, to continuous professional advancement, thus determining a new educational practice and qualitative differences in these processes[3].

...technology-assisted teaching permits student education out of the conventional classroom environment...

In regards to the social impact, including ICT in the teaching process can provide greater access to information and interaction between distant groups, besides demanding better professional preparation to manage these tools[4].

Furthermore, based on the integration of multiple information and communication technologies, virtual learning environments consist of computer systems available on the internet which have the purpose of offering support to educational activities that use several media, languages and resources making it possible to organize information, establish interactions between people and knowledge objects, create and socialize productions, with a view to achieve specific educational objectives[5].

Therefore, the particular feature of a virtual learning environment is to integrate several ICT and make it possible to manage all the resources used in teaching, and thus there is a need for a *team* with the following members:

• Administrator – manages the server and has access to all the resources of the environment;

• Course administrator – responsible for creating the course, has access to the main area and all course databases;

• Instructor – has access to the main area and courses; the instructor-manager has permission to add and remove students from the course list or perform other administrative tasks and the instructor-editor does not perform any administrative tasks regarding the course (which would be the teacher);

• Student – final user of the course[6].

• The several technologies added to virtual learning environments that aim at improving the interaction between teachers, students and student group may be characterized as the following:

• E-mail: software used to send and receive messages and attachments, and requires an electronic address;

• Chats: an application for real time communication (online), which can be used for having specific discussions with the participation of a mediator (teacher or tutor);

• Forums or discussion lists (list servers): applications that allow for communicating, registering and posting messages. In the discussion list the messages are socialized as in e-mails;

• Hypermedia information (www): documents ranging among texts, multimedia (images, sounds and videos), which have the characteristic of having links that make it possible to *skip* to another section of the same document, or to another document; and

• Hypertext: a network of links that integrate non-linearly throughout a text. In teaching, it can raise curiosity and deepen topics[6].

It should be stressed that a virtual learning environment consists of information ecology[7], i.e., a complex system of people, practices, values and technologies, which emerges from the interdependent human activity among participants of this conjecture. As participants interrelate, they change the way they think at the same time they change their environment. Information ecology does not focus on technology, rather it focuses on the relationships that involve people and tools in the activity, characterized by a complex dynamics, by the diversity of spaces and opportunities of development, evolution and experiences.

According to some authors[8-9], technology-assisted teaching permits student education out of the conventional classroom environment with flexibility regarding the space requirements and class hours, as well as the time and pace of learning. It is observed that the individual development of students is important, and they should be considered as active subjects of their education, of knowledge development and overcoming physical and temporal distances in learning.

Although using technology does not solve problems regarding outdated education projects that are not in line with the students needs and the current working market,

can trigger a process of thinking and restructuring of institutions and faculty regarding their educational practices, thus generating changes in the strategies and teaching tools[10].

Therefore, when using technology-assisted teaching, a common mistake made in conventional teaching should be avoided, i.e., using ICT should be supported on a teaching concept that permits significant learning, supporting thinking that is critical, dialogical, contextual, complex, intentional, collaborative, constructive and active[9,11].

These new technologies, applied to learning allow for greater flexibility, creativity, dynamicity, interaction and communication in the teaching-learning process, encouraging students toward active participation in a constructivist perspective[10].

The participation in virtual learning environments means entering a virtual world in which communication occurs mainly through reading and interpreting text and hypertext materials, consisting of reading other people's written thoughts, or expressing your own thought through writing. It also means to face diversity and particularities, exchange ideas and experiences, perform simulations, test hypotheses, solve problems and create new situations, becoming engaged in the collective construction of an information ecology, in which values, motivations, habits and practices are shared[5].

In this context, it is important to perform studies that involve the applicability of informatics in nursing education, helping to develop educational strategies that facilitate learning in a collaborative and constructivist perspective.

In nursing, authors[12] show that the use of computer resources as an effective tool in the teaching-learning process and the implementation of that instrument in the educational environment has been positive despite the resistance from students and teachers. These resistances are mostly related with the lack of basic knowledge in informatics, as well as the constant technological changes, which is a fact that can become a trouble to those who are against computer technology.

Therefore, Nursing must seek technological preparation to use informatics, with an objective to explore its potentials and recognize its possibilities as a working instrument applied in teaching, in knowledge acquisition, in care services, in research and in nursing management[10].

Considering the referred information, we sought to develop proposal for education in cardiopulmonary resuscitation in newborns applied in a virtual teaching environment, with scientific grounding, and that will be made available by a public teaching institution.

This theme was chosen considering the scarcity of educational material on the topic and the need for preparing nurses to work in an emergency situation involving life risks, which requires safety, abilities and skills regarding the procedure.

The care to newborns, especially in a situation or cardiopulmonary arrest has many particularities, which differentiate it from care to adults, requiring safe and efficient practice in a moment when there is a life at risk.

Therefore, flexible training and technical-scientific preparation for nurses, using multimedia resources, interaction and simulation exercises, may help to effectively reduce neonatal morbidity and mortality and improve the quality of health care delivered in emergency situations involving newborns.

Virtual learning environments could provide access to information that would add value to the daily practice of nurses, in addition to promoting professional updates.

Due to the existence of several possibilities and potentialities of different technology resources it is important to plan and analyze new forms of teaching and learning by establishing educational goals as well as skills and abilities in the cognitive, psychomotor and attitudinal aspects, adjusting the use of computers to the objectives proposed[10].

OBJECTIVE

To develop a proposal for interactive virtual education in cardiopulmonary resuscitation in newborns.

METHOD

This study is an applied research, which resulted in a technological production, characterized by the development of a product, and referred to the creation of an educational proposal applied to a virtual learning environment.

Applied research is currently related with the development of new products or processes oriented to the needs of the market or to the solution of problems of immediate interest for the society[13].

The methodology for developing the educational proposal followed the cyclical and interactive stages of conceiving and planning, developing and implementing, as proposed by several researchers[4,14-16].

This study is associated with the Group for Studies and Research on Information Technology in Nursing Working Processes (Grupo de Estudos e Pesquisas de Tecnologia da Informação nos Processos de Trabalho em Enfermagem - GEPETE), with the CNPq (National Council for Scientific and Technological Development). It consists of a subgroup formed by two professors (on specialized in health informatics and the other in obstetrical nursing, having worked in the Neonatal and Pediatric Intensive Care Unit, on nurse (Neonatal and Pediatric Intensive Care Unit specialist with previous work experience), one nursing undergraduate (who has already attended classes in children's and women's health) and one masters graduate (specialist in intensive care nursing and experience in neonatal and pediatric intensive care units).

To facilitate communication among the members of the research group and speed up the process of developing the project, an e-group was created on the *Yahoo – Brasil*® browser, called PCR_Projeto_EEUSP, which was used to store all the meeting calendars, register all the meeting minutes, and to file the educational materials that were developed.

1. Conceiving and planning:

This stage consisted of the basis of the project for developing the virtual learning environment. In addition, the profile of the target audience was characterized, the theme to be addressed was chosen and the available resources were defined.

In the period from October 2005 to August 2007, several meetings were held with the research group with a view to perform the bibliographic survey, create and evaluate the content, select resources and electronic addresses regarding the chosen theme and choose the environment to be used.

Also in this stage, the storyboard of the educational proposal was constructed. According to a previous study [17], the storyboard is considered a draft of how the implementation will be organized, thus allowing for detailing the sequence of contents, the structure of navigation and the interface.

The chosen target-audience consisted of nursing undergraduates, as per established during the study groups.

The theme was chosen considering the scarcity of educational material on the topic and the need for professional preparation regarding cardiopulmonary resuscitation in newborns.

Regarding the selection of content, the educational material adopted was developed by the graduate student from the research group, who authorized making it available as hypertext. The hypertext content was evaluated by the respective group members who were experts in the area.

The teaching-support platform chosen for developing the virtual environment was the TelEduc teaching management system, an environment for the creation, participation and administration of on-the-web distance learning courses that has been under development since 1997, by the partnership between the Center for Education Informatics (*Núcleo de Informática aplicada à Educação* - NIED) and the Computer Institute (Instituto de Computação - IC), both from Unicamp[18].

TelEduc is a distance learning support system that has communication tools that were designed to facilitate the development of activities based on knowledge development such as collaborative activities, with support from different materials, including texts, software and Internet references. The interactions that occur in the TelEduc environment are registered with the purpose of allowing for formative evaluation by continuously following these registers, and by having students think critically about their learning process [18].

In addition, a bibliographic survey was performed on Bireme and Medline (Pubmed Interface) databases to select the studies that addressed the themes of the course modules, which were made available on the TelEduc tools. The interesting links were also selected and posted in the virtual environment so students could explore.

2. Development:

This stage involved the process of producing and digitalizing the media used in the virtual learning environment, according to the selection made in the stage of conceiving and planning, which was developed by the undergraduate.

The resources of the TelEduc platform include tools that permit to present information, post contents and allow for course participants to communicate among themselves. The tools are located on the left side of the screen.

The tools can be used as presented below[19]:

Organization tools:

• *Structure of the environment*: offers information about the tools and the environment;

• *Course dynamics*: presents information about methodological strategies and course organization;

• *Calendar*: it is the entrance page to the course, presenting the daily, weekly or monthly program;

• *Evaluations*: lists the ongoing evaluations and the grades of the course participants.

Content tools:

• *Activities*: presents the course activities;

• *Support material*: provides articles related with the course theme and some suggestions of journals, newspapers and addresses on the web;

• *Reading*: presents useful information related with the course theme, offering support for the proposed activities.

Communication tools:

• *Mural:* an area where participants can post information that they consider relevant, referring to the course context;

• *Discussion Forums*: provides access to a page containing the topics being discussed during that particular moment in the course;

• *Chat*: permits participants to have real time conversation;

• *Mail*: an internal email system;

Student tools:

• *Groups*: permits to create groups to facilitate task distribution;

• *Profile*: stores the participants' individual profiles;

• *Daily Journal*: a place for students to write notes that may be read and commented by educators;

• *Portfolio*: stores texts and files to be used or developed during the course, as well as internet addresses;

In addition to the tools listed above, TelEduc has administration tools that are exclusive to educators, who can follow user attendance and see the interaction between course participants in the Discussion Forums and Chat tools.

The goal proposed by TelEduc is that concepts, in any area of knowledge, should be learnt by solving problems, with the aid of different educational materials. TelEduc also offers a great possibility of intense communication between the participants of the course and a broad view of the work developed. The system stores all information generated during a course, which can be recovered at any time[18].

Using these tools, the content was distributed into modules, which permit using several media and different resources offered by the platform.

The software used to plan, type, and prepare the course content was *Word for Windows XP®*.

3. Implementation:

This final stage involved performing initial navigation tests and content evaluation regarding the use and presentation of the environment.

Therefore, in this stage pre-tests were performed to verify if media were working properly in the environment and to review the texts. All necessary corrections regarding the content and the texts were performed.

RESULT

The proposal on virtual educational in cardiopulmonary resuscitation in newborns was developed according to the described plan, with a view to prepare nursing undergraduates.

The TelEduc platform was used for developing the virtual environment, which can be accessed at: http://arenito.cirp.usp.br/~teleduc//cursos/aplic/index.php?cod_curso=373, using a login and password which the tutor provides to students when they register for the course (and can later be changed).

Hence, students access the home page where the environment was developed, containing the weekly program.

By clicking on the Course Dynamics tool, students access the course objectives, the list of learning resources that will be used, the course program, and information about the evaluation, certification, and tutors.

The class modules refer to the following themes: *Module 1* – Fundamentals of heart anatomy and physiology in newborns; *Module 2* – Risk factors for the occurrence of cardiopulmonary arrest in newborns; *Module 3* – Planning nursing care; *Module 4* – Medications used in cardiopulmonary arrest in newborns; and *Module 5* – Cardiopulmonary arrest care in newborns, as shown in Figure 1.

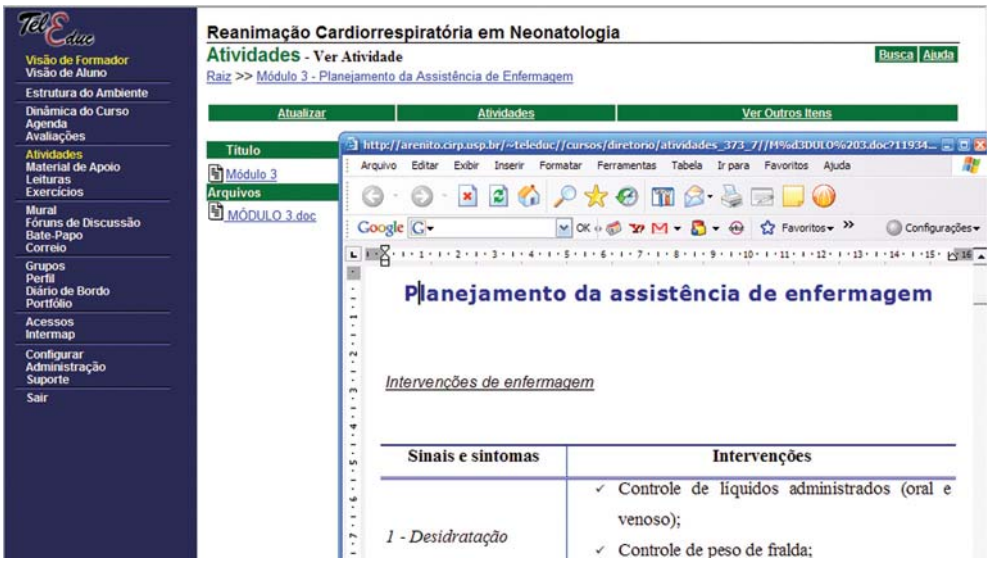

Figure 1 - Screen showing Module 3, "Planning Nursing Care", in Course Activities - São Paulo - 2007

The Support Material and the Readings work as a basis for discussions or group projects, helping students to deepen their knowledge: and include articles regarding the addressed theme, as well as several electronic addresses, as shown in Figure 2:

Figure 2 - Screen showing the related articles and links as Support Materials for Module 1, item "Cardiopulmonary Anatomy, Physiology and Embryology in Newborns" - São Paulo - 2007

Among the main TelEduc tools, the Mural and Discussion Forums were included, as shown in Figure 3:

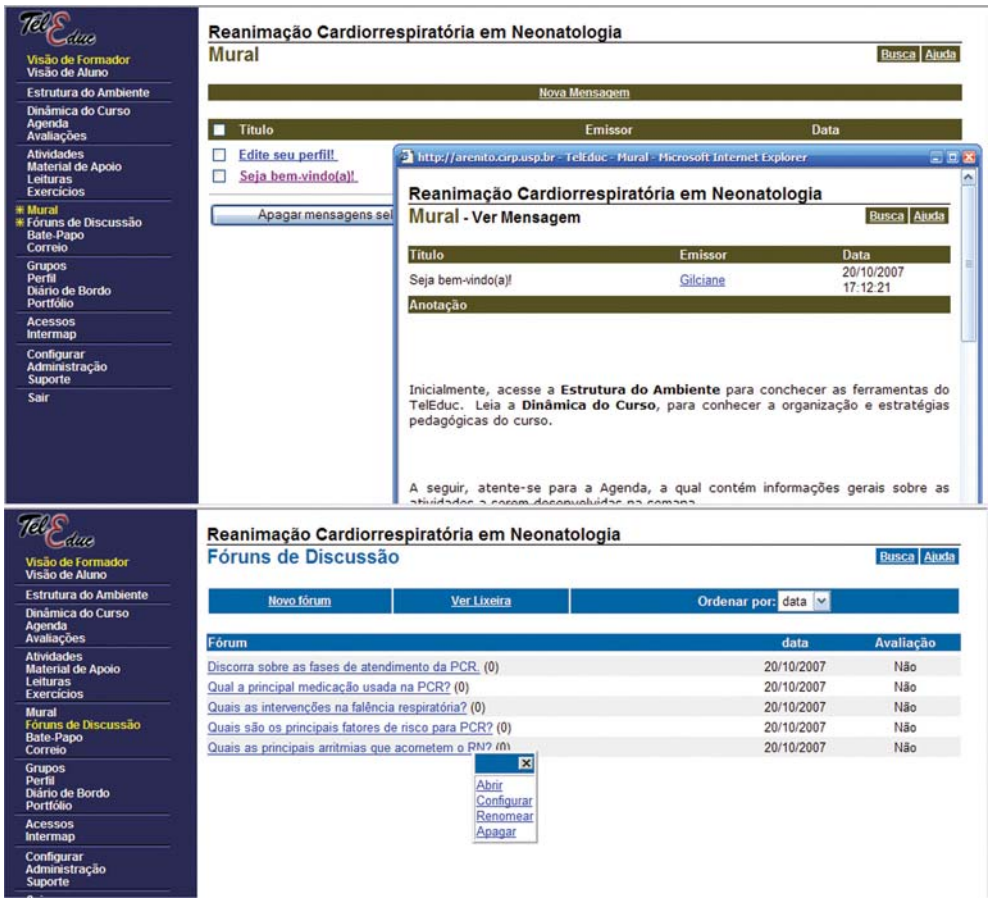

Figure 3 - Screen showing the Mural and Discussion Forums - São Paulo - 2007

Each activity can be accessed by tutors, offering an overview of any activity that was not completed or not corrected. In addition, the proposed activities are divided into class modules, which contain questions regarding each one (Figure 4):

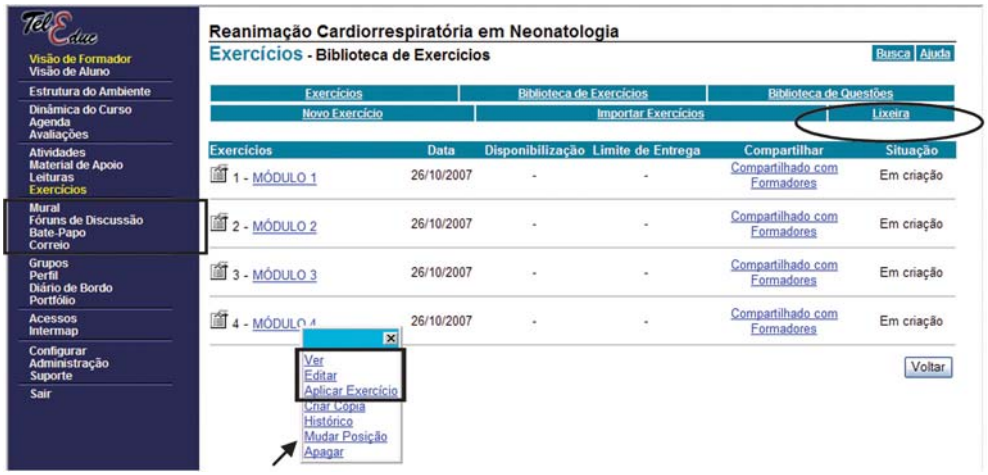

Figure 4 - Screen with Proposed Activities divided by Modules, in the "Activity Library" - São Paulo - 2007

To see a question, tutors simply click on the dialogue box on the side, and choose *see*. A popup window will open with the instruction, the score, the type of question (*open*, *multiple choice*, *link columns*, or *true or false*; respectively referred to as the following abbreviations in Portuguese: DIS - *dissertativa*, ME - *múltipla escolha*, AC – *Associar colunas*, VF – *Verdadeiro e Falso*) and their respective answer choices.

Furthermore regarding the questions, in addition to tutors attributing scores and classifications according to the type, they may also be classified according to the level of difficulty; as easy (F, as in *fácil*), medium (M) or difficult (D).

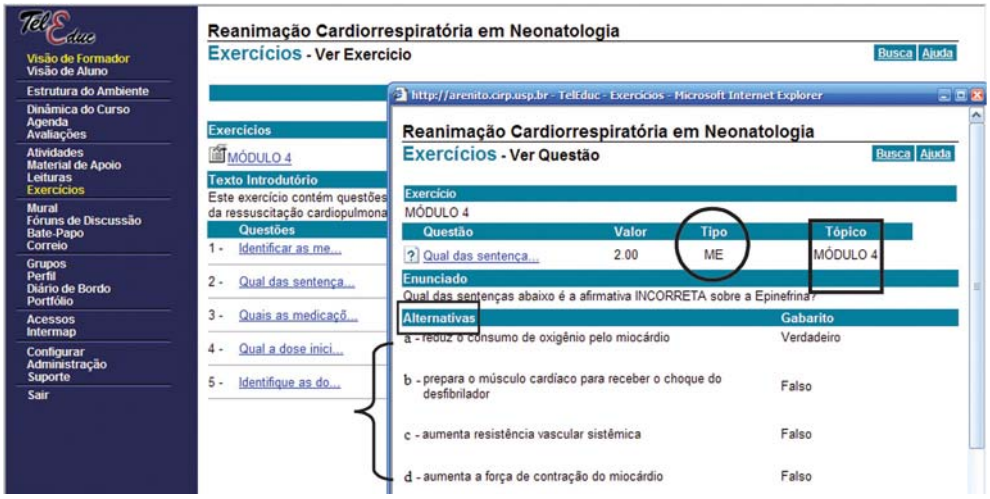

Figure 5 - Screen showing Question 2 of Module 4 - São Paulo - 2007

FINAL CONSIDERATIONS

Taking into consideration that the objective of the present study was to *Develop a Proposal for Virtual Education in Cardiopulmonary Resuscit ation in Newborns*, it is concluded that the points that determined the success of the project and the satisfaction in completing it was the group work, the quality of the educational material, the chosen learning-support platform and methodology.

The participation in the development of a distance-learning course using a virtual environment, organizing, planning and proposing activities, offers new possibilities of professional advancement. On the other hand, it also poses challenges for developing skills to express thoughts and abilities in writing and for including new technologies in nursing education, stimulating the search for new experiences for this modality of distance learning.

In the current context of education, there is a demand for opinion-former professionals. Hence, there is a need for new teaching-learning practices using educational resources and technologies, encouraging and favoring the advancement and preparation of nurses and allowing for self-learning.

From this perspective it becomes evident that there is a need to understand and incorporate the virtual environment as an efficient educational device, and to use that knowledge as a strategy to add new experiences and values to nursing practice.

Finally, we believe this study may contribute with the innovation of nursing education, by means of a proposal for virtual education on a relevant theme, i.e., cardiopulmonary resuscitation in newborns.

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