

Proposal of a Virtual Learning Environment About Cardiopulmonary Resuscitation Care in Adults

¹Maicon de Araujo Nogueira*, ²Tássio Ricardo Martins da Costa, ³Sávio Felipe Dias Santos, ⁴Márcio Almeida Lins, ⁵Anne Caroline Gonçalves Lima, ⁶Anne Kerollen Pinheiro de Carvalho, ⁷Antonia Margareth Moita Sá, ⁸Antônio Carlos Nunes Miranda Junior, ⁹Brenda Gonçalves Fortes, ¹⁰Erlon Gabriel Rego de Andrade, ¹¹Evelyn Tayana Maciel Mendonça, ¹²Henrique Calixto Santos da Silva, ¹³Manoel Victor Martins Marinho, ¹⁴Márcia Paula dos Santos Cordeiro, ¹⁵Andréia Rodrigues Pinto, ¹⁶Natália Fernandes Cunha, ¹⁷Paula Regina de Melo Rocha, ¹⁸Suanne Coelho Pinheiro Viana, ¹⁹Suelen Gaia Epifane, ²⁰Aglaisa Cristina Nabiça Cruz

¹ Nurse. Master in Health Education in Amazon by University of Para State. Professor at University of Para State. Professor at Amazon University. Belem, Para, Brazil.

² Nurse. University of Para State. Belem, Para, Brazil.

³ Nursing Undergraduate at University of Para State. Belem, Para, Brazil.

⁴ Nurse. Metropolitan College of Amazon. Belém, Para, Brazil.

⁵ Nurse. Specialist in Obstetric Nursing by Superior Amazon School. Professor at University of Para State. Obstetric Nurse at Gaspar Vianna Hospital Foundation (FHCGV). Belem, Para, Brazil.

⁶ Nurse. Resident of the Specialization Program on Obstetric Nursing. Federal University of Para. Belem, Para, Brazil.

⁷ Nurse. Doctor. Permanent member of the Post-graduation Program *stricto sensu*, Professional Master degree in Health Education in Amazon, University of Para State, Belem, Para, Brazil.

⁸ Nurse. Specialist in Urgency and Emergency by Federal University of Para, Belem, Para, Brazil.

⁹ Pedagogue, Master in Education by University of Para State. Technical in State Education Secretary, Manager at Center of Professional Education of Belem from National Service in Commercial Learning, Belem, Para, Brazil.

¹⁰ Nurse. Resident of the Multiprofessional Specialization Program in Neurology, University Center of Para State. Belem, Para, Brazil.

¹¹ Nurse. Master in Nursing by Federal University of Para. Professor of Nursing at Superior School of Amazon. Instructor of technical course in nursing at National Service in Commercial Learning. Belem, Para, Brazil.

¹² Nurse. University of Para State. Belem, Para, Brazil.

¹³ Nurse. University of Para State. Belem, Para, Brazil.

¹⁴ Nurse. Specialist in Public Health. Preceptor of the Residency Program in Cardiological Nursing at Gaspar Vianna Hospital Foundation (FHCGV). Belem, Para, Brazil.

¹⁵ Nurse. Specialist in Nephrology and Urology by Amazon University. Belem, Para, Brazil.

¹⁶ Nurse. Resident of the Specialization Program on Obstetric Nursing. Federal University of Para. Belem, Para, Brazil.

¹⁷ Nurse. Specialist in Urgency and Emergency by Madre Celeste High School. Belem, Para, Brazil.

¹⁸ Nurse. Master in Nursing by Federal University of Para. Nursing Professor at University of Para State. Coordinator of technical course in nursing at National Service in Commercial Learning. Belem, Para, Brazil.

¹⁹ Nurse. Resident of the Specialization Program on Oncological Clinic by University of Para State. Belem, Para, Brazil.

²⁰ Nurse. Specialist in Obstetric Nursing and Urgency and Emergency. Technical Member of University of Para State, Belem, Para, Brazil.

Correspondence Author: Maicon de Araujo Nogueira, Nurse. Master in Health Education in Amazon by University of Para State. Professor at University of Para State. Professor at Amazon University. Belem, Para, Brazil

E-mail: profmaiconnogueira@gmail.com

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Abstract

There is still considerable variability in survival rates related to Cardiopulmonary Arrest (CA) that cannot be attributed exclusively to the patient characteristics. The lack of knowledge about the theme by professionals and students is a consequence of flaws on the basic education. This way, graduating professionals able to operate on CA situations is believed to be a primordial attitude to increase patients' survival chances. To do so, digital strategies can be used, one of them is the Virtual Learning Environment. Thus, this paper's objective is to develop a virtual interactive educational proposal about cardiopulmonary resuscitation care in adults. This is an applied research, which led to the development of a technological product – the elaboration of an educational proposal applied on Virtual Learning Environment. Then, it took place the cyclic phases of conception and planning, development and implementation, according to procedures and evidences reported on previous studies. The Virtual Learning Environment was called "Training in Basic Life Support (BLS)", and has seven modules: "Historical Aspects", "Basic Life Support", "Epidemiology", "Concepts", "Anatomy and Physiology", "Algorithms", "Simulation and Questions". The illustrations, formatting and layout were built by integrating two language programming technologies: *Personal Home Page* and *JavaScript*. The results of the evaluation made by the academics about the VLE usage pointed that opportunities to self-learning were created and the available resources in the environment were useful to support learning. It's necessary to comprehend and incorporate the Virtual Learning Environment as an efficient educational tool and get aware of this knowledge as a strategy to add up new experiences and values to teachers' practice.

Key words: Cardiopulmonary Resuscitation, Computer Simulation, Educational Technology, Education, Nursing

INTRODUCTION

Despite significant advances in care for victims of cardiorespiratory arrest (CA), there is still considerable variability in survival rates that cannot be attributed exclusively to the patient characteristics. To increase the chances of survival of CA victims by allowing these individuals to receive high quality care the training in Cardiopulmonary Resuscitation (CPR) must use educational principles supported by researches that turn scientific knowledge into practice (AHA, 2015).

It is reported that professionals and academics from the health sciences do not possess satisfactory scientific knowledge either theoretical or practical regarding to CA/CPR. This lack of knowledge, partially, is a consequence of the formation process, in which the approaches of that theme, when occurred, are just a few and superficial. Therefore, it is insufficient to provide the solid knowledge acquirement to the action in front of a CA victim. (Nogueira et al., 2017a). This way, thinking about the educatee of health professionals that should be able to operate on CA situations is believed to be a primordial attitude to improve the quality of assistance, increasing patients' survival chances (Nogueira et al., 2017b; Silva et al., 2015).

For that, there are Digital Information and Communication Technologies (DICT) strategies that turn possible some innovation on educational process, and the articulation between theory, practice and research. These technologies can be applied since the beginning of the teaching process from undergraduate formation to one's insertion at the profession, as well as at the continuous professional development, determining a new pedagogical tool (Gonçalves et al., 2010). Some studies have shown that technological resources application, as Moodle, apps, social networks, forums and Virtual Learning Environments (VLE), provide the acquirement of information and cognitive skills to carry out Nursing procedures, increasing safety and self-confidence about the acting.

Considering the exposed, it was intended to develop an educational proposal about CA assistance in adults, applied at a VLE, what will become available to public and private Higher Education Institutions and to the whole society. This theme was chosen considering the scarcity of didactical material about the subject on this perspective, and the necessity of nurses to be trained, through specific knowledge, reliability, abilities and skills, to act in emergency situations, that offer life risk. It's believed that, through VLE, it's possible to add meaning to undergraduate nurses' daily practice, stimulate autonomy, as well as to promote professional actualization.

Due to the existence of numerous possibilities and potentialities of different technological resources, planning and analysis of new ways to teach and learn are important, from the establishment of clear educational goals and the abilities and competence on cognitive, psychomotor and attitudinal spheres, suiting the use of computer to objectives proposed to teach. Therefore, the objective of this study was to develop an interactive virtual educational proposal about cardiopulmonary resuscitation in adults.

METHOD

Applied research, which led to the development of a technological product, regarding to the elaboration of an educational proposal applied to Virtual Learning Environment. To reach it, it took place the cyclic and interactive phases of conception and planning, development and implementation, suggested by various researches (Prado et al. 2012; Rodrigues and Peres, 2013; Rios and Mendes, 2014).

This paper is part of the dissertation "Teaching of Basic Life Support to Students of Nursing Graduation Course", linked to the Post-Graduation Program *Stricto Sensu*, Professional master's degree on Health Education at Amazon, from the University of Para State (UEPA). The project was submitted to the Research Ethics Committee from the Nursing Graduation Course of UEPA, Certificate of Presentation to Ethics Appreciation: 62000616.2.0000.5170, with approval number 1.897.505, on 01/25/2017.

RESULTS

3.1 Conception and planning

Construction of the educational technology: website/VLE – The elaboration of educational technologies, by own comprehension, demands scientific evidences; definition of the educational technology objective, goals, selection of the target-public to whom the technology is destined, type of material (guideline, folder, flyer, manual, app, blog, website etc.), themes, illustrations and language; and it demands action planning (Nascimento, 2012). Thus, it was built Virtual Learning Environment named "Training in Basic Life Support (BLS)", highlighting the track among texts and pictures and the outcome (final version). It is found hosted on the link: <<https://capacitacaosbv.000webhostapp.com/index.html>>.

Concerning to the scientific evidences to the VLE construction, the search includes the studies of Bellan (2006) and Gonçalves et. al (2010), as the state of art about Teaching of Basic Life Support in Nursing Graduation, allowing the target-public to be decided. To define the type of technology, it was made a search and reading of scientific articles related to the theme, listing some papers that were close to the studied objective (Prado et al. 2012; Rodrigues and Peres, 2013; Rios and Mendes, 2014; Rangel et al., 2011; Cavalcante et al., 2012). This result was crucial to define the type of technology and its production.

3.2 Development

3.2.1 Track among texts – the scenario provided by the DICT transforms various communication sources into digital information. It also offers the pedagogic option through the virtual environment, optimizing, that way, the relationship between Nursing Professors and their students, in the means that this new setting turns possible a reflection about educational practices (Prado et al., 2012).

Thereby, the investigation of content to be insert on the technology started with the diagram construction of themes chosen by the author up to the VLE elaboration (Figure 01).

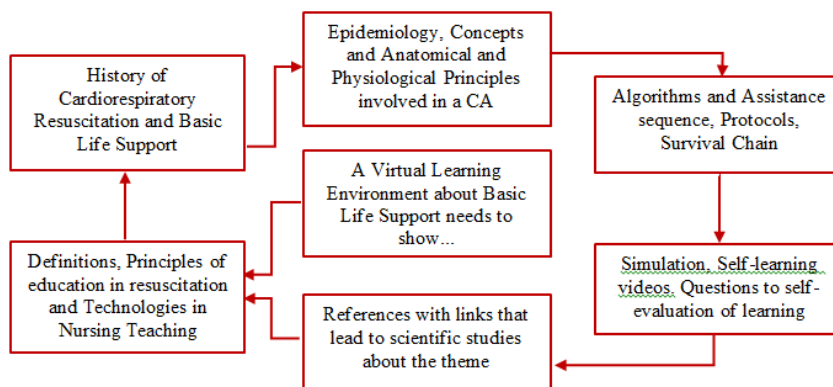


Fig. 1: Diagram – themes on author's experience to the VLE elaboration

Source: Personal Collection, Belem, Para, 2017.

Such reasoning, based on professional experience and sustained by current scientific literature, supported the construction of “VLE – Training in Basic Life Support (BLS)”. It was built according to the recommendations of the International Liaison Committee On Resuscitation (ILCOR) and the scientific consensus of American Heart Association (AHA, 2015). The contents approached in the educational technology were selected by relevance to guide BLS Teaching, in accordance to the educational principles of Resuscitation Science Consensus proposed by AHA (2015).

3.2.2 *Track among images* – VLE’s illustration is a thought-provoking stage, considering that the interpretations are diverse. The images tracking occurred from main themes definition, getting started by the cover pictures (Homepage/ Figure 02).



Fig. 2: Representative figure of Teaching Environment in BLS Image selected to represent the Teaching Environment of CA maneuvers – cover (Homepage).
Source: <http://thetrainingacademy.net/courses/level-2-award-in-emergency-first-aid-at-work/>



Fig. 3: Algorithm of assistance on BLS, responsiveness evaluation.
Source: Personal Collection, Belem, Para, 2017.



Fig. 4: Algorithm of assistance on BLS, pulse verification and chest compressions
Source: Personal Collection, Belem, Para, 2017.



Fig. 5: Algorithm of assistance on BLS, breathing evaluation and permeabilization of airways
Source: Personal Collection, Belem, Para, 2017.



Fig. 6: Algorithm of assistance on BLS, ventilation technique e use of the Automated External Defibrillator (AED).

Source: Personal Collection, Belem, Para, 2017.



Fig. 7: Algorithm of assistance on BLS, position of recovery.

Source: I Guideline of Cardiopulmonary Resuscitation and Emergency Cardiovascular Cares from Brazilian Cardiology Society (Gonzalez et al., 2013).

Within the VLE, some images were inserted, which represent teaching/training environment, algorithms, survival chain, chest compression techniques, securing airway permeability, ventilation, use of AED, airways devices and safety position.

3.3 Implementation

3.3.1 The educational technology/VLE – final version – The educational technology has seven modules: “Historical Aspects”, “Basic Life Support”, “Epidemiology”, “Concepts”, “Anatomy and Physiology”, “Algorithms”, “Simulation and Questions” – in what the student were able to obtain individualized learning, being possible to access each module in independent manner, forwarding and going back whenever needed.

The images of VLE are photographs taken by the authors themselves, at the Nursing School Magalhães Barata, University of Para State, during classes of the curricular component “Nursing at Urgency and Emergency” and courses ministered about BLS, after authorization for usage of the images. Other images were chosen from the internet (sources identified under each illustration).

The illustrations, formatting and layout were result of an effort from a computer engineer, who did the programming and website construction. The VLE was developed by integrating technologies as programming languages *Personal Home Page* (PHP) (<http://www.php.net.>) and *JavaScript*.

DISCUSSION

In Brazil, Nursing has used VLE in its courses, as it is shown by the literature review in thematic areas of medicine administration, wounds treatments, Basic and Advanced Life Support and material sterilization. At the international scenario, this profession uses VLE too and, recently, *Blackboard.5* supported Nursing students learning in a module of Human Anatomy and Physiology (Rangel et al., 2011). Thus, it was decided to create a free and easy to use VLE, which would satisfy the needs of nursing undergraduates.

The results of the evaluation made by the academics about this intervention pointed that opportunities to self-learning were created and the available resources in the environment were useful to support learning, ensuring bigger knowledge and ability to the students. These results are like other health areas, which have used VLE and its resources too – to reduce the number of formal classes’ hours, increase students’ enthusiasm by the use of multimedia materials and provide interactive learning (Rangel et al., 2011).

To assure the quality of educational technological information put in this VLE, the recommendations evidenced in the literature were followed, in which is highlighted the need to make researches in formal reliable sources, such as: books, technic articles and interviews with professionals of the area, besides photographic registers, recordings and direct observations of the reality wanted to intervene (Nascimento, 2012).

Moreover, PHP is one of the most used languages at the Web. The main difference comparing to other languages is the capacity that it has to interact with the Web world, transforming totally the websites that have static pages. Another important PHP characteristic is that, besides being free, is an open source code software (Niederauer, 2010).

Otherwise, the programming language *JavaScript* was used to control the *HyperText Markup Language* (HTML) and the *Cascading Style Sheets* (CSS), languages of marking and style, respectively, which are interpreted by web browsers. Furthermore, *JavaScript* works to manipulate the page control, that is, it was created aiming to supply a way of adding up interactivity to the webpage (Silva, 2010). These tools were fundamental to the VLE creation and application success, demonstrating, this way, the importance of seeking new non-formal learning methods.

In this context, to improve the product quality, it is suggested the hiring of professionals from: informatics, data processing and advertising areas. These are recommended to layouts’ adequacy, diagram creation and publishing. The knowledge about specific softwares will contribute to improve the final quality and give a professional sense to the intellectual production (Nascimento, 2012).

Thus, we observed that in the technological development scope, the good quality material, correct usage of tools and students’ interest reveal the efficacy. It is believed that this initiative has the potential to bring results that are even more satisfactory to nursing education. It also contributes to the scientific community in development of new studies of comparison between the conventional and non-conventional methods of teaching and learning about Basic Life Support.

CONCLUSION

Being part of the construction of a Virtual Learning Environment, organizing, planning and proposing activities, opens new possibilities of professional growth. Otherwise, it presents challenges to the development of thought and written abilities and it is challenging to the insertion of new technologies at Nursing teaching, inciting new experiences search to such teaching method.

In reference of teaching and researching, this study sets forth a valid educational technology, based on the international consensus of Science of Resuscitation from AHA 2015 that is innovative and ready to use. We expect that the VLE – “Training in Basic Life Support (BLS)”, leads higher education managers,

professors and students to a more rigorous look regarding the importance of BLS inclusion in the curricular components within Nursing Graduation Courses. Including this topic in a more consistent way, caring about the current epidemiologic reality, in an innovative methodological perspective.

It is considered that in the present educational context there is a demand of opinion builder professionals. This way, needs of new practices of teaching-learning rise using didactic and technological resources, stimulating and favoring betterment and training of nurses, yet making possible the autonomous learning. Therefore, it is shown the necessity of comprehending and incorporating virtual learning environment as an efficient educational device, and to point out this knowledge as strategy to add up new experiences and values to professor's practice. The present paper is believed to be able to contribute with the innovation of nursing teaching, from the virtual educational proposal about a matter of great academic, scientific and social relevance.

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