



RESEARCH ARTICLE

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## DEVELOPMENT OF AN ONLINE COURSE ABOUT POSTURAL CARE WITH THE NEWBORN IN THE NEONATAL INTENSIVE CARE UNIT

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### ABSTRACT

**Objective:** To describe the process of construction of a distance course on the postural care with newborns in the Neonatal Intensive Care Unit. **Method:** Research of the methodological development type, carried out between September 2018 and June 2019. The construction process involved the development of the Virtual Learning Environment, based on instructional design and prior literature survey through a scope review. **Results:** The search returned 58 studies, being six selected for the review. In the ideation stage, no specific course for the postural care was found. The course developed addresses the history of developmental care with newborns; the importance of postural care for development; types of positioning; and continuity of care in the household. **Conclusion:** This course intends to promote the knowledge in an accessible and expanded way, contributing to an assistance focused on excellence and above all, on humanization.

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### INTRODUCTION

The term technology has Greek origin by the junction of the words *techné* (know-how) and *logos* (reason), it is the study of changing, transforming, technique and acting. The technological development over the years has allowed its insertion in several areas, including education and health, enabling various forms of teaching and learning at different educational levels (Harwood et al, 2018). With the use of information and communication technologies in education, there have been important changes in the educational paradigm, which have provided new ways of teaching and learning, behaviors between teachers and learners, different forms of contact and knowledge production. These new technologies have enabled the versatility in teaching, supplying the demands and needs of the context involving the user (Rabeh et al, 2017).

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Given this scenario, the Distance Education (DE) has gained importance due to its relevant and innovating role in the field of education (Carvalho et al, 2017). It is a systematic educational process, which allows for the individual or group study, through various platforms for communication between the participants, encouraging communication and exchange of knowledge, with the student as the main focus and the teacher as the facilitator of the process (Freire et al, 2015). In Brazil, the DE modality has expanded and provided to the population greater access to initial and continuing training. Public and private institutions of education are adapting its methodology to minimize the difficulties encountered by students to attend on-site courses, such as time, locomotion, space and work load (Silva, Luiz and Ferrarini, 2016). Considering the expansion of the DE, along with the emergence of Information and Communication Technology (ICT), there became necessary the development of virtual environments directed for the purpose of certain formations. From this, the Virtual Learning Environments (VLE) emerged, which consist of a space formed by the subjects, their interactions and modes of communication, established by means of a platform whose main goal is the learning process (Mendes, 2018). This

technological progress observed in education does not differ from the health area, emphasizing here the nursing area. The use of technology contributes to the improvement of patient care and increased survival, highlighting, in this context, the newborns (Braga *et al.*, 2019). Furthermore, it enables the improvement of professionals and students through the use of new learning strategies, such as training, improvement and updating (Freire *et al.*, 2015; Quaglia *et al.*, 2015). Preterm newborns require specialized care in Neonatal Intensive Care Units (NICUs), because they have a still immature body, besides receiving several stimuli from the hospitalization environment itself. On the other hand, they are often deprived of positive stimuli that influence their overall development, in addition to the mother-baby interaction (Nascimento and Teixeira, 2018). The use of technology demands from professionals a technical-scientific knowledge in constant update, contributing to an assistance of excellence and above all, humanized, seeking comfort and recovery of health and well-being of the newborn (NB) (Jesus, Oliveira and Azevedo, 2018). Thus, there arises the importance of systematizing a nursing care that supports the development of the neonatal care, minimizing the risks inherent in the environment of the NICU and promoting quality of life.

The postural care should be part of the care plan, because it contributes to the psychomotor development and stabilization of neonates. The change of decubitus every two or three hours and the correct positioning bring many benefits, such as: stability and postural alignment; optimization of musculoskeletal development and biomechanical alignment; improvement in pulmonary function and ventilation/perfusion ratio; prevention of shortening and deformities of members; reduced incidence of pressure injuries; facilitated participation of the NB in normal sensory-motor experiences, in addition to promoting calmness (Prohmann *et al.*, 2019). Some of the main positions and techniques include: dorsal decubitus, recommended to decrease the risk of apnea or obstruction of the airways and minimize the oscillations of the intracranial pressure; lateral decubitus, which facilitates the gastric emptying, reducing episodes of reflux; ventral decubitus, which optimizes the cardiac frequency and decreases episodes of apnea (Toso *et al.*, 2015); swaddle, which provides greater comfort, stability, postural alignment, stress and energy costs reduction; and hammock, a more current strategy that aims at reducing the disordered movements of the baby and promoting comfort, reflecting on his/her neuropsychomotor development (Albuquerque and Albuquerque, 2017). The shortage of materials for the continuing education of nursing professionals of the neonatal area and the impact of postural care on the development of the NB justify the development of a DE course with the aim of improving nursing care and consequently reducing the harm to the health of the NB.

**Objective:** The main objective of this study is to describe the process of construction of a DE course using the methodology of instructional design on the postural care with the newborn in the Neonatal Intensive Care Unit (NICU).

## MATERIALS AND METHODS

Methodological development research, regarding the construction of an online course. In this type of study, the researcher aims at developing a reliable, accurate and usable instrument that can be used by other researchers and other people. This study fits any scientific subject, dealing with

complex phenomena such as the behavior or health of individuals, as occurs in nursing research (Nascimento and Teixeira, 2018). The study was carried out in the period from September 2018 to June 2019, at the Nossa Senhora das Graças Nursing School of the University of Pernambuco (UPE) FENSG - with the support of the Telehealth State Center of Pernambuco of the Health State Department (NUTES/SES – *Núcleo Estadual de Telessaúde de Pernambuco da Secretaria Estadual de Saúde*), and the Distance Education Center (NEAD - *Núcleo de Educação a Distância*) of the University of Pernambuco. The construction of the course based on instructional design, a systematic process that seeks the development and planning of didactic materials, assessments and activities. This study followed the phases adapted from the ADDIE model, which comprises analysis, planning, development, implementation and evaluation. The stage of implementation and evaluation will be for the second phase of the study (Magalhães, Chaves and Queiroz, 2019).

Concerning the phase of analysis, a literature scope review was performed from the guiding questions: What strategy can be developed in a distance education course for the continuing education of nursing professionals allocated in the neonatal ICU? What contents are suitable for the development of knowledge on the subject? In addition, surveys on the courses available in the aforementioned area were also performed, focusing on the methodological characteristics used. The phases of planning and development were equivalent to the structuring and development of the course. In relation to the literature review, the scope review was chosen, whose main objective is to evaluate the extent, range and nature of the researches; to determine the value of conducting a systematic review; to summarize and disseminate the findings of the studies and finally, to identify gaps in existing literature (Menezes *et al.*, 2015). For this, a bibliographic survey was performed on the Virtual Health Library (VHL), in which the chosen databases were Publisher Medline (Pubmed), Scientific Electronic Library Online (SciELO) and the Latin American and Caribbean Literature in Health Sciences (Lilacs). For the search, the following descriptors were used: Educational Technology; Distance Education; Neonatal Nursing; Neonatal Intensive Care Units and Patient Positioning, along with their correspondents in Portuguese (*Tecnologia Educacional; Educação a Distância; Enfermagem Neonatal; UTI Neonatal and Posicionamento do Paciente*), which were combined using the Boolean operator AND. The inclusion criteria were articles published in the last 10 years; written in Portuguese or English; original articles that addressed the postural care with the newborn in the neonatal ICU or educational technology in the health area. The exclusion criteria were articles with restricted access or with duplicity on databases and that did not approach the study object by reading the title and abstract. In this phase of the research, there were no participants, only the development team, however, it was approved under opinion 3.176.596 issued by the Research Ethics Committee of the Hospital Complex HUOC/PROCAPE.

## RESULTS

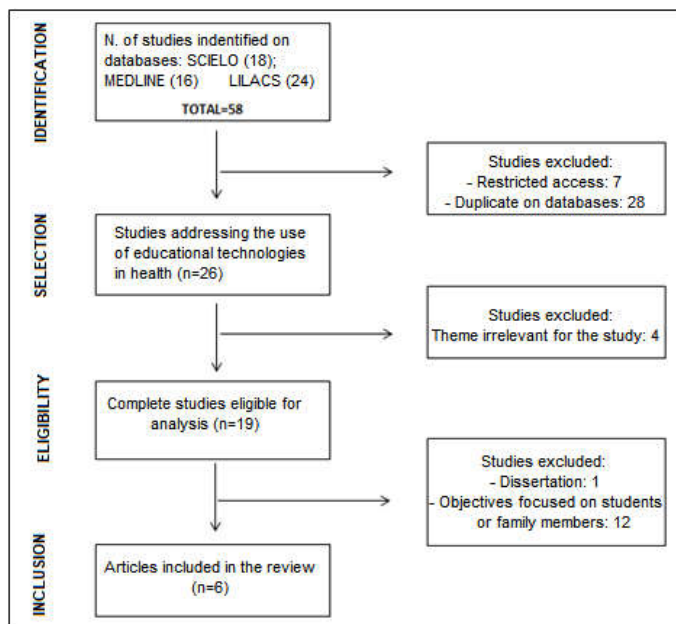
The online course on postural care was built on the Modular Object Oriented Distance Learning (Moodle®) platform and accommodated on the area destined to teleducation of the

Table 1. Characteristics of the studies included in the scoping review. Recife-Brazil, 2019

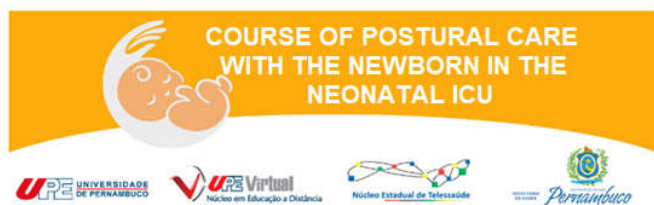
Author and year	Country	Educational Technology used	Sample	Target-Audience	Results	Conclusion
BUSSOTTI <i>et al.</i> , 2016 <sup>(16)</sup>	Brazil	Online training course	2.071	Neonatal and pediatric ICU professionals	The course was structured into 5 modules: Quality indicators as a management tool, Hand Hygiene, Patient Safety, Intravenous Therapy, and Records on the patient's medical chart.	The experience in online training contributed to the perception of the potential of this teaching modality, to leverage learning processes.
RODRIGUES; PERES, 2013 <sup>(17)</sup>	Brazil	Online training course	9	Neonatal nurses	An online course was developed and validated. The course was about CPR in neonatology. ENFNET was perceived as predominantly excellent. Few aspects were considered reasonable and only one was rated as unsatisfactory.	The use of the proposed methodology for the creation of VLEs and the contextualized instructional design were decisive for the creation and implementation of the course, providing safe and clear guidelines for the implementation of the project.
JAIN, 2010 <sup>(18)</sup>	India	Online workshop	48	Nurses	The average pre-training knowledge score was higher in the teleeducation group. After the training, the knowledge and skills score was higher in the on-site teaching group, but the difference was of little practical significance.	Teleeducation can be an efficient and practicable method for training health professionals regarding neonatal resuscitation knowledge and skills.
FONSECA <i>et al.</i> , 2011 <sup>(19)</sup>	Brazil	Games, booklets and softwares	Not applicable	Nursing team	A booklet on the proper positioning of the premature infant in the neonatal unit was developed. As a result of a doctoral thesis, an educational software on semiology and semi-technique of the PTNB was developed.	Technological resources are necessary tools for nurses, as they contribute to the management of care in a humanized manner, within the scope of quality, effectiveness and safety.
POON <i>et al.</i> , 2015 <sup>(20)</sup>	Singapore	Electronic learning program	37	NICU nurses and physicians	77.8% of respondents found the duration of teaching great. 80% thought they had learned a systematic method for interpreting an EEG and 70.4% thought they could interpret a normal EEG with confidence.	An integrated approach to e-learning can help improve subjective and objective EEG knowledge.
THUKRAL <i>et al.</i> , 2012 <sup>(21)</sup>	India	Online course	98	Nurses	There was a significant increase in pretest to posttest scores in relation to knowledge and skills. All participants thought the application was very useful for professional practice and would recommend the course to other colleagues.	Online teaching and training is possible and acceptable to nursing professionals and serves as a useful tool for the professional development of knowledge and practical skills.

Telehealth State Center of Pernambuco site. In the immersion phase, the searches on the listed databases returned 58 studies, being six selected for the scope review. The search strategy occurred through a combination of descriptors in the following way: educational technology / neonatal nursing / distance education; educational technology / neonatal nursing; neonatal nursing / distance education; neonatal ICU / distance education; neonatal ICU / educational technology. In the identification phase, 28 studies were excluded due to duplication on databases and seven, due to restricted access. In the selection phase, other four were excluded because they addressed issues irrelevant to the study object, that is, did not approach the continuous education of the nursing team in neonatology. In the eligibility phase, 12 studies were excluded for having goals focused on students or family members. In addition, one study was also excluded because it was a master's dissertation (Figure 1). Of the selected articles, three were developed in Brazil, two in India and one in Singapore. The types of educational technologies used were training course online, games, workbooks, software and online workshop. The themes chosen in the trainings include hand hygiene, CPR in neonatology, proper positioning of the baby, patient safety, interpretation of the electroencephalogram (EEG), record on the medical chart and intravenous therapy (Table 1). In the first phase, researches were carried out on a search site in order to look for courses available in the field of neonatology for nursing professionals working in the area. Nineteen courses were found, and only six were offered in the modality of DE and directed

to the training or upgrading of professionals. The others were specialization courses, offered on-site, semi-on-site and DE. No course was specifically directed to the postural care. In the phases of planning and preparation, the course was developed on the Moodle® platform™ of NUTES/SES, which can be accessed through the electronic address: <http://tele.saude.pe.gov.br/moodle/> on the part of courses available. For the elaboration of the content and definition of the instructional matrix, searches were carried out in the scientific literature of reliable and updated materials, such as articles, protocols and manuals. After elaborating the theoretical part, a storyboard was structured for organizing texts and multimedia material (images, animated videos, video-classes, audio and games). A web designer team from NUTES/SES built the course on the VLE, from storyboard, in the format Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). A logo was created with the aim of bringing the user to the theme through the junction of two components: the care, represented by the drawing of a hand, and the baby, the main subject of the course (Figure 2). The course offers six animated videos and three video-classes. For the preparation of animated videos, the Animaker was used, which is a tool for creating animated videos online. Each video has a duration between 1 and 2 minutes, and the audios were recorded and edited at the NEAD-UPE studio, with the support of an audio operator and sound editor. The whole process lasted about three months, contemplating the structuring and development, assessment, tests and adjustments.



**Figure 1. Flowchart representing the process and steps for selecting the studies included in the scope review. Recife-Brazil, 2019**



**Figure 2. Logo of the course. Recife-Brazil, 2019**

For the recording of the video-classes, three professionals from the neonatology area were invited. The recordings were made and edited at the NEAD-UPE studio, with the aid of a video technician and a designer. The entire production process of the storyboard, scheduling, recording and editing took about four months. The learning exercises were previously structured in a storyboard and then prepared using a tool to create interactive activities for online courses, the HTML5 Package (H5P). There were up to three attempts for the completion of each exercise and if the student is not able to reach the accuracy percentage of 100%, the answers will be revealed. The course features memory game; drag and drop; relating image with text and association of columns. On the home page, the following icons were arranged: Course Presentation, Module 1, Module 2, Module 3, Module 4, Conclusion and Virtual Library. On the first icon, the student can watch the animation with information regarding the plan course, such as objectives, content and acquisition of the certificate. To complete the first step, the student follows for Module 1: History of developmental care with preterm and low birth weight newborns. This consists of two units: history of developmental care and the humanization of the NB care. This module contains three items: presentation, which features one animation approaching the content; didactic material, with a video-class for each unit, plus space to host material as Portable Document Format (PDF) and slides; and the learning exercise, composed by the game of drag and drop the words. At the conclusion of the first module, the student follows for Module 2: The postural care provided to newborns in the neonatal ICU, composed of a unit: The importance of postural

care for the development of the newborn. As well as the first module, this one contains three items: In the presentation, the student is invited to initiate the study through an animated video. In the didactic material, the content is presented as video, as well as slides (Figure 3) and PDF. Then, the student must answer the learning exercise with the memory game about the benefits of postural care.



**Figure 3. Slide representing the second module of the course. Recife-Brazil, 2019**

**Figure 3. Slide representing the second module of the course. Recife-Brazil, 2019**

Finalizing the second module, the student follows for Module 3: Types of positioning: indication and management, comprising one unit: The positions and techniques most used in neonatal ICUS. This presentation is also made through a very dynamic animation. The didactic material comprises the theoretical-practical video-class, with one parte recorded in the studio and another in the Neonatal Unit of the Integrated Health Center Amaury de Medeiros (CISAM) linked to the University of Pernambuco, in addition to the slides and text in PDF format. The learning exercise is an association of columns, in which the student must relate the benefits, indications and contraindications with the respective positions or techniques.

The Module 4: Continuity of care in the household, is divided into two units: Guidelines on the care with the preterm infant at hospital discharge and The arrival of the baby at home. It contains an animated video for the presentation of the module and didactic material in PDF and slides. The learning exercise consists of relating an image with some information about the correct latch. The course conclusion is composed by the final exam and certification. The exam consists of 10 questions: seven multiple choice three true/false, being each worth 1 point. To obtain the certificate, the student must achieve at least 80% of the total points (100%). Finally, the course has a virtual library that offers all references, with their respective files attached, which were considered relevant for further reading on the subject.

## DISCUSSION

The possibility of using digital platforms for structuring the distance course is able to meet the prerogatives for a vocational qualification in a dynamic and innovative manner, able to assist the professional in quick and accessible search for knowledge that may impact the nursing practice in environments of complex care. According to the scope review, the use of distance education in the training of professionals brings positive benefits for the practice of the profession.



Moreover, it contributes to the teaching-learning process, has practical applicability and has the power to disseminate the knowledge up to the professionals who work in more distant places. Furthermore, the use of technology is favorable to the nurse, because it contributes to the efficacy, safety and quality of care provided to the NB (Bussotti *et al*, 2016; Rodrigues and Peres, 2013; Jain *et al*, 2010; Tavares *et al*, 2018; Poon *et al*, 2015; Thukral *et al*, 2012). In relation to the technological resources used in the course, some studies show that users have great satisfaction with the use of animations, audiovisual resources, assessments and exercises (Castro *et al*, 2015). The development and construction of an VLE provide a greater understanding and mastery of skills in the health and education methodology computer area, constituting an important exercise of instructional design (Rodrigues and Peres, 2013). Some of the great advantages of using educational technology include the definition of the study pace according to each user, the easy learning of content in a dynamic and interactive way and the possibility of repetition of materials by students as many times as necessary, so that there is better fixation of the information (Castro *et al*, 2015). Despite the growth in the use of educational technologies, some authors have reported that, in the health area, the known potential of technology has not been fully explored (Seckman, 2014). As in the present study, other authors reported pedagogical models and similar instructional designs, through the development of online courses structured in modules, enriched with videos, animations, exercises, audio and images (Rabeh *et al*, 2017; Bussotti *et al*, 2016).

It is noticeable that the process of creating and building permeates the aspect of interdisciplinarity and, in this study, it was not different. Specialists in the areas of pedagogy, informatics, technology and health contributed to the success of the final product. The participation of professionals in management and assistance was very important for the credibility and characterization of the course, in addition to providing the users with a feeling of closeness and applicability in their working process. Distance education has the ability to meet both the active professionals regarding as students who are interested in studying this theme, in order to awaken the critical sense and the power of decision, in addition to contributing to the improvement of this public through the use of new learning strategies such as training, qualification and professional updating (Freire *et al*, 2015). The development of an online course on the aforementioned theme can be an effective tool in the learning process, since it provides safe, objective and clear guidelines (Rodrigues and Peres, 2013). The promotion of Virtual Learning Environments in the educational context contributes to the practice of integration between teaching, research and assistance, while strategic resource in the formation of nursing professionals (Góes *et al*, 2015). In addition, there is a need to develop skills with information technologies, for the development of methods, techniques and strategies for the construction of VLEs directed to the nursing continuing education (Jain *et al*, 2010).

## Conclusion

The online course about postural care intends to provide opportunity to encourage learning and add to nursing professionals a set of skills in the management of a safe care for the child's development and professional training. The strong point of this study was to ensure a partnership between

University, Teleducation Centers and Bodies responsible for the management of health policies, which resulted in an interdisciplinary work in commitment to the process of conception, creation and development of the course. Using the computer language and digital platforms was possible because of the involvement of professionals of design and specialized in computer graphics, which added learning and qualification for the structure of the online course. The searches conducted in the literature showed that the theme of the postural care with the newborn in the neonatal ICU is still poorly addressed by nursing and that the scientific production in the area is greatly reduced. This shows potential for expanding knowledge about new tools that support the health care committed to the healthy development of children and increased parental satisfaction with the service. Finally, this study will initiate the process of validation and provision for the target audience in the prospect of working with the knowledge in an accessible and expanded way, bringing countless benefits for both the professionals as the newborns, and, in this way, contributing to a service focused on excellence and, above all, in the humanization.

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