Evaluation of digital educational student-technology interaction in neonatal nursing

Avaliação da interação estudante-tecnologia educacional digital em enfermagem neonatal

Evaluación de la interacción estudiante-tecnología educativa digital en enfermería neonatal

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ABSTRACT

Objective: To assess the digital educational technology interface *Caring for the sensory environment in the neonatal unit: noise, lighting and handling* based on ergonomic criteria. **Methods:** Descriptive study, in which we used the guidelines and ergonomic criteria established by ISO 9241-11 and an online Likert scale instrument to identify problems and interface qualities. The instrument was built based on Ergolist, which follows the criteria of ISO 9141-11. There were 58 undergraduate study participants from the School of Nursing of Ribeirao Preto, University of Sao Paulo, who attended the classes about neonatal nursing content. **Results:** All items were positively evaluated by more than 70% of the sample. **Conclusion:** Educational technology is appropriate according to the ergonomic criteria and can be made available for teaching nursing students.

DESCRIPTORS:

Education, nursing; Educational Technology; Neonatal Nursing; Students, Nursing; Infant, Premature.

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INTRODUCTION

Preterm infants in neonatal units have to deal not only with their own immaturity, but with environmental challenges, which can cause changes in all their bodily systems[1]. Inadequate sensory stimuli can be harmful to the development of preterm infants, who are more susceptible. Excessive noise, lighting and handling cause stress and can cause extensive harm to the growth and development of children[2]. Such complications make care to these children and families a public health problem and one of the priorities on the agenda of social policies, requiring investments for the development of actions and studies in the area.

Nursing education for more effective neonatal care and the construction of healthy environments that minimize the risk of morbidities, may offer these babies care not only restricted for survival but also aligned to a comprehensive view at care reality.

To assist the training process focused on the theme, our current scenario offers educational technologies using computers, whose purpose is to facilitate the training of nurses. However, the need for professors remains, analyzing and transforming such technologies in educational tools able to relate knowledge to the panorama of education[3].

In the face of adversity experienced by preterm infants in the NICU environment, the interactive digital educational technology *Caring for sensory environment in the neonatal unit: noise, lighting and handling* was created so that health professionals, students and families of hospitalized babies have the opportunity to know, understand, discuss and minimize the problems related to sensory environment in the neonatal unit in relation to noise, lighting and handling[4-5].

The planning of this technology was developed in a participatory manner, based on the pedagogical framework of problematization of Paulo Freire, with discussion circles with students and members of the healthcare team. In this process, the researchers counted with the aid of three undergraduate scholarship students in the nursing area, the direct participation of experts in neonatology, that is, three nurses and a speech therapist, and the advice of another speech therapist and a physiotherapist.

The technology is organized in a theoretical module with insertion of multimedia (steady images such as photos and pictures, dynamic images such as videos and animations, and sounds and texts) and a simulation module. The multimedia part was developed by researchers and a technology team of a private contractor, consisting of a systems analyst and a design technician. It was developed for the Web with Flash® technology and has full interactivity with the simulation, built through a typical scenarios of a neonatal unit, and animated characters in 2D.

The *theoretical module* of the educational technology consists of: Introduction: contains the rationale and objectives of digital educational technology. The neonatal unit: this link rescue historical aspects and the changes of care in the current context. There is also a correlation between the procedures performed on the baby in the unit and the lighting, noise and excessive handling, bringing to light the need for integrality, humanized and individualized care. It also has the physical structure of the neonatal unit, its location, the staff and also an interactive map that shows the location of the physical layout (when moving the mouse in each figure, the object is identified on the footer) and its repercussions with focus on sensory environment.

The components of the sensory environment: noise, lighting and handling. The conceptual aspects are addressed, the definitions and units of measurement, as well as the consequences or the baby reactivity to noise, excessive lighting and handling, the resources that generate them, the recommended levels of these components and how to reduce lighting, handling and noise.

The *simulation module* of the educational technology present a digital educational game with three simulations of care actions related to noise, handling and lighting. The user, represented by a virtual professional, makes a choice between two possible outcomes testing the knowledge acquired with the use of the theoretical module tool. This educational technology also features links to references, support and performance, do it yourself, and an evaluation of the educational technology. The link *do it yourself*, there are models of cards that can be printed by site visitors, in order to be used in their neonatal units[5].

In order to achieve a positive impact on the teaching-learning process with the use of educational technologies, it is believed that the need for a user-friendly interface that promotes adequate human-computer interaction (HC-I) should be taken into account. The HC-I was defined as the study of the development process whose main objective is to promote change of the project focused on technology to one centered on the user of the project[6].

Whatever type of technology employed, all content and format of information will cause great impact on user interaction. The interface should be easy to handle, meet user needs and avoid users to get confused and make mistakes. For this to happen, the interface must have the property of usability. That is, the interface should combine several criteria that together, so that it will make the system understandable by the user[7].

Usability is one of the ergonomic properties that can guarantee the quality of the HC-I, giving the software quality[8]. Ergonomics aims to adapt or tailor the best possible way the objects to humans. Items such as safety, comfort, efficiency and usage of the objects are especially studied to facilitate the activities and human tasks[9]. The ergonomic adaptation of a system is of utmost importance, for it to be better understood by the user.

This study aims to assess, based on ergonomic criteria established by Ergolist[10], the interface of the interactive digital educational technology *Caring for sensory environment in the neonatal unit: noise, lighting and handling* with undergraduate nursing students.

METHOD

Descriptive study aimed to evaluate the interface of an interactive digital educational technology based on ergonomic criteria established by Ergolist[10]. It was conducted with students from presence-based Bachelor Degree and Teaching License in Nursing courses at the School of Nursing of Ribeirao Preto, University of Sao Paulo, located in the city of Ribeirao Preto, in the state of Sao Paulo, southeastern Brazil, where students attended classes that offer contents on neonatal nursing, taught for both courses, during their junior year of the undergraduate course. Among 132 students invited to participate in the research, 58 accepted.

We developed a questionnaire about participants characteristics (gender, age, profession, computer knowledge and computer availability) and adapted an existing interface assessment tool, the Ergolist[10], which is based on basic criteria established by the ergonomics Standards ISO 9241-11.

For evaluation of the digital educational technology, it was decided by the ergonomic criteria of the interface, from which you can analyze important aspects of learning that can facilitate or hinder navigation and favor or compromise learning[11].

The interface assessment questionnaire used in this study was adapted from the Ergolist[10], which was elaborated by the researchers of the Usability Laboratory of Informatics of the Federal University of Santa Catarina - LabIUtil.

The adapted instrument has a Likert scale, consisting of the following options: *strongly disagree, disagree, agree, strongly agree, I don't know*, and a space for notes and comments. The items evaluated were: navigation, location of items, icons, user control, feedback, use of fonts and color's shapes, design, error correction and page loading speed.

Students were invited to participate in the study, primarily by an institutional email and later by Facebook®. Those who agreed to participate had two options: access the questionnaire through Moodle or click the link Interface Evaluation in the technology itself, that redirected the student to the questionnaires stored in Google Drive. In any of the two options, the student was sent to an online Consent Form which explained the research to the participants providing information about the study and the assurance that he/she could make the decision to participate fairly and without constraints.

Moodle is a virtual learning environment, very popular among educators around the world. The tool allows the professor to create dynamic web environments for their students. On the other hand, Google Drive is a space for creation, storage and synchronization of files that can be accessed anywhere from any device.

Data collection occurred from November to December 2012 and it is noteworthy that was conducted completely online.

Data on the characterization of the subjects and the interface evaluation were presented by using descriptive statistics and frequency tables were used for quantitative data. Data on the age of the participants and the amount of hours using the Internet were processed using SPSS, version 16.0, and described in specific tables.

The development of the study followed national and international standards of ethics in research involving human subjects - CAAE Protocol 07423212.5.0000.5393.

RESULTS

Among the 58 students who participated in the study, 37 (63.8%) participated via Moodle and 21 through the assessed technology in Google Drive (36.2%).

The data regarding to the characterization of the students are shown in Table 1.

Table 1 – Characterization of students according descriptive variables - Ribeirao Preto, 2013

Variable	n (%)
Gender	
Female	53 (91.4)
Male	5 (8.6)
Work	
No	52 (89.7)
No	6 (10.3)
Computer use frequency	
Often	55 (94.8)
Usually	3 (5.2)
Sometimes	0
Never	0
Place where you have access to the computer	
Home	52 (89.7)
University	5 (8.6)
Work	0
Library	0
Others	1 (1.7)
Have you searched content on the internet to support your education/training?	
Never	0
Yes	58 (100)
Have you ever used digital educational technologies for learning?	
Never	5 (8.6)
Yes	53 (91.4)

All items obtained more than 70% of positive evaluations by students (Table 2).

Table 2 – Results of the students' evaluation about the educational technology *Caring for sensory environment in the neonatal unit: noise, lighting and handling* according to ergonomic criteria - Ribeirao Preto, 2013.

Criteria	Strongly disagree n(%)	Disagree n(%)	Agree n(%)	Strongly Agree n(%)	I don't know n(%)
1.Easy navigation in the digital educational technology	0	1 (1.7)	29 (50)	28 (48.3)	0
2.Screens developed in a clear and understandable way.	0	1 (1.7)	24 (41.4)	33 (56.9)	0
3.The digital educational technology presents an indicator of continuation of items of other pages	1 (1.7)	0	25 (43.1)	27 (46.6)	5 (8.6)
4.Arrangement of objects organized in logical criteria and stimulates memory	1 (1.7)	0	26 (44.9)	31 (53.4)	0
5.Information properly distributed on the screens from the point of view of space.	1 (1.7)	0	26 (44.9)	31 (53.4)	0
6.Icons are economical from the point of view of space on screen and readable	1 (1.7)	1 (1.7)	26 (44.9)	29 (50)	1 (1.7)
7.Icons, action buttons, kept menu and presentation format consistent from one screen to another	1 (1.7)	0	26 (44.9)	31 (53.4)	0
8.User can pause and resume content at any time.	2 (3.5)	1 (1.7)	17 (29.3)	32 (55.2)	6 (10.3)
9.The digital educational technology offers immediate feedback.	1 (1.7)	2 (3.5)	21 (36.2)	31 (53.4)	3 (5.2)
10.The sources used are of adequate size and style.	0	2 (3.5)	24 (41.4)	31 (53.4)	1 (1.7)
11.Presentation of texts and style features (italic, bold, underline or different styles) highlight important words or concepts	0	5 (8.6)	23 (39.6)	29 (50)	1 (1.7)
12.Use of appropriate colors does not overload the information	1 (1.7)	0	20 (34.5)	36 (62.1)	1 (1.7)
13.The simulation allows users to check their performance	1 (1.7)	4 (6.9)	15 (25.9)	38 (65.5)	0
14.Errors in the simulation are easy to fix	2 (3.5)	0	23 (39.6)	21 (36.2)	12 (20.7)
15.Error messages are objective, neutral and polished	1 (1.7)	0	17 (29.3)	26 (44.9)	14 (24.1)
16.Acceptable speed of loading the pages of digital educational technology in the online environment	1 (1.7)	8 (13.8)	24 (41.4)	23 (39.6)	2 (3.5)

Students expressed their overall impression concerning the educational technology and its relevance to education in Nursing ...website is *very interesting and relevant to its educational purpose. Congratulations!* (E58) and *Congratulations to all the research and the important* website (E12).

Regarding the assistance to the teaching-learning process provided by the technology, students commented it is *very didactic, easy to access and understandable* (E57), reporting the contribution of this simulation in this resource as ...*didactic and creative and a great way to memorize the exposed content* (E12).

A student highlighted the importance of the educational technology in teaching, including mentioning other issues that could be developed assimilated computing resources:

This work is very important, so I'd like it to be expanded to other subjects and care (E8).

Two mentioned that the use of technology enhances memorization, making them ...*remember basic and important concepts that are often overlooked* (E51) and ... *the digital environment provides us with the possibility to go back in contents already seen in previous courses of undergraduate*... (E19). The latter referred to the need of previous moments of virtual training students to then provide direct care in real neonatal unit so that it does not result in discomfort: ... *but without the pressure and the neonatal environmental stress* (E19).

Regarding the design of content on pages, a student said that despite the *clear content, it could be more dynamic. I had a feeling that there could be more content, more information on each page* (E41).

In the simulations of the assessed educational technology, multimedia such as sounds were used, for example, the alarm triggered from a device, represented by a sound and lighting warning. The dialog of the virtual characters, the nurse, the user/student is represented through the written form in a transmission balloon and texts imputation in such balloons, according to students, ...*could have a more rapid presentation, maybe word by word and not letter by letter, it greatly decreases the simulation speed and the patience of those who are doing* (E24) ...*and the simulation of speech is a little slow* (E47).

One participant drew attention to the situations simulated in the educational technology, which ...*could have separate icons, which would be divided questions for people less familiar with the subject and another icon for professionals in the area, because some simulated situations may not show many new knowledge for professionals already working in the area* (E47).

Also in relation to the simulated situations, another student said that there *should be more situations involving the daily life of a neonatal unit, such as excessive noise arising from conversations both visitors and professionals, even with respect to handling situations where people can receive guidance and direction which they would receive according to the situation* (E17).

About typing in the texts of the theoretical module of educational technology, a student indicated that there were *spelling mistakes, concordance and exchange of women by men, and missing commas* (E18)

DISCUSSION

The internet is present in different areas and activities, assisting from leisure activities to solving everyday life problems, even research. Its advent has made numerous benefits possible in terms of research, since a researcher who has adequate technology and technique can, in one day, design a research, conduct tests and make available to participants. The whole environment has become dynamic, giving another dimension to research and processes that happen before release[12].

This study was entirely carried out with the use of computers and the internet, since the selection of the participants in the evaluation of the educational technology, the contact, the invitations, were made through the virtual acceptance of the Consent Form to the collection of online data.

Communication with students was facilitated by Facebook®. After the invitation through message on Facebook®, the number of hits increased gradually and, as they arose questions or problems with the questionnaires, these were being resolved through the social network chat.

Analyzing the pros and cons of using electronic questionnaires, it was concluded that this would be the most coherent tool with the study objective, which seeks to precisely assess and encourage the use of computerized educational technologies.

The Ergolist[10] used for construction of the questionnaire was also adapted and used in a study that evaluated the interface of educational technology on diagnostic thinking in nursing quoted above, together with computer and nursing professionals[11].

With regard to ergonomic criteria, it is known that it is necessary to evaluate all possible items in educational software, as each one aims to detect different aspects of operability and usability of computer systems[13].

In the construction of Ergolist[10], researchers at the LabUtil were based on the basic criteria of ergonomics, which are 18 in total. In the questionnaire used in this study, 8 of them were covered.

The statements of the interface evaluation questionnaire have the objective of evaluating the basic criteria of ergonomics and were grouped according to each criterion. We obtained the following data from evaluator students: readiness (assessed by items 1 and 3 of the questionnaire) 94%; Readability (evaluated by the items 2, 5, 6, 10, 11, 12 and 13 of the questionnaire) 94.8%; grouping by location (measured by item 4 of the questionnaire) 98.3%; consistency (assessed by item 7 of the questionnaire) 98.3%; User control (assessed by item 8 of the questionnaire) 84.5%; immediate feedback (assessed by item 9 of the questionnaire) 89.6%; correction of errors (evaluated by item 14 of the questionnaire) 75.8%; error messages (assessed by questionnaire item 15) 74.2%.

Researchers at LabIUtil are based on the authors who developed the ergonomic criteria and ISO 9241-11. According to them, the readiness facilitates navigation in the application, reduces the occurrence of errors, guides the user and provides the learning of a series of commands[14]. The readiness regard to information that enables the user to identify the state or context where it is located, as well as helping tools and accessing mode[10].

An interface that has satisfactory readiness address the user, even if he/she does not know a series of commands, it is also easy to navigate and reduces the generation of errors[14]. In the educational technology under review, the readiness was assessed by two items of the questionnaire and was considered adequate by 94% of students.

Legibility refers to lexical features of the information presented in the display of the software, capable of facilitating the reading of such information as, for example, the size and the brightness of the letter, the contrast between the letter and background, the word spacing, lines and paragraphs, etc[10].

The ideal readability facilitates the reading of the information and to get it, it is recommended the use of centralized titles and labels in capital letters[14]. In this study, seven items of the questionnaire concerned the readability obtained 94.8% approval of students, showing that the technology is appropriate for the criterion.

The criteria grouping by location is related to the relative positioning of the items, set to indicate whether or not they belong to a particular class or classes to indicate differences between classes or within the same class[10]. For an interface to have grouping by location, it is recommended that items are organized into hierarchical lists, the options of a menu driven dialogue and the existence of many options that the organization is logical[14]. In this study we assessed this item through a questionnaire and received positive evaluation of 98.3% of the participants, revealing suitability for the criterion.

Consistency refers to the way in which the choices in the design of the interface (codes, names, formats, procedures, etc.) are kept identical in different contexts. It is appropriate to standardize the maximum possible objects regarding the format and the name, and standardize the syntax of the procedures. The lack of homogeneity in the menus, for example, can greatly increase the time the user spends looking for the content[14]. The lack of homogeneity is also an important reason for the refusal to use a software[10].

In order to obtain sufficiently homogeneity to the user, it is recommended to use similar location of window titles, use the same formats on all screens, follow the same procedures for access to the options in the menus, always use the same scores and the same constructions of driven sentences[14]. In this evaluation, an item of the questionnaire concerned that criterion and was considered adequate by 98.3% of participants.

User control refers to the control of the interactions between the user and the computer[10]. This criterion contributed to learning and reducing the error rate, making the computer increasingly predictable[14]. In this evaluation, an item corresponding to this criterion was considered adequate by 84.5% of students.

The immediate feedback is related to system responses to the actions that the user practices. The quality and speed

of feedback are very important factors for the establishment of user satisfaction and trust, as they allow the user to better understand how the system works[10]. In order for a system to have an interface with appropriate feedback, it is recommended that all users of entries to be displayed and provide a perceptible feedback that may be in the form of symbols, for example, an asterisk. Also, it is suggested that in situations where the user generates an interruption of a particular procedure, a message informing the user that the system is available again in its previous state[14]. For this criterion an item in the questionnaire was considered adequate by 89.6% of students.

The criterion correction of errors with regard to the means available to the user in order to allow the correction of errors that he/she made[10]. In order to obtain satisfactory error corrections, it is recommended to provide the ability to modify the commands at the time of error. If you do not see the error at the time it occurred, the system must provide correction any time it recognizes it[14]. For this criterion, the item in the questionnaire was assessed positively by 75.8% of students.

The quality of error messages refers to the relevance, clarity and accuracy of information that is passed to the user, the nature of the mistake he/she made (syntax, format, etc.) and the actions to be taken to correct it, favoring the learning system[10]. In order to obtain quality in error messages, it is recommended in cases where the user presses an invalid function key, that there is no action, unless a message indication; should provide error messages task-oriented and use very specific terms for the error messages, which should be brief with neutral vocabulary[14]. In the ergonomic evaluation questionnaire of this study, there was an item about this criterion, which was considered adequate by 74.2% of students who participated in the study.

In this study, the *correction of errors* criteria and *error messages* were those which had higher percentage of responses *I don't know*, which leads to the conclusion that users do not know or could not assess satisfaction with the response to error and quality of error message for not having made any.

In technologies and computerized educational systems, it is necessary to consider skills and perceptual and cognitive human capacities, as well as aspects related to the task that will be developed. When these characteristics are taken into account, technologies and systems can deliver fast learning facilities in use and low error rates[12].

About the layout of the contents on the pages, critical points for better presentation of each page were reformulated. A web design study showed that web pages users first read horizontal motion at the top of content area, then move the page down a bit and read-in by means of a second horizontal movement, which covers a smaller area than the previous movement and, finally, analyze the contents with a left vertical movement. Therefore, the first two paragraphs should bring the most important information, titles and paragraphs should begin with the words that convey information that is really important, since users will notice it when examining the left side of the content[15].

According to a study conducted in 2007, balloons and captions are the most used resources in storytelling in comics[16] and that's how the narration was conducted in the simulation of digital technology in question.

With respect to one of the virtual characters dialogue, the nurse, change in the input process of the transmission lines balloon was implemented, moving from letter by letter format for word by word, which made texts more agile as requested by the users participating in the study.

Summering, the interface of educational technology *Caring for sensory environment in the neonatal unit: noise, lighting and handling* was evaluated very positively, and criticism by participants were considered for immediate and medium term for improvement of the technology, also providing projects for the development of new educational technologies.

A study conducted in 2012, also performed with nursing students addressed the development and evaluation of a software which checked the diagnostic accuracy. In the usability evaluation, the software was considered excellent, very good or good by 96.2% of the students and, similarly, showed that in the perception of the students, the software brought benefits to learning about the topic studied[17].

Simulations have long been used in nursing education and allow anticipation of procedures and situations of hospital practice in a very interesting and challenging way, respecting the pace of learning of each student and providing the development of an ethical stance given nursing care[11].

The advantages of using technologies that justify its use in teaching are to provide the user an easier understanding of the subject discussed[18], respecting the pace of learning of each student, enabling them to repeat the use of technology as often as needed for better learning[19-21], creating a safe and effective environment to simulate clinical practice in virtual environments closer to reality[22], motivating the use due to its graphics characteristics[21], having an immediate time response to the actions and demonstrating students performance on tasks as part of the evaluation process[23].

Other scholars point out that technology has evolved significantly and currently students are more computerized than previous generations, so the focus should be on effective ways to incorporate new methodologies in education. Although the use of Internet-based learning is most widespread in the health education, evidence is still incipient related to the support of teaching strategies used in these environments that enhance learning outcomes and increase the sense of community and cognitive engagement in students[24].

In a study, authors emphasized that technological tools used in healthcare have not explored the well-known potential of technology yet. They extend the argument exemplifying that with the knowledge already produced in behavioral science, organizational, engineering and clinical research, one could build important simulation environments for the construction of new knowledge and new science[25].

Notwithstanding, based on the choice of investigating the possibility of inclusion of these tools for teaching, it can be concluded that they have an important role in supporting the teacher in the teaching-learning process, but by no

means these tools can replace them. Regarding the selection of situations in the virtual environment of the neonatal unit, the most frequently used ones were more likely to be experienced by students in their theoretical and practical immersion in the course. Including game elements adds entertainment to the learning experience, which increases the intrinsic motivation of the student to practice and learn, making the learning experience more enjoyable and potentially more effective[26].

Technology and science should always be together, in this sense, we emphasize the importance of adherence of educational technologies in universities (a reality which already occurs on the international scenario with more fluidity). Science generates, synthesizes and accumulates knowledge, and technology produces theories of new processes using the knowledge produced[25].

The use of computational resources as an effective instrument in the process of teaching and learning and the implementation of this feature in the educational environment has been confirmed from basic education environment to universities, but there should be no illusion that the digital age will solve the same educational problems which have always existed[27].

CONCLUSION

The results showed that the evaluated educational technology has a user friendly interface, provides easy handling besides a pleasant and motivating learning environment, simulating the reality of a neonatal unit via multimedia (sound, steady and dynamic images and texts), as the claims concerning the interface of ergonomic assessment questionnaire reached 70% or more of positive responses (agree or strongly agree).

RESUMO

Objetivo: Avaliar a interface da tecnologia educacional digital *Cuidando do ambiente sensorial na unidade neonatal: ruído, luminosidade e manipulação* com base nos critérios de ergonomia. **Método:** Estudo descritivo, em que foram utilizadas as orientações e os critérios ergonômicos estabelecidos pela Norma ISO 9241-11 e um instrumento tipo Likert *online* para identificar problemas e qualidades da interface. O instrumento foi construído com base no Ergolist, que segue os critérios da ISO 9141-11. Participaram do estudo 58 alunos de graduação da Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo, os quais cursaram as disciplinas que oferecem conteúdos de enfermagem neonatal. **Resultados:** Todos os itens foram avaliados positivamente por mais de 70% da amostra. **Conclusão:** A tecnologia educacional está adequada segundo os critérios ergonômicos e pode ser disponibilizada para o ensino de estudantes de enfermagem.

DESCRITORES:

Educação em Enfermagem; Tecnologia Educacional; Enfermagem Neonatal; Estudantes de Enfermagem; Prematuro.

RESUMEN

Objetivo: Evaluar la interfaz de la tecnología educativa digital *Cuidando el ambiente sensorial en la unidad neonatal: ruido, luminosidad y manipulación* con base en los criterios de ergonomía. **Método:** Estudio descriptivo, en el que se emplearon las orientaciones y los criterios ergonómicos establecidos por la Norma ISO 9241-11 y un instrumento tipo Likert en línea para identificar los problemas y las calidades de la interfaz. El instrumento fue construido con base en el Ergolist, que sigue los criterios de la ISO 9141-11. Participaron del estudio 58 alumnos de pregrado de la Escuela de Enfermería de Ribeirão Preto de la Universidad de São Paulo, quienes cursaron las asignaturas que ofrecen contenidos de enfermería neonatal. **Resultados:** Todos los puntos fueron evaluados positivamente por más del 70% de la muestra. **Conclusión:** La tecnología educativa está adecuada a los criterios ergonómicos y se puede utilizarla para la enseñanza de estudiantes de enfermería.

DESCRIPTORES:

Educación en Enfermería; Tecnología Educacional; Enfermería Neonatal; Estudiantes de Enfermería; Prematuro.

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