

Digital object in neonatal nursing: impact on student learning**Objeto digital em enfermagem neonatal: impacto na aprendizagem de estudantes**

Natália Del'Angelo Aredes¹, Fernanda dos Santos Nogueira de Góes², Marta Angélica Iossi Silva³,
Marlene Fagundes Carvalho Gonçalves⁴, Luciana Mara Monti Fonseca⁵

¹ Nurse, Master in Public Health Nursing. Student of the Graduate Program in Public Health Nursing, Doctoral level, at the Nursing School of Ribeirão Preto of Universidade de São Paulo (EERP/USP). Ribeirão Preto, SP, Brazil. E-mail: nataliadel.aredes@gmail.com.

² Nurse, Ph.D in Public Health Nursing. Professor at EERP/USP. Ribeirão Preto, SP, Brazil. E-mail: fersngoes@eerp.usp.br.

³ Nurse, Ph.D in Public Health Nursing. Associate Professor at EERP/USP. Ribeirão Preto, SP, Brazil. E-mail: maioosi@eerp.usp.br.

⁴ Educator, Ph.D in Education, at EERP/USP. Ribeirão Preto, SP, Brazil. E-mail: mgoncalves@eerp.usp.br.

⁵ Nurse, Ph.D in Public Health Nursing. Associate Professor at EERP/USP. Ribeirão Preto, SP, Brazil. E-mail: lumonti@eerp.usp.br.

ABSTRACT

The study compared the cognitive learning of nursing students about clinical evaluation of premature, dividing them among those who used and did not use the learning digital object (LDO) as support material. Besides, it assessed the students' opinion about the LDO. The quasi-experiment was conducted in the infant health discipline of a Nursing course, in which 22 students participated divided as control group (n = 10) and experimental group (n = 12). There was no significant statistical difference between groups, but the intra-group comparison for performance demonstrated significant difference in both, showing positive learning effects. Regarding students' opinion, very satisfying assessments were obtained about the digital object and its characteristics of interaction with the user. Although there was no significant impact between groups, the positive assessment from students' use reflects its importance as innovative didactic strategy and motivation for the students.

Descriptors: Education, Nursing; Educational Technology; Neonatal Nursing.

RESUMO

O estudo comparou a aprendizagem cognitiva de estudantes de enfermagem, sobre avaliação clínica do prematuro, dividindo-os entre os que utilizaram e que não utilizaram objeto digital de aprendizagem (ODA) como material de apoio. Além disso, avaliou o ODA na opinião dos estudantes. O quase-experimento foi conduzido no contexto da disciplina de saúde infantil de um curso de Enfermagem, em que participaram 22 estudantes divididos entre grupo controle (n=10) e grupo experimental (n=12). Não houve diferença estatisticamente significativa entre os grupos, porém a comparação do desempenho intragrupos demonstrou diferença significativa em ambos, denotando os efeitos positivos da aprendizagem. Quanto à opinião dos estudantes, foram obtidas avaliações muito satisfatórias sobre o objeto digital e suas características de interação com o usuário. Apesar de não haver impacto significativo na comparação entre os grupos, a avaliação positiva de uso pelos estudantes reflete sua importância enquanto estratégia de inovação didática e motivação para os estudos.

Descritores: Educação em Enfermagem; Tecnologia Educacional; Enfermagem Neonatal.

INTRODUCTION

The learning digital objects (LDOs), also known as learning virtual objects have been gaining emphasis in the educational strategy of superior courses, given its reutilization advantages, motivational interaction through animations or simulations and versatile application for distance or classroom teaching. Besides, its expansion in the health field is still shy, according to the systematic analysis of initiatives reported in the scientific literature. Regardless of this panorama, nursing is the most noticed field producing these teaching and learning tools, as well as their assessment⁽¹⁾.

The advantages of technological tools that justify its use consist in offering the user an easy comprehension of the addressed subject⁽²⁾; to respect the learning rhythm and, to allow the reutilization as an easy way to browse between contents^(1,3-4); to create a safe and effective environment to simulate the clinical practice when equipped of more advanced resources⁽⁵⁾; to develop interest due to its graphic peculiarities⁽⁴⁾ and, promote user's satisfaction⁽⁵⁾. Besides, the LDO's use based on active methodologies stimulates students to collaborate with digital use. Thus, geographical distances stop being an issue for group works that start to be incorporated in distance learning, since necessary multimedia resources are offered and, tasks and homework are aligned with this proposal⁽⁶⁾. Therefore, it is fundamental to reflect about disadvantages aimed to better plan the development and implementation of these tools, highlighting: the elevated cost⁽⁷⁾, risk of social isolation during learning⁽⁷⁾ and subuse of justified resource by lack of interest or dissatisfaction⁽⁸⁾.

Considering the hypothesis that the LDO for clinical evaluation of premature helps cognitive learning of students and favors motivation for studies in this theme, the justification of this study is based on the preoccupation to investigate the real impact of the tool on student's development in a learning assessment and their opinion about its use.

The objectives of this study were: 1. To compare the learning performance of students of a control group in

relation to a experiential group, adopting the LDO's use about clinical evaluation of premature and 2. To assess the LDO under the view of students who used it (experimental group).

METHODS

A quasi-experimental study conducted with nursing undergraduate students at a public university located at the interior southeast region of Brazil, who were divided in control and experimental groups and, evaluated it by pre- and post-test.

The students were invited to participate in the study by a researcher unknown by them, in a way to guarantee no existing conflict of interests from the professor-student relationship. After reading the Free and Informed Consent, comprehension of the document and agreement, the students signed and dated two copies, according with the Brazilian legislation of ethics in research. This study was approved by the Ethics in Research Committee of the Nursing School of Ribeirão Preto from the Universidade de São Paulo under the protocol 1220/2010.

The invitation to participate was made to all 22 students enrolled in the discipline, as they met the adopted inclusion criteria: 1. To be enrolled on the discipline child's health (duration: 120 hours) and 2. To participate in the internship's practical activity at a neonatal unit, as foreseen by the course. The discipline organization foresees previous division of students in two groups to make the hospital internship viable, being a group of 10 and another of 12 students. Thus, there was no random allocation of participants in the investigated groups, the first one was defined as control (n=10) and the second as experimental (n=12).

The LDO "Semiotecnic and Semiology of the pre-term newborn" (SSPTNB) became available for exclusive access of the experimental group through the virtual learning environment Moodle[®] and controlled by a login and password registry.

The offered course for students in the control group was different only by the access of the adopted tool in this study as intervention, once the learning opportunities and the educational method were the same for both groups as it is normally done at the university.

The resources used on the LDO were composed by videos, photos, animations, pictures, sounds, texts and, questions about the clinical evaluation of premature.

Considering it a computer tool with free browsing access, it offers greater autonomy to the user, who can study what is desired, when and where the user wants, without the need to complete pre-established modules to advance contents. The Figure 1 below presents the initial LDO screen for Semiotécnica and Semiologia of the premature newborn:



Figure 1: Opening LDO screen for Semiotécnica and Semiologia of the premature newborn. Ribeirão Preto, SP, Brazil, 2011.

The instruments used for data collection were: Form of participant's characteristics; Questionnaire for pre- and post-test composed by 20 objective questions including multimedia animations and figures and, Questionnaire for assessment of student's opinion about the LDO (for those who used the tool) containing 12 items based on a Likert scale.

To assess cognitive learning, the student's performance was considered as being the difference between the pre- and post-test scores (value subtracted in this order, allowing obtainment a negative

performance – if the student performed better on the pre-test).

The statistical tests were used by the SPSS program (Statistical Package for the Social Sciences) using Mann-Whitney as non-parametric analysis method for comparison between groups and Wilcoxon test to assess performance before and after the discipline, with and without intervention within the same group. All tests considered a level of significance equal to 0.05.

RESULTS

Considering the results found in this study, the descriptive variables for participant's characteristics are presented on Table 1.

From the data presented above, we highlight the places where students used more the computer: at home

(n=8/ 80% in the control group and n=10/ 83.3% in the experimental group) and at university (n=10/ 100% in the control group and n=11/ 91.7% in the experimental group).

Table 1: Descriptive variables of control and experimental groups. Ribeirão Preto, SP, Brazil, 2011.

Variable	Control		Experimental	
	n	(%)	n	(%)
Frequency*				
Frequently	7	70	10	100
Regularly	2	20	0	0
Sometimes	1	10	0	0
Never	0	0	0	0
Gender				
Male	4	40	1	8.3
Female	6	60	11	91.7
Access a computer at home				
No	2	20	2	16.7
Yes	8	80	10	83.3
Access a computer at the university				
No	0	0	1	8.3
Yes	10	100	11	91.7
Access a computer at work				
No	9	90	12	100
Yes	1	10	0	0
Access a computer at another place				
No	10	100	11	91.7
Yes	0	0	1	8.3
Researched information about the course in the internet				
No	0	0	0	0
Yes	10	100	12	100
Researched clinical evaluation or prematurity on the internet**				
No	0	0	2	18.2
Yes	10	100	9	81.8
Do you Work				
No	8	80	10	83.3
Yes	2	20	2	16.7

* Two students from the experimental group did not answer

**One student from the experimental group did not answer

Another aspect that should be highlighted when observing Table 1 refers to the large quantity of students who already researched the internet regarding clinical evaluation or prematurity. It demonstrates their interest to know and study contents related to the theme during other disciplines offered in the nursing course.

The mean for internet access, in hours, demonstrated the participants allocated to the experimental group used the internet more (15.17 hours per week) in relation to

the control (9.11 weekly hours) increasing the possibility to access the virtual learning environment by students who had free access to LDO in this study.

The comparison between groups of the cognitive learning based on performance is represented by Figure 2. The Mann-Whitney test demonstrated no significant difference between the investigated groups ($p=0.27$).

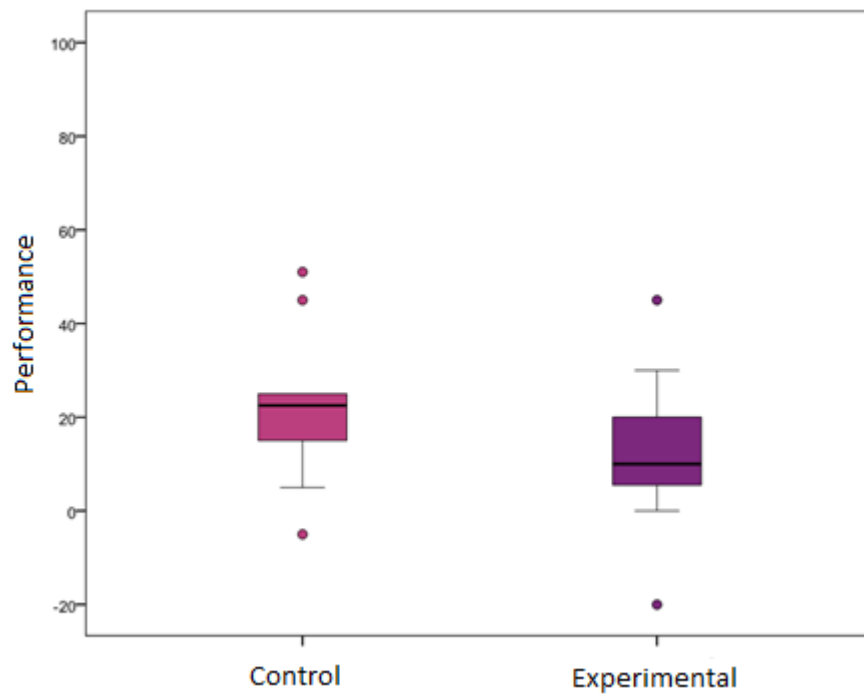


Figure 2: Performance comparison between control and experimental groups about cognitive learning of the clinical exam of the premature newborn. Ribeirão Preto, SP, Brazil 2011.

In relation to students' performance while comparing post-test scores with pre-test within the same group, the Wilcoxon test found significant improvement for the two

groups, considered one by one, for the control ($p=0.008$) as well as for the experimental ($p=0.025$), as shown on Figures 3 and 4.

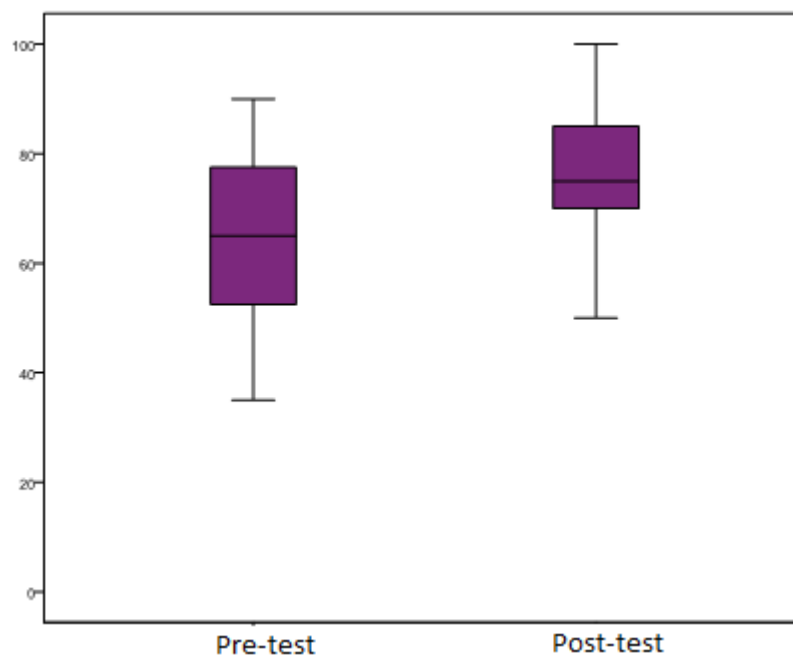


Figure 3: Students' performance of the experimental group when comparing pre- and post-tests for cognitive learning. Ribeirão Preto, SP, Brazil, 2011.

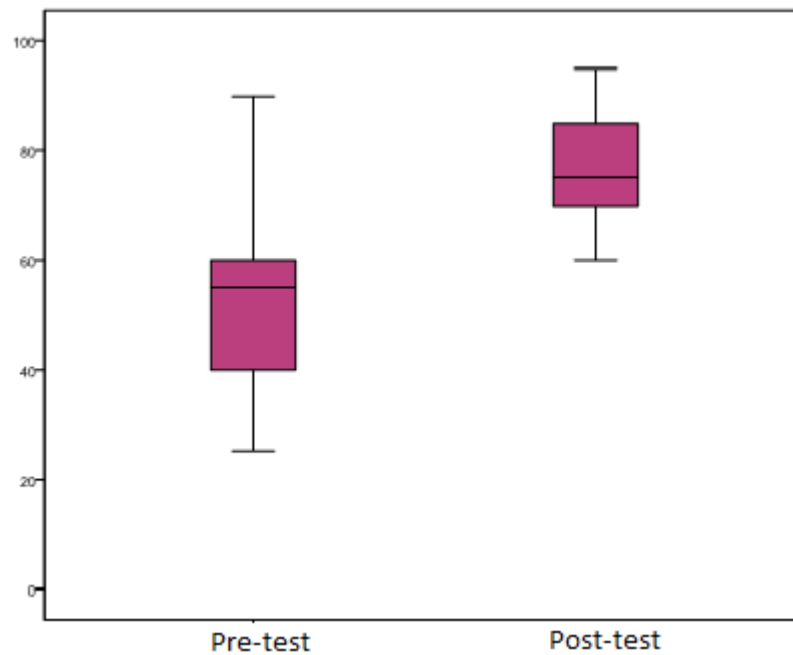


Figure 4: Student's performance of the control group when comparing pre- and post-tests for cognitive learning. Ribeirão Preto, SP, Brazil, 2011.

For the instrument assessment regarding the students' opinions about LDO, the expressive majority agrees with the educational technology being satisfactory

and refutes the possibility to substitute professors by technological resources, as the LDO (Table 2).

Table 2: Frequencies of answers about the LDO's subjective assessment by students of the experimental group. Ribeirão Preto, SP, Brazil, 2011.

LDO Characteristics	TA		A		NAND		D		TD	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Easy to use	8	66,7	4	33,3	0	0	0	0	0	0
Pleasant	8	66,7	4	33,3	0	0	0	0	0	0
Gives immediate feedback	9	75	3	25	0	0	0	0	0	0
Didactic	10	83,3	2	16,7	0	0	0	0	0	0
Gives autonomy	10	83,3	1	8,3	1	8,3	0	0	0	0
Allows to learn the preterm' basic human needs	8	66,7	4	33,3	0	0	0	0	0	0
I can choose what I want to learn	5	41,7	7	58,3	0	0	0	0	0	0
It would be interesting to have digital objects like this with other themes	10	83,3	2	16,7	0	0	0	0	0	0
Digital objects like this can substitute the professor	1	8,3	0	0	2	16,7	5	41,7	4	33,3
To use the digital objective helped me to learn	10	83,3	2	16,7	0	0	0	0	0	0
I felt motivated to use the digital object	6	50	6	50	0	0	0	0	0	0
I believe that the access time for the digital object was satisfactory to enrich my learning	5	41,7	6	50	0	0	1	8,3	0	0

TA = Totally agree; A = Agree; NAND = Neither agree nor disagree; D = Disagree; TP = Totally disagree

We highlighted some students' comments that help the comprehension of the results obtained in this study.

... but requires practice and ability to study (Student C).

Although facility was referred unanimously, one student completed:

About the freedom to choose what to learn, all students agreed that LDO offers such advantage:

I believe the LDO helped on learning and that we can choose what to study (Student C).

All students judged the LDO as presenting immediate feedback:

it was an interesting learning tool, especially because it is possible to see at the act the correct choice (Student F).

It is possible to identify the majority of students (75%) “totally agreeing” with the LDO being didactic, considering that all other also “agreed” with this affirmation. One student affirmed that:

it was an interesting learning tool (Student D).

Another important aspect showing the students’ interest about the digital educational tools was the suggestion to continue developing resources as the one used in this study:

and should be expanded to other disciplines and themes (Student B) and

very good, this could be expanded to other disciplines (Student E).

DISCUSSION

Recognizing the multiple ways to study and learn, we believe that professors should search for balance within the needs, expectations and students’ learning profiles, as well as the different strategical demands that will allow students to have an active and participating role in their teaching-learning process. Within these strategies, we emphasize the implementation of technological innovation for education as it facilitates to comprehend complex information and attend the youth preference.

A study⁽⁹⁾ that highlights the difference of students’ learning profiles and talks about informatics’ acceptability on the learning routine points aspects that need to be considered on the university context and considering to

define teaching strategies. Even considering the individuality of each student, classes or groups have characteristics unifying them when considering similar age, culture and values of a generation⁽¹⁰⁻¹¹⁾. The results of the present study corroborate with this affirmation when homogeneity of highly positive answers is observed regarding the opinion assessment about LDO and invite professors to reflect about the role of innovative tools inside classrooms and beyond the university, in a digital environment viable by the internet.

University students from nowadays are part of a new generation, denominated by some as “digital natives” who seem to present very different learning needs than the past generations. Studies affirm that youngsters from now learn easier when the learning is related to technology and they positively incline to conduct group tasks based on experiences, problems and collaborative and interactive learning⁽¹²⁾. Although our results have not presented difference statistically significant regarding the digital tool applied nursing teaching, similar to other studies’ findings^(7,12), we highlight the satisfaction of students strengthening the findings of the study cited above.

A study conducted with 117 students assessed the knowledge of three groups: LDO and reading (n=37), LDO, reading and demonstration (n=40) and reading and demonstration (n=40) and similarly to the obtained results in this study, there was no significant difference between groups; but it was shown the support from the digital object enhancing development of abilities⁽⁸⁾. On the other hand, a previous study comparing two groups of nurses acting at the clinical practice about cognitive knowledge of intravenous injection verified difference statistically significant as advantage to the group using multimedia resource⁽¹³⁾. Analyzing the literature, we identified the need for more investigations about the LDO impact on learning, with more rigorous studies; including a bigger sample and sample calculation, randomization of participants to allocate the groups and control of confusion variables.

Regarding the intra-group comparison, another similar study conducted in Brazil with nursing students⁽¹²⁾ also obtained significant difference of the means pre- and post-test, similar to this investigation. There was an important increase of the mean considered a standard to measure student's performance, based on cognitive learning and the authors attributed part of the success to the use of the educational technology.

Although few studies demonstrate not having significant difference from a statistical standpoint, but in general, experimental groups using technology as a tool to help on the educational process are more successful in average for cognitive assessment⁽¹⁴⁾ or satisfaction under the user's point of view⁽¹⁵⁻¹⁶⁾, raising reflection about the analysis of the importance of these digital objects. It is important for the success of educational tools that pedagogic context favors it. Therefore, the professor should be the one to recognize learning needs and the moments in the educational process to bring strategies and supporting materials, as well as to use available resources.

In this study, students manifested high level of satisfaction with the LDO use in the child's health discipline and everybody agreed with the easy handling. Such aspect should be considered to implement technological resources in education as it enables and stimulates its use by the students^(3,17), that is the facility to use and the interaction between user and LDO should exist on the interface as critical factors for success. The acknowledgement of students' main difficulties about using technological resources in virtual environments is really important because by this mapping strategy it is possible to propose solutions for its better use⁽⁸⁾.

The dynamics and design of digital resources are directly related to the good use of tools once beyond the content quality, the appearance motivates the access and handling, it makes the browsing pleasant and, stimulates the search for new knowledge. This relationship is connected to the concept of emotional design⁽¹⁸⁾, which constitutes with a new field of study and development of

products aiming to contribute with the interaction between these and its consumers. It is a term used in fields as marketing for example, and in this case, for being education, emotional design aims to contribute with the development of educational tools capable to awaken creativity, curiosity and motivation of users for a study based on positive emotion facing the mediator educational resource.

In reference to the LDO being pleasant to use, we verified unanimity of agreement, similar to what occurred in a study conducted about one LDO for verification of vital signals⁽³⁾. The usability is intimately linked to user's satisfaction and should be considered to align the expectations of students facing educational technologies.

The immediate feedback has large responsibility on LDO's success, once it can resolve doubts about a determined subject whenever they arise through fast answer. Because it is a problematizing educational strategy, the immediate feedback increases student's autonomy through self-regulation of its own learning, and from it, it can deconstruct and reconstruct concepts about a certain subject⁽¹⁹⁾. This mechanism is part of the process to build critical thinking about the addressed themes and favors subsequent discussions, and it broadens the student's sight to deal with a similar situation during practice.

The students assessed very positively the possibility to learn the proposed theme with the LDO, satisfying the creation proposal of the reusable educational technology, besides being a motivational factor⁽⁴⁾ manifested by the interest to expand the digital initiative for other themes, in accordance with results obtained from the students' evaluation on the present study.

About the item suggesting the professor figure to be substituted by LDOs, we found an expressive disagreement from participants, showing the relationship which educational technologies should have, that is, of supporting tool and not substitute tool, neither of isolated solution for educational problems.

The LDOs should be used while teaching supplement, reinforcing the idea of an instrument that adds but does not excludes the educator's function⁽¹⁷⁾. Educational technologies used as didactic resources in teaching practice should stimulate the study and the constant search for new knowledge.

All participants from the experimental group affirmed to strongly agree with the item "I feel motivated to use the virtual object", constituting a fundamental aspect, once if the student does not desire to access it, there will be underuse⁽⁴⁾. Satisfactorily, this study identified that participants felt motivated to use the teaching tool, which enabled accesses during the discipline and encouraged to develop and apply strategies similar to this for the nursing course.

Besides motivation, it is necessary to consider lack of time due to many activities during the superior course⁽²⁰⁾ as a reason to decrease the LDO use by students, being this a variable of interest that requires attention of professors during curricular planning and technical support.

Initiatives focused on motivation vary since the adequate use of multimedia resources⁽⁴⁾, identification of students' preferences regarding the technological tools and creation of these as guides and the emotional design and the human-computer interaction⁽²¹⁾. We have been working based on these aspects when developing new teaching materials and in the investigation of students' preferences, as well as on the tendencies for technological implementation that are pertinent to the teaching-learning process, promoting motivation for students and major didactic possibilities for the teacher.

About the advancing challenges of the technology applied on learning, universities still find a basic obstacle: lack of digital fluency. To surpass it, universities need to plan actions enabling the access to technologies and promote user's training, that is, professors, employees working in institutions of superior education and students⁽²²⁾.

Although there are limitations on the present study, as the reduced sample and lack access control; it contributed with answers about the use of technologies on nursing undergraduate course and demonstrated the importance to assess virtual objects developed and validated with the public to which the proposal was created.

We believe on the importance of scientific research to investigate the impact of teaching technologies, the standard adherence to devices of this new generation of students and their preferences. It is needed to advance on this field of research so that in consonance with the interest of the Brazilian government, to progress considering in special, the new guidelines of superior teaching for health courses. In this context, we consider that the implementation of new validated educational technologies could contribute with a more participative teaching character, turning materials available for students to use in accordance with their individual needs and respecting the diverse rhythms of learning.

CONCLUSION

The comparison between groups of students demonstrated the use of the SSPTNB LDO not determining a significant increase on cognitive learning of participants from the performance analysis. The LDO contributions are especially related to user's satisfaction, in accordance with the table presented in our results, creating a pleasant study environment that complements other teaching activities, as the classes regularly offered in courses and clinical practice of students in neonatal units. Thus, consists of an interesting teaching tool to incorporate in the educational context of neonatal nursing.

We recommend the development of other studies with larger sample and randomization of individuals to verify the impact of the digital object use for learning through parametric statistics. Besides, efforts are needed to investigate the association between the LOD use and the motivation of students to study. Such importance is

justified by the need to value students' proactivity facing their own learning process at universities and interest to train professionals that are more resolute, critic and that continually tries to improve their knowledge and actions.

REFERENCES

1. Trindade CS, Dahmer A, Reppold CT. Learning objects: an integrative review in healthcare. *Journal of Health Informatics*, 2014; 6(1):20-29.
2. Alvarce DB, Pierin AMG. Elaboração de uma hiperídia educacional para o ensino do procedimento de medida da pressão arterial. *Revista da Escola de Enfermagem da USP*, 2011; 45(4):939-44.
3. Cogo ALP, Silveira DT, Pedro ENR, Tanaka RY, Catalan VM. Aprendizagem de sinais vitais utilizando objetos educacionais digitais: opinião de estudantes de enfermagem. *Revista Gaúcha de Enfermagem*, 2010; 31(3):435-41.
4. Blake H. Computer-based learning objects in healthcare: the student experience. *International Journal of Nursing Education Scholarship*, 2010; 7(1):1-15.
5. Grady JL. The Virtual Clinical Practicum: an innovative tele-health model for clinical nursing education. *Nursing education perspectives*, 2011; 32(3):189-194.
6. Boling EC, Hough M, Krinsky H, Saleem H, Stevens M. Cutting the distance in distance education: perspectives on what promotes positive, online learning experiences. *Internet and higher education*, 2012; 15(2):118-126.
7. Kaveevivitchai C, Chuengkriankrai YL, Thanooruk R, Panijpan B, Ruenwongsa P. Enhancing nursing students' skills in vital signs assessment by using multimedia computer-assisted learning with integrated content of anatomy and physiology. *Nurse Education Today*, 2008; 29:65-72.
8. Carlson-Sabelli LL, Giddens JF, Fogg L. Challenges and benefits of using a virtual community to explore nursing concepts among baccalaureate nursing students. *International Journal of Nursing Education Scholarship*, 2011; 8(1):1-17.
9. Markovic S, Jovanovic N. Learning style as a factor which affects the quality of e-learning. *Artif Intell Rev*, 2012; 38(4):303-312.
10. Collins AS, Graves BA, Gullette D, Edwards R. Developing an interactive microsimulation method in pharmacology. *Journal of Nursing Education*, 2010; 49(7):410-3.
11. Gibson S. Enhancing intergenerational communication in the classroom: Recommendations for successful teacher-student relationships. *Nursing Education Perspectives*, 2009; 30(1):37-9.
12. Alvarez AG, Dal Sasso GTM. Aplicação de objeto virtual de aprendizagem, para avaliação simulada de dor aguda, em estudantes de enfermagem. *Revista Latino-Americana*, 2011; 19(2):229-37.
13. Tsai SI, Tsai WW, Chai SK, Sung WH, Doong JL, Fung CP. Evaluation of computer-assisted instruction in intravenous

FINANCIAL SUPPORT

This research project received support from CNPq (Brazilian National Council of Scientific and Technological Development) for its conduction.

- injection. *International Journal of Nursing Studies*, 2004; 41(2):191-98.
14. Morey DJ. Development and Evaluation of Web-Based Animated Pedagogical Agents for Facilitating Critical Thinking in Nursing. *Nursing Education Perspectives*. 2013; 33(2):116-120.
15. Anderson JK, Page AM, Wendorf DM. Avatar-Assisted Case Studies. *Nurse Educator*. 2013; 38(3):106-109.
16. Hessler KL, Henderson AM. Interactive Learning Research: Application of Cognitive Load Theory to Nursing Education. *International Journal of Nursing Education Scholarship*. 2013; 10(1):1-9.
17. Fonseca LMM, Aredes NDA, Chiodi LC, Furtado MCC, Leite AM, Martins JCA, Rodrigues MA. Serious game e-Baby e software de avaliação clínica do prematuro: influência na aprendizagem de estudantes de enfermagem no tema neonatal. In: IASIS – I workshop ibero-americano de sistemas interoperáveis em Saúde. *Revista da Faculdade de Medicina e do Hospital das Clínicas de Ribeirão Preto*. 2014; 47: 38-43.
18. Tonetto LM, Costa FCX. Design emocional: conceitos, abordagens e perspectivas de pesquisa. *Strategic Design Research Journal*, 2011; 4(3):132-140.
19. Fonseca LMM, Aredes NDA, Dias DMV, Scochi CGS, Martins JCA, Rodrigues MA. Serious game e-Baby: percepção dos estudantes de enfermagem sobre a aprendizagem da avaliação clínica do bebê prematuro. *Rev Bras Enferm*, 2015; 68(1):13-19.
20. Silva VLS, Chiquito NC, Andrade RAPO, Brito MFP, Camelo SHH. Fatores de estresse no último ano do curso de graduação em enfermagem: percepção dos estudantes. *Rev. enferm. UERJ*, 2011; 19(1):121-126.
21. Fonseca LMM, Dias DMV, Góes FSN, Seixas CA, Scochi CGS, Martins JCA, Rodrigues MA. Development of the e-Baby serious game with regard to the evaluation of oxygenation in preterm babies. *Computers, Informatics, Nursing*, 2014; 32(9):428-436.
22. NMC – New Media Consortium and The EDUCAUSE Learning Initiative. Johnson L, Adams Becker S, Estrada V, Freeman A. *NMC Horizon Report: Higher Education Edition*, 2014. ISBN 978-0-9897335-5-7. Austin, Texas: The New Media Consortium.

Received: 04/28/2015.

Accepted: 09/24/2015.

Published: 12/31/2015.