Production and validation of a video lesson on cardiopulmonary resuscitation

Construção e validação de videoaula sobre ressuscitação cardiopulmonar

Elaboración y validación del video-lección acerca de la reanimación cardiopulmonar

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ABSTRACT

Objective: To elaborate and validate a teaching virtual contemporary object, video-lesson, about resuscitation cardiopulmonary with adult in life support care using automatic external defibrillator in the hospital environment.

Method: This is an applied research of techonological productions in witch the video-lesson elaboration was according to the methodological trajectory proposed by Fleming, Reynolds and Wallace. The research was accomplished in the Minas Gerais University State and in the Ribeirão Preto Nursing School (Brazil). Sixteen expertises nurses in the area of urgency and emergency participated of this research. The AC1 Gwet's statistic was used to the interobsevers agreement.

Results: The validation of script and storyboard to the video-lesson development was reached the interobsevers agreement, classified as "moderate agreement" according to Landis and Kock, with AC1=0.59 and p<0.0001.

Conclusions: The video-lesson elaborated and validated in this research represent an adequate contemporary important strategy to aplication in the teaching-learning process.

Keywords: Teaching. Learning. Education technology. Cardiopulmonary resuscitation. Life support care.

RESUMO

Objetivo: Construir e validar um objeto contemporâneo virtual de ensino, videoaula, sobre ressuscitação cardiopulmonar no adulto em suporte básico de vida com o uso do desfibrilador externo automático no ambiente hospitalar.

Métodos: Trata-se de uma pesquisa aplicada, de produção tecnológica, com produção de vídeoaula de acordo com a trajetória metodológica proposta por Fleming, Reynolds e Wallace. Desenvolvido na Universidade do Estado de Minas Gerais e na Escola de Enfermagem de Ribeirão Preto no período de janeiro de 2017 a março de 2018. Participaram 16 enfermeiros *expertises* na área de urgência e emergência. Para concordância inter-avaliadores foi utilizado a estatística AC1 de Gwet.

Resultados: A validação do roteiro/*script* e *storyboard* foi alcançada a concordância inter-avaliadores, de acordo com Landis e Kock, classificada em "concordância moderada", com AC1=0,59 e p<0,0001.

Conclusões: A videoaula, construída e validada neste estudo, representa importante estratégia contemporânea adequada para aplicação no processo de ensino-aprendizagem.

Palavras-chave: Ensino. Aprendizagem. Tecnologia educacional. Reanimação cardiopulmonar. Cuidados para prolongar a vida.

RESUMEN

Objetivo: Construir y validar un objeto contemporáneo virtual de enseñanza, vídeo-lección, acerca de la reanimación cardiopulmonar con adultos en cuidados para prolongar la vida, utilizando el desfibrilador externo automático en ambiente hospitalario.

Método: Se trata de una investigación aplicada, de producción tecnológica en que la elaboración del vídeo-lección se llevó a cabo según la trayectoria metodológica propuesta por Fleming, Reynolds y Wallace. El estudio se desarrolló en la Universidad del Estado de Minas Gerais y en la Escuela de Enfermería de Ribeirão Preto (Brasil). Participaron de esta investigación 16 enfermeros especialistas en el área de urgencia y emergencia. Para la concordancia 'interevaluadores' se usó la estadística AC1 de Gwet.

Resultados: Se alcanzó la concordancia 'interevaluadores' para el desarrollo del vídeo-lección a través de la validación del *script* y *storyboard* que, según Landis y Kock, es clasificada como "concordancia moderada" con AC1=0,59 y p<0,0001.

Conclusiones: El vídeo-lección, elaborado y validado en este estudio, representa una importante estrategia contemporánea apropiada para la aplicación en el proceso de enseñanza-aprendizaje.

Palabras clave: Enseñanza. Aprendizaje. Tecnología educacional. Reanimación cardiopulmonar. Cuidados para prolongación de la vida.

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■ INTRODUCTION

Proper pedagogical practice should be a constant concern as the advancement of technology is incessant and, therefore, the way in which information is conveyed should enable new possibilities of teaching and learning in modern times, in the peculiar profile of the digital natives[1].

The learning characteristics of the current generation, the digital natives, are extremely tied to the use of technologies, which play an academic role that facilitates comprehension of the content, aligning the students' interests and abilities with teaching strategies. An expository class in video is an advantage in the teaching-learning process, and through them it is possible to achieve positive results in cognitive, social, and emotional development, as well as in the daily educational practice[2].

In the last decades, the teaching-learning process, with the use of active methodologies, underwent a revolution with the inclusion of digital information, being currently established and accessible in a versatile way, enabling disclosures that were previously impossible[3]. Videos contribute in a practical and dynamic way with the teaching-learning process in the same way as texts and images, and they are able to captivate the people involved, stimulating them, within the teaching strategy and can be used as technological resources to update knowledge and improve practical performance in patient care[4].

The use of videos is a valuable technology in Nursing teaching as it motivates learning and proves to be useful and feasible as a tool for teachers in the teaching-learning process for Nursing students[4].

Training in Cardiopulmonary Resuscitation (CPR) adapted to the target public in different categories, and offering alternative teaching strategies to ensure acquisition and retention of knowledge and skills for treating a Cardiopulmonary Arrest (CPA) is supported by the International Liaison Committee on Resuscitation – ILCOR, representing the American Heart Association – AHA[5].

When considering the learning objective in CPR, the proper construction of knowledge and acquisition of skills require an excellence standard[6] and, it is emphasized that survival in CPA is a crucial component of the quality of the CPR[7].

With respect to teaching through videos, there is an increase in the acquisition of knowledge and skills using this resource as a teaching strategy, and expository classes through videos are as effective as in the classroom[4].

In view of the above, the aim of this study is to create a virtual contemporary learning object, a video lesson, on adult CPR in the Basic Life Support (BLS) with the use of Automated External Defibrillator (AED) in the hospital environment, for teaching and learning of students and healthcare practitioners who need training in this area.

■ METHOD

To carry out this study, an applied research was used with technological production, as a result of a master's thesis defended in the scope of the Graduate Program in Fundamental Nursing of the Ribeirão Preto School of Nursing (EERP), from the University of São Paulo (USP)[7], which involves the production of a video lesson on adult CPR in BLS with the use of AED in the hospital environment, created according to AHA guidelines for CPR[8] and CPA/CPR registration pursuant to the In-hospital Utstein Style's report[9]; the research was carried out from January 2017 to March 2018.

The study population was composed of *experts* of the Emergency and Urgency (EU) area for evaluation and validation of the *scripts* and *storyboard* of the video lesson. For selection, Fehling's criteria[10] were used as inclusion criteria: minimum score of five points, minimum value to be considered *expert*, performance/education/ teaching in the EU area; the exclusion criteria included vacations or work leave in the period defined by the researcher for evaluation of the instruments and failure to perform the evaluation within in the given period.

To select them, a survey was conducted in the research groups related to the EU areas, and a search was carried out for authors of studies related to CPA and CPR and teachers from the EU area in institutions from different regions. An invitation by e-mail was sent to 26 *experts* listing the objectives of this study, 18 agreed to participate, and 16 completed the evaluation and validation process. Those who agreed to participate were sent by e-mail or printed, according to the preference of the *expert*, the following items: Free and Informed Consent (FIC); General guidelines related to the evaluation/validation process; Explanatory script for validation; instrument for validation; and the *script* and *storyboard* of the video lesson.

In order to optimize the validation process by the *experts*, an explanatory guide for validation of the video lesson was prepared exhibiting the aspects to be considered in the validation process.

For production of the video lesson, the methodological approach proposed by Fleming, Reynolds and Wallace[11] was used, as shown in Chart 1.

The video lesson was recorded in partnership with the School Studio, linked to the Journalism and Marketing and Advertising courses of the UEMG – Passos Unit, which has

Stage	Step	Description
I	Writing the *script* and *storyboard*	The *script* was organized in the following sequence: presentation of the title and objectives, characterization of the host, presentation of the main concepts, details of the links within the Chain of Survival, explanations on the management of AED, and information on proper CPA/CPR registration. *Storyboard* structured in a table with three columns (Audio/Description, Images/Scenes, and Photos). Distribution of the content of the *script* in the Audio/Description column; detailing texts and actions for recording in the Images/Scenes column; Images, logos, and animations in the Photos column.
II	Validation of the *script* by *experts*	For validation by the *experts* of the *script* and *storyboard* the following aspects were considered: Objective, Content, Relevance, Environment, Verbal Language, and Topic Inclusion.
	Validation of the *storyboard* by *experts*	
	Rehearsal with the actors	Rehearsed in a room with acoustic insulation in the School Studio of the University of Minas Gerais (UEMG) – Passos Unit. Conducted by the researchers, accompanied by professionals with experience in EU, and by technical professionals in audiovisual, involved in the shooting of the scenes and/or edition of the video lesson. Rehearsal according to the content of the validated *script* and *storyboard*.
	Footage of the scenes	Pursuant to the previous step, Rehearsal with the actors. After the rehearsals, the scenes were filmed.
	Development of images and animations	Support requested from the Multimedia Creation and Production Service (SCPM) of the EERP/USP to create animations in videos. For the background, a simulated scenario of an EU unit was defined. It was included in the right side of the video "cuts" of videos simulating CPA/CPR, produced by the researchers, for association of the theoretical content with the practice. Images according to the links of the Chain of Survival were inserted according to the text. Slides were included to highlight the links of the Chain of Survival and learning objects. Texts were included in the footer, reinforcing the concept/information exposed and, in the footer of the screen, the references were presented.
	Audio description/ recording	The content of the video lesson was presented by one of the researchers, without information regarding the description.
III	Edition	Task under the responsibility of the audiovisual technician with experience in production of videos of the SCPM of EERP/USP, following the detailed information in the validated *storyboard* . The researchers prepared guidelines regarding the details for the *storyboard* edition.

Chart 1 – Elements for producing the video lesson
Source: Research data, 2018.

a room with sound insulation and *Chroma Key*. The professionals who work in the studio have experience in video production and journalism.

To validate the *script* and *storyboard* of the video lesson, the instrument adapted from the model developed and applied by Ferreira[12] was used, with items related to the following topics: objective, content, relevance, environment, verbal language, and topic inclusion, and response options similar to the *Likert* scale with five points, distributed between "strongly agree", "agree", "disagree", "strongly disagree", and "don't know". It was requested to the *experts*, upon identification of absence of necessary information

and/or unnecessary information, and in disagreements, to provide suggestions and comments in the specific area of the instrument. It is important to note that, upon the annotations provided in the validation, adjustments and corrections were made in the *script* and *storyboard* of the video lesson, when in line with the AHA's guidelines[7].

The content of the *script* and *storyboard* of the video lesson were considered validated if 80% of the *experts* provided a positive review, that is, a "strongly agree" or "agree", in the validation instrument.

The project was submitted to evaluation of the Research Ethics Committee (CEP) of the EERP/USP, using Resolution 466/2012 of the National Health Council (CNS) as a legal parameter for the research. After the favorable opinion was issued, under number 2,002,839, CAAE: 65387417.4.0000.5393, the instruments were finally evaluated. It was requested from Ferreira[12] permission to use the validation instruments, who granted the authorization, and they were adapted to this study.

For data organization, spreadsheets were prepared in *Microsoft Excel* 2010®, with double typing, with subsequent validation to obtain reliable data. The analysis of data regarding the characterization of the *experts* was performed by descriptive statistics, frequency, percentage, and measure of position (mean). To evaluate the inter-rater agreement between the 16 *experts*, the AC1 statistic developed by Gwet was used[13]. The inter-rater agreement to evaluate the video lesson was used according to the items related to the objective, content, relevance, environment, verbal language, and topic inclusion. It was also evaluated the general inter-rater agreement.

Statistical analysis was performed with the support of a statistical professional linked to the EERP/USP. The program used for agreement analysis was program R, version 3.4.1. A significance level of 5% (p<0.05) was adopted for all analyzes. To categorize the inter-rater agreement, the values defined by Landis and Kock were considered[14], which considers satisfactory when indices present values higher than 0.60.

■ RESULTS

Initially the characterization of the *experts* who participated in the validation of the *script* and *storyboard* of the video lesson will be presented.

The sample was completely characterized by nurses. Regarding gender, 13/16 (81.25%) were women and 3/16 (18.75%) were men. Age ranged from 29 to 55 years (average of 36.56 ± 7.33) and professional practice between four and 32 years (average of 12.93 ± 7.51). Regarding academic qualifications, 13/16 (81.25%) have a specialist degree, 15/16 (93.75%) have a Master's degree, 10/16 (62.50%) have a Doctor's degree, and 3/16 (18.75%) have a Post-doctoral degree. It is noteworthy that 8/16 (50%) work in teaching in higher education. When questioned about the participation in events in the last two years, 13/16 (81.25%) reported having participated in events related to the area of interest of this study, that is, EU.

It should be noted that the professionals who participated in the study are from different states in Brazil, namely: 7/16 (43.75%) from São Paulo, 4/16 (25.00%) from Minas Gerais, 2/16 (12.50%) from Rio Grande do Norte, 1/16 (6.25%) from Pernambuco, 1/16 (6.25%) from Alagoas, and 1/16 (6.25%) from Mato Grosso do Sul, covering the Southeast, Midwest, and Northeast regions of Brazil, working in Higher Education Institutions (HEI), such as the Federal University of Rio Grande do Norte, the UEMG – Passos Unit, the Federal University of Mato Grosso do Sul, the EERP/USP, the Federal Institute of Pernambuco, the Federal Institute of Southern Minas Gerais, and private institutions in the countryside of Minas Gerais and São Paulo.

With respect to the classification by Fehling's criteria[10], an excellent classification was observed, since most of the *experts* have a score of ten points or higher (62.5%) and 4/16 (25%) have a maximum score of 14 points. It is emphasized that the minimum score defined for inclusion was five points. It is also worth mentioning that 15/16 (93.75%) have a clinical practice of at least one year in the adult EU, 10/16 (62.50%) published an article in a reference journal on the EU topic, and 8/16 (50%) have a PhD in the EU area.

The details of the video lesson scenes, presented in Table 1, were aimed at structuring a sequence to guide the process, ensuring direction in the validation, test, filming, image and animation development, audio description/recording, and editing stages.

In the question related to the **objectives** of the video lesson, the items were positively evaluated, with 45/48 (93.25%) of the items in "strongly agree" or "agree" and 3/48 (6.25%) in "disagree". In the items related to the **content**, it was found that 99/120 (88.39%) were evaluated with "strongly agree" or "agree" and 13/120 (11.61%) with "disagree" or "don't know". With respect to the **environment**, 30/32 (93.25%) evaluated the items with "strongly agree" or "agree" and 2/32 (6.25%) with "strongly disagree".

Regarding the **verbal language**, 32/32 (100%) of the *experts* considered the items satisfactory, classifying them as "strongly agree" or "agree". In the evaluation of the items related to **topic inclusion**, 46/48 (95.83%) of the items were evaluated with "strongly agree" or "agree" and 2/48 (4.17%) with "disagree".

Table 1 – Distribution of responses from *experts* (n=16), related to the validation of the *Script* and *Storyboard* of the video lesson with respect to the objectives, content, environment, verbal language, and topic inclusion. Ribeirão Preto/SP, 2018

Items	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know	
	N	%	N	%	N	%	N	%	N	%
Objectives										
The objectives are consistent with the practice in CPR	12	75.00	03	18.75	01	6.25				
The objectives are consistent with the objectives proposed in the research	12	75.00	03	18.75	01	6.25				
The objectives are suitable to be effective	11	68.75	04	25.00	01	6.25				
Content										
The content showed in the *script* corresponds to the objectives proposed	13	81.25	01	6.25	02	12.5				
The content facilitates the teaching-learning process in the topic	14	87.50	01	6.25	01	6.25				
The content enables the understanding of the theme	15	93.25	01	6.25						
The content follows a logical sequence	12	75.00	04	25.00						
The content incorporates all the necessary steps to perform CPR in the BLS with the use of AED by professionals in an in-hospital environment in an orderly manner	11	68.75	04	25.00	01	6.25				
The content has all the necessary materials for CPR in the BLS with the use of AED in an in-hospital environment	11	68.75	02	12.50	02	12.5			01	6.25
The list of information presented in the *script* is correct	13	81.25	01	6.25	02	12.5				
Relevance										
The images, scenes, and photos illustrate important aspects for the practice of CPR in the BLS with the use of AED by professionals in the in-hospital environment.	12	75.00	03	18.25					01	6.25
The images, scenes, and photos are relevant so that the CPR in the BLS with use of AED by professionals in the in-hospital environment is of high quality.	13	81.25	02	12.50					01	6.25
Images, scenes, and photos enable the transfer of the learned content to the professional practice.	12	75.00	02	12.50	01	6.25			01	6.25
Environment										
The scenario is suitable for transmission of the video lesson.	13	81.25	02	12.50			01	6.25		
The scenario is suitable for learning the topic.	14	87.50	01	6.25			01	6.25		
The verbal language used in the *script* is accessible to the target audience	14	87.50	02	12.50						
Verbal language is easy to assimilate	12	75.00	04	25.00						

Items	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know	
	N	%	N	%	N	%	N	%	N	%
Topic inclusion										
Objective of the video lesson.	12	75.00	03	18.75	01	6.25				
Concepts of CPA, CPR, and BLS.	12	75.00	04	25.00						
Steps in the Chain of Survival for the in-hospital environment.	12	75.00	04	25.00						
CPA/CPR registration.	13	81.25	02	12.50	01	6.25				

Source: Research data, 2018.

Table 2 – Inter-rater agreement measure (n=16), related to the validation of the *Script* and *Storyboard* of the video lesson regarding objectives, content, environment, verbal language, and topic inclusion. Ribeirão Preto/SP, 2018

Variables	AC1	EP _ AC1	p-value*
Objective	0.43	0.0359	0.0068
Content	0.60	0.0667	0.0001
Relevance	0.54	0.0405	0.0056
Environment	0.66	0.0672	0.0644
Verbal language	0.54	0.1710	0.1937
Topic inclusion	0.55	0.0227	0.0002
General	0.59	0.0255	<0.0001

Source: Research data, 2018.
* Significance level of 5% (p < 0.05)

In the analysis of agreement among the *experts* for validation of the video lesson, a "moderate agreement" was obtained in most of the questions, except in the environment, which obtained "considerable agreement" (AC1=0.66). The overall inter-rater agreement, including all items in the *script* and *storyboard* of the video lesson, is classified as "moderate agreement" with AC1=0.59 and p<0.0001.

The *experts* made notes on the evaluation process and the following modifications were made: replacement of the opening/closing song, title review, spelling and grammar check, adjustments in text distribution, presentation of the learning objectives, targeting of the audience, use of resuscitation plate (resuscitation board) for external chest compressions, use of "C and E Technique" for coupling the mask in the ventilation, adjustments in edition (to make more dynamic with resources – images, clippings, texts, and slides), and presentation of the video lesson focusing on non-verbal communication. All changes suggested were accepted as they were in line with the AHA guidelines[7]. In regard to the "don't know" evaluation, the *expertise* pointed out the need to view the finished video, after recording, to evaluate the item.

There was approximately five hours of rehearsal at the UEMG School Studio – Passos Unit, aiming at optimization of the time, organization of the recording dynamics, and familiarization with the recording environment. The adjustments were defined during the rehearsals, among them, the following stand out: adjustment of body posture and tone of voice. It was not necessary to memorize the text due to the use of *templates*. The scenes were filmed in October 2017 at the UEMG School Studio – Passos Unit, following the validated *script*, that is, after making adjustments identified in the evaluation stage by the *experts* and after the rehearsals, lasting approximately two hours.

For the background of the video lesson, an image was captured in Laboratory I of CSPE of EERP/USP; for the opening and closing music, after suggestions to change it in the validation process, a professional musician was called and the purpose and content of the video lesson was explained; he provided a musical arrangement, evaluated by the researchers as suitable. The image of the AED in the CSPE of the EERP/USP was captured for insertion at the moment when the equipment is used; a printed material of the CPA/CPR log sheet in the *In-hospital Utstein Style* template was structured for exhibition at the time of the exhibition of the topic.

Adobe Flash CS6 was used in the links of the AHA' Chain of Survival[7], which were individually separated to be presented during the video in the moments related to each link, as presented in the *storyboard*.

During the edition, five face-to-face meetings were held and there was an exchange of *emails* with the staff

of the SCMP of the EERP/USP for organization of images/scenes/photos and edition of the video lesson according to the validated *storyboard*. These stages took approximately 40 hours in the period from December 2017 to February 2018. The completed video lesson lasts for 17 minutes and 17 seconds and is available at: https://www.youtube.com/watch?v=MT4DJ5sazik&t=178s.

■ DISCUSSION

Providing the digital native with access to qualified pedagogical strategies through the use of technologies will contribute to the pleasure of discovery, investigation, curiosity and construction of knowledge, thus fulfilling the role of contemporary society by the use of technologies in a critical and conscious way[1]. Educational interventions using technologies can positively impact clinical skills, developing not only knowledge but also different skills, which promotes a meaningful learning[15]. The availability of differentiated resources for teaching can be an incentive for changes to active, attractive, and current models.

The use of technologies is a common tool in the teaching-learning process, so it is necessary to create specific strategies and actions for optimization and appropriate use, in order to raise an increasingly digital future and incorporate the possibility of improvements in patient care[16]; in this sense, this study produced a video lesson on adult CPR in the BLS with the use of AED in the hospital environment.

Learning using information available in *online* network offers accessibility, convenience, and flexibility, characterizing an alternative in the teaching-learning process[17]. The video lesson produced is available on a free-access digital platform, contributing to the access and use in teaching-learning on the subject addressed.

In health, technology increases the opportunities for projection, testing, and implementation of tools that enable preparation for decision making. Obviously, it is necessary to engage healthcare practitioners in the creation and use of new technologies for teaching and professional practice[18]. With the use of appropriate technological resources as a strategy in the teaching-learning process, it is possible to make knowledge dissemination productive and enjoyable[19].

It is worth emphasizing that, in educational processes related to Health Sciences, the use of educational technologies does not suppress the need for orientations and practices by a professor in a classroom[20]. The evidence of the use of technology through videos is strong and this teaching methodology is a promising direction, mediating educational practices in an attractive way[18].

Videos are increasingly used to improve the quality of education in contemporary conditions[4].

It is essential to teach adult CPR in the BLS with the use of AED in a contemporary, attractive, relevant, and convenient way, promoting changes in behavior through teaching sustained in updated scientific evidence. It is worth reiterating that the AHA encourages that, in order to ensure knowledge and skills in CPR, teaching must happen in a manner adapted to the target audience and in different categories[5].

CPR is a critical situation and consists of a set of actions that requires knowledge and skills, providing the victim with excellence to reverse CPA and eliminate sequelae caused by failures in the CPR, as, for this complexity, it is valid to use videos in the teaching-learning process of this subject. Despite advances in science regarding CPR, BLS remains a critical factor in determining outcome, and it is necessary to incorporate the recently published scientific evidence for CPR teaching in the BLS[6]. The video lesson produced is based on international guidelines and has a satisfactory inter-rater agreement, "moderate agreement" ($AC1=0.59$, $p<0.0001$).

Virtual objects represent a powerful tool for CPR training, especially for current generations, and by associating virtual objects with the traditional teaching model, they can achieve better learning outcomes in CPR[3]. The production of a video lesson on adult CPR in BLS with the use of AED in the hospital environment was structured to meet the current need for application of contemporary teaching strategies in this area. Through the object developed in this study it is possible to disseminate new teaching-learning possibilities on the theme discussed, and it may conduct teaching, research, and extension strategies in a contemporary and up-to-date manner.

■ FINAL CONSIDERATIONS

The need for this study is evidenced by the change in the population profile. The so-called digital natives are intimately related to technological resources, and the teaching-learning process can and should be adapted to this profile. Teaching and evaluation are still exaggeratedly applied by traditional methods.

During this study it was possible to observe the need to optimize the use of technology in the teaching-learning process, enabling the implementation of a qualified, feasible, and relevant process. It is essential to note the limitations of this study: delay in obtaining the acceptance or refusal responses to participate in the study, as well as the time it took for the instruments to be evaluated and

validated by the *experts*; the revalidation (test-retest) by the *experts* after the changes made through the accepted suggestions was not performed; the failure to validate the finished video lesson after editing.

The video lesson validated and produced in this study represents an important contemporary strategy suitable for use in the teaching-learning process on adult CPR in BLS with the use of AED in the hospital environment, based on international guidelines.

■ REFERENCES

1. Tezani TCR. Nativos digitais: considerações sobre os alunos contemporâneos e a possibilidade de se (re)pensar a prática pedagógica. Doxa: Rev Bras Psicol Educ. 2017;19(2):295-307. doi: https://doi.org/10.30715/rbpe.v19.n2.2017.10955.

2. Lee NJ, Chae SM, Kim H, Lee JH, Min HJ, Park DE. Mobile-based video learning outcomes in clinical nursing skill education: a randomized controlled trial. Comput Inform Nurs. 2016;34(1):8-16. doi: https://doi.org/10.1097/CIN.0000000000000183.

3. Semeraro F, Scapigliati A, Ristagno G, Luciani A, Gandolfi S, Lokey A, et al. Virtual reality for CPR training: how cool is that? dedicated to the "next generation". Resuscitation. 2017;121: e1-e2. doi: https://doi.org/10,1016/j.resuscitation.2017.09.024.

4. Forbes H, Oprescu FI, Downer TF, Nicole M, Philips NM, McTier L, et al. Use of videos to support teaching and learning of clinical skills in nursing education: a review. Nurse Educ Today. 2016; 42:53-6. doi: https://doi.org/10.1016/j.nedt.2016.04.010.

5. Greif R, Andrew SL, Conaghan P, Lipper A, De Vries W, Koenraad GM. European Resuscitation Concil Guidelines for Resuscitation 2015: section 10. Education and implementation of resuscitation. Resuscitation. 2015;95:288-301. doi: https://doi.org/10.106/j.resuscitation.2015.07.032.

6. Kleinman ME, Goldberger TR, Rea T, Swor RA, Bobrow BJ, Brennan EE, et al. 2017 American Heart Association focused update on adult basic life support and cardiopulmonary resuscitation quality. Circulation. 2018;137:e7-e13. doi: https://doi.org/10.1161/CIR.0000000000000539.

7. Alves MG. Objetos contemporâneos para ensino-apresendizagem da ressuscitação cardiopulmonar [dissertação]. Ribeirão Preto (SP): Programa de Pós- Graduação em Enfermagem Fundamental, Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo; 2018.

8. American Heart Association. Destaques da American Heart Assosciation: atualização das diretrizes de RCP e ACE. Dallas, TX: AHA; 2015 [cited 2018 Dec 20]. Available from: https://eccguidelines.heart.org/wp-content/uploads/2015/10/2015-AHA-Guidelines-Highlights-Portuguese.pdf.

9. Avansi PA, Meneghin P. Translation and adaptation of the In-Hospital Utstein style into the Portuguese language. Rev Esc Enferm USP. 2008;42(3):500-3. doi: https://doi.org/10.1590/S0080-62342008000300013.

10. Fehring JR. Methods to validate nursing diagnoses. Heart Lung. 1987;16(6 Pt1):625-9.

11. Fleming SE, Reynolds, J, Wallace B. Lights… camera… action! a guide for creating a DVD/video. Nurse Educ. 2009;34(3):118-21. doi: https://doi.org/10.1097/NNE.0b013e3181a0270e.

12. Ferreira MVF, Godoy S, Góes FSN, Rossini FP, Andrade D. Lights, camera and action in the implementation of central venous catheter dressing. Rev Latino-Am Enfermagem. 2015;23(6):1181-6. doi: https://doi.org/10.1590/0104-1169.0711.2664.

13. Gwet KL. Computing inter-rater reliability and its variance in the presence of high agreement. Br J Math Stat Psychol. 2008;61(1):29-48. doi:https://doi.org/10.1348/000711006X126600.

14. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977;33(1):159-74. doi: https://doi.org/10.2307/2529310.

15. Silveira MS, Cogo ALP. Contribuições das tecnologias educacionais digitais no ensino de habilidades de enfermagem: revisão integrativa. Rev Gaúcha Enferm. 2017;38(2):e66204. doi: https://doi.org/10.1590/1983-1447.2017.02.66204.

16. O'Connor S, Hubner U, Shaw T, Blake R, Ball M. Time for TIGER to ROAR! Technology Informatics guiding education reform. Nurse Educ Today. 2017 Nov;58:78-81. doi: https://doi.org/10.1016/j.nedt.2017.07.014.

17. Wu XV, Chan YS, Tan KHS, Wang W. A systematic review of online learning programs for nurse preceptors. Nurse Educ Today. 2018 Jan;60:11-22. doi: https://doi.org/10.1016/j.nedt.2017.09.010 .

18. Lima MB, Rebouças CBA, Castro RCMB, Cipriano MAB, Cardoso MVLML, Almeida PC. Construção e validação de vídeo educativo para orientação de pais de crianças em cateterismo intermitente limpo. Rev Esc Enferm USP. 2017;51:e03273. doi: https://doi.org/10.1590/s1980-220x2016005603273.

19. Silva AC, Bernardes A, Évora YDM, Dalri MCB, Silva AR, Sampaio CSJC. Desenvolvimento de ambiente virtual de aprendizagem para a capacitação em parada cardiorrespiratória. Rev Esc Enferm USP. 2016;50(6):990-7. doi: https://doi.org/10.1590/s0080-623420160000700016.

20. Gambo JM, Bahreman NT, Watties-Daniels D, Neal M, Swoboda SM. Can mobile technology enhance learning and change educational practice? ComputInform Nurs. 2017;35(8):375-80. doi: https://doi.org/10.1097/CIN.0000000000000380.

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