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Validation of educational video on covid-19 and severe acute respiratory syndromes prevention for students

Validação de vídeo educativo sobre prevenção contra covid-19 e síndromes respiratórias agudas graves para escolares

Validación de video educativo sobre prevención de la covid-19 y síndromes respiratorios agudos graves para alumnos

ABSTRACT

Objective: To describe the construction and validation of a playful educational technology for children on the prevention and control measures of COVID-19 and other Severe Acute Respiratory Syndromes (SARS). **Method:** Methodological study that enabled the development and validation of an educational technology with a playful approach, developed in four stages: collection of prior knowledge and bibliographic survey; creation of the educational video script; construction of the educational material; and validation of the technology by specialists and schoolchildren. **Results:** The technology was validated in terms of content by 14 judges, with a Content Validity Index (CVI) of 0.86%, and appearance by 25 schoolchildren, with a CVI of 0.93%. **Conclusion:** The video can be used as educational material by nursing professionals and nursery and elementary school teachers, with a view to linking education and health, as well as providing tools for health professionals working in schools.
Descriptors: Educational Technology; Health Education; School Nursing; Severe Acute Respiratory Syndrome.

RESUMO

Objetivo: Descrever a construção e validação de uma tecnologia educacional lúdica para crianças sobre as medidas de prevenção e controle da covid-19 e outras Síndromes Respiratórias Agudas Graves (SARS). **Método:** Estudo metodológico que possibilitou o desenvolvimento e validação de uma tecnologia educacional com abordagem lúdica, desenvolvido em quatro etapas: coleta de conhecimentos prévios e levantamento bibliográfico; criação do roteiro do vídeo educativo; construção do material educativo; e validação da tecnologia por especialistas e escolares. **Resultados:** A tecnologia foi validada quanto ao conteúdo por 14 juízes, com Índice de Validade de Conteúdo (IVC) de 0,86% e aparência por 25 escolares, com IVC de 0,93%. **Conclusão:** O vídeo pode ser utilizado como material educativo por profissionais de enfermagem e professores do ensino infantil e fundamental, visando à articulação entre educação e saúde, além de instrumentalizar os profissionais de saúde que atuam nas escolas.
Descritores: Tecnologia Educacional; Educação em Saúde; Serviços de Enfermagem Escolar; Síndrome Respiratória Aguda Grave.

RESUMEN

Objetivo: Describir la construcción y validación de una tecnología educativa lúdica para alumnos sobre medidas de prevención y control de la covid-19 y otros síndromes respiratorios agudos grave (SRAS). **Método:** Estudio metodológico que posibilitó el desarrollo y validación de una tecnología educativa con enfoque lúdico, desarrollado en cuatro etapas: recolección de conocimiento previo y levantamiento bibliográfico; elaboración de guion del video educativo; construcción del material educativo; y validación de la tecnología por especialistas y alumnos. **Resultados:** La tecnología en cuanto a contenido fue validada por 14 jueces, con un Índice de Validez de Contenido (IVC) del 0,86%, y en cuanto a apariencia 25 alumnos la evaluaron, con un IVC del 0,93%. **Conclusión:** El vídeo educativo puede ser utilizado como material didáctico por profesionales de enfermería y profesores de educación infantil y la primaria, con el fin de vincular educación y salud, así como proporcionar herramientas a los profesionales sanitarios que trabajan en las escuelas.
Descriptores: Tecnología Educacional; Educación en Salud; Servicios de Enfermería Escolar; Síndrome Respiratorio Agudo Grave.

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INTRODUCTION

Viruses, in general, are considered responsible for a significant proportion of acute respiratory infections and are one of the main factors in morbidity and mortality worldwide. These agents differ regarding their mode of infection and virulence since their taxonomy (order, family, and genus) defines the infection symptoms[1].

Historically, the coronavirus viral family has been affecting humans for decades, perhaps centuries, considering the documented reports of viral epidemics that ravaged prehistoric populations[2]. Currently, seven strains of coronavirus have been identified, two of which are responsible for the serious outbreaks of SARS-CoV, which triggers Severe Acute Respiratory Syndrome (SARS), and MERS-CoV, which causes Middle East Respiratory Syndrome (MERS), with pediatric, geriatric, and immunosuppressed populations at risk[2-5]. The emergence of the new strain of this viral family, SARS-CoV-2, with the consequent establishment of a COVID-19 pandemic, has raised questions about the role of epidemiological surveillance in the field of prevention, especially for those who had historically already been affected[6].

However, due to Decree No. 10.344 of May 11, 2020, which suspended school activities nationwide, it has become difficult for early childhood education professionals to address the issue of COVID-19 and Severe Acute Respiratory Syndromes (SARS) with children and guardians[7]. Thus, the importance of connecting health and education emerges, in line with the principles of the Unified Health System (SUS), referring to comprehensive and articulated care and the right to information, and with the School Health Program (PSE), focusing on integrating teachers and Primary Health Care (APS) nurses, to enable the dissemination of correct explanations about the COVID-19 pandemic, thus strengthening health education actions aimed at the school population[8,9].

It is worth considering that the intended audience may find it easier to relate the information they have learned to their everyday experiences. To achieve this, applying practical and reflective tools can facilitate communication that integrates affective, motivational, and supportive elements in teaching and learning environments[10].

To effectively correlate health education actions, ludic educational technologies can be used to achieve objectives related to cognition, affection, socialization, motivation, and creativity[11]. Playfulness can help bridge the gap between children's language and their learning context, leading to contextualized teaching that enhances and values their imagination, creativity, and curiosity[12].

Moreover, educational technologies have become highly relevant tools in health education since their use triggers changes in health behaviors[13]. However, for this technology to be viable, especially for children, it is necessary to recognize the child's social behavior and the environment in which they live for the construction of the educational technology not to ignore the belonging recognition and the interpersonal relationships of the target audience[14].

To provide accurate and accessible information on caring for children during the pandemic, a ludic educational video has been created, aiming to guide the target audience on the necessary precautions that should be taken when dealing with COVID-19 and other Severe Acute Respiratory Syndromes (SARS). This study focuses on developing and validating this educational technology to help children learn how to prevent and control COVID-19 and other SARS.

METHOD

This methodological study was conducted in August 2020 at a municipal school located in the southwestern region of Recife, PE. The study aimed to create educational technology using a method developed by Falkembach[15], which

focuses on a constructionist approach to learning. According to this approach, the student is at the center of the learning process, which involves four stages: analysis and planning, modeling, implementation, and validation.

To select participants for the study, some criteria were established. The candidates had to be registered in the Recife municipal school system and attend classes remotely, besides being aged between six and twelve. Nonetheless, individuals with physical, emotional, or cognitive disorders, as confirmed by a medical diagnosis from the management team, did not participate in the study.

Adhering to Freire's approach[16], which respects the general public's knowledge and their connection to the topic, a survey was conducted during the analysis and planning phase[15], This involved gathering the children's practical knowledge and concerns about the subject. However, due to the pandemic, this phase of the study took place remotely through the platform Virtual Unit of Distance Learning Courses of the Department of Education of the City of Recife (UniRec), implemented in 2015 and institutionalized in January 2018 by Decree No. 31,129[17], which subsidized the curricular didactic activities during the period of social distancing, by providing chips with internet access.

Still, to provide a scientific basis to build up the educational technology, a search regarding topics to be covered in the video, in addition to those previously discussed with the target audience. The additional subjects were defined based on a bibliographic survey carried out in the LILACS, MEDLINE, and PubMed databases, using the following guiding questions: what do the publications indicate about Severe Acute Respiratory Syndromes and COVID-19? What are the most common risk factors and consequences described in the literature? And what are the strategies described for preventing Severe Acute Respiratory Syndromes?

The search system used the following terms from the Descriptors in Health Science/Medical Subject Heading (DeCS/MeSH) databases: "COVID-19," "Severe Acute Respiratory Syndrome", "Risk Factors," "Control of Communicable Diseases." The "COVID-19" term was used as a controlled descriptor associated with the Boolean operator "AND" to the already mentioned descriptors. There was no delimitation of time and period for the selection of publications.

In the modeling stage[15], the design used to develop the educational technology was planned. The choice to include digital animations in the video considered the target audience's age since animations are more appealing, allowing for an aesthetic improvement of the drawings and offering multisensory and multidimensional support, thus providing greater participation[18]. The development of the storyline (educational video script) followed the recommendations to build up audiovisual materials, which aimed to facilitate the development of educational videos, proposing three phases: a simple script - containing text to be spoken, lettering, and suggested scenes[19].

In the third stage, which corresponds to implementation[15], the technology was developed, including its crucial characteristics, such as texts, images, animations, and videos, based on the target audience, to show the possibility of autonomy and protagonism. To do this, the free Powtoon animated creation tool was used. With this program, animated characters, texts, and images were added, creating ludic educational technology.

The fourth stage consisted of evaluating and validating the content and visual aspect of the educational video[15], which was freely available to the participants, enabling the necessary adjustments to improve the technology. Regarding the validation of content and appearance by judges/experts, the Educational Content Validity Index (ECVI) was used to assess the proportion of agreement on specific aspects of the instrument and its items. The evaluation of the instruments followed twelve criteria, divided into three groups: clarity, structure/

organization, and relevance of both texts and images. Accordingly, the judges were instructed to analyze whether the language adopted was appropriate for the target audience[20].

The instrument used a Likert-type scale with a score of 0 to 2, where 0 was considered "irrelevant," 1 - "partially relevant," and 2 - "very relevant." Items scored 0 and 1 were revised or eliminated. Judges were selected through a survey on the Lattes platform and the Snowball technique, i.e., the initial members of the sample were asked to indicate other members who met the inclusion criteria[21]. Professionals who met the following criteria were considered experts: recent knowledge and scientific production on themes such as health education or educational technology with children. The number of experts who participated in the study was determined by convenience; however, according to the framework adopted, the number could not be inferior to six participants[20]. The invitation to the judges was sent via e-mail containing the invitation letter, the "Termo de Consentimento Livre e Esclarecido (TCLE)" – an Informed Consent Form (ICF), and the Google Forms link to access the questionnaire.

The ECVI adapted to evaluate the appearance of educational technology was used to validate it with the students[22]. In this way, the instrument was divided into four sections relating to the organization, writing style, appearance, and motivation, using a Likert scale with a score of 1 to 3, where 1 - represents "totally disagree," 2 - "partially agree," and 3 - "totally agree," with the answer options represented by emoticons, i.e., graphic representations of faces with emotions.

The sample at this phase consisted of 25 schoolchildren selected for convenience. The appearance validation was conducted personally by watching the educational video in a group in a private room, followed by the application of the validation instrument, which was filled in by the students under the prior guidance of the researchers.

After collecting the data from the evaluations of the educational technology appearance and content, it was double-entered to consolidate a reliable database, using the Epi Info 3.5.4 program as a tool, which was then exported for analysis using the PSPP 1.6.2 software. The validity of the proposed data was evaluated using the Content Validity Index (CVI), which measures the agreement of the judges/target audience as to the representativeness of the items concerning the content under study[23]. In addition, the binomial test (p-value) was applied to check the adequacy significance compared to the minimum value determined by the literature (0.80) as satisfactory, considering a significance level of 0.05 since the p-value is an indicator that varies between less than 0.05 and higher than 0.05 - this means that the closer the p-value is to 0.05, there is no reason to discard the evaluated item[24].

To take part in the research, the judges and the student's parents or guardians signed the TCLE, and the children also signed the Termo de Assentimento Livre e Esclarecido (Tale) - another Informed Consent Form. The research was conducted according to aspects contained in Resolution 466 of 2012 of the National Health Council of the Ministry of Health, with the consent of the Research Ethics Committee of the Federal University of Pernambuco (CEP - UFPE/CCS), under CAAE number: 34362820.0.0000.5208 and opinion number: 4.173.554/ 2020.

RESULTS

During the analysis and planning stage, the searching for studies to support the topics for educational video, 15 articles published between 2018 and 2020 were found. After reading them in full, the elements relevant to the COVID-19 educational approach were identified. The researchers indicate that the main risk factors are associated with sociodemographic and ethnic conditions and other pathologies related to the infection. Concerning the principal forms

of prevention, the studies highlight vaccination coverage, the use of masks, and social distancing measures.

In addition, the subject content covered was also analyzed using prior knowledge (Table 1). To do this, a focus group was set up using UniRec with 15 eligible children, but only six completed this stage due to unstable connections or noise in the family environment.

Table 1 – Summary of the qualitative analysis of the students' prior knowledge. Recife 2020

	School children's knowledge about
Concept of COVID -19 and SARS-CoV-2	The participants had doubts about the conceptualization of the COVID-19 disease and the SARS-CoV-2 virus.
Sanitary measures	*"Sanitizing the whole environment (...)".* ***Participant 2, 11 years old*** *"I think sanitary measures mean cleanliness (...)".* ***Participant 4, 11 years old*** *"(...) warning people to take care of themselves".* ***Participant 6, 12 years old***
Resumption of face-to-face classes	*"Great, because I wanted to go back to school (...)"* ***Participant 2, 11 years old*** *"(...) I get scared (...) because of the deaths."* ***Participant 3, 11 years old*** *"My family and I feel happy (...) to be able to come back."* ***Participant 4, 11 years old*** *"My parents said they wouldn't let me go back (...) without a vaccine."* ***Participant 5, 12 years old*** *"I myself feel very happy, because the online class is very bad, because the internet goes down, the cell phone discharges, then the cell phone crashes and then it goes down, it's horrible."* ***Participant 6, 12 years old***

Source: Elaborated by the authors.

In this way, the covered content in the educational technology was outlined in terms of the historical context of the coronavirus viral family, how the disease is transmitted and manifests itself, and how it can be controlled through health measures. In addition, the importance of vaccination and the necessary precautions for returning to school were discussed.

In the validation stage, the questionnaire was sent to 30 judges; however, only 14 answered the whole instrument. The group was composed of nurses, dentists, designers, and biomedical professionals, eight of whom had postgraduate degrees and all of whom had experience in building and validating educational technologies.

The judges considered the material adequate, suggesting minor audiovisual changes regarding the text synchronization and audio volume. As for changes to the content, the judges indicated that the vaccine information should be added since the vaccination campaign against COVID-19 began in 2021 and that the need for social distancing measures should be emphasized, even when vaccinated, given that the vaccines produced against the virus do not prevent infection, but rather the development of graver symptoms. The total content analysis, as a whole, showed covered items relevant and easy for children to understand. Table 2 shows a summary of the experts' suggestions, all of which were accepted for the final production of the educational video, regarding the judges' expertise and the aim of making the material more appropriate.

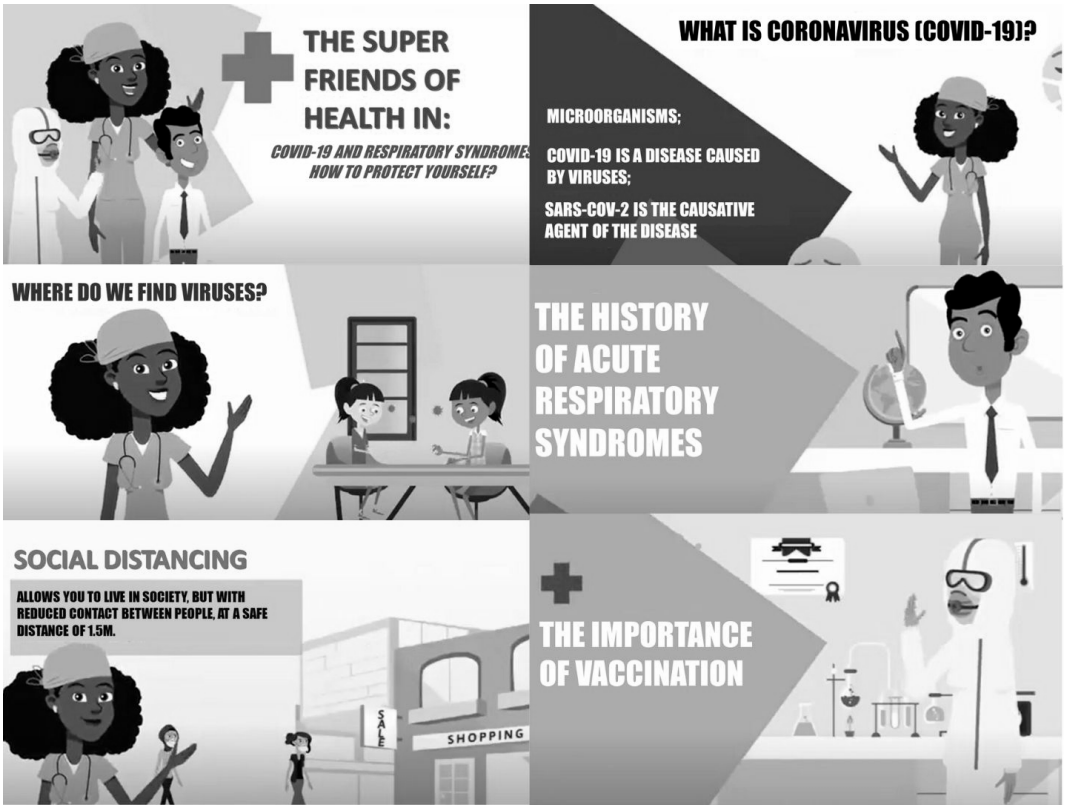
Table 2 – Summary of the qualitative analysis of the changes suggested by the judges

	Judges' suggestions
Regarding the objectives	Replace the adult characters with children; Add information about SARS in the children's scene.
Regarding structure and presentation	Revise the Portuguese of the subtitles; Improve the synchrony between the subtitles and speech; Increase the audio volume; Review vocabulary; Make content changes regarding the vaccination; Emphasize distancing measures even when immunized; Connect the scenario with what the character is saying.

Source: Elaborated by the authors.

After the modeling and implementation stage, the final version of the educational video entitled "The Superfriends of Health: COVID-19 and Respiratory Syndromes" lasted six minutes and 21 seconds, featuring the participation of pivotal characters such as a nurse, a teacher, and a scientist, playing a leading role aimed at children. Figure 1 shows the final description of the video's development, depicted by some screenshots.

Figure 1 – Screenshots of the educational video presented to judges and schoolchildren. Recife, 2020



Source: Elaborated by the authors.

The content of the educational video was validated with an ECVI of 0.86% (Table 3). This value is higher than the 0.80 stipulated by the literature to validate educational technologies, thus guaranteeing the scientific quality of the material and the possibility of using it with schoolchildren. This index made it possible to infer the judges' total agreement on the different aspects of the material and analyze each instrument item individually, making it possible to see which ones should be altered for better suitability.

Table 3 – Distribution of the content validation index (CVI) by blocks and total of the educational video on measures to prevent and control COVID-19 and other respiratory syndromes. Recife, 2020

Items	Content validation index
Block 1: objectives	0.82
Block 2: structure and presentation	0.85
Block 3: relevance	0.91
TOTAL CVI	**0.86**

Source: Elaborated by the authors.

When it came to validating the appearance with the schoolchildren, 25 children met the inclusion criteria. The validation took place face-to-face and to the audience was read the Tale and the instrument used for validation. After this, the 25 schoolchildren answered the instrument completely. Of these, 13 were under the age of 12, the majority (16) were male, all from Pernambuco. In order to get the children to take part in the study, it was necessary to contact their respective guardians. This contact was made possible by the secretary of the municipal school where the study was carried out, who signed an informed consent form so that the children's answers could be recorded.

The material was validated in terms of appearance with an ECVI of 0.93% (Table 4), which was higher than the value stipulated by the researchers for validating the educational video (0.80). It should be noted that, at the end of the evaluation, the students expressed their praise for the children's avatars, demonstrating their protagonism concerning the subject, and were also satisfied with the different ethnicities represented in the video.

Table 4 – Agreement of the target audience concerning the item appearances evaluated in the educational video. Recife, 2020

Items evaluated by the target audience	Judgment							
	Partially agree		Totally agree		Totally disagree			
	n	%	n	%	n	%	I-CVI*	P-value †
ORGANIZATION								
The beginning of the video caught your attention about the topic	8	32	14	56	3	12	0.88	0.234
You agree with the video length	4	17	19	80	2	8	0.92	0.098
WRITING STYLE								
The type, color and size of the subtitles facilitate your understanding	8	32	15	60	2	8	0.92	0.098
The characters in the video spoke in a way that you could understand	2	8	23	92	-	-	1.00	0.004
APPEARANCE								
The settings, colors and characters in the video are attractive	6	24	16	64	3	12	0.88	0.234
MOTIVATION								
The way the scenes were presented motivates you to keep watching	8	32	17	68	-	-	1.00	0.004
The video helped you learn how to prevent COVID-19 and other Severe Acute Respiratory Syndromes	6	24	18	72	1	4	0.96	0.027

***Content validity index.**

†p-value of binomial test (H:p≥0,80 x H1:p<0,80).

Source: Elaborated by the authors.

DISCUSSION

Methodological studies deal with developing, validating, and evaluating tools[21]. In this context, it is implied that the process of construction and validation derives from achieving quality to legitimate and credit the foreseen results[25].

The study made it possible to develop an educational video on COVID-19 and other SARS by encouraging children to assume the lead in defining the content and characters and making up the video's ludic language, ensuring that the educational tool is more appropriate for the target audience. Educational videos allow knowledge to be learned and health awareness to be developed, as well as being a resource that influences children's involvement in the subject[26].

Building up the educational video stimulated creativity, minimizing the emotional tension caused by concerns and insecurity about the subject. Schoolchildren's participation in the development of educational materials brings students closer together and makes an active contribution, allowing them to assimilate the knowledge[27]. However, to be effective, the technology needs to have an accessible and attractive language to the target audience to make them protagonists and facilitators in health.

Faced with the reality of social distancing and isolation caused by the COVID-19 pandemic, we can think of the internet as one of the spaces to ensure health promotion for children and adolescents. Thus, using Information and Communication Technologies (ICT), it was possible to reinforce the association between health and education and disseminate safe information on the subject, as the video content allowed the target public to get involved to interpret and engage with it[28].

The involvement of schoolchildren in producing the video ensured that curricular knowledge was linked to the emergency demand for health care to deal with the pandemic. It is known that the school environment should contribute to citizen education by fostering the child's growth and development. In this way, the intersectoral articulation involving education and health, with the use of ICT, enables the creation of a virtual or physical space for health promotion. In addition, bringing schoolchildren closer to ICT is a growing trend in recent years, which justifies using the new teaching-learning strategies by education professionals[29].

The judges' participation helped add pertinent and detailed ideas, which were considered when improving the final version of the educational video. Besides, the children's evaluation - being the target audience, consolidated the link between scientific knowledge and the easier assimilation of the technology produced[30].

The use of ICT in healthcare is considered a scientific tool contributing to the validation of care practices and helping in the dynamics of health teaching. In this context, nursing is one of the health professions that most often takes on the role of coordinator with the school team in promoting the health of children and adolescents by considering health education actions and ICT applications that foster the integral development of this population group in a contextual connection between family and community[13].

Therefore, the design, development, and use of digital technologies, such as educational videos, enables nurses, in partnership with the management team, to share knowledge, promote discussions and debates, clarify doubts, and encourage the participation of the public involved in preventing and promoting health[15,28].

CONCLUSION

This study showed the relevance of creating and validating educational ludic technologies

as instruments to help raise awareness among children concerning measures to prevent and control Severe Acute Respiratory Syndromes (SARS) - including COVID-19, since the tool fulfilled its role of epidemiological surveillance concerning prevention (made available free of charge to managers and schoolchildren via the link: https://www.youtube.com/watch?v=zP3euSKdSGQ).

Moreover, it is noteworthy that the video achieved excellent metrics in the content and appearance validation process, reassuring that this audiovisual resource has an easy-to-understand language, allowing safe information to be shared and distributed appropriately to stimulate changes in health behaviors. Besides, this technology can be used by nurses and preschool and elementary school teachers to promote health education strategies in line with the PSE (Health at School Program).

The study's principal limitation was the social restrictions imposed by the COVID-19 pandemic, which made it impossible to have a larger sample of judges and impacted data collection in the target audience. In addition, there is a gap in the literature concerning the validation of educational videos on the subject, restricting a more specific and comparative discussion of the findings.

The production of this educational video can support future research that longitudinally monitors schoolchildren's knowledge and health thinking about Severe Acute Respiratory Syndromes, as well as other innovative practices for preventing infectious respiratory diseases.

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