

Validation of an educational game about first aid for schoolchildren

Validação de jogo educativo sobre primeiros socorros para crianças escolares

Validación de un juego educativo sobre primeros auxilios para escolares

Bárbara Duarte Dutra¹

ORCID: 0000-0001-6971-6283

Keyla Cristiane do Nascimento¹

ORCID: 0000-0003-4157-2809

Maria Elena Echevarría-Guanilo¹

ORCID: 0000-0003-0505-9258

Valéria de Cássia Sparapani¹

ORCID: 0000-0001-8125-8967

Gabriela Marcellino de Melo Lanzoni¹

ORCID: 0000-0001-5935-8849

¹Universidade Federal de Santa Catarina. Florianópolis,
Santa Catarina, Brazil.

How to cite this article:

Dutra BD, Nascimento KC, Echevarría-Guanilo ME,
Sparapani VC, Lanzoni GMM. Validation of an
educational game about first aid for schoolchildren.
Rev Bras Enferm. 2021;74(6):e20201107.
<https://doi.org/10.1590/0034-7167-2020-1107>

Corresponding author:

Keyla Cristiane do Nascimento
E-mail: keyla.n@ufsc.br



EDITOR IN CHIEF: Antonio José de Almeida Filho
ASSOCIATE EDITOR: Alexandre Balsanelli

Submission: 10-27-2020 **Approval:** 01-27-2021

ABSTRACT

Objectives: to validate the content and appearance of an educational game about first aid for schoolchildren with experts in education and health. **Methods:** this is a methodological, quantitative and descriptive research, carried out using the Delphi technique, using an online collection instrument, covering 55 items of the game. Content and appearance assessment was performed by 26 judges. The data were analyzed using Content Validity index. **Results:** the final prototype is presented in a board format, composed of four buildable pawns and 117 cards between questions, alerts and challenges. Overall Content Validity index of 0.95 and greater than 0.8 was obtained for all items in two Delphi rounds. **Conclusions:** the educational game validated by experts is a pedagogical tool for teaching first aid to schoolchildren as an option to traditional educational practices.

Descriptors: Validation Study; Play and Playthings; First Aid; Child; Nursing.

RESUMO

Objetivos: validar o conteúdo e a aparência do jogo educativo sobre primeiros socorros para crianças em idade escolar com *experts* da área da educação e saúde. **Métodos:** pesquisa metodológica, quantitativa descritiva, realizada por meio da técnica Delphi a partir de instrumento de coleta *online*, contemplando 55 itens do jogo. A avaliação do conteúdo e aparência foi realizada por 26 juízes. Os dados foram analisados a partir do Índice de Validação de Conteúdo. **Resultados:** o protótipo final do jogo apresenta-se em formato de tabuleiro, composto por quatro peões montáveis e 117 cartas entre perguntas, alertas e desafios. Obteve-se Índice de Validação de Conteúdo geral de 0,95 e superior a 0,8 em todos os itens, em duas rodadas Delphi. **Conclusões:** o jogo educativo validado pelos *experts* é uma ferramenta pedagógica para o ensino de primeiros socorros com crianças escolares como opção às práticas educativas tradicionais.

Descritores: Estudo de Validação; Jogos e Brinquedos; Primeiros Socorros; Criança; Enfermagem.

RESUMEN

Objetivos: validar el contenido y apariencia del juego educativo de primeros auxilios para niños en edad escolar con expertos en el campo de la educación y la salud. **Métodos:** investigación metodológica, cuantitativa y descriptiva, realizada mediante la técnica Delphi utilizando un instrumento de recolección en línea, cubriendo 55 ítems del juego. La evaluación de contenido y apariencia fue realizada por 26 jueces. Los datos se analizaron mediante el índice de validación de contenido. **Resultados:** el prototipo final del juego se presenta en formato de tablero, compuesto por cuatro peones ensamblables y 117 cartas que incluyen preguntas, alertas y desafíos. Se obtuvo un índice de validación de contenido general de 0,95 y superior a 0,8 para todos los ítems, en dos rondas Delphi. **Conclusiones:** el juego educativo validado por los expertos es una herramienta pedagógica para la enseñanza de primeros auxilios a escolares como opción a las prácticas educativas tradicionales.

Descritores: Estudio de Validación; Juego e Implementos de Juego; Primeros Auxilios; Niño; Enfermería.

INTRODUCTION

First aid measures are immediate measures provided immediately to people affected by sudden illness or accident, who are at risk of death⁽¹⁾. It is an initial service that can be performed by any individual, lay or not, until the arrival of a specialized service, aiming to provide well-being, in addition to avoiding possible worsening of people's living conditions⁽¹⁻²⁾. Therefore, basic knowledge about how to act in these situations is essential for everyone, even if they are not a health professional.

Health complications are frequent in the school environment, considering the length of time children stay in schools and exposure to recreational activities. In this phase of child development, children are continuously looking for new experiences, being exposed to accidents such as falls, injuries, bruises, drowning, and burns. The school represents a relevant space for contributing to implementing accident prevention actions and providing first aid⁽²⁾.

Nursing occupies a strategic position for health education about first aid at school because it is inserted in emergency services. Moreover, it works in programs such as Health at School, which deals with school health promotion and in projects such as SAMU in Schools and *Samuzinho*⁽¹⁾. Therefore, studies referring to educational technologies on first aid are relevant for nursing since they can contribute to educational interventions carried out by this professional category at school.

Educational games, while educational technologies, are based on an interactive process that implies the acquisition of knowledge, the development of cognitive and affective skills, favoring the exchange of experiences and information, making it possible to experience mutual respect⁽³⁻⁴⁾. These have been consolidated as an important resource in health guidance.

The use of educational games represents an important strategy in health education, which can cause changes in attitude and behavior in those who use it. The development of teaching-learning methodology through educational technology, in the form of a board game, focus of this study, is a strategy that fosters motivation, curiosity and interest in learning. This type of game allows children to develop their ability to think, reflect, understand, raise hypotheses and assess them with autonomy and cooperation⁽⁴⁾.

Therefore, it is believed that teaching first aid can be made available and addressed with schoolchildren through games. However, for effective learning about first aid, in which children will be able to act with greater safety in the event of an emergency situation⁽⁵⁾, it is understood that the game content and appearance validation is essential.

In this way, validating the game appearance, clarity and relevance of content is sought. Based on an analysis of experts in the field, we seek to determine whether the game content effectively explores the requirements for measuring what we want to investigate⁽⁶⁾. In this context, the validation process indicates the game reliability, supporting such technology for its use during educational practices.

OBJECTIVE

To validate the content and appearance of an educational game about first aid for schoolchildren with experts in education and health.

METHODS

Ethical aspects

The study respected the formal requirements contained in the national and international regulatory standards for research involving human beings. It was approved by the Research Ethics Committee of *Universidade Federal de Santa Catarina*. The images used in the game (board and cards) were taken from stock images considered royalty free after acquisition as Google Images and Freepik, paying attention to their copyright issue.

Study design, period, and place

This is a methodological, quantitative, descriptive study, guided by the GREET tool⁽⁷⁾. It was aimed at validating an educational technology, in a board game format, produced based on first aid. It was held in 2019 in Santa Catarina.

The methodological trajectory was organized in three stages: board game prototype creation; game content validation and appearance by judges according to the Delphi technique; educational game production (Figure 1).

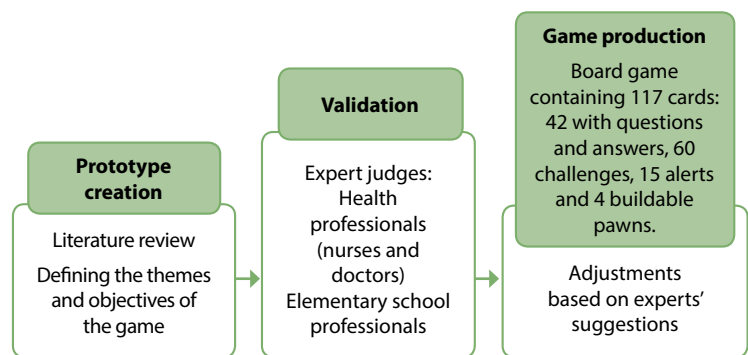


Figure 1 - Educational game development process stages

Sample, and inclusion and exclusion criteria

To validate the instrument content, experts/judges were selected for convenience; as a judge was identified and met the inclusion criteria, he/she was asked to suggest other names with ideal characteristics for the research objective. Snowball sampling was used, which consists of using chains of references for recruiting participants, based on indications of participants. The selection strategy of judges, in March 2019, was based on the inclusion criteria.

Two groups of experts/judges participated. The inclusion criteria for experts/judges were: 1st sample group – being an elementary school educator, with a minimum experience of one

year in teaching the initial grades and having experience with educational materials. 2nd sample group - being a doctor or nurse, with teaching or assistance experience in pediatric emergency, having a master's and/or doctoral degree in the area of interest of the study, and having at least one year of experience in direct care for pediatric patients. Experts/judges who did not confirm participation or did not return the validation questionnaire completed in the proposed period were excluded.

The number of judges was defined based on the sample calculation performed with the formula for known or finite population: $n = p(1-p) Z^2 N / \epsilon^2 (N-1) + Z^2 p(1-p)$. Thus, n is the sample size; p is the expected proportion that was 50%; Z is the value for the 95% confidence level; ϵ is the margin of error defined as 19%; N is the sample population in which were Brazilian health professionals (nurses and/or doctors) and elementary school teachers⁽⁸⁾. The calculation resulted in a sample value of 26 judges.

Fifty-eight professionals (nine doctors, 16 nurses and 33 elementary school teachers) were contacted via email, through a formal contact regarding the objectives, purpose and development of the study, in addition to requesting consent by signing an Informed Consent Form. In the first Delphi round, 43 judges agreed to participate in the research, with six doctors, 13 nurses and 24 elementary school teachers. However, the convenience sample consisted of twenty-six experts/judges who sent their opinion within the established period of thirty days. The validation sample group was composed of 26 judges, 13 of whom were health professionals (nurses/doctors), specialists in pediatrics, and 13 elementary school teachers.

Study protocol

To select the content of first aid to be addressed, literature searches were carried out using the LILACS, Scielo and PubMed databases on topics related to childhood accidents and first aid for children, published in the last five years, for support the game content. In this regard, based on literature, six themes on first aid were chosen to be addressed: traffic accidents (including activation of emergency services), drowning, falls, burns, suffocation, and intoxication.

After selecting the content, the target audience's age group was defined, in addition to the type, format and elements of the game, its rules, and the way in which first aid would be addressed, for instance, using cards with questions and answers. Then, the game layout was assembled.

In the development stage, the game was called *Vidas em Jogo* (Lives at Stake), targeting schoolchildren aged at least nine years, considering autonomy, socialization and the ability to read and understand written and oral languages (Figure 2). The initial prototype was created in the shape of a rectangular board, sized 67 cm by 29.7 cm, composed of 54 squares, in which players pass according to the sequence determined by the drawing. It consisted of four buildable pawns, rules of the game and 154 cards, distributed in three sets: question cards on the topics, distributed at random and can be opened or with alternatives; alert cards, with messages that alert a mistake or a hit on the topics of first aid; challenge cards that indicate a challenge to be performed by players (cognitive ability).

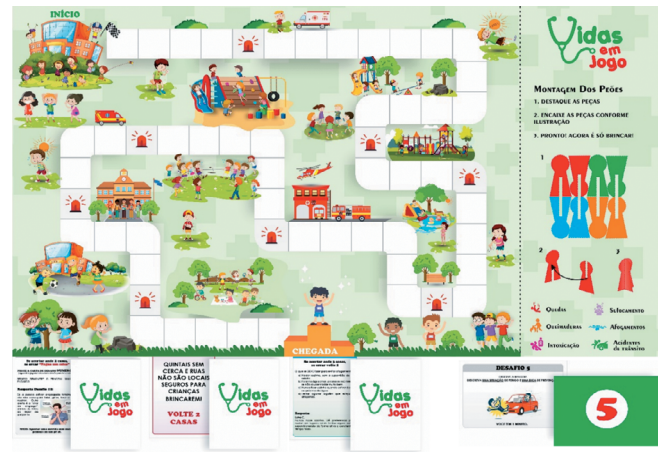


Figure 2 – Initial prototype of *Vidas em Jogo* on first aid

To validate the educational game, a specific data collection instrument was developed, composed of two parts, the first referring to the professional characterization of subjects, and the second was composed of four categories related to the educational technology's objective: (A) validation game rules (15 items); (B) game design validation (4 items); (C) game cards validation (12 items); (D) game relevance and satisfaction (24 items). Thus, the validation instrument was composed of 55 assessed items.

The initial contact with the potential experts/judges took place through an invitation card sent electronically, with information about the study. For those who agreed to collaborate, the data collection instrument was sent using Google Forms[®]. The judges assessed the instrument items using a Likert-type scale, with categories in five levels of importance and the selection of a single answer for each variable: totally disagree (one), partially disagree (two), neither agree nor disagree (three), partially agree (four), and totally agree (five). A space for suggestions and considerations was made available in an observation column for each assessed item. This process was carried out using the Delphi technique⁽⁹⁾, which consists of collecting data, tabulating and assessing a specific topic through the judgment of experts on the subject.

The first Delphi round analysis generated changes and refinement in the educational game; thus, the data collection instrument content, composed of eight items, was reformulated for the second round. The instrument, contemplating the modifications of the game, was sent to the same group of experts/judges, with a deadline of twenty days for return. In this way, eighteen experts/judges who returned the assessed instrument within the given period took part of this stage. At this stage, the experts were again able to present suggestions and observations relevant to improving the game.

At the end of two rounds of validation, the board game now consists of 117 cards: 42 question cards - six for each first aid theme, 60 challenge cards and 15 alert cards. Thus, 37 cards were excluded to reduce the number considered in excess by the judges.

Analysis of results, and statistics

The results of each round were digitized in an Excel spreadsheet, in order to obtain the Content Validity index (CVI). CVI measures the

percentage of agreement among judges on an instrument and the representativeness of its items. Initially, it allows to analyze each item individually and later the instrument as a whole⁽¹⁰⁾. The sums of agreement of items marked 4 or 5 by judges were used, and the Content Validity of Individual Items (I-CVI), divided by the number of experts/judges, was calculated. The Content Validity Index Average (S-CVI/Ave) was used for all I-CVI indexes, obtaining a general CVI⁽¹⁰⁾. A consensus of 80% (0.8) or more between judges' assessments was considered valid. Items with values below 80% (0.8) were adjusted based on experts' suggestions and forwarded to the second Delphi round.

RESULTS

In the first round of validation, the sample of experts/judges was composed of 26 professionals, 12 (46.15%) of whom were between 30 and 40 years old, mostly female (80.77%), with time with an average education of 12.38 years, 22 (84.62%) from southern and four (15.38%) from southeastern Brazil. As for professional degree, there are 13 specialists (50%), 6 masters (23.08%), 3 doctors (11.54%), and 4 graduates (15.38%). Regarding professional activity, 13 judges (50%) worked in assistance, being 9 (34.62%) nurses and 4 (15.38%) doctors, with experience in pediatrics and an average time of 14.82 years, and 13 (50%) were elementary school teachers, with an average experience time of 13.98 years.

Regarding the variables related to the study in the first Delphi round, the judges assessed the instrument consisting of 55 items and four categories: (A) game rules validation; (B) game design validation; (C) validation game cards; (D) game relevance and satisfaction (Table 1). The results show the Content Validity Index of Individual Items (I-CVI) greater than 0.80 in 47 items.

Table 1 - Agreement percentage, validity index, average score and standard deviation of educational game items in the first Delphi round, Florianópolis, Santa Catarina, Brazil, 2019

ASSESSED ITEMS	Agreement percentage		I-CVI
	Group 1*	Group 2**	
(A) GAME RULES VALIDATION			
1. Age and number of participants are consistent	9	11	0.77
2. The number of cards is adequate	8	10	0.69
3. Introduction is clear and easy to understand	12	9	0.81
4. The game's objective is clear and consistent	11	8	0.73
5. Card categories are clear and objective	12	9	0.81
6. Card categories are consistent and appropriate	12	12	0.92
7. Preparation is clear and objective	12	13	0.96
8. Preparation is easy to understand and consistent	11	12	0.88
9. The game rules have important steps	11	10	0.81
10. The game rules show clarity and objectivity	11	10	0.81
11. The rules are easy to understand and consistent	11	11	0.85
12. Extra cards are exposed clearly and objectively	11	12	0.88
13. There is an attraction in the existence of these cards	13	13	1.00
14. The form of closure is clear and consistent	12	12	0.92
15. The rules are in accordance with the game's purpose	12	13	0.96
(B) GAME DESIGN VALIDATION			
1. Title and content size in the topics is adequate	11	9	0.77
2. Design is attractive (interface like cards or boards)	10	9	0.69
3. Images are capable of drawing the attention of children	13	12	0.96
4. Images are clear enough	13	13	1.00
(C) GAME CARDS VALIDATION			
QUESTIONS AND ALERTS			
1. Card look is appropriate	13	11	0.92
2. Card content is clear and objective	11	10	0.81
3. Questions are easy to understand	09	10	0.73
4. Language is compatible with the level of knowledge	10	8	0.69
5. Language is adequate and accessible	10	10	0.77
6. Language verses with interaction/involvement	11	10	0.81
CHALLENGES			
1. Card look is appropriate	13	11	0.92
2. Card content is clear and objective	13	12	0.88
3. Questions are easy to understand	11	11	0.85
4. Language is compatible with the level of knowledge	12	10	0.85
5. Language is adequate and accessible	12	10	0.85
6. Language verses with interaction/involvement	11	11	0.85
(D) GAME RELEVANCE AND SATISFACTION			
OBJECTIVES			
1. Content is relevant to the teaching of first aid	12	13	0.96
2. The information presented in the game is consistent	12	11	0.88
3. Enables clarification of doubts	12	13	0.96
4. Favors reflection on the theme	12	13	0.96
5. Influences adoption of new behaviors	12	12	0.92
STRUCTURE AND PRESENTATION			
6. The game is stimulating for children	12	10	0.85
7. The game offers situations or variations of activities, making it dynamic or attractive	12	13	0.96
8. The game features key aspects that are reinforced with children	12	13	0.96
9. Questions relate to the topic of learning	12	13	0.96
10. Content is adequate for schoolchildren	11	11	0.85
11. Contents are presented clearly and objectively	10	12	0.85
12. Contents are arranged completely and comprehensively	12	12	0.92
13. Contents accurately reach the approach to the themes	12	12	0.92
14. Variation in the presentation of content helps to maintain attention	12	12	0.92
15. Features different levels of challenges	12	12	0.92
16. Challenges and alerts contribute to the game dynamism	11	12	0.88
SOCIAL INTERACTION			
17. The game promotes interaction between people	12	12	0.92
18. The game promotes moments of cooperation between participants	11	13	0.92
RELEVANCE			
19. After the game the topics covered are easy to remember	12	12	0.92
20. After the game children are able to apply what they have learned	12	11	0.88
21. The game contributes to children's understanding of the theme	12	13	0.96
22. The game is efficient for learning, compared to other teaching activities	12	13	0.96
23. The experience with the game contribute to children's learning	12	13	0.96
24. Stimulates interest in the theme	12	13	0.96
S-CVI/Ave			0.88

Note: *Nurses and doctors (N=13); **Elementary school teachers (N=13); I-CVI - Content Validity of Individual Items; SD - Standard Deviation; S-CVI/AVE - Average of content validity indexes for all indexes obtained.

Table 2 - Agreement percentage, validity index, average score and standard deviation of the educational game items in the second Delphi round, Florianópolis, Santa Catarina, Brazil, 2019

PROPOSED QUESTIONS	Agreement percentage Group		I-CVI
	1*	2**	
(A) GAME RULES VALIDATION			
1. Age and number of participants are consistent	9	8	0.94
2. The number of cards is adequate	10	08	1.00
4. Objective is clear and consistent	10	8	1.00
B) GAME DESIGN VALIDATION			
1. Title and content size in the topics is appropriate	9	6	0.83
2. The game design is attractive (interface as cards or board)	10	8	1.00
C) GAME CARDS VALIDATION			
QUESTIONS AND ALERTS			
1. Questions are easy to understand			
Intoxication	9	8	0.94
Burn	9	8	0.94
Drowning	9	8	0.94
Suffocation	9	8	0.94
Traffic accidents	9	8	0.94
Falls	10	8	1.00
2. Language is compatible with level of knowledge			
Intoxication	10	8	1.00
Burn	9	8	0.94
Drowning	8	8	0.89
Suffocation	8	8	0.89
Traffic accidents	9	8	0.94
Falls	10	8	1.00
3. Language is adequate and accessible			
Intoxication	9	8	0.94
Burn	9	8	0.94
Drowning	9	8	0.94
Suffocation	9	8	0.94
Traffic accidents	9	8	0.94
Falls	9	8	0.94
S-CVI/Ave			0.95

Note: * Nurses and doctors (N=10); ** Elementary school teachers (N=08); I-CVI - Content Validity of Individual Items; SD - Standard Deviation; S-CVI/AVE - Average of content validity indexes for all indexes obtained.

of the game's purpose for children. In the game design, two items were reformulated according to the suggestions: board design and content. In game cards validation, three items were returned for analysis in the reformulated instrument: ease of understanding of the questions, compatible language and appropriate/accessible language. All category 4 items reached a CVI greater than 0.80 in the first Delphi round.

The instrument of the second round of validation, composed of eight items with CVI less than 0.8, received a subdivision for assessment of the three items of Game Cards Validation. We opted for a subdivision of these three items, referring to the themes addressed in the game: intoxication, burns, drowning, suffocation, traffic accidents and falls, in order to facilitate judges' responses on the contents of the six themes, considering the number of formulated cards. This instrument was sent, via Google Forms, to the same judges and obtained a CVI higher than 0.8 (scores between 0.81 - 1.00) in the second round of validation in the educational game.

Table 2 shows the items assessed in the second round, with levels of agreement above 83%, reaching a total 95% validation percentage of the educational game.

Considering judges' suggestions, the final version of *Vidas em Jogo* was made in a board format. The size of 67 cm by 29.7 cm was maintained, with 117 cards, with six question/answer cards for each theme, 15 alert cards and 60 challenge cards, in addition to four buildable pawns. The game rules were changed in a way that facilitated children's reading, managing to better understand the proposal. The final version of *Vidas em Jogo* is represented in Figure 3.

DISCUSSION

The educational game assessment, developed in this study, proceeded by calculating CVI and addressed four dimensions: game rules, which pronounce the means and purposes that one wishes to achieve through the game; game design, which analyzes the images and interface between cards and board; game card content, referring to the sufficiency of the game to the deprecated theme; game satisfaction, which assesses the degree of significance of the game items. Similarity was observed in the assessment approach in other national games validation studies regarding the importance of non-textual elements, such as images, dynamics and interaction, such as in *Contando Bem que Mal Tem*⁽¹¹⁾ and *Papo Reto*⁽¹²⁾, both games addressing sexuality with adolescents.

The educational game was assessed with an excellent content and appearance validity index by experts, reaching a 95% validation percentage in two Delphi rounds. Such result is considered



Figure 3 – Final version of *Vidas em Jogo* validated by judges

In the first round, of the total of 55 validation items, 47 items obtained CVI greater than 0.8 and 08 items obtained CVI less than 0.8 (scores between 0.65 - 0.77), were adjusted according to experts/judges' suggestions. Three items of the game rules validation, did not reach agreement CVI, which refer to the game's age group, number of cards and objective. These items received suggestions for improvements such as increasing the age range, reducing the number of cards and simplifying the understanding

relevant, since educational technology needs to be viable, in addition to being understandable. There was the inclusion of a greater number of experts in comparison with other validation studies carried out in Brazil, such as the game *Boas Práticas no Parto*⁽⁴⁾, validated by 10 judges and *Familiares Cangurus na UTI Neonatal*⁽⁶⁾, assessed by 15 judges. Nurses, doctors and elementary school teachers participated in this process, which is extremely relevant for the production of an effective game, as its assessment promoted the diversity of opinions and approaches on the same theme to ensure greater reliability to the instrument⁽¹³⁾.

Other methodological studies on the development of educational technologies, carried out in Brazil, have also validated their materials with excellent CVI, such as educational material for prevention of metabolic syndrome in adolescents⁽¹⁴⁾, with a global CVI of 0.98 and validation of educational technology for a mother-child bond in Neonatal Intensive Care Units with 0.92 of global CVI⁽¹³⁾.

The changes made in the first version, after the Delphi round, enabled a better understanding of its language, as observed in another research that developed a booklet to welcome "family kangaroos" in a neonatal unit. This study highlighted the importance of detachment from the first version for adequacy of the target audience's language and knowledge⁽⁶⁾. Other studies were identified, such as Family Nursing Game⁽¹⁵⁾, board game about family and *ConheceDOR*⁽¹⁶⁾, game for education in pain, developed in Brazil, and Everybody's Different: The Appearance Game⁽¹⁷⁾, about positive body image, carried out with children in British schools, who developed educational material in the form of games. However, none were found to associate appearance and design with content information. These studies⁽¹⁵⁻¹⁷⁾ use written and verbal communication as the main focus of the game.

Regarding design and appearance, the judges scored the game with a CVI of 0.85, considered valid by judges. However, it was reformulated after suggestions for improvements, resulting in a CVI of 0.95 in the second Delphi round, considered attractive and with sufficient clarity. Classification was similar to other surveys for appearance validation of educational technologies⁽¹³⁻¹⁴⁾.

The game design and images are important resources for communicating scientific ideas as well as being essential as resources for visualization and play a necessary role in the constitution of ideals and in their contextualization⁽⁴⁾. The image stands out for the fact that it is enlightening, as it overcomes language obstacles.

Regarding the card content, studies on oral health, carried out in India⁽¹⁸⁾ and about human immunology, carried out in Greece⁽¹⁹⁾, highlight the ability of the object and the context to provide behavioral changes in educational games and be effective in promoting knowledge among children. It should be noted that the theoretical content that structures this game is based on a scientific framework, adapted for children over nine years old. Even with a rigorous construction, the game validation by judges was decisive for scientific anchoring and credibility of the educational technology. Judges' assessments showed that the game built was a relevant and valid material with regard to the content to be presented, first aid for schoolchildren.

Language was deemed clear, accessible and appropriate after the second Delphi round. However, in the first Delphi round, the sub-items related to language compatible with the

level of knowledge, adequate and accessible and with easy to understand questions reached CVI below 0.80 (0.69 - 0.77) in judges' assessments. After modifications made from the observations made by the judges in the sub-items that obtained CVI lower than the recommended, such as increasing age range, language readjustment and reducing the number of cards, the second round of validation followed, was successfully validated by judges, showing CVI 0.95 for the Game Cards Validation item. This data supports this study on the validation of an educational booklet for teachers about first aid at school⁽¹⁾, which obtained a satisfactory assessment of clarity, objectivity and attractiveness, with a CVI of 0.96.

Regarding relevance and satisfaction, fourth and last category analyzed, authors point to the importance of an educational activity based on interaction and active participation in the construction of knowledge⁽¹¹⁻¹²⁾. In *Vidas em Jogo*, this ability is linked to the possibility of interaction between children, betting on the construction and reconstruction of knowledge, encouraged by alerts, challenges and question-answer cards presented.

Attractiveness and interaction must be considered in all educational technologies, as it fosters public interest until the end of the educational material, favoring learning and increasing interactivity⁽²⁰⁾. When it comes to games and playfulness in its broadest sense, board games stand out for promoting direct interaction between a group of players, without requiring electronic means as mediators of this interaction, in addition to greater accessibility in relation to social classes⁽²¹⁾. Whether the game is competitive or cooperative, it is concluded that the whole game of rules promotes a challenging environment that requires concentration, skills and voluntary desire to learn from children.

Regarding the validity of relevance and satisfaction, it is observed that this item reached CVI indexes of 0.85 and 0.96 in the first Delphi round assessment. It is worth noting that the sub-items, which observe whether the game fosters interest in the theme, offers situations or variations of activities, making it attractive or dynamic, if the experience with the game contributes to children's learning, questioning whether the game is efficient for learning, in comparison with other teaching activities, were considered appropriate by judges and reached a total CVI of 0.96. The overall CVI for relevance and satisfaction category was 0.923.

The board game is considered a potential educational tool capable of contributing to the development of children's education as well as to the construction of health knowledge. Playing emerges as an innovative pedagogical proposal, in contrast to traditional pedagogical models, in health education, due to its attractiveness, playfulness and development⁽²²⁾. Themes such as childhood accidents and first aid, when presented in a playful and interactive way, applied in the teaching/learning process, provide the target audience with a more participatory, dynamic and contextualized relationship⁽²³⁾.

Once the validation process is completed, it becomes necessary to implement the game in real configurations, in the context for which the game was built, since it presents adequacy to the intended learning objectives. The applicability of the game to schoolchildren will prove its effectiveness as a teaching-learning pedagogical tool.

Study limitations

It is believed that the fact that experts/judges are specialists in different areas (health professionals and elementary school teachers) may have restricted analysis of certain categories and content, considering the possible difficulties when assessing the game from perspectives that go beyond their areas of expertise. It is noteworthy, however, that this same fact reveals its potential, by allowing a greater diversity of opinions in the analysis process. The inclusion of experts/judges from only two Brazilian regions is also a limitation, since diversity of regions could bring diverse opinions and suggestions, contributing to the game development. The non-validation with the target audience is also a limiting factor, which could assist the researchers in the assertiveness of language and illustrations of the game. This phase is foreseen in future stages of this project, which can guarantee that *Vidas em Jogo* is an attractive and understandable strategy for the target audience.

Contributions to nursing, health, or public policies

This educational game, built to assist in teaching first aid to schoolchildren, has the potential to be used both by schoolchildren, health professionals and early childhood education professionals as an option to traditional educational practices. Furthermore, it corroborates the multiplication of information about first aid, a topic that is barely available in an interactive way and in language

for children, who, once instructed, will be able to act with greater security if they see an emergency.

CONCLUSIONS

The educational game was considered valid by experts, reaching a total percentage of 95% validation in two Delphi rounds. It is a pedagogical tool for teaching first aid to schoolchildren, as an option to traditional educational practices. In order for effective results to be achieved, it is recommended to validate *Vidas em Jogo* with the target audience (children), to assess the opinion and understanding of the game by them and also, promote parallel actions, covering not only children, but also parents/guardians and the rest of the community. As the game does not become an isolated event and without continuity, it is necessary to insert it in more comprehensive educational processes and with continued actions.

It is suggested the creation of an online version as a way to reach a larger audience since virtual technologies are constantly growing and the use of virtual strategies can contribute to the learning not only of children, but of those who want to learn how to deal in risky situations playfully.

Finally, it is important to value the fact that *Vidas em Jogo* promotes social interaction and entertainment combined with teaching first aid to children. These factors make the activity more dynamic, enjoyable, and the challenge itself is of particular interest. In this context, spreading knowledge reinforces learning by holding subjects' attention more.

REFERENCES

- Galindo Neto NM, Caetano JA, Barros LM, Silva TM, Vasconcelos EM. First aid in schools: construction and validation of an educational booklet for teachers. *Acta Paul Enferm.* 2017;30(1):87-93. <https://doi.org/10.1590/1982-0194201700013>
- Zonta JB, Eduardo AHA, Okido ACC. Self-confidence for the initial management of health issues in schools: construction and validation of a visual analogue scale. *Esc Anna Nery.* 2018;22(4):e20180105. <https://doi.org/10.1590/2177-9465-ean-2018-0105>
- Silva L, Costa J, Furtado L, Tavares J, Costa J. Primeiros socorros e prevenção de acidentes no ambiente escolar: intervenção em unidade de ensino. *Enferm Foco.* 2017;8(3). <https://doi.org/10.21675/2357-707X.2017.v8.n3.893>
- D'Avila CG, Puggina AC, Fernandes RAQ. Construction and validation of an educational game for pregnant women. *Esc Anna Nery.* 2018; 22(3):e20170300. <https://doi.org/10.1590/2177-9465-ean-2017-0300>
- Doane KJ, Boyd P. Authoring of patient education materials by medical students: an activity designed to demonstrate communication to the lay public. *Med Sci Educ.* 2016;26:47-52. <https://doi.org/10.1007/s40670-015-0182-y>
- Nascimento MHM, Teixeira E. Educational technology to mediate care of the "kangaroo family" in the neonatal unit. *Rev Bras Enferm.* 2018;71(Suppl 3):1290-7. <https://doi.org/10.1590/0034-7167-2017-0156>
- Phillips AC, Lewis LK, McEvoy MP, Galipeau J, Glasziou P, Moher D, et al. Development and validation of the guideline for reporting evidence-based practice educational interventions and teaching (GREET). *BMC Med Educ.* 2016;16(1):237. <https://doi.org/10.1186/s12909-016-0759-1>
- Agranonik M, Hirakata V. Cálculo de tamanho de amostra: proporções. *Clin Biomed Res.* 2011 [Internet]. 2011[cited 2020 Jul 15];31(3). Available from: <https://seer.ufrgs.br/hcpa/article/view/23574>
- Revorêdo L, Maia R, Torres G, Chaves-Maia EM. O uso da técnica Delphi em saúde: uma revisão integrativa de estudos brasileiros. *Arq Ciênc Saúde.* 2015;22(2):16-21. <https://doi.org/10.17696/2318-3691.22.2.2015.136>
- Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? critique and recommendations. *Res Nurs Health.* 2006;29(5):489-97. <https://doi.org/10.1002/nur.20147>
- Sousa MG, Oliveira EML, Coelho MMF, Miranda KCL, Henriques ACPT, Cabral RL. Validation of educational game for adolescents about the sexuality topic. *Rev Pesqui: Cuid Fundam.* 2018;10(1):203-9. <https://doi.org/10.9789/2175-5361.2018.v10i1.203-209>
- Souza V, Gazzinelli MF, Soares AN, Fernandes MM, Oliveira RNG, Fonseca RMGS. The game as strategy for approach to sexuality with adolescents: theoretical-methodological reflections. *Rev Bras Enferm.* 2017;70(2):376-83. <https://doi.org/10.1590/0034-7167-2016-0043>

13. Santos AS, Rodrigues LN, Andrade KC, Santos MSN, Viana MCA, Chaves EMC. Construction and validation of an educational technology for mother-child bond in the neonatal intensive care unit. *Rev Bras Enferm.* 2020;73(4):e20190083. <https://doi.org/10.1590/0034-7167-2019-0083>
 14. Moura IH, Silva AFR, Rocha AESH, Lima LHO, Moreira TMM, Silva ARV. Construction and validation of educational materials for the prevention of metabolic syndrome in adolescents. *Rev Latino-Am Enfermagem.* 2017;25:e2934. <https://doi.org/10.1590/1518-8345.2024.2934>
 15. Fernandes CS, Martins MM, Gomes BP, Gomes JA, Gonçalves LHT. Family Nursing Game: developing a board game. *Esc Anna Nery.* 2016;20(1):33-37. <https://doi.org/10.5935/1414-8145.20160005>
 16. Valentim JCP, Meziat-Filho NA, Nogueira LC, Reis FJJ. ConheceDOR: the development of a board game for modern pain education for patients with musculoskeletal pain. *BrJP.* 2019;2(2):166-75. <https://doi.org/10.5935/2595-0118.20190030>
 17. Guest E, Jarman H, Sharratt N, Williamson H, White P, Harcourt D, Slater A. "Everybody's Different: The Appearance Game": a randomised controlled trial evaluating an appearance-related board game intervention with children aged 9–11 years. *Body Image.* 2021;36(1):34-44. <https://doi.org/10.1016/j.bodyim.2020.09.010>
 18. Harikiran AG, Vadavi D, Shruti T. Beta Testing an Oral Health Edutainment Card Game Among 12–13-Year-Old Children in Bangalore, India. *Games Health J.* 2017;6(6):334-42. <https://doi.org/10.1089/g4h.2016.0079>
 19. Konstantara K, Xinogalos S. Cells of War: a serious game for familiarizing players with the immune system. *Simulat Gaming.* 2018;49(5):567-89. <https://doi.org/10.1177/1046878118803418>
 20. Moura TNB, Moreira TMM, Sousa AD, Santos Neto AC, Sousa RX, Lima LHO. Development and validation of a smartphone educational game regarding healthy lifestyle habits for adolescents. *Texto Contexto Enferm.* 2019;28:e20180252. <https://doi.org/10.1590/1980-265x-tce-2018-0252>
 21. Prado LL. Jogos de tabuleiro modernos como ferramenta pedagógica: pandemic e o ensino de ciências. *Rev Eletrôn Ludus Sci [Internet].* 2018 [cited 2020 Aug 21];2(2):26-38. Available from: <https://revistas.unila.edu.br/relus/article/view/1485/1522>
 22. Gontijo DT, Vasconcelos ACS, Monteiro RJS, Facundes VLD, Trajano MFC, Lima LS. Occupational therapy and sexual and reproductive health promotion in adolescence: a case study. *Occupational Ther Intern.* 2015;23:19-28. <https://doi.org/10.1002/oti.1399>
 23. Cruz GCV, Vasconcelos MGF, Maniva SJCF, Carvalho REFL. Construction and validation of an educational technology on human papillomavirus vaccine for adolescents. *Esc Anna Nery.* 2019;23(3):e20190050. <https://doi.org/10.1590/2177-9465-ean-2019-0050>
-