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Construction and validation of educational material on promoting breastfeeding in schools

Construção e validação de material educativo sobre promoção do aleitamento materno em escolares

Construcción y validación de material educativo para la promoción de la lactancia materna en las escuelas

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ABSTRACT

Objective: to build and validate an educational technology on the promotion of breastfeeding for schoolchildren. **Methods:** a methodological study was developed through a bibliographic survey, situational diagnosis, creation of illustrations, layout, design and texts, validation of the material with the help of expert judges and target audience. **Results:** the content judges enabled the validation of the material with an overall Content Validity Index of 90%, the judges of the design Suitability Assessment of Materials of 90.4% and the target audience with a 95.6% agreement. The readability percentage proved to be excellent, with an overall score of 100%. **Conclusion:** the educational technology proved to be a valid and reliable instrument to promote a breastfeeding culture among schoolchildren.
Descriptors: Validation Studies; Breastfeeding; Child Health; Health Education; Educational Technology.

RESUMO

Objetivo: construir e validar uma tecnologia educativa sobre a promoção do aleitamento materno para crianças em idade escolar. **Métodos:** estudo metodológico, cujo desenvolvimento se deu por meio de levantamento bibliográfico, diagnóstico situacional, elaboração de ilustrações, *layout*, *design* e textos e validação do material com auxílio de juízes especialistas e público-alvo. **Resultados:** os juízes de conteúdo possibilitaram a validação do material com Índice de Validade de Conteúdo global de 90%, os juízes de *design,* com *Suitability Assessment of Materials,* de 90,4%, e o público-alvo com 95,6% de concordância. O percentual de legibilidade mostrou-se excelente, com pontuação global de 100%. **Conclusão:** a tecnologia educativa mostrou-se instrumento válido e confiável para ser utilizada, a fim de promover a cultura da amamentação em escolares.
Descritores: Estudos de Validação; Aleitamento Materno; Saúde da Criança; Educação em Saúde; Tecnologia Educacional.

RESUMEN

Objetivo: Construir y validar una tecnología educativa sobre promoción de la lactancia materna para niños en edad escolar. **Métodos:** Estudio metodológico desarrollado mediante relevamiento bibliográfico, diagnóstico situacional, elaboración de ilustraciones, *layout*, diseño y textos, validación del material con ayuda de jurados especialistas y público-objetivo. **Resultados:** Los jurados de contenido permitieron validar el material con Índice de Validez de Contenido global del 90%; los jueces del diseño, con *Suitability Assessment of Materials* del 90,4%, y el público-objetivo, con 95,6% de concordancia. El porcentaje de legibilidad resultó ser excelente, con puntaje global del 100%. **Conclusión:** La tecnología educativa demostró ser un instrumento válido y confiable para ser utilizado a efectos de promover la cultura de la lactancia en escolares.
Descriptores: Estudios de Validación; Lactancia Materna; Salud Del niño; Educación en Salud; Tecnología Educativa.

INTRODUCTION

Breastfeeding is considered the only ideal food for children[1], having a fundamental role in promoting maternal-infant health, and being responsible for helping to develop the right micro-environment for intestinal development and maturation of the child's immune system[2-3]. It also contributes to maternal health, promoting pre-gestational weight recovery, in addition to contributing to maternal health, promoting the recovery of pre-gestational weight, acting as a protective factor against breast, ovarian, type 2 diabetes, obesity and helping in rapid uterine involutio [4].

Although breast milk is considered a complete and adequate food for infant nutrition, there is a great difficulty in adhering to breastfeeding. Global indicators show that only 35% of children are exclusively breastfed during the first four months of life [5]. In Brazil, only 45.7% of children under six months are exclusively breastfed, and this practice is less frequent in the Northeast region of the country (38%)[6].

It is understood that the decision to breastfeed, as well as its maintenance, is a complex process that depends on a series of aspects and that several factors can influence this institution. This attitude is often related to the history of maternal life and the meaning it attaches to breastfeeding, being associated with her experiences and the education she has received since childhood [7].

Thus, the need for the message of breastfeeding promotion to be present since childhood and still in the school environment has been reinforced, and it should be conveyed by both formal and family education, as it is understood that the school is a propitious scenario for health promotion actions and, therefore, should expose all students to the advantages of breastfeeding during the first years of training [8].

It is believed that through the establishment and encouragement of a habit, it can manifest itself during another phase of life. That is, by promoting breastfeeding during childhood, through playful strategies such as comic strips, this behavior and the thought of its importance would be perpetuated to adulthood, positively influencing the establishment of breastfeeding[8].

The literature demonstrates the use and effectiveness of educational technologies (serial albums, booklets, string literature, folders) to promote breastfeeding among different audiences (mothers, fathers and grandparents) [9-11].

Thus, it is understood that the use of educational technologies that can contribute to knowledge, assimilation and incorporation of appropriate care for the promotion of breastfeeding even in childhood, through health education on breastfeeding.

Nevertheless, it is believed that the construction of educational materials to promote the culture of breastfeeding in children contributes to promote an awakening to the need to implement measures to promote breastfeeding since school age.

OBJECTIVE

To build and validate an educational technology on the promotion of breastfeeding for schoolchildren.

METHODS

Ethical aspects

The research project was approved by the Research Ethics Committee of the Federal University of Piauí, by Plataforma Brasil, with an opinion approved in November 2016. The ethical precepts set out in Resolution 466/2012 of the National Health Council were obeyed.

Study design, setting and period

A comics-based methodological study was conducted between August 2016 and to February 2018. The construction and validation of the educational technology followed the stages: bibliographic survey, situational diagnosis, creation of illustrations, layout, design and texts, validation of the material with experts and target audience.

The first stage of the study took place from August to September 2016, with a literature survey, by means of an integrative review on the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), National Library of Medicine (PUBMED), Latin American and Caribbean Health Sciences Literature (LILAC), BDENF (a Brazilian database in Nursing), IBECS (a Spanish Bibliographic Index on Health Sciences), the Pan American Health Organization Digital Library (MedCaribe), and the Brazilian Dentistry Bibliography (BBO).

The health terminology found in the Health Science Descriptors (DeCS) and Medical Subject Headings (MeSH) was used for the selection of papers, with the controlled descriptors: "Validation Studies", "Breastfeeding", "Child Health", "Health Education" and "Educational Technology", both in association with each other or using the boolean operators AND and OR.

The second stage, called situational diagnosis, was carried out in order to know the population for which the technology built was intended. A preliminary survey was conducted[12] with 307 schoolchildren aged seven to nine years old, enrolled in public schools in a city in the South-Central region of the state of Piaui, , in between August 2017 to February 2018, in order to evaluate their level of knowledge about breastfeeding. A semi-structured form with socioeconomic questions and knowledge variables was applied. The answers obtained from the interviews were recorded and organized into topics to support the creation of the comic strip.

The illustrations were created in the third stage, through the creation of the characters, configuration and diagramming. Photoshop® was used with the help of a graphic designer to create and diagram of educational technology, with an attempt to comply with the criteria related to content, structure/organization, language, layout and design, cultural sensitivity and suitability for the pediatric public[13].

InFor the construction of the material, the authors madethe content concise and bright colored to arouse the interest of children. This fact can be reflected by the small number of pages, as recommended by the literature[14].

The built technology was validated (fourth stage) by consulting with specialists in the area of interest. This stage was divided into three categories, which was described as follows.

Population/sample, inclusion and exclusion criteria

Twenty-one judges were selected for internal validation, divided into three groups, according to relevant literature[15], using the following criteria: 1) content teaching judges (eight researchers/teachers with experience in the area of breastfeeding, educational technologies and/or instrument validation); 2) content assisting judges (eight nurses with experience in clinical child health care); and 3) five judges with professional experience in design and marketing.

For content validation, raters who complied with at least two of the following five criteria were considered experts: having skills/specialized knowledge that makes the professional an authority in the area of child health and breastfeeding, having special abilities in a particular type of study; being certified in a specific test to identify judges; and having a high classification assigned to the authority[16].

To close the panel of judges, five design and marketing professionals were also invited to evaluate the suitability of the material for its proposed purpose. The snowball sampling technique was adopted.

To constitute the target audience, students were recruited in the municipal school network of the city of Picos, state of Piauí, at a previously scheduled time with the school's principal during class breaks, using an appropriate setting and respecting the subjects' privacy. Students were selected among those who met the inclusion criteria, established by researchers: being between seven and nine years old, being regularly enrolled in one of the public schools in the city in question, bringing in the informed consent form signed by their parents, signing the free and informed term of consent, having average 30 minutes available to take part in the reading of the story, and responding to the evaluation questionnaire concerning the areas of organization, writing style, appearance, and motivation. The validation consisted of 37 children, in accordance with the criteria set forth in the literature regarding the minimum number of participants, and the characteristics of the targeted population[17].

After data collection, in this stage, the data were analyzed and relevant adjustments were made based on the answers.

Study protocol

After consent to take part in the research and evaluation of the educational material, the 21 judges were given an invitation letter via e-mail, postal mail or personally explaining the objectives of the research. They also received a free and informed consent term, the validation instrument and a version of the comic strip.

Each group of participants used a type of instrument, so three instruments were used. The evaluation questionnaire sent to the content judges (teachers and assistants) was adapted from another study[13]; this instrument uses a Likert type standard scale, for each of the subject matters, as follows: Language clarity (1 = inadequate, 2 = partially adequate, 3 = adequate, and 4 = totally adequate); Practical relevance (1 = not important, 2 = partially important, 3 = important, and 4 = totally important); and Theoretical relevance (1 = not relevant 2 = partially relevant, 3 = relevant, 4 = totally relevant)[18].

The evaluation questionnaire aimed towards the design judges was the *Suitability Assessment of Materials* (SAM), built from the adaptation used for the validation of educational technologies/materials. The SAM is an American instrument and it consists of a list or checklist with six categories with 22 items, using a score scale from zero to two, which must be applied after reading the text[19].

Using the prepared content, the Flesch readability test was performed in order to ensure that the reading of the story was adequate. This test uses a score that considers the number of syllables per word and the amount of words per sentence in order to rank the analyzed texts within a scale of 100 points. The test was applied in each paragraph/sentence of the comic strip and in the full story, adopting the following indices as reference: 100-75: very easy; 74-50: easy; 49-25: difficult; 24-0: very difficult[20-21]. Analysis was performed using the Microsoft Word® software, 2010 version.

The last instrument, the adapted evaluation questionnaire for the target audience, contains items regarding the domains of organization, writing style, appearance and motivation[22].

Analysis of results and statistics

The data were analyzed and based on the relevant literature about the subject. During the stage of instrument analysis by the content experts, the Content Validity Index (CVI) was used to verify the agreement between them. The result was obtained by dividing the number of concordant items of the experts, that is, the items scored 4 and 5 by them, by the total number of items[23]. Indices equal to or higher were considered acceptable 78% (CVI≥0.78) was considered acceptable, both for individual evaluation of each item and for general evaluation of the comic strip[18].

The calculation of the instrument's score, analyzed by the design experts, was adapted from the SAM. In this analysis, it is possible to calculate the total adequacy score by means of the sum of the scores obtained, divided by the total number of questionnaire items and multiplied by 100, to convert it into a percentage, finding the following results: 70-100% (superior material), 40-69% (adequate material) or 0-39% (inadequate material)[19].

In the analysis of the data judged by the target audience, items with a minimum level of agreement of 75% for positive responses were considered validated. Items with an agreement index lower than 75% were considered subject to change [24].

The professional profile of the judges, as well as the children's sociodemographic data, were organized in the Excel 8.0 software, and descriptive analysis was carried out, with calculation of absolute and relative frequencies, as well as measures of central tendency (mean) and dispersion (standard deviation).

The reliability of instruments measured at scale was analyzed using the Kappa Fleiss test with a significance test for each domain. The binomial test was applied to verify the proportion of adequacy for each domain according to the judges (teachers and assistants), and a value equal to or greater than 85% was desirable, considered to be appropriate if the test did not present statistical significance ($p > 0.05$). Analyses were made with the help of the R software version 3.5.0 and a 0.05 significance level was considered in all tests[25].

RESULTS

The comic strip called "Zoo trip: learning about breastfeeding"[26] has a cover/back cover on A4 paper, 20 pages bound in brochure format, fastened with staples (Figure 1).

The content of the material addresses topics related to breastfeeding in the context of a zoo tracing a parallel with the breastfeeding of mammals in a zoo. The main character talks about the mammals' habits related to breastfeeding in a zoo and demonstrates to children the importance of this habit and how the practice of breastfeeding should be[26].

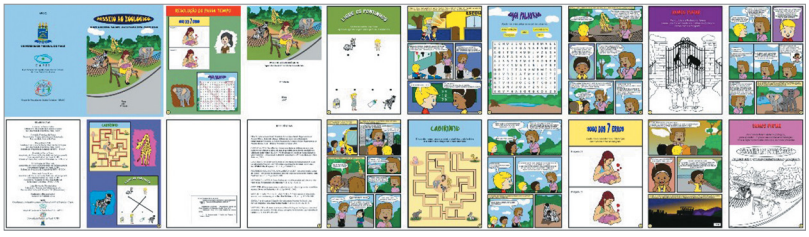

Figure 1 – Validated version of the comic strip, Picos, Piauí, Brazil, 2018

A review was carried out, and after literature analysis, the topics covered in the comic strip were defined: importance of breastfeeding for growth and development, as well as in the prevention of some pathologies; species-specific food; dangers of cross-breastfeeding; breastfeeding on demand; exclusive breastfeeding until six months of life; breastfeeding during the first hour of life; harms from the use of pacifiers and feeding bottles; paternal support in the establishment of breastfeeding; the importance of bonding during breastfeeding.

I order to promote greater interactivity between the comic strip and the children, some pages at the end brought pastimes, such as pages with illustrations to paint and games like word search, seven errors, maze, and dots.

All paragraphs/phrases from the comic strip were considered very easy. In the complete analysis, the test used revealed an index of 87, contained within the range of 100-75, which classifies the educational material as very easy, in addition, none of the phrases were in the passive voice, which would make it difficult to understand them.

In the history validation stage, eight content judges (teachers) participated in the study, with an average of 36.3 years ± 8.7 years, most of them female (87.5%); on vocational training, 50% were nurses, 25% nutritionists and 25% pedagogues and 62.5% had a master's degree. In addition to these, there were also eight content judges (assistants) with an average of 36.13 years ±10.9 years, mostly female (75%); as for their profession, 62.5% were nurses and 37.5% nutritionists, and 62.5% had a specialization. The content experts responded to an adapted questionnaire in which there was the possibility of qualifying the illustrations page by page and they could indicate they totally disagreed, disagreed, agreed or totally agreed, in addition to demonstrating the calculated CVI for each item.

Regarding language clarity, only one page received a CVI lower than 0.78 (page 9), so the content of this page was changed, based on the suggestions from the content judges. Because it presented a high CVI in terms of practical relevance and theoretical relevance, the choice was made to only adapt the language of that page and thus leave it in the material. It is also noted that no judge suggested removing the page.

The questions of practical relevance and theoretical relevance showed CVI greater than 0.80 on all pages. Thus, the overall CVI of the comic strip was calculated, and values of 0.90 were obtained in terms of language clarity and practical and theoretical relevance, indicating an excellent level of agreement between the judges.

The Kappa Fleiss measure was significant (p value<0.05) for the domains Language Clarity and Global Assessment. Therefore, it can be said that the comic strip is successfully validated by the content experts.

Regarding the binomial test, it was observed that in all domains the proportions are greater than 85% and p value<0.05, therefore the domains were considered adequate in the evaluation of the judges, according to the binomial test.

The comic strip was also evaluated by design judges, with an average age of 28.4 years ± 3.7 years, with respect to sex, most were female (60%) and had specialization in the area. The design judges answered the questionnaire adapted from the SAM [19].

When analyzing the contents of Table 1, it is noted that a judge evaluated item 3.4 as "Inadequate". In this case, there was no recommendation to change this item since the educational technology did not have lists or tables.

Regarding items 4.1, 4.2 and 4.3, no changes were made because only one judge considered each item as inappropriate and there was no recommendation of any necessary modification. It was possible to verify that all the judges classified the comic strip as superior (90.4%).

After adaptation of the material, according to the comments made by the judges, the validation process with the target audience was carried out. It was sought, through the evaluation of the children, to identify the organization, writing style, appearance and motivation of the content of the comic strip.

The study included children from 07 to 09 years of age, predominantly female (75.7%) and who self-declared themselves as black (40.5%) participated in the study. As for grade/year, most were in the first or second grade (40.5%) and 94.6% lived with their parents.

Table 2 shows the results obtained in each question and their respective level of agreement in the answers.

The level of agreement of positive responses ranged from 86.5% to 100% among the items addressed, making for a total of 95.6% in general, a sufficient result for validation of the comic strip by the population.

Of the four domains rated, the appearance was the one that obtained the highest number of positive responses: 94.6% thought the illustrations were simple, all of them thought the illustrations were beautiful, interesting, all thought the pages or sections seemed organized and the majority managed to answer all the activities presented in the comic strip.

After reading the suggestions and opinions of the children it was possible to note that the comic strip was considered interesting and entertaining by them. Regarding the suggestions, it is possible to observe that very few were made, therefore it is unnecessary to carry out new changes in the educational technology.

Table 1 – Evaluation of the design judges regarding content, literacy requirement, illustrations, layout and presentation, stimulation/motivation of learning and cultural adequacy of comic strips, Picos, Piauí, Brazil, 2018

Rated items	Superior	Adequate	Inadequate	N/A
1. Content				
1.1 The purpose is evident	5	-	-	-
1.2 The content is about behaviors	5	-	-	-
1.3 The content is focused on the purpose	4	1	-	-
1.4 The content highlights the main points	5	-	-	-
2. Literacy requirement				
2.1 Reading level	4	1	-	-
2.2 Uses active voice writing	4	1	-	-
2.3 Uses vocabulary with common words in the text	4	1	-	-
2.4 Context comes before new information	3	2	-	-
2.5 Learning is aided by topics	4	1	-	-
3. Illustrations				
3.1 The purpose of the illustration referring to the text is clear	4	1	-	-
3.2 Types of illustrations	5	-	-	-
3.3 Figures/illustrations are relevant	4	1	-	-
3.4 Lists, tables, etc. have an explanation	2	-	1	2
3.5 Illustrations are subtitled	3	-	-	2
4. Layout and presentation				
4.1 Layout characteristics	3	1	1	-
4.2 Size and font	2	2	1	-
4.3 Subtitles are used	2	-	1	2
5. Stimulation/Motivation of learning				
5.1 Uses interaction	5	-	-	-
5.2 Guidelines are specific and give examples	5	-	-	-
5.3 Motivation and self-efficacy	4	1	-	-
6. Cultural suitability				
6.1 Is similar to their logic, language and experience	5	-	-	-
6.2 Cultural image and examples	4	1	-	-

Table 2 – Evaluation of the target audience regarding the organization, writing style, appearance and motivation of the comic strip, Picos, Piauí, Brasil, 2018

	Positive responses		Negative responses		Impartial responses	
	n	%	n	%	n	%
1. Organization						
1.1 Did the cover catch your eye?	35	94.6	2	5.4	-	-
1.2 Does the story follow a beginning, middle and end?	33	89.2	4	10.8	-	-
2. Writing style						
2.1 As to the understanding of the sentences, they are (easy to understand/ hard to understand/ do not know)?	35	94.6	2	5.4	-	-
2.2 Is the text (interesting/ uninteresting/ don't know)?	37	100	-	-	-	-
3. Appearance						
3.1 Are the illustrations (simple/ complicated / other)?	35	94.6	2	5.4	-	-
3.2 Are the illustrations beautiful, interesting?	37	100	-	-	-	-
3.3 Do the pages or sections look organized?	37	100	-	-	-	-
3.4 Are the activities presented in the story interesting?	37	100	-	-	-	-
3.5 Have you been able to respond to all activities presented in the story?	36	97.3	1	2.7	-	-
4. Motivation						
4.1 In your opinion, can any child who reads this little story understand what it is about?	33	89.2	2	5.4	2	5.4
4.2 Did you feel like reading the story to the end?	37	100	-	-	-	-
4.3 Did the story suggest thinking about the importance of breastfeeding?	36	97.3	1	2.7	-	-
4.4 Did you feel like talking about breastfeeding to others after reading the story?	32	86.5	5	13.5	-	-
General agreement	-	95.6				

DISCUSSION

The use of validated educational technologies grants a greater degree of reliability to the teaching-learning process, narrows the communication of health care, revalidates the safety of the guidelines presented and enhances the degree of coherence of the information in responding to the proposed objective, corroborating as a mediator of the relationship between the target audience and health professionals[27].

The content judges (teachers and caregivers) gave positive responses to assess the story in the comic book, and the answers provided by the adapted questionnaire[13] show a CVI with high reliability and agreement levels, as well as a study on the validation of the device in teaching teenagers in the context of sexuality[28], thus showing the appropriateness of the material to the target audience in the opinion of the judges.

Regarding the SAM score used in the validation by the design experts, it reached a higher score than the one established. All judges considered the educational technology appropriate for use with the audience to which it is intended, thus demonstrating that the presentation, illustrations, layout and diagramming of the material are attractive and understandable[29].

In order to improve the educational technology, in addition to the evaluation by the judges, they still left their contributions and observations recorded, ensuring the quality of the story for the population, such details contribute to the enrichment of the final product and to improve its applicability, through information reformulation, replacement of terms and review of the illustrations[14].

The recruitment of professionals from different areas of activity in the validation process also allowed to combine several types of specialized knowledge in the topic addressed, ensuring greater accuracy in the selection and evaluation of educational materials, in addition to valuing opinions and different approaches the same theme [30].

The responses of the target audience obtained a high level of agreement from the positive responses and after reading the children's suggestions and opinions it was possible to notice that they considered the comic strip interesting and fun.

Based on this assumption it is believed that, to build an educational material, it is necessary to know the context of the population to which it is intended, through a participatory, communicative and collective approach. Thus, there was the concern to include children in the analysis of the comic strips and to perform a prior situational diagnosis of their knowledge on the subject, as well

as in other studies in the area[31-32], in order to better trace the scope of this health education strategy and improve its reach and effectiveness.

Regarding the degree of readability, it was assessed after validation with the judges, and it presented an excellent percentage of understanding of the comic strip writing, considering the explanatory technology that is important and appropriate for the target audience and even for people with poor education, similar to what was found in a national study, demonstrating that, even with low education, individuals can read and understand the material, thus improving their motivation to develop the habit[13-31]. Thus, it is understood that measuring the degree of readability of an educational technolog is important to avoid learning limitations, as a result of low schooling, possibly promoting the credibility and acceptance of educational technologies when there is the participation of experts and representatives of the target audience[19].

Through the validation of the comic book, its effectiveness and suitability as a health education instrument to stimulate the practice of breastfeeding, through the demonstration of breastfeeding in mammals, were confirmed.

Study limitations

The limiting factor of this study is that it did not carry out clinical validation. A further study should be conducted in order to attest to the suitability of the material to its proposed objective.

Contributions to the nursing, health and public health areas

It is believed that the validation process of the comic strip by different groups of judges and the target audience made it possible to create an additional resource to stimulate the promotion of breastfeeding still during childhood. Therefore, this educational material can contribute to the establishment of the habit still during childhood and later stimulate the implementation of this practice in adulthood by future parents.

CONCLUSION

The comic strip proved to be valid in terms of content and appearance, a fact demonstrated by the high evaluation scores by the judges, thus demonstrating to be a valid and reliable technology. In addition to the evaluation of the items, the experts and the target audience had the opportunity to make suggestions throughout the construction process. Thus, the engagement of the various evaluators made it possible to create a tool capable of assisting in the promotion of breastfeeding in schoolchildren.

The construction of the comic strip allows the message of breastfeeding to be inserted into the daily lives of children as early as possible in order to allow this idea to last until adulthood and then to positively influence the establishment of this habit and support the improvement of breastfeeding rates and health education on the subject.

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