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VALIDATION OF AN E-BOOK TO ENCOURAGE SELF-CARE FOR PEOPLE WITH INTESTINAL OSTOMIES

Validação de um e-book para estimular o autocuidado de pessoas com estomias intestinais

Validación de un libro electrónico para fomentar el autocuidado en personas con ostomías intestinales

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RESUMO

Objetivo: construir, validar o conteúdo, a aparência e usabilidade de uma tecnologia móvel, no formato *e-book*, para educação em saúde de pacientes com estomia. **Método:** pesquisa metodológica conduzida em três fases: exploratória, elaboração do e-book e validação da tecnologia pelo público-alvo. Realizada entre maio de 2023 e fevereiro de 2024. **Resultados:** o Índice de Validade de Conteúdo geral foi de 94% e um coeficiente alfa de Cronbach de 0,72. A versão final do e-book, foi avaliada por 19 usuários estomizados de Porto Velho – Rondônia. Obteve-se um Índice de Validade de Aparência por Item de 99% e um Índice de Validade de Aparência Total de 100%. A usabilidade da tecnologia foi classificada como excelente. **Conclusão:** o e-book aborda aspectos essenciais no cuidado com a estomia, além de estratégias específicas para manejar os desafios, através de recursos interativos. Possibilitando a redução e prevenção de complicações, promovendo uma melhor qualidade de vida.

DESCRITORES: Estomia; Eostomyterapia; Autocuidado; Estudo de validação; Tecnologia educacional; Educação em saúde

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ABSTRACT

Objective: to develop and validate the content, appearance, and usability of a mobile technology in the form of an e-book for the health education of ostomy patients. **Method**: the methodological search was conducted in three phases: an exploratory phase, development of the e-book, and validation of the technology by the target audience. The study was conducted between May 2023 and February 2024. **Results:** the overall content validity index was 94%, and Cronbach's alpha coefficient was 0.72. The final version of the e-book was evaluated by 19 ostomy users from Porto Velho, Rondônia. An item appearance validity index of 99% and a total appearance validity index of 100% were obtained. Technology's usability was classified as excellent. **Conclusion:** the e-book addresses essential aspects of ostomy care and provides specific strategies for overcoming challenges through interactive resources. It enables the reduction and prevention of complications and promotes a better quality of life.

DESCRIPTORS: Ostomy; Enteroostomyl therapy; Self-care; Validation study; Educational technology; Health education.

RESUMEN

Objetivo: construir, validar el contenido, apariencia y usabilidad de una tecnología móvil, en formato de libro electrónico, para la educación en salud de pacientes con ostomías. **Método:** investigación metodológica realizada en tres fases: exploratoria, elaboración del libro electrónico y validación de la tecnología por parte del público objetivo. Realizado entre mayo de 2023 y febrero de 2024. **Resultados:** el Índice de Validez de Contenido general fue de 94% y un coeficiente alfa de Cronbach de 0,72. La versión final del libro electrónico fue evaluada por 19 usuarios de ostomía de Porto Velho – Rondônia. Se obtuvo un índice de validez de apariencia del ítem del 99% y un índice de validez de apariencia total del 100%. La usabilidad de la tecnología fue calificada como excelente. **Conclusión:** el libro electrónico aborda aspectos esenciales del cuidado de la ostomía, así como estrategias específicas para el manejo de los desafíos, a través de recursos interactivos. Permitiendo la reducción y prevención de complicaciones, promoviendo una mejor calidad de vida.

DESCRIPTORES: Eostomyterapia; Autocuidado; Estudio de validación; Tecnología educacional; Educación en salud; Estomía.

INTRODUCTION

An intestinal ostomy is a surgical procedure in which a loop of the intestine is brought outside the body and attached to the abdomen. This allows for the elimination of intestinal contents. It can be either temporary or permanent. With a temporary ostomy, there is the possibility of reconstituting the intestine later. Permanent ostomy is indicated for cases affecting the lower portion of the intestine and/or the rectum and/or when the patient has comorbidities that make intestinal reconstruction infeasible.[1]

Nascimento *et al*.[2] conducted a study to describe the number of colostomy procedures performed in Brazil's five regions in 2021. The North Region, followed by the Midwest Region, had the fewest colostomy procedures. This result can be attributed to the specific characteristics of these regions, such as greater difficulty accessing early diagnoses and appropriate treatments, lower levels of education, and difficult geographic access.

The challenges observed in the North and Midwest regions of Brazil make the adaptation and rehabilitation process for colostomy patients more difficult. In this context, adequate training and guidance before hospital discharge is crucial so patients can learn to manage their ostomy and maintain a good quality of life after surgery.[3] These individuals require comprehensive care due to their fragile emotional state, as well as systematized, interdisciplinary follow-up.[4]

Considering this, Ordinance No. 400/2009 was established, proposing the National Guidelines for Healthcare for People with Ostomies. The guidelines stipulate that the care network should be structured across three levels of healthcare and outline the responsibilities related to health promotion, care, and rehabilitation. They also guarantee the rights of people with ostomies. The guidelines emphasize the need for specialized, interdisciplinary care services that focus on self-care, preventing complications associated with ostomies, and providing collecting equipment, protective and safety devices.[5]

In this context, nurses should use strategies that promote meaningful learning for individuals, contributing broadly and creatively to care practices and favoring educational advancement.[6] The use of mobile technology can facilitate this process by increasing access to specialized information through visual resources and accessible language.[7]

Among mobile and digital technologies, an e-book is a digital version of a printed work. This mobile technology offers practical features such as the ability to increase font

size, annotate text, underline snippets, and access secondary fonts with a simple tap.[9]

When developing educational technologies for the Northern Region, it is crucial to consider local, housing, and population characteristics. A study by Vilaça *et al*.[10], conducted in the state of Amazonas, aimed to validate the content of an educational technology regarding the rational use of medicines for riverside community health agents. The study revealed that the research population lived on the banks of rivers and lakes in the world's largest tropical forest, underscoring the importance of considering these characteristics in the development of educational technologies.

Therefore, the objective of this study was to construct and validate the content, appearance, and usability of a mobile technology in e-book format for the health education of ostomy patients in the Northern Region of Brazil.

METHOD

This is a methodological study of technological production with a quantitative approach. It was conducted from May 2022 to February 2024. Phases I and II took place in the Graduate Nursing Program at the Federal University of Paraná and the Multiprofessional Study Group in Adult Health (GEMSA). Phase III took place at the Oswaldo Cruz Polyclinic (POC) in Porto Velho, Rondônia. The POC is a state outpatient care agency that provides medium- and high-complexity care, as well as specialized care, such as healthcare services for people with ostomies.

The study was developed in three phases. The first phase was exploratory and involved a literature search on self-care for people with intestinal ostomies. The second phase involved creating an e-book, and the third phase involved evaluating the technology.

The exploratory phase involved a literature search from May to December 2022 to identify studies on self-care for people with intestinal ostomies. The literature search was conducted in the following bibliographic databases: Medical Literature and Retrieval System Online (MEDLINE/PubMed®) via the National Library of Medicine; Cumulative Index to Nursing & Allied Health Literature (CINAHL); Scopus (Elsevier); Latin American and Caribbean Health Sciences Literature (LILACS); and the Nursing Database (BDENF). Additionally, we searched manuals, books, and guides on the official websites of the Ministry of Health (MS), the José Alencar Gomes da Silva National Cancer Institute (INCA), and the Brazilian Association of Stomatherapy (SOBEST).

After a literature search, content was selected to serve as the basis for a script organized into topics for evaluation by a committee of expert evaluators. Five nurses were invited to join the committee via the WhatsApp®. Each specialist was also asked to suggest a new participant, using the "snowball" sampling technique. This resulted in a total of ten professionals. Inclusion criteria included: having training in nursing, specifically as a nurse with at least six months of ostomy care experience, as well as nurses with a *latu sensu* specialization in stomatherapy and professors of the undergraduate course with a specialist, master's, or doctoral degree who worked with the theme.

Evaluators were notified via email and provided with the professional characterization questionnaire and the content validation instrument, adapted from Silva[11]. The content validation instrument consists of fifteen questions structured according to the Likert scale and grouped into three evaluation areas: objective, structure and organization, and relevance.

Phase II involved creating the e-book, which included defining the editor, selecting images, producing video and audio, and editing. The PDF format was chosen as the editor. Images were chosen from image banks such as the paid platform Envato Elements and the free platform Flaticon. Videos and audio files were created to facilitate learning about care. Since this is an e-book produced in the North Region, we opted for illustrations that portray this setting.

During the technology evaluation stage, the e-book was evaluated by the target audience, which included adult patients with ostomies. Inclusion criteria included patients with ostomies who were over 18 years of age, in the post-surgical period for up to six months and receiving assistance from the POC ostomy care service. Users who stated that they could not read or write, or who had visual impairments, were excluded.

The evaluation was conducted in person at the POC headquarters by patients enrolled in the care service who met the established inclusion criteria. Thirty patients with intestinal ostomies were recruited during the study. After they consented to participate in the study, they signed the ICF and received the e-book via WhatsApp®. The e-book evaluation instrument, consisting of three parts (sociodemographic and clinical identification, the Validation of Appearance of Educational Technologies in Health [VAETH] instrument, and the Usability Evaluation using the System Usability Scale [SUS] questionnaire, translated into Portuguese, was then applied. [12]

Data analysis

In the initial stage, an analysis of agreement between the evaluators was performed using the Content Validity

Index (CVI). The CVI evaluates the proportion of experts who agree with certain aspects of the instrument and its items. The overall CVI of the instrument was calculated by adding all the individual CVIs and dividing by the number of items.[13]

The agreement among experts for each item and the instrument was considered satisfactory with a minimum value of 0.90, or 90%.[14] The Kappa test was also used to assess agreement among experts. Kappa values can range from -1.0 to 1.0. Landis and Koch[15] define Kappa values between 0.20 and 0.39 as indicating "reasonable agreement"; values between 0.40 and 0.59 as indicating "moderate agreement"; values between 0.60 and 0.79 as indicating "substantial agreement"; and values higher than 0.79 as indicating "practically perfect agreement."

In stage III, the data were analyzed using the Appearance Validity Index (AVI), based on the CVI method.[16] With regard to evaluation, a AVI-I greater than or equal to 0.78 is classified as excellent, while a AVI-I between 0.60 and 0.77 indicates the need for adjustments to improve the appearance of the educational health technology. An item with a AVI-I of less than 0.60 is considered inadequate, meaning the material needs to be redone. Conversely, the AVI-T must be greater than or equal to 0.90. The SUS score was calculated and classified the evaluated system as follows: 20.5 (the worst imaginable), 21–38.5 (poor), 39–52.5 (median), 53–73.5 (good), 73.5–85.5 (excellent), and 86–100 (the best imaginable).

Ethical aspects

This study was approved by the Research Ethics Committee of the Health Science Sector at the Federal University of Paraná according to Opinion No. 5,785,939. All participants received and signed the informed consent form (ICF).

RESULTS

For the literature review, five official documents that met the theme of this study were selected. These documents were chosen for inclusion in the e-book due to their standardized language and widespread use among professionals who treat patients with this profile. Five central themes were then selected for the e-book (Chart 1).

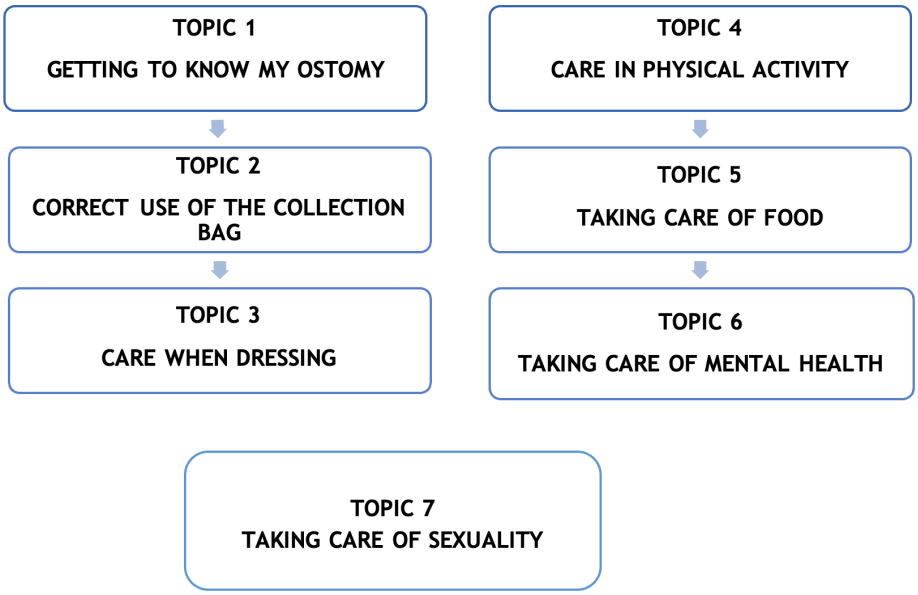
Chart 1 - Contents selected after bibliographic survey to define the guidelines presented in the *e-book*

Selected content	Justifications
Intestinal ostomy	To know the changes in the ostomy, such as color change (healthy: pink/red) to dark purple, brown, or black, or bleeding from inside the ostomy, and peristomy, always paying attention to the presence of itching, redness, or lesions, which are essential for the ostomy patient, to avoid serious complications.
Collection Bag	The collection bag must be appropriate for the type of ostomy according to the guidelines and indications of a specialized professional. Knowing how to handle, apply, and store this material correctly is an essential part of self-care.
Essential Areas for the Well-Being of the Person with an ostomy	Assistance to ostomy patients is based on the rehabilitation process directed toward self-care in areas considered essential for well-being, such as care with physical activities, dressing, and spirituality.
Sexual Health of the Ostomy Patient	The physical and psychological impact of an ostomy on sexual expression requires understanding as an integral part of quality of life. Many myths and fears are closely associated with the sexuality and sexual health of people with ostomies.
Diet for people with ostomies	People with ostomies do not need special diets, so guidance on food is essential. It is important to note that diet directly impacts stool consistency.

Source: The Authors (2024).

The content was organized into topics that highlight the main precautions ostomy patients should follow during the postoperative period and after discharge from the hospital. Figure 1 shows the topics that researchers considered necessary for developing self-care skills in people with ostomies.

Figure 1 - Topics of the e-book content



Source: The Authors (2024).

During the expert content validation stage, the final sample consisted of 11 evaluators. Regarding the sociodemographic profile, three evaluators (27%) were specialists in the field of stomatherapy. Five evaluators (46%) reported having between five and 10 years of experience. Regarding experience conducting research on ostomy care, eight evaluators (73%) reported having none. Two specialists (18%) had published work in the field of stomatherapy, and seven (64%) had teaching experience.

In the first round of evaluation, the CVI was 84%, with variations ranging from 72.7% to 100%. Item 3 (clarifies doubts about the topic addressed) had the lowest CVI (72.7%), followed by items 5 (encourages behavior change), 8 (interactive language allowing active involvement in the educational process), and 14 (current theme), which reached a CVI of 81.8%. The Kappa coefficient value was 0.29, with a 95% confidence interval (0.21 - 0.37); thus, the level of agreement can be considered reasonable.

The initial total CVI proposal was 90%; however, the index was 84% in this round, with several suggestions and modifications by the evaluators to improve the content. The expert evaluators' suggestions for improving the e-book were analyzed and accepted by the researchers. A new script was prepared, and a second round of content evaluation was carried out.

The same evaluators who participated in the first round were invited to participate in the second round. An invitation was sent to all 11 evaluators. By the end of the round, 10 evaluators had returned the completed instrument, making up the final sample.

The total CVI in this second round of evaluation reached 94%, thus complying with the stipulated percentage in the method. Item 11, which addresses essential topics for preventing complications, had the lowest CVI percentage (80%), followed by Item 10, which is also related to item relevance (suggesting that a person with an ostomy should acquire knowledge about the management of the ostomy), with a CVI of 70%. The Kappa coefficient was 0.72, with a 95% confidence interval (0.64 to 0.80), indicating significant agreement.

In Phase II, the e-book was created, and the publisher was defined, choosing the Portable Document Format (PDF)®. The e-book was written with short sentences in the active voice, with one to two main ideas per page, a standard font, and a font size of at least 13mm. Simple definitions known to the target audience were also used.

Regarding the choice of images, original illustrations were developed. A graphic design professional created all the illustrations used in the e-book and submitted them to the researchers for evaluation and approval. 14 illustrations were ultimately created.

As for the audio and visual components of the videos, the researcher sent the written narration to the producer. A professional was chosen to narrate the audio for the e-book.

After finishing the scenes, the researcher uploaded the experimental videos to a YouTube® channel in "unlisted" mode, which allows the videos to be viewed. The videos were evaluated and approved by the authors.

In the end, three videos were created. The first video, entitled "Taking Care of My Ostomy," is two minutes and 51 seconds long and is in the first chapter, "Knowing My Ostomy," on page 6 of the e-book. The second video, "The One-Piece Ostomy Bag," is one minute and 57 seconds long. The third video, "The Two-Part Ostomy Bag," is two minutes and 53 seconds long and is located at the end of the second chapter of the e-book on page 11.

After structuring the content, language, images, and videos, the material was sent to layout. Lato was chosen as the font, standardized at size 14 for titles, subtitles, text body, and text boxes. The background color was chosen as white to make reading easier and more pleasant. Text boxes were used to highlight information in light yellow and gray to give the material a light look. The final edition resulted in the e-book "I Am Ostomized. What Now? How to Take Care of it." It has seven chapters distributed across 18 pages.

From August to November 2023, the target audience of 19 ostomy patients undergoing treatment at the POC ostomy care service evaluated the technology in terms of its visual appearance and usability. Regarding sociodemographic characteristics, the age range was observed to be from 31 to 50 years old (n=10, 52%). Regarding gender, 12 (63%) were male. Regarding salary income, 12 (63%) received up to one minimum wage. Regarding clinical characteristics, 17 (89%) were colostomized, two (11%) had ileostomy, and the most frequent ostomy type was temporary (n = 12, 63%).

The appearance was validated through the instrument (VAETH) used by the target audience. (Table 1).

Table 1 - Instrument for the Validation of Appearance of Educational Technology in Health (VAETH) - target audience: ostomized. Porto Velho, Rondônia, Brazil, 2024

Items	N = 19					
	Strongly disagree	Disagree	Partially disagree	Agree	Totally agree	Individual AVI
	1	2	3	4	5	%
1. The illustrations are appropriate for the intended audience.	-	-	-	3	16	100
2. The illustrations are clear and easy to understand.	-	-	-	5	14	100
3. The illustrations are relevant to help the target audience understand the content.	-	-	-	6	13	100
4. The colors of the illustrations are appropriate for the type of material.	-	-		5	14	100
5. The shapes of the illustrations are also appropriate.	-	-		4	15	100
6. The illustrations portray the daily life of the intervention's target audience.	-	-	-	5	14	100
7. The figures are arranged in harmony with the text.	-	-		6	13	100
8. The figures used clarify the content of the educational material.	-	-	-	4	15	100

Items	N = 19					
	Strongly disagree	Disagree	Partially disagree	Agree	Totally agree	Individual AVI
	1	2	3	4	5	%
9. The illustrations help to explain the theme and are in a logical sequence.	-	-	-	4	15	100
10. There is an adequate quantity of illustrations in the educational material.	-	-		7	12	100
11. The illustrations are appropriately sized.	-	-	-	6	13	100
12. The illustrations help change the target audience's behaviors and attitudes.	-	-	3	5	12	90
TOTAL AVI (%)						**99%**

Legend: Appearance Validity Index; (AVI) Individual and Total, considering answers 4 and 5.
Source: The Authors (2024).

Usability was evaluated using the SUS instrument and classified on a scale from 0 to 100; the higher the score, the greater the user satisfaction. In this study, the mean total score was 83.2 (considered excellent), with a standard deviation of 9.1, ranging from a minimum of 65.0 to a maximum of 97.5. Thus, the technology is acceptable to the target audience.

The final version of the e-book was published and made available on the CofenPlay® platform (Figure 1) via: https://cofenplay.com.br/conteudo/120029, as well as on the GEMSA website: https://gemsaufpr.wordpress.com/2024/04/29/e-book-sou-estomizado-e-agora-como-cuidar-2/.

Figure 1 – Cover of the e-book "I Am Ostomized. What Now? How to Take Care of it" available at Cofenplay®

Source: The Authors (2024).

DISCUSSION

Health education plays a fundamental role in achieving and promoting quality health. Pantoja *et al*.,[17] conducted a study in Pará with the objective of developing an educational technology in the form of a booklet. The researchers highlighted that educational technologies (ET) combined with health education produced significant results for the study participants.

The educational technology produced in this study was based on manuals, booklets, and educational documents developed by associations, the Ministry of Health, and other relevant entities, with an emphasis on the particularities of the northern region of Brazil. Nascimento[2] developed a podcast as an educational resource for people with intestinal ostomies, using institutional protocols to develop and validate the content. Other studies on educational technology for people with intestinal ostomies have also adopted national and international protocols and guidelines as a basis for script content. For example, Silva *et al*.,[18] developed a mobile application to support self-care, aligning their recommendations with those of the Brazilian Association of Stomatherapy (SOBEST).

It is important to note that nursing has incorporated scientific evidence into its practice to provide safe and effective care for patients. This is evident in the development of health technologies based on scientific evidence and validated by specialized professionals.[19] The content of this study was validated by specialists in stomatherapy.

Paczek *et al*.[20] highlight that didactic health resources should include relevant information for the target audience and use understandable, captivating language. The main purpose is to encourage better adaptation to clinical conditions, ensuring that self-care is carried out safely and improving quality of life, while simplifying the learning process.

Barbosa's[21] study, carried out in Ceará, focused on creating and validating educational technology for managing the rights of people with ostomies. The study resulted in the creation of didactic videos. This method is feasible and effective, with the potential to improve ostomy patients' understanding of their rights.

This study found that the e-book was considered valid by the ostomy users who participated in the third stage. According to Melo *et al*.[22], the validation of materials is a crucial step in advancing educational technologies. Validation by the target audience identifies elements that highlight legibility and allows for improvement. In this study, the target audience used the VAETH instrument to validate the appearance of the educational technology.

Similar results have been achieved in other validation studies using VAETH. For example, Frazão *et al*.[23] successfully validated an educational booklet on sexual and reproductive health for discordant serum couples with an AVI-T of 92%, which is considered satisfactory. Negreiros *et al*.[24], who tested the E-MunDiabetes app aimed at educating nursing students about diabetes during the Coronavirus (Covid-19) pandemic, also obtained a similar result with an AVI-T of 92%. Thus, ease of use is directly linked to user satisfaction, as poorly designed interfaces can lead to user disinterest or distrust. [2]

CONCLUSION

The technology created is significant due to its potential for communication and health education, as well as its ability to spread on social media platforms on a large scale. The educational e-book is an innovative digital tool aimed at the population of Northern Brazil. It is accessible and can be implemented in health services to promote the health of adults with ostomies.

One limitation is that the technology development process requires specialized third-party services and incurs financial costs. Additionally, the e-book's reach is limited to individuals with smartphones and reading ability.

This study demonstrated that, in methodological terms, the e-book is feasible and applicable as a health technology with the potential to improve people with ostomies' understanding of self-care. During hospitalization, it is difficult to absorb new information.

Thus, the created e-book can provide ostomy patients with greater independence by complementing healthcare. Patients can identify characteristics and information crucial for adapting to ostomy, improving quality of life, and social reintegration.

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