



SOCIO-EDUCATIONAL TECHNOLOGY FOR CERVICAL CANCER PREVENTION: A METHODOLOGICAL STUDY

TECNOLOGIA SOCIOEDUCATIVA PARA A PREVENÇÃO DO CÂNCER DO COLO DO ÚTERO: UM ESTUDO METODOLÓGICO

TECNOLOGÍA SOCIOEDUCATIVA PARA LA PREVENCIÓN DEL CÁNCER DE CUELLO UTERINO: UN ESTUDIO METODOLÓGICO

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RESUMO

Objetivo: Desenvolver e validar uma tecnologia socioeducativa, no formato de série audiovisual composta por cinco vídeos, voltada à prevenção do câncer de colo do útero em mulheres na faixa etária de 20 a 40 anos. **Método:** Estudo metodológico, de abordagem mista, conduzido em duas etapas: construção e validação de tecnologia audiovisual. A construção baseou-se em revisão de escopo conforme o *Joanna Briggs Institute*, com busca em bases nacionais, internacionais e literatura cinzenta. A validação técnico-científica foi realizada com 22 enfermeiros especialistas, por meio do Índice de Validade de Conteúdo ($\geq 0,70$), e a dimensão ilustrativa avaliada por cinco designers utilizando o *Suitability Assessment of Materials*. A análise incluiu estatística descritiva e análise temática das sugestões. **Resultados:** A revisão subsidiou cinco roteiros temáticos. O Índice de Conteúdo global foi de 0,96, indicando elevada concordância entre especialistas. A validação ilustrativa atingiu 96,9% de adequação, evidenciando qualidade técnico-científica e adequação sociocultural do material. **Conclusão:** A tecnologia apresentou validade de conteúdo e qualidade ilustrativa, com potencial para uso em ações educativas em saúde. Recomenda-se avaliação futura junto ao público-alvo.

Descritores: Neoplasias do Colo do Útero; Prevenção de Doenças; Educação em Saúde; Enfermagem Oncológica; Tecnologia Educacional.

ABSTRACT

Objective: To develop and validate a socio-educational technology in the format of an audiovisual series composed of five videos, aimed at preventing cervical cancer in women aged 20 to 40. **Method:** A methodological study with a mixed-methods approach, conducted in two stages: development and validation of audiovisual technology. Development was based on a scoping review according to the Joanna Briggs Institute, with searches in national and international databases and gray literature. Technical-scientific validation was performed with 22 specialist nurses using the Content Validity Index (≥ 0.70), and the illustrative dimension was evaluated by five designers using the Suitability Assessment of Materials. Analysis included descriptive statistics and thematic analysis of suggestions. **Results:** The review provided the basis for five thematic scripts. The global Content Validity Index was 0.96, indicating high agreement among specialists. Illustrative validation reached 96.9% adequacy, demonstrating technical-scientific quality and sociocultural suitability. **Conclusion:** The technology demonstrated content validity and illustrative quality, with potential for use in health education actions. Future evaluation with the target audience is recommended.

Descriptors: Uterine Cervical Neoplasms; Disease Prevention; Health Education; Oncology Nursing; Educational Technology.

RESUMEN

Objetivo: Desarrollar y validar una tecnología socioeducativa en formato de serie audiovisual compuesta por cinco videos, dirigida a la prevención del cáncer de cuello uterino en mujeres de 20 a 40 años. **Método:** Estudio metodológico con enfoque de métodos mixtos, realizado en dos etapas: desarrollo y validación de tecnología audiovisual. El desarrollo se basó en una revisión de alcance según el Instituto Joanna Briggs, con búsquedas en bases de datos nacionales e internacionales y literatura gris. La validación técnico-científica fue realizada por 22 enfermeras especialistas utilizando el Índice de Validez de Contenido ($\geq 0,70$), y la dimensión ilustrativa fue evaluada por cinco diseñadores mediante el *Suitability Assessment of Materials*. El análisis incluyó estadística descriptiva y análisis temático de las sugerencias. **Resultados:** La revisión proporcionó la base para cinco guiones temáticos. El Índice de Validez de Contenido global fue de 0,96, lo que indica un alto acuerdo entre los especialistas. La validación ilustrativa alcanzó el 96,9% de adecuación, demostrando calidad técnico-científica y adecuación sociocultural. **Conclusión:** La tecnología demostró validez de contenido y calidad ilustrativa, con potencial para ser utilizada en acciones de educación en salud. Se recomienda la evaluación futura con el público objetivo.

Descriptores: Neoplasias del Cuello Uterino; Prevención de Enfermedades; Educación en Salud; Enfermería Oncológica; Tecnología Educacional.

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What is already known:

- Cervical cancer is preventable through Human Papillomavirus (HPV) vaccination and cytopathological screening, yet it maintains high incidence and mortality rates.
- Barriers such as misinformation, fear, embarrassment, and difficulties in accessing health services contribute to low adherence to preventive strategies.
- Audiovisual socio-educational technologies have the potential to broaden access to information and promote behavior change.

What this article adds:

- It developed and validated an audiovisual series of five socio-educational videos on cervical cancer prevention with a high Content Validity Index (CVI=0.96).
- It demonstrated high cultural, motivational, and communicational suitability of the material (96.9% agreement among designers).
- It evidenced that validated audiovisual technologies can strengthen educational strategies and broaden the reach of cervical cancer (CC) prevention.

INTRODUCTION

Cervical cancer (CC) is a chronic disease originating from intraepithelial alterations that can evolve into an invasive process. It affects the fibromuscular portion located in the lower part of the uterus, known as the uterine cervix, which consists of the ectocervix and the endocervix, joined by the squamocolumnar junction⁽¹⁻²⁾.

CC is caused by persistent infection by oncogenic subtypes of the Human Papillomavirus (HPV), the most common sexually transmitted infection globally, which is responsible for almost all cases of the disease. Cervical infection can lead to the development of cervical intraepithelial neoplasia (CIN), a precursor lesion that, in advanced stages, can progress to invasive cancer⁽³⁻⁴⁾. Detection of these lesions is primarily performed through the cytopathological examination of the cervix—known as the Pap smear—which is considered the gold standard for CC screening, as it enables the early identification and timely treatment of cellular changes⁽³⁾.

Recent international estimates indicate that CC is the fourth most incident type of cancer among women worldwide; in 2022, approximately 661,000 new cases and 348,000 deaths from this pathology were registered. Such data highlight the persistent impact of the disease, especially in low- and middle-income countries⁽⁵⁻⁶⁾. The annual global incidence is approximately 604,000 new cases, corresponding to 6.5% of all cancer types in women, with an estimated risk of 13.3 cases per 100,000 women⁽⁷⁾. In Brazil, the number of new cases was 17,010 in the 2023-2025 triennium, with higher prevalence in the North and Northeast regions⁽⁸⁾.

Despite the possibility of prevention and early diagnosis, it is observed that insufficient use of the Pap smear, associated with barriers such as fear, shame, difficulty in accessing health services, and misinformation, contributes to late diagnosis and the maintenance of high morbidity and mortality rates⁽⁹⁻¹⁰⁾.

In this context, health education acts as a strategy aimed at broadening access to information, stimulating self-care, and strengthening women's decision-making regarding preventive measures. This strategy is described as more effective when associated with technologies that facilitate the transmission of information in a clear and accessible manner⁽¹¹⁻¹²⁾.

The use of socio-educational technologies, such as audiovisual materials, has been described as a resource applicable in various care contexts. These materials contribute to

the dissemination of information, the teaching-learning process, and the stimulation of self-care by integrating accessible language, visual resources, and narratives that facilitate the understanding of content related to CC prevention⁽¹²⁻¹³⁾.

The choice of the 20-40 age group is based on the need to reach women in the reproductive phase, a strategic period for educational actions aimed at prevention before the consolidation of health problems, although screening is recommended from the age of 25.

Although there are advances in the prevention of this cancer, there is a lack of evidence in the literature regarding the development of audiovisual technologies specifically validated for the Brazilian sociocultural context, especially in the Amazon region. This justifies the need for methodological studies aimed at the construction and validation of accessible and culturally appropriate educational resources.

Given this scenario, this study aimed to develop and validate a socio-educational technology in the format of an audiovisual series composed of five videos, aimed at preventing cervical cancer in women aged 20 to 40.

METHOD

Study definition

This is a methodological study with a mixed-methods approach (quantitative-qualitative), aimed at the production and validation of an audiovisual health educational technology. The product was classified as socio-educational didactic material, in accordance with the guidelines of the Coordination for the Improvement of Higher Education Personnel (CAPES) for Technical and Technological Products. The study was conducted in two stages: technology development and validation of the technical-technological product⁽¹⁴⁾.

Regarding the technological maturity level, the developed product is classified as Technology Readiness Level 4 (TRL 4), characterized by validation in a controlled environment. At this stage, the technology demonstrates technical-scientific consistency, having been evaluated by specialists regarding its content and illustrative dimension, although it has not yet been applied to the target audience⁽¹⁵⁻¹⁶⁾.

Quantitative analysis included descriptive statistics and the calculation of agreement indices, while the qualitative approach consisted of the analysis of specialists' suggestions, which were categorized and incorporated into the material according to their technical and scientific rele-

vance.

The development of the socio-educational technology was conducted based on a methodological cycle for the construction and validation of health educational technologies⁽¹⁴⁾.

The development stage included a scoping review, guided by the Joanna Briggs Institute (JBI) and structured by the PCC strategy (Population, Concept, and Context), to support the technology's content.

Based on the identified evidence, thematic axes and pedagogical organization were defined, and video scripts were elaborated, considering accessible language and sociocultural suitability. Subsequently, the audiovisual technology was produced using motion graphics resources to favor communication and public engagement. The validation stage was carried out by specialists, including evaluation of the technical-scientific content and the illustrative dimension, with the incorporation of suggestions into the material.

Development of the socio-educational technology

The technology development stage was carried out in three phases: scoping review and content selection for script composition; production of video scripts; and production of the socio-educational videos.

To formulate the research's guiding question, the PCC mnemonic structure was used, as recommended by the JBI⁽¹⁷⁾. The defined elements were: P - Population: Women of all ages and in different regions of the world; C - Concept: Evidence available in the scientific literature on cervical cancer prevention; C - Context: Cervical cancer. Thus, the guiding question was: "What evidence is found in the literature on cervical cancer prevention at a global level?"

A global approach was adopted to gather comprehensive scientific evidence on cervical cancer prevention, allowing for the identification of consolidated strategies and international recommendations. These contents were subsequently adapted to the target audience's sociocultural context, ensuring applicability to the local reality.

For the scoping review, the Virtual Health Library (BVS) platform was accessed, and the following databases were selected: *Medical Literature Analysis and Retrieval System Online* (MEDLINE), Latin American and Caribbean Literature in Health Sciences (LILACS), Nursing Database (BDENF), National Center for Information on Medical Sciences of Cuba (CUMED), and the Municipal Health Secretariat of São Paulo. Regarding gray literature, documents obtained through manual searches in various sources—such as health handbooks, recommendations, and booklets addressing CC prevention, available in the virtual collections of official bodies like the Ministry of Health (MS), the National Cancer Institute (INCA), and specialized societies—were considered.

The descriptors used in the search strategy were selected from the controlled vocabularies Health Sciences Descriptors (DeCS) and *Medical Subject Headings* (MeSH), ensuring terminological standardization and international coverage. Equivalent terms in Portuguese, English, and Spanish were used, combined by Boolean operators (AND/OR), according to the specificities of each database.

Search Strategy 1 was defined as: (*Prevenção* OR *Prevention* OR *Prevención*) AND (*Câncer de colo do útero* OR *Neoplasias do Colo do Útero* OR *Uterine Cervical Neoplasms* OR *Cáncer de cuello uterino* OR *Neoplasias del cuello uterino*). Search Strategy 2 contemplated the combination: (*Neoplasias do Colo do Útero* OR *Uterine Cervical Neoplasms* OR *Neoplasias del cuello uterino*) AND (*Prevenção de Doenças* OR *Disease Prevention* OR *Prevención de Enfermedades*) AND (*Educação em Saúde* OR *Health Education* OR *Educación en Salud*) AND (*Nível de Saúde* OR *Health Status* OR *Nivel de Salud* OR *Doenças Não Transmissíveis* OR *Noncommunicable Diseases* OR *Enfermedades No Transmisibles*). In Search Strategy 3, the following descriptors were used: (*Neoplasias do Colo do Útero* OR *Uterine Cervical Neoplasms* OR *Neoplasias del cuello uterino*) AND (*População* OR *Population* OR *Población*) AND (*Prevenção de Doenças* OR *Disease Prevention* OR *Prevención de Enfermedades*). Finally, Search Strategy 4 included: (*Neoplasias do Colo do Útero* OR *Uterine Cervical Neoplasms* OR *Neoplasias del cuello uterino*) AND (*Política de Saúde* OR *Health Policy* OR *Política de Salud*) AND (*Educação em Saúde* OR *Health Education* OR *Educación en Salud*).

Primary studies with quantitative, qualitative, and mixed approaches were included, as well as secondary studies—such as systematic, integrative, and scoping reviews—in addition to normative documents from the gray literature. Editorials, letters to the editor, opinion studies, and publications that did not answer the guiding research question were excluded. Disagreements between reviewers were resolved by consensus.

The inclusion criteria considered studies published in the last ten years addressing CC prevention strategies in various contexts and populations. The search covered full, free-access articles indexed in databases and identified in the gray literature, in English, Portuguese, and Spanish. The time frame aimed to evaluate studies conducted after the implementation of the National HPV Vaccination Program, initiated in 2014 by the Brazilian Ministry of Health⁽¹⁸⁾.

Articles were selected based on title analysis, followed by independent peer review of abstracts to determine full-text reading. Studies were synthesized using a protocol prepared by the authors and cataloged in a *Microsoft Excel*® table. Critical analysis of primary studies was used to present this review.

Based on the identification of the best technical, scientific, and normative evidence, topics for the videos were selected. The researchers' practical experience was systematically incorporated via triangulation with scientific evidence and normative recommendations, contributing to the contextualization of the content. All elements were submitted to specialist validation, ensuring technical-scientific rigor.

From this analysis, the series "Cervical Cancer Prevention", consisting of five videos, was created. The video narrative was conducted by a nurse in a discussion group format with three characters. At this stage, the research was assisted by a designer. Production followed the Motion Graphics technique, based on previously validated and adjusted scripts. Videos were created in Animaker®, using

animated characters to discuss CC prevention.

In the post-production stage, a comprehensive review of the material was performed, with adjustments in transitions, color palette, and insertion of explanatory texts to improve clarity and audiovisual cohesion. The final material was exported in MP4 format.

Validation of the socio-educational technology

Validation occurred in two dimensions: technical-scientific and illustrative, as recommended for methodological studies on the development of educational technologies. In this phase, evaluation by specialists is used to verify the clarity, structure, relevance, and suitability of the produced material⁽¹⁴⁾.

For technical-scientific validation, specialist nurses were selected⁽¹⁹⁾, requiring at least two of the following: scientific production in oncology; experience in constructing/validating educational materials; specialist, master, or doctor in oncology; member of a scientific society; at least two years of clinical experience in oncology; and development of oncology prevention actions.

The sample size formula used was: $n = Z\alpha^2 \cdot P(1-P) / d^2$, where $Z\alpha^2 = 1.96$, $P = 0.85$, and $d = 0.15$. The result was 22 specialists, considered adequate for an evaluation with an ideal 85% acceptance and minimum 70%, with a 95% confidence level⁽²⁰⁾.

Specialists were identified via the Lattes Platform. After selection, they were invited via electronic submission of the validation instrument, with a 15-day response deadline. A reminder email was sent on the tenth day.

Exclusion criteria included failure to respond by the 15th day, reports of psychological distress during the evaluation, or difficulty in understanding the method.

Data collection used a structured instrument⁽²¹⁾ with three domains: objectives, relevance, and structure/presentation, totaling 17 items. A four-point ordinal scale was used: 1 – Totally Adequate (TA); 2 – Adequate (A); 3 – Partially Adequate (PA); and 4 – Inadequate (I). An open field for suggestions was included⁽²²⁾.

For data analysis, the Content Validity Index (CVI)⁽²³⁾ was adopted. The CVI per domain was calculated by summing responses of “Totally Adequate” and “Adequate,” divided by the total responses. The global CVI was obtained by the arithmetic mean, with 0.70 as the cut-off⁽¹⁴⁾.

For the illustrative dimension, the Suitability Assessment of Materials (SAM) instrument⁽²⁴⁾ was used, with 13 items across five domains (content, language, graphic illustrations, cultural suitability, and motivation), scored from 0 to 2.

Interpretation followed the classification based on percentage of adequacy: <40% inadequate; 40% to 69% adequate; >70% superior. Classification as “adequate” (≥ 10 points/40%) was the minimum acceptability criterion⁽¹⁴⁾.

Qualitative analysis involved organization in an electronic spreadsheet, floating reading, and open coding for meaning units, grouped into thematic categories (clarity, language, technical-scientific correctness, organization, sociocultural suitability).

Suggestions were incorporated based on scientific rele-

vance, coherence, alignment with objectives, and applicability, ensuring methodological rigor.

Ethical aspects

The research was submitted to the Research Ethics Committee of the State University of Amazonas, in compliance with Resolutions No. 466/2012 and No. 510/2016 of the National Health Council (CNS), and was approved under Opinion No. 6,876,876. All participants were informed about the study's objectives and the content of the Informed Consent Form.

RESULTS

In the review, a total of 30,288 studies were identified across various information sources. Of this total, 27,240 were found in the MEDLINE database, 1,510 in LILACS, 116 in CUMED, 112 in BDENF, and 54 in the São Paulo Public Health Secretariat database. The search in non-conventional literature yielded 27 additional documents.

After applying filters, the number of studies was reduced to 6,223. Preliminary analysis of the titles led to the exclusion of 6,001 articles, leaving 222 for subsequent stages. In a new screening, abstracts were evaluated for duplicates, resulting in the elimination of 129 articles, totaling 93 studies for full-text reading. After careful reassessment, 60 articles were excluded for not addressing the research question, resulting in 33 papers selected for the final sample.

From the review analysis, five central themes were identified: cervical cancer prevention; risk factors, signs, and symptoms; HPV and vaccination; preventive examination; and myths and taboos related to cervical cancer. Based on these, the series entitled “Cervical Cancer Prevention” was structured. These thematic axes supported the development of five scripts, organized hierarchically and objectively in a two-column format (scripts and image descriptions), following methodological recommendations for producing educational audiovisual materials. Considering the literature evidence, it was defined that each video would have an average duration of five minutes, aiming to maintain the audience's attention and facilitate content assimilation.

Based on the scripts validated by nurse specialists, the production of the socio-educational videos was carried out, developed by a professional designer using the *motion graphics* technique. Five videos were produced, with clear and didactic language, combining animated characters, graphic elements, and different shot types. The virtual setting prioritized welcoming environments, similar to waiting rooms in health services, in addition to simulations of collective educational activities and explanatory charts, with the objective of facilitating the understanding of the concepts addressed and promoting greater engagement of the target audience with the topic of cervical cancer prevention.

Validation of technical-scientific content

The group of evaluators, composed of 22 nurse specialists, was responsible for the validation of the technical-scientific content, with 100% being female, 14 holding

master's degrees (63.6%), seven doctorates (31.8%), and one specialist (4.5%). Additionally, the average time since academic graduation was approximately 20 years. The years of experience ranged from 10 to 41 years, with a predominance of the 15 to 18 years range (27.3%), 20 to 27 years (22.7%), and 36 to 41 years (18.2%).

Validation of the script showed high agreement among the nurse specialists regarding the suitability of the proposed technology. In Domain 1 - Objectives, which assesses the purposes and goals of the technology, a CVI of 0.96 was obtained, with a predominance of "Totally Adequate" and "Adequate" classifications, with no records of inadequacy.

Similarly, Domain 2 - Structure/Presentation, related to organization, coherence, formatting, and the script's presentation strategy, reached a CVI of 0.95, indicating high acceptance, despite some suggestions.

In Domain 3 (Relevance), which analyzes the significance and pertinence of the technology, the highest level of agreement among evaluators was observed, with a CVI of 0.99 and an absence of inadequate evaluations. Considering the average of the three domains, the overall CVI was 0.96, confirming the validation of the script and its suitability for use in health practice, according to the specialists' assessment (Table 1).

Table 1 - Distribution of scores and agreement CI* from health specialists for each item. Manaus, AM, Brazil, 2025

1 - OBJECTIVES – Refer to purposes, goals, or ends desired to be achieved with the use of technology						
Items of the OBJECTIVES domain	TA [†]	A [‡]	PA [§]	I	TA+A	IVC [¶]
1.1 The information/content is consistent with the daily needs of the technology’s target audience.	15	6	01	00	21	0.95
1.2 The information/content is important for the quality of life and/or work of the technology’s target audience.	18	03	01	00	21	0.95
1.3 Invites and/or instigates changes in behavior and attitude	13	09	00	00	22	1.00
1.4 Can circulate in the scientific environment of the area.	13	09	00	00	22	1.00
1.5 Meets the objectives of institutions that serve/work with the technology’s target audience.	10	10	02	00	20	0.91
Total CVI[¶] – DOMAIN 1						0.96
2 - STRUCTURE/PRESENTATION – way of presenting the guidelines. Includes general organization, structure, presentation strategy, coherence, and formatting.						
Items of the STRUCTURE/PRESENTATION domain	TA [†]	A [‡]	PA [§]	I	TA+A	IVC [¶]
2.1 The technology is appropriate for the target audience.	15	06	01	00	21	0.95
2.2 Messages are presented in a clear and objective manner.	14	08	00	00	22	1.00
2.3 The information presented is scientifically correct.	14	07	01	00	21	0.95
2.4 The material is appropriate to the sociocultural level of the target audience.	10	12	00	00	22	1.00
2.5 There is a logical sequence of the proposed content.	13	09	00	00	22	1.00
2.6 Information is well structured in agreement and spelling.	12	07	03	00	19	0.86
2.7 The writing style corresponds to the level of knowledge of the target audience.	13	08	01	00	21	0.95
Total CVI[¶] – DOMAIN 2						0.95
3 - RELEVANCE – degree of significance of the technology						
Items of the RELEVANCE domain	TA [†]	A [‡]	PA [§]	I	TA+A	IVC [¶]
3.1 Themes portray key aspects that should be reinforced.	15	07	00	00	22	1.00
3.2 Technology allows for generalization and transfer of learning to different contexts.	13	09	00	00	22	1.00
3.3 The technology proposes the construction of knowledge.	14	08	00	00	22	1.00
3.4 The technology addresses the necessary subjects for the target audience’s knowledge.	13	09	00	00	22	1.00
3.5 The technology is suitable to be used by any professional with the target audience.	14	07	01	00	21	0.95
Total CVI[¶] – DOMAIN 3						0.99
OVERALL CI*: 0.96 (Domain 1) + 0.95 (Domain 2) + 0.99 (Domain 3) / 3 = 0.96						

Legend: CI = Agreement Index; [†]TA = Totally Adequate; [‡]A = Adequate; [§]PA = Partially Adequate; ^{||}I = Inadequate; [¶]IVC = Content Validity Index.

Source: prepared by the authors, 2025.

It was found that all domains reached the established CVI. Despite this, there were suggestions and responses in

the PA option that were considered and detailed in Chart 1.

Chart 1 - Considerations of nurse specialists (E)* and researchers' responses. Manaus, AM, Brazil, 2025

Video 1: Cervical Cancer Prevention		
Suggestion	How it was	How it became
Would put disorganized and uncontrolled growth (E2)	Cancer is a disease that makes the body's cells grow uncontrollably.	Cancer is a disease that makes the body's cells grow in a disorganized and uncontrolled way.
Image description: suggestion to add the word "disorganized" and "metastasis" (E10)	Images of cells growing uncontrollably, possibly invading other organs.	Images of cells growing in a disorganized and uncontrolled way, possibly invading other organs (metastases).
Add the source of this age information (E10)	This cancer mainly affects women over 25, but all women who have or have not had sexual intercourse are at risk.	According to data from the National Cancer Institute (INCA), in Brazil this type of cancer is the third most common type in women, mainly affecting those aged 40 to 59.

Chart 1 - Considerations of nurse specialists (E)* and researchers' responses. Manaus, AM, Brazil, 2025 (continued)

Video 2: Risk factors and signs and symptoms of cervical cancer		
Suggestion	Original version	Revised version
Suggestion to adjust the text (E08, E14)	It is good to remember that in the early phase of the disease, symptoms may not appear. Symptoms appear when the disease is already in a more advanced state; changes in menstrual flow may occur, with excessively long periods of bleeding.	It is important to remember that, at the beginning, cervical cancer generally has no symptoms. Signs usually appear only when the disease is more advanced. In this phase, bleeding outside the menstrual period, very long bleeding, bleeding during sexual intercourse, and belly pain may occur.
Some repetitions, for example, the HPV virus, was described as "virus papilomavirus humano", the correct would be Human Papillomavirus (E15)	There is a virus known as HPV, which is the Human Papillomavirus Virus	There is a virus known as Human Papillomavirus (HPV).
Video 3: HPV and cervical cancer prevention by vaccine		
Suggestion	Original version	Revised version
Adjust information about HPV (E07, E14)	HPV causes changes in the cells of the cervix. If these changes are not treated, they can, over time, turn into cancer.	HPV, if it is of the carcinogenic types, can cause changes in the cells of the cervix. If these changes are not identified and treated, they can, over time, progress to cancer, mainly in the cervix, but also in the vagina, vulva, anus, penis, oropharynx, and mouth.
Adjust information about HPV (E13, E19)	The lesions that appear should be treated as soon as possible to prevent them from becoming cancerous. That's why it's so important to have regular preventive exams.	There is no specific treatment for HPV, however, some types of HPV can develop genital warts and can be removed with medications or surgical procedures.
Image description: modification suggestion (E10)	Illustration of a person receiving the vaccine, with a highlight on the protection symbol.	Illustration of an adolescent receiving the vaccine, with a highlight on the protection symbol.
Image description: modification suggestion (E14)	Animation showing a syringe with a heart, symbolizing protection.	Animation showing the protection percentage of the vaccine.
Video 4: Cervical Cancer Preventive Exam		
Suggestion	Original version	Revised version
Adjust the information: If there are changes (E10)	After the cervical cells are collected, this material is sent to a laboratory that will examine if everything is normal or if there is any change. If something is altered, that is at the beginning and that is not so complicated, it is possible to treat it and prevent it from turning into cancer. That's why we say this exam can save lives.	After the cervical cells are collected, this material is sent to a laboratory that will examine if everything is normal or if there is any change. If there is something abnormal, it needs to be evaluated so that it can be treated or monitored. Remembering that not every change means cancer. That's why we say this exam can Save Lives...
Adjust the information source about the age of women for preventive exam collection (E13)	The Pap smear is indicated for all women aged 25 to 64, who have had or have an active sexual life.	According to the Ministry of Health, the Pap smear is indicated for all women aged 25 to 64, who have had or have an active sexual life.
Video 5: Myths and Taboos about Cervical Cancer		
Suggestion	Original version	Revised version
Image description: suggestion to change the image (E10)	Animation showing a woman smiling during an exam, with a clock marking a short time.	Animation showing a woman entering the office apprehensive and another leaving after a peaceful collection.
Adjust about embarrassment (E10)	Taking care of health should come first. No need to be embarrassed. All are professionals.	Taking care of health should come first. Embarrassment should be overcome by thinking about disease prevention. All are professionals.
Add the percentage in case of early detection (E08)	When detected early, cervical cancer is treatable, and many cases are curable.	When detected early, cervical cancer is treatable, and 90% of cases are curable.

Legend: *(E) = Specialist.

Source: prepared by the authors, 2025.

Validation of the illustrative dimension

The evaluators of the technology's illustrative dimension were five professionals in the design field, aged between 30 and 65 (mean 42.2 years). Participants had experience in the field ranging from 3 to 20 years, with a mean of 11 years. Academic background is concentrated in design, advertising, technology, and education. The group possesses postgraduate degrees in Marketing, Advertising, Graphic and Multimedia Design, and Digital Technologies, in addition to master's degrees in User Interface and Education.

Considering ten points as the minimum for individual validation, the minimum overall score required was 50 points (multiplication of the parameter by the number of specialists). In the general assessment, 126 points were

reached (Table 2), with an individual average score of 25.2 points, which classifies the socio-educational video as adequate. Evaluations of the illustrative dimension ranged from 24 to 26 points; three specialists evaluated the material with the maximum score (26 points) and two with 24 points.

Table 2 presents the assessment of the socio-educational technology's illustrative dimension, carried out by five specialists, according to the SAM instrument.

In the content domain, a total of 30 points (100%) was obtained. In the language domain, 29 points (96.7%) were recorded. The graphic illustration domain presented 17 points (85%). In the motivation and cultural suitability domains, 30 points (100%) and 20 points (100%) were achieved, respectively (Table 2).

Table 2 - Individual scores of specialist *designers* (E.D.)* for validation of the illustrative dimension by domain. Manaus, AM, Brazil, 2025

Specialist Designer	Score by Domain					Final Score
	Content	Language	Graphic Illustration	Motivation	Cultural Suitability	
E.D 01	06	06	04	06	04	26
E.D 02	06	05	03	06	04	24
E.D 03	06	06	02	06	04	24
E.D 04	06	06	04	06	04	26
E.D 05	06	06	04	06	04	26
Score by specialist Total of judges: 26+24+24+26+26 / 5 = 126 / 5 Average score = 25.2 points						

Legend: *E.D – Specialist *designer*

Source: prepared by the authors, 2025.

The total score obtained was 126 points, out of a maximum possible 130 points, corresponding to 96.9% adequacy. The average score was 25.2 points, in a maximum total of 26 points (Table 2). According to the SAM classification, this result qualifies the material as “superior” ($\geq 70\%$). Individual specialist scores ranged between 24 (92.3%) and 26 points (100%), all staying in the “superior” classification range.

The results obtained in the evaluation of the socio-educational videos, especially the high scores in the Cultural Suitability (30 points) and Motivation (20 points) domains, show the technical-scientific quality and sociocultural suitability of the material, according to the specialists’ judgment. These findings indicate that the technology has potential to favor the understanding and engagement of

the target audience, although its effectiveness cannot be inferred, considering that it has not yet been applied in a real context.

In this sense, the technology is at a maturity level corresponding to TRL 4, characterized by validation in a controlled environment, with the need for subsequent studies to evaluate its applicability and impact with the population⁽¹⁶⁾.

Table 3 presents the distribution of specialist responses in the validation of the socio-educational technology’s illustrative dimension, according to the domains of the SAM instrument. The overall value obtained was 126 points (96.9%) of a total possible 130 points, amply exceeding the acceptability parameter.

Table 3 - Distribution of points with each specialist *designer* according to the responses obtained in each item, according to content, language, graphic illustrations, motivation, cultural suitability. Manaus, AM, Brazil, 2025

Domain items	00 I*	01 PA [†]	02 A [‡]	Points obtained
DOMAIN 01 – CONTENT				
1.1 The objective is evident, facilitating prompt understanding of the material	-	-	10	10
1.2 The content addresses behavior-related information that helps to prevent and self-care	-	-	10	10
1.3 The material proposal is limited to objectives, so the reader can understand in the permitted time and without confusion	-	-	10	10
DOMAIN 02 – LANGUAGE				
2.1 The reading level is adequate for viewer comprehension	-	-	10	10
2.2 Conversational style facilitates text understanding	-	01	08	09
2.3 Vocabulary uses common words	-	-	10	10
DOMAIN 03 – GRAPHIC ILLUSTRATIONS				
3.1 The title attracts attention and portrays the material purpose	-	02	06	08
3.2 The illustrations present key visual messages so that the viewer can understand the main points alone, without distractions	-	01	08	09
DOMAIN 04 – MOTIVATION				
4.1 Interaction occurs between text and viewer, leading to problem solving, making choices and/or demonstrating skills	-	-	10	10
4.2 Desired behavior patterns are modeled or well demonstrated	-	-	10	10
4.3 Motivation for self-efficacy exists, i.e., people are motivated to learn because they believe tasks and behaviors are feasible	-	-	10	10
DOMAIN 05 – CULTURAL SUITABILITY				
5.1 The material is culturally suitable to the logic, language, and experience of the target audience	-	-	10	10
5.2 Presents culturally suitable images and examples	-	-	10	10
OVERALL SCORE				126 POINTS

Legend: I = Inadequate; PA = Partially Adequate; A = Adequate.

Source: prepared by the authors, 2025.

In the Content Domain, all items were evaluated as “Adequate”, totaling 10 responses (100%) in each item, with no records of “Partially Adequate” or “Inadequate” responses. In the Language Domain, a predominance of “Adequate” responses was observed, with 28 responses (93.3%), and 2 responses (6.7%) classified as “Partially Adequate”. There were no records of “Inadequate” responses. In the Graphic Illustrations Domain, 14 responses (70%) were recorded as “Adequate” and 6 responses (30%) as “Partially Adequate”, with no occurrence of “Inadequate” responses. In the Motivation Domain, all responses were classified as “Adequate”, corresponding to 10 responses (100%) in each

item evaluated. In the Cultural Suitability Domain, total agreement was also verified, with 10 responses (100%) classified as “Adequate” in all items. In the overall total, considering all domains, there was a predominance of “Adequate” responses, with a low frequency of “Partially Adequate” responses and an absence of “Inadequate” evaluations.

Chart 2 presents the relationship of socio-educational videos organized by theme, composing the series “Cervical Cancer Prevention”. It describes the titles corresponding to each theme addressed, as well as the respective access links on the eduCAPES and YouTube platforms.

Chart 2 - Links to access the eduCAPES Platform and YouTube. Manaus, AM, Brazil, 2025

Video	Title	eduCAPES	YouTube
1	Cervical Cancer Prevention	http://educapes.capes.gov.br/handle/capes/922130	https://www.youtube.com/watch?v=XDxw80pJQDM
2	Risk factors and signs and symptoms of Cervical Cancer	http://educapes.capes.gov.br/handle/capes/922133	https://www.youtube.com/watch?v=jpeMyxOhO-k
3	HPV and vaccination for Cervical Cancer prevention	http://educapes.capes.gov.br/handle/capes/922136	https://www.youtube.com/watch?v=voxIo4WE4dA
4	Cervical Cancer preventive exam	http://educapes.capes.gov.br/handle/capes/922134	https://www.youtube.com/watch?v=Cv90UrWSWJo
5	Myths and taboos related to Cervical Cancer	http://educapes.capes.gov.br/handle/capes/922135	https://www.youtube.com/watch?v=9aNf5JswjQA

Source: prepared by the authors, 2025.

DISCUSSION

The development of validated socio-educational materials is essential for the dissemination of safe and accessible information, especially regarding high-impact pathologies such as CC. By fostering awareness and the implementation of prophylactic measures, such resources aim to contribute to the reduction of incidence and mortality rates associated with this disease.

In this study, multi-professional validation was adopted with the participation of specialists from the fields of health and design⁽¹⁴⁾. While the former validated the technical-scientific content, the latter evaluated the illustrative dimension. In both categories, the technology received a satisfactory evaluation, which corroborates its relevance and alignment with the outlined objectives.

The development of educational materials that are simultaneously attractive and capable of conveying messages clearly, ensuring the comprehension of concepts, constitutes a methodological challenge. Resources such as booklets, videos, and leaflets are designed to qualify the guidance of patients and family members, favoring the communication process, increasing treatment adherence, and strengthening autonomy in decision-making⁽²⁵⁾.

These materials allow for the transmission of information in a visual, dynamic, and accessible manner, facilitating the understanding of crucial topics, such as the relevance of the cytopathological examination, HPV vaccination, and the adoption of healthy habits. Furthermore, socio-educational videos possess the versatility to be adapted to different audiences and platforms, reaching women of various age groups and sociocultural contexts. Such an interactive approach not only informs but also stimulates reflection

and behavioral changes, contributing to the prevention and early diagnosis of CC⁽²⁶⁾.

The rigorous validation process allowed specialists to analyze the technology through the prisms of scientific accuracy, linguistic accessibility, and pedagogical alignment, ensuring the effectiveness of the final message.

Regarding the content domain, the general organization, structure, narrative strategy, coherence, and formatting were evaluated⁽²¹⁾. Although most items obtained a positive CVI, specialists’ observations regarding specific script segments were incorporated to optimize clarity and ensure full comprehension by the target audience.

Textual readjustment and the synthesis of lines made the dialogues more dynamic, broadening the potential for engagement and the promotion of changes in the users’ reality. The adequacy of the content directly impacts its relevance, demonstrating that the technology reinforces fundamental aspects, favors learning, and establishes a fruitful dialogue between different areas of knowledge⁽²⁷⁾.

In the validation by design, the high score in the “Motivation” domain indicates that the videos are capable of engaging the target audience positively, stimulating interest and active participation. Such results suggest that the material transcends its informative function by encouraging changes in attitude, which enhances its effectiveness in the realm of health education.

Obtaining 126 points (96.9% adequacy) reflects the high standard of quality and acceptability of the material. This result attests that the videos meet the validation criteria, presenting robust cultural adequacy, communicational clarity, and motivational capacity.

Reaching a near-maximum score indicates that the content is relevant and structurally sound, with the poten-

tial to positively impact women's adherence to preventive measures. Additionally, this evaluation strengthens the credibility of the technology, encouraging its application in contexts of awareness and health promotion.

CC prevention is an imperative strategy to mitigate the morbidity and mortality of the disease, which remains elevated in regions with barriers to accessing health services. In this scenario, audiovisual technologies play a crucial role in capillary-expanding the reach of educational actions⁽²⁸⁾.

Audiovisual resources constitute innovative tools for nursing care and education. Such technologies expand the possibilities of care practices, qualifying care and allowing knowledge construction to occur horizontally⁽²⁷⁾.

A validated technology in video format is relevant for overcoming informational and communicative barriers⁽²⁸⁾. Visual characteristics and textual elements favor individuals with different literacy levels, providing greater adherence. Therefore, the video constitutes a strategic tool for modifying unfavorable indicators related to CC.

The protagonism of the nurse in the construction, validation, and utilization of socio-educational technologies is highlighted, acting as a mediator between scientific knowledge and community practice. Their participation in the validation process ensured the rigor of information, linguistic adequacy, and thematic relevance.

As a limitation of this study, the completion of only two initial methodological stages is noted. The phase of practical application, aimed at verifying usability and direct impact with the target audience, was not contemplated in this temporal scope.

CONCLUSION

The study demonstrated that the technology holds val-

idation from both nurse and designer specialists, as evidenced by the scores attributed across criteria such as clarity, relevance, and applicability. The utilization of this material in health education initiatives can be a valuable tool for strengthening preventive care, raising women's awareness regarding the importance of regular screening, and encouraging the adoption of safe and effective health practices. The impact of this approach reinforces the relevance of using socio-educational technologies in addressing public health challenges.

Furthermore, the role of the nurse as a strategic agent in the implementation of socio-educational technologies is highlighted, as they can utilize the developed videos in various care and educational contexts, especially in Primary Health Care. Its application has the potential to strengthen health education actions, expand access to information, and contribute to the prevention of cervical cancer.

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CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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Data collection: Aguiar MVC, Ribeiro MNS, Diniz CX.

Data analysis: Aguiar MVC, Ribeiro MNS, Diniz CX.

Data interpretation: Aguiar MVC, Ribeiro MNS, Diniz CX.

All authors are responsible for the textual writing and critical review of the intellectual content, the final version published, and all ethical, legal, and scientific aspects related to the accuracy and integrity of the study.



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