



Educational technology for adolescents: construction and validation of an acquired syphilis flip chart

Tecnologia educativa para adolescentes: construção e validação de álbum seriado sobre sífilis adquirida

Tecnología educativa para adolescentes: construcción y validación de álbum ilustrado sobre sífilis adquirida

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ABSTRACT

Objective: To construct and validate an acquired syphilis flip chart to be used as an educational strategy for adolescents. **Methods:** This methodological study was carried out in Recife, Pernambuco, from November 2018 to April 2019. Data were collected from 22 expert judges to validate the appearance and content of the flip chart and 40 adolescents from a public school who evaluated the album for appearance. The content validity was analyzed using the Item - Level Content Validity Index (I-CVI) and agreement between the judges using the Intraclass Correlation Coefficient (ICC). The appearance validity was analyzed using the Suitability Assessment of Materials (SAM). The Statistical Package for the Social Sciences (SPSS) software was used for analysis. **Results:** The flip chart has 20 pages and contains guidelines on acquired syphilis. The mean I-CVI measured by the expert judges was 0.97, with an excellent level of agreement between the responses. According to the SAM form, the flip chart met superior criteria, with a mean score of 80.99% among the judges, and its use was recommended by the target audience. The adolescents unanimously approved the material, believing it to be clear, easy to understand and relevant. **Conclusion:** The flip chart was constructed, and judges validated its content and appearance and the target audience validated its appearance. It can be used with adolescents in the school environment or in other realities.

Descriptors: Validation Studies; Educational technology; Adolescent; Syphilis.

RESUMO

Objetivo: Construir e validar um álbum seriado sobre sífilis adquirida a ser utilizado como estratégia educativa para adolescentes. **Métodos:** Trata-se de um estudo do tipo metodológico realizado em Recife, Pernambuco, no período de novembro de 2018 a abril de 2019. Obtiveram-se dados provenientes de 22 juízes especialistas para validação de aparência e conteúdo do álbum seriado e de 40 adolescentes de uma escola pública, os quais avaliaram o álbum quanto à aparência. Analisou-se a validade de conteúdo considerando: o Item - Level Content Validity Index (I-CVI); a concordância entre os juízes, por meio do coeficiente de correlação intraclass (ICC); e a validade de aparência, usando o Suitability Assessment of Materials (SAM). Utilizou-se o software Statistical Package for the Social Sciences (SPSS) para análise. **Resultados:** O álbum seriado possui 20 páginas



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e contém orientações sobre a sífilis adquirida. A média do I-CVI foi de 0,97 pelos juízes especialistas; constatando-se como excelente nível de concordância entre as respostas. A partir do formulário o SAM, o álbum foi julgado como superior, obtendo uma média de 80,99% entre os juízes, sendo recomendada sua utilização pelo público ao qual se destina. Houve unanimidade pelos adolescentes na aprovação do material, julgando ser claro, de fácil compreensão e relevante. **Conclusão:** O álbum seriado foi construído e validado em seu conteúdo e aparência por juízes e, quanto à aparência, pelo público-alvo, podendo ser utilizado com adolescentes no ambiente escolar ou em outras realidades.

Descritores: Estudos de Validação; Tecnologia Educacional; Adolescente; Sífilis.

RESUMEN

Objetivo: Construir y validar un álbum ilustrado sobre la sífilis adquirida para utilizarla como estrategia educativa para adolescentes. **Métodos:** Se trata de un estudio del tipo metodológico realizado en Recife, Pernambuco, en el periodo entre noviembre de 2018 y abril de 2019. Se recogieron datos de 22 jueces especialistas para la validación de la apariencia y del contenido del álbum ilustrado y de 40 adolescentes de una escuela pública los cuales evaluaron la apariencia del álbum. Se analizó la validez del contenido considerándose el Item – Level Content Validity Index (I-CVI); la concordancia entre jueces a través del coeficiente de correlación intraclase (ICC); y la validez de la apariencia usando el Suitability Assessment of Materials (SAM). Se utilizó el software Statistical Package for the Social Sciences (SPSS) para el análisis. **Resultados:** El álbum ilustrado tiene 20 páginas y orientaciones sobre la sífilis adquirida. La media del I-CVI ha sido de 0,97 de parte de los jueces especialistas, constatándose como excelente nivel de concordancia entre las respuestas. El álbum ha sido considerado como superior por el formulario SAM con una media del 80,99% entre los jueces y la recomendación de su utilización por el público de destino. Hubo unanimidad de los adolescentes para la aprobación del material considerándolo claro, de fácil comprensión y relevante. **Conclusión:** El álbum ilustrado ha sido construido e validado por jueces por su contenido y apariencia y solo por la apariencia por el público investigado y puede ser utilizado con adolescentes en su entorno escolar o en otras realidades.

Descriptores: Estudio de Validación; Tecnología Educacional; Adolescente; Sífilis.

INTRODUCTION

Educational technology (ET) is defined as effective processes that are based on everyday experiences aimed at the systematic development of knowledge to be used in specific practices⁽¹⁾. Thus, the objective of these processes is to mediate educational practices so that they collaborate with the participants' teaching and learning activities⁽²⁾.

There are several forms of ET, such as brochures, booklets, flip charts, guidance books and handouts, available in print and digital versions⁽²⁾. The use of print ET is considered a viable alternative to promote information and sensitize the target audience, therefore contributing to generate new ways of promoting health⁽³⁾.

It is important to insert adolescents into health services, especially because of the vulnerabilities to which they are exposed, and into the school environment, which are considered spaces for the exchange of knowledge⁽⁴⁾.

Currently, there has been an increase of 32.7% in the number of cases of acquired syphilis in Brazil⁽⁵⁾. These numbers are more worrying among adolescents as many of them do not wear condoms, which can also lead to unwanted pregnancies and, as a consequence of not effectively treating syphilis, new cases of congenital syphilis, which will require more time and the health team's commitment to this population group⁽⁶⁾.

Health services face difficulties related to this public simply because they do not seek services because they are ashamed to assume that they are having a sex life. Therefore, it is important to create health promotion strategies in the environment in which these adolescents are inserted to improve understanding about sexuality and knowledge of their vulnerabilities⁽⁷⁾.

Therefore, the objective of this study was to construct and validate an acquired syphilis flip chart to be used as an educational strategy for adolescents.

METHODS

This methodological study was carried out in Recife, Pernambuco, Brazil, from November 2018 to April 2019. This study consisted of the implementation of a previously disclosed protocol following the same methodological steps⁽⁸⁾. A bibliographic survey was carried out by selecting eleven scientific articles, one thesis, three dissertations, four manuals issued by the Ministry of Health and one website of a Non-Governmental Organization (NGO). The

materials were searched in different databases using one or more of the following descriptors: validation studies, educational technology, adolescents and syphilis.

The purpose of the selection was to gather the relevant content for the flip chart and construct the instrument for the informal interview carried out in the situational diagnosis. Thus, the following questions were formulated: What have you heard about syphilis? Do you know that there are several types of syphilis? Would you know what they are? What are the types of syphilis? How do you think syphilis can appear in the body? How do you think syphilis is prevented? What did you hear about the number of syphilis cases in your city? What about the cure for syphilis, what have you heard about it?

After developing this instrument, 100 informal interviews were held with adolescents aged 10 to 19 years from a public school in the municipality of Recife⁽⁹⁾. At this stage, the following inclusion criteria were considered: being between 10 and 19 years old, not having previously participated in any educational intervention related to the subject and being regularly enrolled in the school chosen for the study.

In an attempt to meet the need for information identified in this step and analyze the references, we created the flip chart script. We chose to use an explanatory dialog based on the following themes: 1 - Talking to Maria and José; 2 - What is syphilis?; 3 - How is syphilis transmitted?; 4 - Can I prevent syphilis? How can I protect myself?; 5 - Syphilis has more than one stage, did you know that?; 6 - How do I know if I am infected?; 7 - Is it possible to get treated?; 8 - Is syphilis curable?

The illustrations were designed based on reflective reading, in which the designer was informed about the way the situations and the contents should be presented based on the references analyzed and the most relevant subjects of the flipchart.

These data were sent to a professional with experience in preparing educational materials who used Adobe InDesign CS3 to make the drawings and Adobe InDesign CS6 to design the layout of the information, including all the text and image content of the flip chart. Knowing the importance of validating the ET constructed, we proceeded to the third stage of the study – the validation of the flip chart. A total of 22 experts participated in this process, a number considered adequate for an evaluation in which there is an ideal proportion of 85% of acceptance among the judges⁽¹⁰⁾.

The literature recommends criteria for the selection of judges, such as having specialized knowledge in the area, having special ability in a type of study, passing a test for judges and/or having a high rating given by an authority on the subject⁽¹¹⁾. Thus, the selection of judges took place through a search in the Lattes curriculum system based on teaching and/or assistance experience in the fields of adolescent health, health technology, instrument validation, epidemiology and public health⁽¹²⁾. The sampling method used was the snowball, where existing study subjects who meet the eligibility criteria indicate other study subjects⁽¹³⁾.

After selecting the judges, letters containing the research objectives were sent to invite them to participate. Thus, those who agreed to participate received an informed consent form, a digital version of the flip chart, the characterization questionnaire, the flip chart analysis protocol and the Suitability Assessment of Materials (SAM)⁽¹⁴⁾.

The author-developed questionnaire for the characterization of the judges contained variables related to identification, training and professional experience, and scientific publications in the fields of study. A quantitative assessment was carried out to calculate the percentage for the number of judges included in each item presented.

The flip chart analysis protocol was organized into two sections. The first, which was adapted from another instrument⁽¹¹⁾, contained five items referring to the internal content of each script containing the evaluation of the variables: clarity and description; comprehension and easy understanding; association with the proposed theme; adequacy of the content to the target audience; relevance of the figures and script. The second section, which was also adapted from another instrument⁽¹⁵⁾, included the evaluation of the flip chart as a whole based on eleven variables: adequacy of the educational material to adolescents; messages presented in a clear and objective manner; scientifically correct information; logical sequence of content; information structured cohesively and spell-checked; writing style adequate to the target audience; consistency of cover, back cover and summary information; adequacy of the size of titles and topics; expressive and sufficient illustrations; appropriate flip chart material; and adequacy of the number of pages. This instrument was evaluated on a Likert-like scale, which was used to assess content validity. The CVI (Content Validity Index) was used to measure the proportion of judges who agreed on certain aspects of the instrument⁽¹²⁾.

Thus, three mathematical equations were used: a) the I-CVI (Item-Level Content Validity Index) to evaluate each item. The I-CVI was computed as the number of judges who rated the item as 3-agree and 4-totally agree on the Likert scale. These responses are considered adequate as the Likert scale scores them as positive and what matters

is the total value of the sum of the responses; b) S-CVI/AVE (Scale-Level Content Validity Index, Average Calculation Method) to measure the proportion of the scale items rated as 3-agree and 4-totally agree by each judge; and c) the S-CVI (Scale-Level Content Validity Index) to measure the average proportion of items rated as 3-agree and 4-totally agree by all judges. The index was considered as desirable in the content validation was 0.80 or higher⁽¹²⁾.

The Suitability Assessment of Materials (SAM) is an instrument⁽¹⁵⁾ adapted and translated into Portuguese⁽¹⁴⁾ that allows checking whether the educational material is suitable for the intended audience and validating the appearance of the material. The evaluation criteria were considered as: "superior" – two points; "Adequate" – 1 point; and "Not suitable" – 0 points. Thus, the flip chart will be considered a "superior" educational material when it reaches between 70% and 100% of the scores; "Adequate" when between 40% and 69%; and "Not suitable" when between 0 and 39%. Another evaluation of the flip chart checked the agreement between the judges through the intraclass correlation coefficient (ICC), with a significance level of 5%.

A space for open responses was included in the analysis protocol for possible contributions and criticisms to be reported by the judges. In that regard, all the interviewees' responses were analyzed and accepted and contributed to the final version of the flip chart.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 and later presented in tables.

For the evaluation by the target audience we used an adapted instrument⁽¹⁶⁾ with items addressing the appearance of the flip chart: attractive cover indicating the content of the flip chart; appropriate size of the cover title and short titles; topics arranged in an order; adequate number of pages; importance of the topic addressed for adolescent health; the flip chart features information on acquired syphilis; and whether the texts are plain, clear and interesting and present important information for learning about syphilis.

The validation was carried out with 40 adolescents from a school in the municipality of Recife, Pernambuco. The literature recommends 25 to 50 subjects for the validation of instruments and technologies⁽¹⁷⁾.

This study was approved by the Research Ethics Committee of the Agamenon Magalhães Hospital (Approval No. 2.670.213). All the participants and their legal guardians gave written informed consent. Confidentiality on all the information collected was maintained and the anonymity of the participants was ensured according to the provisions contained in Resolution No. 466/12 of the National Health Council⁽¹⁸⁾.

RESULTS

Most of the judges who participated in this study were women, representing 95.5% (n=21) of them. Regarding age, the predominant age ranges were 30-39 years old and 50+ years old, representing 36.4% (n=08) each. The judges were selected from different regions of Brazil, with the Southeast Region being the most representative, with 50% (n=11) of the judges. As for number of years since graduation, 36.4% (n=08) of the judges reported 11-20 years and 22.7% (n=05) reported 31 years, thereby showing that the judges were highly experienced in their field of work (Table I).

With regard to basic training, the study counted on the participation of professionals from different fields of knowledge in order to contribute to the evaluation process from different points of view. There was a predominance of nurses among the professionals, representing 81.8% (n=18) of the judges. Regarding their degree, 63.3% (n=14) held a master's degree. In addition, the most representative field of work was Child and Adolescent Health (50%; n=11) (Table I).

With regard to the validation process, the protocol was divided into two sections: the first referred to the evaluation of the scripts, which consisted of the guidelines that the professional should disclose during the educational activity, and the second referred to the illustrations, the content, the layout and the relevance of the material (Table II).

Thus, 19 of the 22 judges obtained a S-CVI/AVE score of 1, which represented agreement on all the items evaluated. Only 1 judge obtained a score of 0.94 and the remaining two obtained a score of 0.60. Thus, the mean S-CVI/AVE score among the judges was 0.97. The protocol evaluated 16 items and the I-CVI for each one and its mean were computed. A total of 6 items obtained an I-CVI score of 1; 9 scored 0.95 and one scored 0.91, with a mean I-CVI score of 0.97 (Table II).

Table I - Characterization of judges according to profile and professional experience variables. Recife, 2019.

Variables	n	%
Sex		
Men	01	4.5
Women	21	95.5
Age		
20-29 years	01	4.5
30-39 years	08	36.4
40-49 years	05	22.7
50+ years	08	36.4
Region where he/she lives		
Northeast	07	31.8
North	04	18.2
Southeast	11	50.0
Training		
Dentist	01	4.5
Nurse	18	81.8
Physician	02	9.1
Pharmacist	01	4.5
Years since graduation		
5-10 years	05	22.7
11-20 years	08	36.4
21-30 years	04	18.2
31+ years	05	22.7
Degree		
Master's	14	63.6
PhD	07	31.8
Post-doctoral	01	4.5
Fields of publication/work		
Right to health	01	4.55
Nursing and caring	01	4.55
Epidemiology	01	4.55
Child and Adolescent Health	11	50.0
Women's Health	01	4.55
Public Health	01	4.55
Systematization of Nursing Care	01	4.55
Educational Technology	04	18.18
Instrument Validation	01	4.55
Total	22	100.0

Table II - Judges' assessment of the flip chart in relation to the items in the instrument by relevance. Recife, 2019.

Items	Judges																						Values	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	*ass.	I-CVI
Section 1 – Scripts																								
1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	21	0.95
1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	21	0.95
1.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
1.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	21	0.95
1.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
Section 2 – Assessment of the flip chart illustrations, content and layout and relevance of material																								
2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
2.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	21	0.95
2.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	21	0.95
2.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	21	0.95
2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	21	0.95
2.6	X	-	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	20	0.91
2.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
2.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
2.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	21	0.95
2.10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	1.00
2.11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	21	0.95
S-CVI/ AVE	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	1.00	1.00	1.00	0.69	1.00	1.00	1.00		
Mean I-CVI																							0.97	
S-CVI																							0.97	

*Number of agree or totally agree responses considered by the judges; (X) Agree or totally agree on the Likert scale; (-) Disagree or totally disagree on the Likert scale

With regard to the content validity of the items in section I – which covers the scripts – assessed by the ICC, Table III shows there were 93 (84.5%) responses totally agreeing with item 1.1 (clarity of description), 1.2 (comprehension and easy understanding), 1.3 (association with the proposed theme), 1.4 (suitability of the content to the target audience) and 1.5 (relevance of the flip chart figures and script). The ICC was 0.780 ($p < 0.0001$), which demonstrates a high level of agreement between the judges and statistical significance.

Table III also shows the ICC values for section 2, which evaluated the illustrations, the adequacy of the content, the layout of the flip chart and whether the material developed was relevant. There were 175 (72.3%) responses totally agreeing with the evaluated items, namely: 2.1 - The educational manual is suitable for adolescents; 2.2 - The messages are presented in a clear and objective way; 2.3 - The information presented is scientifically correct; 2.4 - The logical sequence of the proposed content is consistent; 2.5 - The information is structured cohesively and spell-checked; 2.6 - The writing style corresponds to the level of knowledge of the target audience; 2.7 - Information on the cover, back cover, summary, acknowledgments and/or presentation are consistent; 2.8 - The size of the title and topics is adequate; 2.9 - The illustrations are expressive and sufficient; 2.10 - The analyzed version is suitable

for printing and 2.11 - The number of pages is adequate. Thus, the ICC was 0.780 ($p < 0.0001$), which is statistically significant to the characteristics that assess the level of significance of the flip chart.

Table III - Distribution of judges' responses regarding the analysis sections of the scripts. Recife, 2019.

Sections	Totally disagree 1	Disagree 2	Agree 3	Totally agree 4
Section 1 – Scripts				
Item 1.1	-	1	2	19
Item 1.2	-	1	4	17
Item 1.3	-	-	1	21
Item 1.4	-	1	4	17
Item 1.5	-	-	3	19
Total percentage	0.0	2.7	12.7	84.5
ICC: 0.784; $p < 0.001$		TOTAL ICC: 0.903; $p < 0.001$		
Section II – Illustrations. content. layout and relevance of the material				
Item 2.1	-	-	6	16
Item 2.2	-	1	7	14
Item 2.3	-	1	2	19
Item 2.4	-	1	3	18
Item 2.5	-	1	4	17
Item 2.6	-	2	9	11
Item 2.7	-	-	6	16
Item 2.8	-	-	6	16
Item 2.9	-	1	4	17
Item 2.10	-	-	8	14
Item 2.11	-	1	4	17
Total percentage	0.0	3.3	24.4	72.3
ICC: 0.894; $p < 0.001$		TOTAL ICC: 0.903; $p < 0.001$		

The total ICC for the two sections was 0.903 ($p < 0.00$), a value above expectations and which represents a high level of significance.

Figure 1 shows the relationship between all the expected and obtained values in the analyses performed. It is possible to state that the flip chart outperformed the results in all the analyses performed.

The judges suggested 15 adjustments, which were made in the material: addition of characteristics of an adolescent to the character; inclusion of internal content elements on the cover; change of the order of the summary by placing the script on prevention before treatment of syphilis; inclusion of a male character so as not to transmit the idea that only the girl is accountable; designation of one script as “transmission” and inclusion of information saying that contamination can occur through contaminated needles; change of the color of condoms to transparent; softening of the text about treatment and inclusion of information saying that there is an alternative for those allergic to penicillin, and, finally, addition of a page to end the flip chart with a speech from the characters. Chart 1 shows some scripts after suggestions from judges.

Chart 1 - 1st version and final version of the flip chart, synthesis of qualitative analysis of the changes recommended by the judges and the final version of the flip chart.

1 st version	Final version
 <p style="text-align: center;">Cover</p>	 <p style="text-align: center;">Final cover</p>
 <p style="text-align: center;">Summary in the first version</p>	 <p style="text-align: center;">Summary in the final version</p>
 <p style="text-align: center;">Page 7 in the first version</p>	 <p style="text-align: center;">Page 7 in the final version</p>
 <p style="text-align: center;">Page 8 in the first version</p>	 <p style="text-align: center;">Page 8 in the final version</p>



Topic 1 presents the characters and the theme to be addressed throughout the flip chart in three scripts. Topic 2 addresses the definition of this infection and has only one script. Topic 3 consists of one script reporting the forms of transmission of syphilis through a diagram. Topic 4 addresses the forms of prevention distributed in two scripts. For topic 5, which is more extensive, we used three scripts with explanations about the stages of syphilis. Topic 6 addresses the ways of detecting syphilis in one script. Topic 7 describes how to carry out the treatment of syphilis in two scripts. Topic 8, and last one, consists of one script with information on how to achieve the cure for this infection.

Table IV shows the results of the application of the SAM individually to each judge. Regarding the use of the SAM to assess the suitability of the educational material, most of the judges (77.3%, n=17) classified the flip chart as superior, with percentages between 75 to 100%, whereas 5 (22.7%) judges classified it as adequate, with values ranging from 40.91 to 65.91%. Considering the total SAM score of 80.99, the flip chart was classified as superior.

Table IV - Distribution of the total and individual flip chart educational material suitability index. Recife, 2019

Judges	SAM
Judge 1	100.00
Judge 2	59.09
Judge 3	72.73
Judge 4	65.91
Judge 5	72.73
Judge 6	97.73
Judge 7	90.91
Judge 8	63.64
Judge 9	77.27
Judge 10	86.36
Judge 11	100.00
Judge 12	93.18
Judge 13	88.64
Judge 14	86.36
Judge 15	47.73
Judge 16	84.09
Judge 17	100.00
Judge 18	100.00
Judge 19	40.91
Judge 20	70.45
Judge 21	93.18
Judge 22	90.91
Total SAM	80.99

A total of 40 adolescents evaluated the flip chart. They were between 13 and 19 years old and attended the 5th to 9th grades. There was unanimity (100%) among the adolescents regarding the clarity and relevance of the items in the flip chart. There was also unanimity (100%) when considering all the information important and that the images in the flip chart helped to improve the understanding about the subject.

DISCUSSION

The evaluation conducted by the judges in the present study showed that the flip chart constitutes an ET with relevant and valid content in relation to the construct that we wanted to evaluate. In addition, it has an attractive appearance that motivates one to use it. The results of the adequacy corroborate other studies^(19,20) in which all the judges considered the ET to be suitable for use by the target audience. In addition, practices such as ET boost health care and strengthen the precepts and assumptions of the National Health Promotion Policy.

The I-CVI score obtained in the present study (0.97) shows an ET with good quality and a content rigorously validated by judges with high levels of knowledge. This result is similar to that of a study that validated an educational booklet focused on healthy eating for Malaysian adults to ensure an improvement in the quality of life of individuals⁽²¹⁾.

In general, there was an agreement between judges' responses, which can be seen in the results of the present study. The judges' responses in the SAM resulted in a mean score of 80.99%, with designates high reliability and agreement in the responses^(22,23).

Although the overall I-CVI was satisfactory (0.97), the judges suggested some changes to improve the flip chart evaluated in the current study. Other studies carried out with the same objective, i.e., to validate an educational material, also used the CVI to validate the content, and some adjustments were also requested for the final version, which demonstrates the importance of this step during the process of preparing the material in order to ensure a quality final product^(24,25). In addition, the suggestions made by the judges for the ET were key to increasing its scientific rigor and efficiency during its use with the target audience⁽²⁶⁾.

Educational interventions based on structured knowledge and information directed to the target audience can be put into effect through the elaboration of quality educational materials. Furthermore, the use of these teaching strategies is extremely necessary in several situations⁽²⁶⁻²⁸⁾.

Strategies like this one are extremely important for promoting health, both individually and collectively, as they are able to assist in modifying the current health scenario in Brazil⁽²⁹⁾. With regard to health promotion, the transmission of information is a valuable ally as it can encourage the population's involvement in preventive actions⁽³⁰⁾.

Therefore, the flip chart on syphilis created in the present study is extremely necessary to assist in the development of positive behaviors and to increase adolescents' adherence to disease prevention measures, which can positively impact the reduction in the number of infected people. These actions can occur through health education, which defined as an educational process of building health-related knowledge aimed at the apprehension of the subject by the population. Moreover, it guarantees better conditions for health promotion and disease prevention, thus resulting in a better quality of life and equity in services^(31,32).

Thus, knowing that the reporting of the number of cases of acquired syphilis among adolescents aged 13 to 19 years has been increasing since 2010, with a total rate of 39.9% of the cases⁽³³⁾, it is necessary to develop actions for health promotion and education using validated materials. Therefore, the school is also considered a privileged space for the development of health education actions with adolescents as it represents a place for socialization, training and information⁽³⁴⁾.

It should be noted that the validation of a flip chart requires a multidisciplinary panel of judges since the diversification of the fields is the representation of teamwork, which emphasizes the importance of different opinions and perspectives in relation to the theme. Furthermore, the educational material is a new opportunity to standardize and certify new care practices^(35,36). It should also be noted that the flip chart is a technology that is easy to use in health services and schools as it does not depend on electrical resources.

One limitation of this study was the failure to carry out health education actions in schools to identify the knowledge acquired by adolescents with the use of the flip chart. Even with the construction and validation of the flip chart, the study has not yet ended. The flip chart will still require continuous updates following scientific evidence with the aim of taking the validated material to schools and conducting new research to evaluate the effectiveness of the content and the results of its implementation. Finally, collaboration from health and government institutions is necessary to reproduce the flip chart, publicize its existence and distribute it in schools and in other settings in different formats in addition to the print version.

CONCLUSION

The content and appearance of the flip chart was constructed and validated by judges and the target audience and can be used with adolescents in the school environment or in other settings. Thus, it is possible to contribute with scientifically correct information in order to build adolescents' knowledge about the theme addressed.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

CONTRIBUTIONS

Shayane Bezerra dos Santos, Luiz Carlos de Abreu and Italla Maria Pinheiro Bezerra contributed to the study conception and design; acquisition, analysis and interpretation of data; and writing and revision of the manuscript. **José Lucas Souza Ramos** contributed to the study conception and design. **Ana Paula de Araújo Machado** and **Marianna Tamara Nunes Lopes** contributed to the writing and revision of the manuscript.

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