



# Learning through play: semantic validation of educational technology on tuberculosis for school children

*Aprender brincando: validação semântica de tecnologia educacional sobre tuberculose para crianças escolares*

*Aprender jugando: validación semántica de tecnología educativa sobre tuberculosis para niños estudiantes*

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## ABSTRACT

**Objective:** to semantically validate tuberculosis educational technology for school children. **Method:** a methodological study, conducted with 51 students aged 10 to 12 years old, from a public school in Belém, Pará. For data collection, the children were presented with the educational technology, a word search, with definition, transmission, signs and symptoms of tuberculosis and, after its application, an individual interview was carried out, with open and closed questions about attributes associated with the general impression, content and form. To describe the agreement of the answers to the interview, the content validity index was used, with a cutoff point equal to 0.80. To describe the numerical variables, we used the software Statistical Package for the Social Sciences, 22.0, and for the text corpus, we used the software IRaMuTeQ 0.7, alpha 2. **Results:** the content validity indexes presented results higher than 90%. The description of the statements generated two word clouds, referring to the understanding about the disease and the informative capacity of the technology. **Conclusion and implications for practice:** the technology was considered easy to use, relevant and with appropriate content, therefore, valid for children to understand the disease, enabling them to act as multipliers of information to their social network.

**Keywords:** Health Education; Tuberculosis; Child; Educational Technology; Validation Studies.

## RESUMO

**Objetivo:** validar semanticamente tecnologia educacional sobre tuberculose para crianças escolares. **Método:** estudo metodológico, realizado com 51 escolares, entre 10 e 12 anos, de escola pública em Belém, Pará. Na coleta de dados, apresentou-se às crianças a tecnologia educacional, um caça-palavras, com definição, transmissão, sinais e sintomas da tuberculose e, após sua aplicação realizou-se entrevista individual, com perguntas abertas e fechadas, sobre atributos associados à impressão geral, ao conteúdo e forma. Para descrever a concordância das respostas à entrevista, foi utilizado o índice de validade de conteúdo, com ponto de corte igual a 0,80. Na descrição das variáveis numéricas, utilizou-se o software *Statistical Package for the Social Sciences*, 22.0 e, para o corpus textual, empregou-se o software *IRaMuTeQ 0.7, alpha 2*. **Resultados:** os índices de validade de conteúdo apresentaram resultados superiores a 90%. A descrição dos depoimentos gerou duas nuvens de palavras, referentes à compreensão sobre a doença e capacidade informativa da tecnologia. **Conclusão e implicações para a prática:** a tecnologia foi considerada de fácil utilização, relevante e de conteúdo apropriado, portanto, válida para crianças compreenderem a doença, possibilitando atuarem como multiplicadores da informação para sua rede de convívio.

**Palavras-chave:** Educação em Saúde; Tuberculose; Criança; Tecnologia Educacional; Estudos de Validação.

## RESUMEN

**Objetivo:** validar semánticamente la tecnología educativa sobre tuberculosis para niños estudiantes. **Método:** estudio metodológico, realizado con 51 estudiantes, entre 10 y 12 años, de una escuela pública de Belém, Pará. En la recolección de datos, se presentó a los niños la tecnología educativa, un buscador de palabras, con definición, transmisión, signos y síntomas de tuberculosis y, luego de su aplicación, se realizó una entrevista individual, con preguntas abiertas y cerradas, sobre atributos asociados a la impresión general, contenido y forma. Para describir la concordancia de las respuestas a la entrevista se utilizó el índice de validez de contenido, con un punto de corte igual a 0,80. En la descripción de las variables numéricas se utilizó el software *Statistical Package for the Social Sciences*, 22.0 y, para el corpus textual, se utilizó el software *IRaMuTeQ 0.7, alfa 2*. **Resultados:** los índices de validez de contenido presentaron resultados superiores al 90%. La descripción de los testimonios generó dos nubes de palabras, referidas a la comprensión de la enfermedad y la capacidad de información de la tecnología. **Conclusión e implicaciones para la práctica:** la tecnología se consideró fácil de usar, relevante y con contenido adecuado, así que, válida para que los niños comprendan la enfermedad, posibilitándoles actuar como multiplicadores de información para su red social.

**Palabras clave:** Educación en Salud; Tuberculosis; Niño; Tecnología Educacional; Estudio de Validación.

## INTRODUCTION

Tuberculosis is a major challenge to public health worldwide. According to the World Health Organization (WHO), 95% of cases and deaths from the disease occur in developing countries, and it is considered the leading cause of death from infectious diseases worldwide. Countries like Brazil, the Russian Federation, India, China and South Africa, which make up the BRICS, account for about 50% of tuberculosis cases in the world.<sup>1</sup>

The global scenario led the WHO to define, for the period from 2016 to 2020, a new list of priority countries, which includes three lists with 30 countries that, according to their epidemiological characteristics, represent 87% of the cases of the disease in the world; Brazil is in two of these lists, occupying the 20th position in the classification of disease burden. For the Ministry of Health (MH), since 2003, the disease is considered a priority in the political agenda, with diagnosis and treatment available in the Unified Health System (UHS).<sup>2</sup>

In Brazil, in 2019, an incidence coefficient of 35.0/100,000 inhabitants and a mortality coefficient of 2.2 deaths/100,000 inhabitants were recorded. In Pará, there were 4,885 notified cases, with an incidence coefficient of 55.8/100,000 inhabitants. It is understood that the incidence and outcome of tuberculosis are associated with the social determination of the health-disease process. Individual, social and programmatic vulnerability, especially in the context of the country's economic crisis, contributed to the increased incidence of the disease in the sub-scenarios.<sup>3</sup>

Despite advances in its diagnosis, treatment and control, tuberculosis remains a major public health problem. Thus, it is necessary to increase health education strategies in the context of Primary Health Care (PHC), aiming to empower people about diagnosis, prevention and treatment, so that they become co-responsible for controlling the chain of transmissibility, especially in regions of greater social vulnerability.<sup>4</sup>

In this context, the school becomes a privileged space for health promotion and disease prevention practices, for the development of knowledge, skills and behavioral changes, especially because it brings together children and adolescents in a period of experimentation, maturation and multiple physical, psychological and social transitions.<sup>5</sup>

Thus, it is understood the need to use attractive, critical and innovative health education strategies, so that they can expand their knowledge and, empowered, become replicators and executors of health promotion actions in their daily lives.<sup>6</sup>

Health education is a set of pedagogical practices that enables a continuous, dynamic, complex and planned learning and teaching process that takes into account the internal and external factors of individuals, which influence their health status and their potential to improve their knowledge, skills and attitudes towards their needs and behaviors in the health context.<sup>7</sup>

The use of educational technologies enables the exchange of knowledge and agrees with the appreciation of prior knowledge, added to scientific knowledge, for the problematization in the joint construction of knowledge in health. Thus, the possibility of

subjects becoming agents of transformation is enhanced, both individually and collectively.<sup>8</sup>

Throughout human development and scientific knowledge, the term technology has been attributed to the conception of machines, usable physical goods, as well as technical procedures, in a reductionist view. New studies have allowed the development of knowledge on the subject, expanding the concept and demonstrating that it can be understood as the result of everyday experience and research, developing scientific knowledge for the creation of material products or knowledge that enables intervention in practical situations.<sup>9</sup>

Educational technology is an appropriate tool to provide learning that can make children agents of knowledge, since it favors the participation of the subjects in the educational process, contributing to the construction of citizenship and increasing the autonomy of those involved.<sup>10</sup> For them to play this role, it is necessary that they go through a validation process to give reliability to their content.<sup>11</sup> Thus, this study aimed to semantically validate an educational technology about tuberculosis for school children.

## METHOD

This is methodological research, which is a type of research that covers the production/construction, validation and evaluation of new products.<sup>12</sup> Multicenter study with international collaboration, developed as part of a research project in academic cooperation, with the participation of five public universities and financed by a governmental agency.

The technology validated in this study resulted from a project also developed within the multicenter study. It was developed in two interrelated stages. Initially, culture circles were held to train adolescent school health multipliers, under the assumptions of multicultural education and health promotion, and the construction and presentation of the technology. The construction considered official documents and publications related to tuberculosis and health education for schoolchildren. Afterwards, the technology was evaluated using the Delphi method with specialists in health and education.<sup>13</sup>

This semantic validation step was developed in a public municipal school, located in a suburban neighborhood in Belém, Pará. This neighborhood was selected as the research scenario because it annually registers a significant number of cases of tuberculosis, according to data from the Municipal Health Secretariat (MHS) of Belém, and corroborated by the results of a master's thesis, also linked to the research project funded by governmental agency.<sup>14,15</sup>

The study population consisted of Brazilian schoolchildren aged 10 to 12 years and the sample size was defined according to the Manual of the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRaMuTeQ), version 0.7, alpha 2.<sup>16</sup> The study included regularly enrolled students with updated attendance, considering the data collection period, which occurred in February 2019. The group of participants was selected by convenience, since all eligible

children who showed up at school on the days and times set by the institutional coordination for presentation of the project and data collection were invited to participate. Those who did not show up after two attempts of invitation during the data collection period were excluded.

Data collection occurred on school premises, in rooms predetermined by the coordination and was divided into two moments. In the first, the students were presented with the technology to be validated, a word search game whose objective is to work on tuberculosis prevention and control with students, addressing aspects related to the definition of the disease (what

is tuberculosis?), transmission modes (how does it go from one person to another?), signs and symptoms (what can be observed in a sick person or what does he/she feel?), and where to seek help and treatment (which services or professionals can be sought in case of illness?).

The final version of the game (Figure 1) is presented on a printed page, containing an initial explanatory text with nine lines, which brings information about the disease, flanked by the respective set of words to perform the search. There are 15 words extracted from the initial text that must be identified by the participants. It also has 15 pictures representing the expressions

# Wordsearch

## Tuberculosis

Let's get to work. Find the words!

Tuberculosis is a disease caused by Mycobacterium tuberculosis, also known as Koch's bacillus. It is transmitted from one person to another through the saliva that comes out of a sick person's mouth when he or she speaks, coughs or sneezes. Close quarters and places with many people together increase the chances of spreading the Bacillus and infecting others. A person with TB can present: a cough with phlegm, lack of appetite, weight loss, low fever, a lot of sweating, and tiredness. In severe cases, there can be bloody phlegm.

**Working with the words found**

**Definition:**

*What is tuberculosis?*

**Communicability:**

How does it pass from one person to another?

**Signs and symptoms:**

What can be observed in a person with tuberculosis?

Figure 1. Final version of the word search on tuberculosis for school children. Belém, Pará, Brazil, 2019. Source: Prepared by the authors.

described in the text, and three blank boxes of different colors, where the definition of the disease, forms of transmission, and characteristic signs and symptoms should be written, according to the words found.

After the presentation of the word search, the dynamics of the work was explained and the text was read, explaining its content. Copies were given to each of the participants, asking them to identify the words in the set of words in the word search and describe what they identified in the three specific boxes, relating the words to the explanatory text.

In the second step, an individual interview was conducted, using a form containing ten closed and two open questions, prepared by the authors themselves, based on an instrument made available by a European group and adapted for Brazil by a research group registered in the Directory of the National Council for Scientific and Technological Development (CNPq).<sup>17-19</sup> The children answered the word search questions in a set of three blocks, namely: general appearance, understanding and relevance of the text, and about its format.

The semi-structured questions focused on the relevance of technology as expressed in the children’s understanding of the information contained in the word search and its applicability. They were invited to describe, in their own words, what they understood of the information and its practical applicability for other people to learn more about TB. These questions were recorded in digital media or registered in the instrument itself by the researchers, with the consent of the guardians and the children themselves.

The closed-ended questions considered the attributes regarding form and content that made up the three evaluation blocks, considering the overall impression of the word search, the content of the text, and the format of the technology, with the children responding on a four-item Likert-type scale, varying in a ranking where 1 would be not relevant or not representative and 4 relevant or representative.<sup>11</sup>

The Content Validity Index (CVI) was used to measure the agreement between the children’s answers to the items related to the three blocks of the word search evaluation. The CVI was calculated by means of the sum of the items marked by the children as relevant/representative, divided by the total number

of items considered in the evaluation. A cutoff point equal to 0.80 was taken into account for the CVI.<sup>11</sup>

All moments of data collection were conducted by the main researcher, assisted by seven members of the research group, trained and supervised by her. Meetings were held prior to data collection to get to know the technology, the data collection instrument, and the dynamics of the phases foreseen for its execution.

The numerical information was organized in a Microsoft Excel spreadsheet, using the double entry technique for validation and described using the Statistical Package for the Social Sciences (SPSS) software version 22.0, serial number 10101151049.

The textual material was organized into a corpus and subjected to processing with the help of the IRaMuTeQ software, public domain, and described according to word clouds. In this type of lexical analysis, the words are grouped by number of occurrence and organized graphically according to their frequency in the submitted corpus, easily allowing their identification, as well as the analysis process to be done by the researchers.<sup>16</sup>

The project complied with Resolution NHC/MH No. 466/12 and was approved by the Research Ethics Committee of a Public University on 10/09/2018, under opinion No. 2,892,400. Parents and children declared their acceptance to participate by signing the Informed Consent and Consent Terms, respectively.

## RESULTS

Fifty-one children participated in the study, 52.9% being female. The age of ten years (82.4%) predominated, with a mean age of 10.2 and standard deviation equal to 0.6. Regarding the CVI, based on the three blocks of items, the children evaluated favorably, considering that the overall and block CVI showed indexes above 90%.

Based on these results, it is possible to state that the word searcher was semantically validated in a positive way, meeting what was intended to be evaluated. The small adjustments in the form suggested by some children, such as increasing the size of letters and/or removing pictures or words considered difficult to understand, were accepted by the researchers (Table 1).

**Table 1.** Results of the Content Validity Indices, by blocks and in general, according to the answers of the children. Belém, Pará, Brazil, 2019.

Blocks of the word searcher’s evaluation	Objectives	CVI* (%)	General CVI* (%)
General impression	To identify the child’s overall impression of the technology’s text set, form, and information capacity.	98.3	95.9
Text content	Identify whether, for the child, the information in the text is clear and important for gaining knowledge about the disease.	94.9	
Form of the technology	To assess the degree of difficulty of the child in solving the word search game and whether its shape and appearance are attractive and facilitate learning about the disease.	96.6	

\* CVI = Content Validity Index



are relevant, because they translate the evaluation of those who will use the technology. By measuring these aspects, we meet the scientific rigor required in the validation processes.<sup>11,21,22</sup>

As for the technology being a tool that enables the understanding of tuberculosis, the semantic validation showed the importance of carefully choosing the words that allow an understanding compatible with the lay public and age group. This aspect is important, considering that, in the health area, information is often disclosed in technical language, which makes it difficult for the target audience to understand, especially when dealing with different groups, such as children or people with special needs.<sup>23,24</sup>

The importance of paying attention to the evaluation of health educational materials is emphasized, with respect to the cohesive and organized structure, with appropriate and sufficient language for understanding. It is important that the content maintains the focus on the theme and that its texts present a logical sequence of ideas, starting from more general contexts to more specific issues,<sup>24</sup> which was considered in this study when dealing with questions about tuberculosis, from its concept to the more specific issues concerning transmission, signs and symptoms, and how to seek help and treatment.

The need to bring valid information is essential, since any technology and/or instrument developed and made available for health intervention, as well as for any other type of measure, should give voice to the target audience. This aspect is reinforced in this study, since we considered children of school age, a phase of assimilation of knowledge and stimulus to critical thinking, and when producing educational technologies in a simple, clear, and objective way, which can provide greater knowledge and adherence of children and their families to the subject in question.<sup>25,26</sup>

For any group, in any age group, one must consider, in a contextualized way, the amount and type of information that the target audience wants or needs to feel informed and encouraged to change practices, not forgetting that such changes are dependent on experiences and information from other sources. Materials written in easy-to-understand language, such as word search puzzles, can enhance the development of skills for adherence to conducts of prevention and treatment of various diseases.<sup>27</sup>

In schools, innovative and active teaching and learning practices promote access to inclusive education, and are a suitable model for children's participation in health issues.<sup>28</sup> It is understood necessary to consider integrality as an essential aspect for care, which occurs as the child is understood in its entirety, in the family and community context, considering the aspects that form them as active subjects, respecting their singularities.<sup>29</sup>

Global initiatives have encouraged practices to stimulate childhood development, based on multi-sectoral structures and activities,<sup>30</sup> which include, among others, health actions, access to services, protection and learning opportunities.<sup>31</sup> It highlights the importance of individual and community interventions seeking to expand access to care, reduce costs, and empower health characteristics for social change. Thus, the articulation between professionals, health services, and other social sectors, such as schools, is relevant to child health surveillance.<sup>32,33</sup>

Thus, health issues should not be considered only in its biological characteristics, but should be understood as a process

and a product of everyday life, considering its determination from sociocultural, political, and economic aspects related to the living and health conditions of the population. This debate is recognized and strengthened in Brazil, reaffirming the school as an important space to favor a life with quality.<sup>34</sup>

Thus, it is understood that health education can happen in different spaces, such as schools, providing guidance activities for health promotion and prevention of important diseases, such as tuberculosis. Thus, the role of the health educator is highlighted, improving methodologies to achieve the objectives, using validated educational technologies that are able to share safe and appropriate information to the public of interest.<sup>35</sup>

## **CONCLUSION AND IMPLICATIONS FOR PRACTICE**

The research achieved its objective by showing that the technology allows clarifying and informing in a playful and technically correct way about an important issue such as tuberculosis. It was considered adequate and can be a valid tool to be used in health educational activities by teachers and/or health professionals, and to mediate information for the prevention of disease, circulating accurate information to both the school community and the community in general. Giving voice to the target audience, including schoolchildren in the validation process, provided an easy-to-read material, with accessible language and great possibilities to fulfill this purpose.

As a limitation of this research, it was carried out exclusively with children from public schools, since their responses and interest in the technology may be different from those of children from private schools. However, the technology has the potential to contribute to the practice of researchers and professionals in the area of health and education, because it is an educational material that overcomes the practice of vertical and traditional health education.

It is also understood that children can play an important role as multipliers of correct information about tuberculosis, based on their understanding of the subject facilitated by technology, especially when it is treated in a playful way. Next, in order to provide the opportunity for further studies, a word search test is proposed in relation to the health literacy of schoolchildren, related to the identification, prevention and treatment of tuberculosis.

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## REFERENCES

- World Health Organization. Global tuberculosis report 2019 [Internet]. Geneva: WHO; 2019 [citado 19 out 2020]. Disponível em: <https://apps.who.int/iris/bitstream/handle/10665/329368/9789241565714-eng.pdf?ua=1>
- Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Departamento de Vigilância Epidemiológica. Brasil livre da tuberculose: plano nacional pelo fim da tuberculose como problema de saúde pública [Internet]. Brasília (DF): Ministério da Saúde; 2017 [citado 20 out 2020]. Disponível em: [http://portal.arquivos2.saude.gov.br/images/pdf/2017/junho/29/plano\\_nacional\\_tb\\_web.pdf](http://portal.arquivos2.saude.gov.br/images/pdf/2017/junho/29/plano_nacional_tb_web.pdf)
- Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Departamento de Vigilância Epidemiológica. Boletim epidemiológico tuberculose 2020 [Internet]. Brasília (DF): Ministério da Saúde; 2020. 40 p. [cited 2020 Oct 21]. Disponível em: <https://antigo.saude.gov.br/images/pdf/2020/marco/24/Boletim-tuberculose-2020-marcas--1-.pdf>
- Wanzeler WA, Rodrigues ILA, Nogueira LMV, Brasil GB, Santos CB. Álbum seriado sobre tuberculose para adolescentes. In: Teixeira E, editor. Desenvolvimento de tecnologias cuidado-educacionais. 2. ed. Porto Alegre (RS): Moriá; 2020. p. 133-143.
- Xu T, Tomokawa S, Gregorio Jr ER, Mannava P, Nagai M, Sobel H. School-based interventions to promote adolescent health: a systematic review in low- and middle-income countries of WHO Western Pacific Region. *PLoS One*. 2020 mar;15(3):e0230046. <http://dx.doi.org/10.1371/journal.pone.0230046>.
- Silva KVLG, Gonçalves GAA, Santos SB, Machado MFAS, Rebouças CBA, Silva VM et al. Training of adolescent multipliers from the perspective of health promotion core competencies. *Rev Bras Enferm*. 2018 jan/fev;71(1):89-96. <http://dx.doi.org/10.1590/0034-7167-2016-0532>.
- Pueyo-Garrigues M, Whitehead D, Pardavila-Belio MI, Canga-Armayor A, Pueyo-Garrigues S, Canga-Armayor N. Health education: a Rogerian concept analysis. *Int J Nurs Stud*. 2019 jun;94:131-8. <http://dx.doi.org/10.1016/j.ijnurstu.2019.03.005>.
- Silva DML, Carreiro FA, Mello R. Educational technologies in nursing assistance in health education: integrating review. *J Nurs UFPE on line*. 2017 Feb;11(Suppl. 2):1044-51.
- Nietsche EA, Lima MGR, Rodrigues MGS, Teixeira JA, Oliveira BNB, Motta CA et al. Innovative technologies of nursing care. *Rev Enferm UFSM [Internet]*. 2012; [citado 2020 out 21];2(1):182-9. Disponível em: <https://periodicos.ufsm.br/reufsm/article/view/3591/3144>
- Lima ACMACC, Bezerra KC, Sousa DMN, Vasconcelos CTM, Coutinho JFV, Oriá MOB. Educational technologies and practices for prevention of vertical HIV transmission. *Rev Bras Enferm*. 2018;71(Suppl. 4):1759-67. <http://dx.doi.org/10.1590/0034-7167-2016-0333>.
- Alexandre NMC, Coluci MZO. Content validity in the development and adaptation processes of measurement instruments. *Cien Saude Colet*. 2011 Jul;16(7):3061-8. <http://dx.doi.org/10.1590/S1413-81232011000800006>.
- Teixeira T, Nascimento MHM. Pesquisa metodológica: perspectivas operacionais e densidades participativas. In: Teixeira E, editor. Desenvolvimento de tecnologias cuidado-educacionais. 2. ed. Porto Alegre: Moriá; 2020. p. 51-61.
- Massaroli A, Martini JG, Lino MM, Spenassato D, Massaroli R. The Delphi Method as a methodological framework for research in nursing. *Texto Contexto Enferm*. 2017 jan;26(4):e1110017. <http://dx.doi.org/10.1590/0104-07072017001110017>.
- Pará, Secretaria de Estado de Saúde Pública, Coordenação Estadual do Programa de Controle da Tuberculose. Plano Estadual do Programa de Controle da Tuberculose 2018. Belém; 2018.
- André SR, Nogueira LMV, Rodrigues ILA, Cunha TN, Palha PF, Santos CB. Tuberculosis associated with the living conditions in an endemic municipality in the North of Brazil. *Rev Latino-Am Enfermagem*. 2020 ago;28:e3343. <http://dx.doi.org/10.1590/1518-8345.3223.3343>.
- Souza MAR, Wall ML, Thuler ACMC, Lowen IMV, Peres AM. The use of IRAMUTEQ software for data analysis in qualitative research. *Rev Esc Enferm USP*. 2018 out;52:e03353. <http://dx.doi.org/10.1590/s1980-220x2017015003353>.
- Deon KC, Santos DMSS, Reis RA, Fegadolli C, Bullinger M, Santos CB. Translation and cultural adaptation of the brazilian version of DISABKIDS® Atopic Dermatitis Module (ADM). *Rev Esc Enferm USP*. 2011 abr;45(2):450-7. <http://dx.doi.org/10.1590/S0080-62342011000200021>.
- Deon KC, Santos DMSS, Bullinger M, Santos CB. Preliminary psychometric assessment of the Brazilian version of the DISABKIDS® Atopic Dermatitis Module. *Rev Saude Publica*. 2011 set;45(6):1072-8. <http://dx.doi.org/10.1590/S0034-89102011005000067>.
- Fegadolli C, Reis RA, Martins STA, Bullinger M, Santos CB. Adaptation of the generic DISABKIDS® module for Brazilian children and adolescents with chronic disorders. *Rev Bras Saude Mater Infant*. 2010 jan/mar;10(1):95-105. <http://dx.doi.org/10.1590/S1519-38292010000100010>.
- Okayo ILA, Dowse R. An illustrated booklet for reinforcing community health worker knowledge of tuberculosis and facilitating patient counselling. *Afr J Prim Health Care Fam Med*. 2018 maio;10(1):a1687. <http://dx.doi.org/10.4102/phcfm.v10i1.1687>.
- Brasil GB, Rodrigues ILA, Nogueira LMV, Palmeira IP. Educational technology for people living with HIV: validation study. *Rev Bras Enferm*. 2018;71(Suppl. 4):1657-62. <http://dx.doi.org/10.1590/0034-7167-2017-0824>.
- Sousa EKS, Moraes EJS, Amorim FCM, Oliveira ADS, Sousa KHJF, Almeida CAPL. Elaboration and validation of an educational technology related to violence against women. *Esc Anna Nery*. 2020 maio;24(4):e20190314. <http://dx.doi.org/10.1590/2177-9465-ean-2019-0314>.
- Kronish IM, Goldfinger JZ, Negron R, Fei K, Tuhim S, Arniella G et al. The effect of peer education on stroke prevention: the prevent recurrence of all inner-city strokes through education (PRAISE) randomized

- controlled trial. *Stroke*. 2014 set;45(11):3330-6. <http://dx.doi.org/10.1161/STROKEAHA.114.006623>.
24. Galindo-Neto NM, Alexandre ACS, Barros LM, Sá GGM, Carvalho KM, Caetano JA. Creation and validation of an educational video for deaf people about cardiopulmonary resuscitation. *Rev Latino-Am Enfermagem*. 2019 mar;27:e3130. <http://dx.doi.org/10.1590/1518-8345.2765.3130>.
25. Ernst G, Menrath I, Lange K, Eisemann N, Staab D, Thyen U et al. Development and evaluation of a generic education program for chronic diseases in childhood. *Patient Educ Couns*. 2017 jun;100(6):1153-60. <http://dx.doi.org/10.1016/j.pec.2017.01.001>.
26. Romeiro V, Bullinger M, Marziale MHP, Fegadolli C, Reis RA, Silveira RCCP et al. DISABKIDS® in Brazil: advances and future perspectives for the production of scientific knowledge. *Rev Latino-Am Enfermagem*. 2020 abr;28:e3257. <http://dx.doi.org/10.1590/1518-8345.3003.3257>.
27. Wild CFW, Nietsche E, Salbego C, Teixeira E, Favero NB. Validation of educational booklet: an educational technology in dengue prevention. *Rev Bras Enferm*. 2019 set;72(5):1318-25. <http://dx.doi.org/10.1590/0034-7167-2018-0771>.
28. Koller D. 'Kids need to talk too': inclusive practices for children's healthcare education and participation. *J Clin Nurs*. 2017 set;26(17-18):2657-68. <http://dx.doi.org/10.1111/jocn.13703>.
29. Furtado MCC, Mello DF, Pina JC, Vicente JB, Lima PR, Rezende VD. Nurses' actions and articulations in child care in primary health care. *Texto Contexto Enferm*. 2017 mar;27(1):e0930016. <http://dx.doi.org/10.1590/0104-07072018000930016>.
30. Britto PR, Lye SJ, Proulx K, Yousafzai AK, Matthews SG, Vaivada T et al. Nurturing care: promoting early childhood development. *Lancet*. 2017 jan;389(10064):91-102. [http://dx.doi.org/10.1016/S0140-6736\(16\)31390-3](http://dx.doi.org/10.1016/S0140-6736(16)31390-3).
31. Black MM, Walker SP, Fernald LCH, Andersen CT, Digirolamo AM, Lu C et al. Early childhood development coming of age: science through the life course. *Lancet*. 2017 jan;389(10064):77-90. [http://dx.doi.org/10.1016/S0140-6736\(16\)31389-7](http://dx.doi.org/10.1016/S0140-6736(16)31389-7).
32. Grant J, Lines L, Darbyshire P, Parry Y. How do nurse practitioners work in primary health care settings? A scoping review. *Int J Nurs Stud*. 2017 jun;75(4):51-7. <http://dx.doi.org/10.1016/j.ijnurstu.2017.06.011>.
33. Yakuwa MS, Neill S, Mello DF. Nursing strategies for child health surveillance. *Rev Latino-Am Enfermagem*. 2018;26:e3007. <http://dx.doi.org/10.1590/1518-8345.2434.3007>.
34. Silva CS, Bodstein RCA. A theoretical framework on intersectoral practice in School Health Promotion. *Cien Saude Colet*. 2016 Jun;21(6):1777-88. <http://dx.doi.org/10.1590/1413-81232015216.08522016>.
35. Halse KM, Fonn M, Christiansen B. Health education and the pedagogical role of the nurse: Nursing students learning in the clinical setting. *J Nurs Educ Pract*. 2014 out;4(3):30-7. <http://dx.doi.org/10.5430/jnep.v4n3p30>.