



Acta Paulista de Enfermagem

ISSN: 0103-2100

ISSN: 1982-0194

Escola Paulista de Enfermagem, Universidade Federal de São Paulo

Araújo, Kellen Cristina; Souza, Aline Corrêa de;  
Silva, Alessandra Dartora da; Weis, Alisia Helena  
Tecnologias educacionais para abordagens de saúde com adolescentes: revisão integrativa  
Acta Paulista de Enfermagem, vol. 35, eAPE003682, 2022  
Escola Paulista de Enfermagem, Universidade Federal de São Paulo

DOI: <https://doi.org/10.37689/acta-ape/2022AR03683>

Available in: <https://www.redalyc.org/articulo.oa?id=307070269046>

- ▶ How to cite
- ▶ Complete issue
- ▶ More information about this article
- ▶ Journal's webpage in redalyc.org



Scientific Information System Redalyc

Network of Scientific Journals from Latin America and the Caribbean, Spain and Portugal

Project academic non-profit, developed under the open access initiative

# Educational technologies for health approaches to adolescents: an integrative review

Tecnologias educacionais para abordagens de saúde com adolescentes: revisão integrativa  
Tecnologías educativas para abordajes de salud con adolescentes: revisión integradora

Kellen Cristina Araújo<sup>1</sup>  <https://orcid.org/0000-0002-5089-2831>

Aline Corrêa de Souza<sup>1</sup>  <https://orcid.org/0000-0001-5824-3468>

Alessandra Dartora da Silva<sup>1</sup>  <https://orcid.org/0000-0003-2325-7389>

Alisia Helena Weis<sup>1</sup>  <https://orcid.org/0000-0003-4830-4583>

## How to cite:

Araújo KC, Souza AC, Silva AD, Weis AH. Educational technologies for health approaches to adolescents: an integrative review. Acta Paul Enferm. 2022;35:eAPE003682.

## DOI

<http://dx.doi.org/10.37689/acta-ape/2022AR03682>



## Keywords

Adolescent health; Health education; Educational technology; Adolescent health services

## Descritores

Saúde do adolescente; Educação em saúde; Tecnologia educacional; Serviços de saúde do adolescente

## Descriptores

Salud del adolescente; Educación en salud; Tecnología educacional; Servicios de salud del adolescente

## Submitted

December 5, 2020

## Accepted

October 10, 2021

## Corresponding author

Kellen Cristina Araújo  
E-mail: [kellenc.araujo@hotmail.com](mailto:kellenc.araujo@hotmail.com)

## Associate Editor (Peer review process):

Ariane Ferreira Machado Avelar  
(<https://orcid.org/0000-0001-7479-8121>)  
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, São Paulo, SP, Brazil

## Abstract

**Objective:** To know and synthesize scientific production on educational technologies for health approaches with adolescents.

**Methods:** This is an integrative literature review carried out on the PubMed, Web of Science, Scopus, LILACS, SciELO and Virtual Health Library databases, between April and July 2020. Full and free availability of articles in Portuguese, English and/or Spanish, and publications carried out in the last five years formed the inclusion criteria. A descriptive analysis of study and content characterization was carried out.

**Results:** A total of 14 articles were selected, and booklets, interactive games and videos were highlighted as educational technologies. Most studies contemplated the VI level of evidence, including qualitative studies and expert opinions, seven studies were in English and the predominant design was of the methodological type, with nine articles.

**Conclusion:** The objective was achieved and evidence showed that educational technologies are essential for addressing school health with adolescents; however, it is necessary to privilege spaces for dialogue and consideration of their needs in order to bring them closer to health services.

## Resumo

**Objetivo:** Conhecer e sintetizar a produção científica sobre tecnologias educacionais para abordagens em saúde com adolescentes.

**Métodos:** Trata-se de uma revisão integrativa de literatura realizada nas bases de dados Pubmed, Web of Science, Scopus, Lilacs, SciELO e BVS, entre abril e julho de 2020. A disponibilidade completa e gratuita dos artigos em português, inglês e/ou espanhol e as publicações realizadas nos últimos cinco anos compuseram os critérios de inclusão. Realizou-se análise descritiva da caracterização dos estudos e do conteúdo.

**Resultados:** Foram selecionados 14 artigos, e destacaram-se cartilhas, jogos interativos e vídeos como tecnologias educacionais. A maioria dos estudos contemplou o VI nível de evidência - inclui estudos qualitativos e opiniões de especialistas, sete estudos estavam na língua inglesa e o delineamento predominante foi do tipo metodológico - com nove artigos.

**Conclusão:** O objetivo foi alcançado e as evidências apontaram que as tecnologias educacionais são fundamentais para a abordagem de saúde escolar com adolescentes, porém é necessário privilegiar espaços para o diálogo e para as considerações de suas necessidades a fim de aproximá-los dos serviços de saúde.

## Resumen

**Objetivo:** Conocer y sintetizar la producción científica sobre tecnologías educativas para abordajes en salud con adolescentes.

<sup>1</sup>Universidade Federal de Ciência da Saúde de Porto Alegre, Porto Alegre, RS, Brazil.  
Conflicts of interest: nothing to declare.

**Métodos:** Se trata de una revisión integrativa de la literatura realizada en las bases de datos Pubmed, Web of Science, Scopus, Lilacs, SciELO y BVS, entre abril y julio de 2020. La disponibilidad completa y gratuita de los artículos en portugués, inglés o español y las publicaciones realizadas en los últimos cinco años compusieron los criterios de inclusión. Se realizó un análisis descriptivo de la caracterización de los estudios y del contenido.

**Resultados:** Se seleccionaron 14 artículos y se destacaron cartillas, juegos interactivos y videos como tecnologías educativas. La mayoría de los estudios contempló el VI nivel de evidencia - incluye estudios cualitativos y opiniones de especialistas, siete estudios estaban en lengua inglesa y la delimitación predominante fue del tipo metodológico - con nueve artículos.

**Conclusión:** El objetivo fue alcanzado y las evidencias apuntaron a que las tecnologías educativas son fundamentales para el abordaje de la salud escolar con adolescentes, sin embargo existe la necesidad de privilegiar espacios para el diálogo y para las consideraciones de sus necesidades con la finalidad de aproximarlos a los servicios de salud.

## Introduction

Adolescence is a transition period between childhood and adulthood. It is considered a complex process in which individuals seek autonomy and recognition as a subject in society. According to the United Nations Population Fund (UNFPA), the population between 10 and 24 years old accounts for 24% of the world population,<sup>(1)</sup> which corresponds to approximately 1.8 billion people. In Brazil, despite the slowdown in the growth rate of the young population, approximately 37% of the Brazilian population is represented by this audience, according to the 2010 census.<sup>(2)</sup>

The period of adolescence, a phase characterized by transitions and several discoveries and transformations, is crucial for the adoption of habits that can last throughout life.<sup>(3)</sup> The adoption of health risk behaviors, such as smoking, physical inactivity, alcoholism and unhealthy eating habits, among adolescents is a complex, multifactorial process influenced by the social context.<sup>(4)</sup> In addition to this, in Brazil, external causes are presented as health problems with the greatest impact on adolescents' morbidity and mortality, with an increasing trend in violence-related mortality from 15 years old onwards.<sup>(5)</sup>

In this scenario, nurses, as professionals who follow individuals in the stages of human development and in different social contexts, play essential role in the articulation of strategies with health services. It is noteworthy that, according to Law 7,498, nurses are responsible for participating in the planning, execution and assessment of health programming and education aimed at improving the population's health.<sup>(6)</sup>

Considering that the adolescent population experiences such a process of transformation, for the

most part, in the school environment, health education actions in schools are essential. Partnerships in education and health projects in schools, as proposed by the School Health Program, qualification in monitoring situations of greater vulnerability and partnerships with the Municipalities' Departments of Sport, Culture and Leisure, are essential.<sup>(7)</sup> For this to be possible, the need to establish intersectoral and interdisciplinary intervention processes, organization of services and implementation of health practices that integrate a set of strategies for disease prevention and health promotion is emphasized.

The effectiveness of health education programs must consider the complementarity existing between school health promotion and public policies defined for this purpose, in addition to considering the different subjects - with their ways of thinking and doing health - and articulating different sectors.<sup>(8)</sup> In this context, educational technologies occupy the central axis of the learning process, as they are tools that enable the mutual construction of knowledge through contextualized education, in order to give students the opportunity to act as an agent of change.<sup>(9)</sup> Therefore, to work effectively in a context of health education with communities, the participants' entire biopsychosocial context must be considered, in addition to integrating health and education professionals.<sup>(10)</sup>

Scientific literature enables the articulation of knowledge between different areas of activity and provides critical reflection by health professionals. Furthermore, there are few review studies on the use of educational technologies for health approaches with adolescents in the scientific literature. Therefore, this research can contribute to filling this gap, and its results can improve knowledge about the effectiveness of health education actions

and the analysis of educational technologies for the adolescent audience.

Thus, this study aims to understand and synthesize scientific production on educational technologies for health approaches to adolescents.

## Methods

This is an integrative literature review.<sup>(11)</sup> The PICO strategy was used (P: adolescents; I: health education; C: not applicable; O: educational technologies), in order “to know the scientific production on educational technologies for approaches to health education with adolescents”.<sup>(12)</sup> Searches were performed on the National Library of Medicine (PubMed), Web of Science, Scopus, Latin American and Caribbean Health Sciences (LILACS) and Scientific Electronic Library (SciELO) databases, using the Boolean operators AND and OR combining the following Health Sciences Descriptors (DeCS): “*educação em saúde*”, “*adolescente*”, “*tecnologia educacional*” and “*enfermagem*” for databases in Portuguese. In English databases, the following terms Medical Subject Headings (MeSH) were used: “adolescent”, “educational technology”, “instructional technology” and “school health services”.

Articles with complete and free availability in Portuguese, English and/or Spanish and publications made in the last five years (2015-2020) were included. Studies that did not cover the topic, theses, dissertations, experience reports, theoretical articles, observational studies, repeated publications and abstracts of conference proceedings were excluded. The survey was carried out between April and July 2020.

For study selection, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method recommendations were followed.<sup>(13)</sup> As shown in Figure 1, initially, the inclusion and exclusion criteria were applied for article selection. Then, titles, abstracts and the studies were read. In total, according to the combination of terms, 1,267 articles were found. With the application of the inclusion and exclusion criteria, 312 articles remained, of which only 40 were pre-selected

by the abstracts and, finally, 14 articles comprised the study selection.

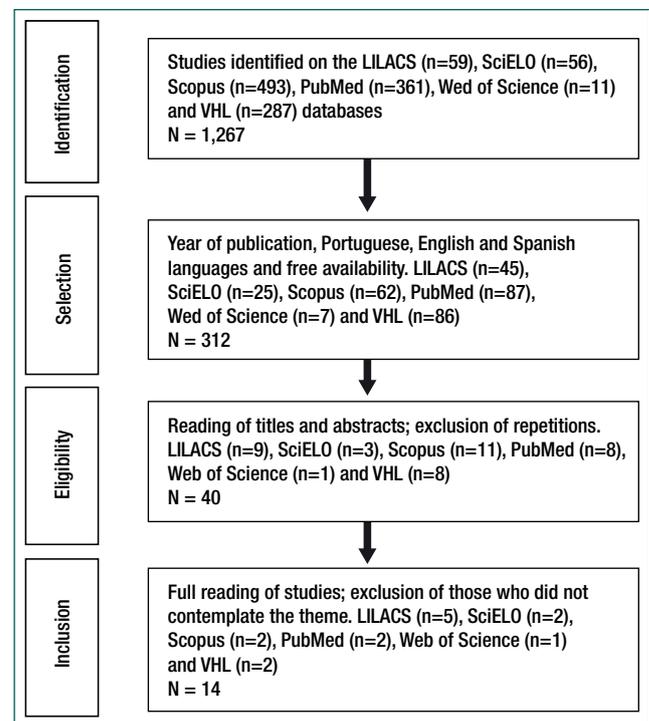


Figure 1. Article selection

A Google Drive spreadsheet was used to organize the selection, with the items number, database, title, authors, objective, type of study, population, intervention, outcome/conclusion, level of evidence, year of publication, journal and new classification. The articles' level of evidence<sup>(14)</sup> was verified, and data analysis was carried out by calculation of simple and relative frequency. The educational technologies for health approaches to adolescents described in the articles were organized by similarity and grouped by themes.

## Results

The sample consisted of 14 articles that describe the educational technologies used to approach health with adolescents. The database that concentrated the largest number of publications was LILACS with five articles,<sup>(15-27)</sup> followed by Scopus,<sup>(17,24)</sup> SciELO,<sup>(21,22)</sup> PubMed<sup>(25,28)</sup> and Virtual Health Library<sup>(18,19)</sup>, with two articles each. Only one study

from the Web of Science<sup>(23)</sup> was selected. Most studies<sup>(15-26)</sup> were published in 2019, four,<sup>(18,20,24,25)</sup> in 2018, two studies,<sup>(27,28)</sup> in 2015 and one,<sup>(16)</sup> in 2017.

Regarding study design, nine are methodological.<sup>(15-23)</sup> Among these, only in three studies<sup>(20-22)</sup> the pedagogical approach is clear - pedagogical reference of meaningful learning, pedagogical reference of Paulo Freire and serious game approach. Eight<sup>(15-23)</sup> validated the technologies with the participation of adolescents. Only one article<sup>(18)</sup> did not include adolescents in the validation process. Two studies are of the intervention and control type.<sup>(25,26)</sup> Of these, only one<sup>(26)</sup> brings a specific pedagogical approach - educational model of health promotion by Nola Pender; one is characterized as descriptive<sup>(27)</sup> and clarifies pedagogical aspects

(using the Meaningful Learning Theory); one is a randomized controlled study<sup>(24)</sup>; and one is randomized cluster.<sup>(28)</sup> According to the level of evidence of the journals, 10 have level VI<sup>(15-27)</sup> and four articles are level IV.<sup>(24-28)</sup> Chart 1 summarizes the characterization and the evidence analyzed in the articles included.

The educational technologies for adolescent health approaches described in the 14 articles were organized into six thematic categories: booklets,<sup>(15-19)</sup> games,<sup>(20-23)</sup> websites,<sup>(24)</sup> videos,<sup>(25)</sup> simulations<sup>(26,27)</sup> and practical interventions.<sup>(28)</sup>

### Category 1 - Booklets

Five studies<sup>(15-19)</sup> used booklets and educational materials as technologies for health approaches with

**Chart 1.** Articles included in the integrative review with the search strategy

Title	Authorship	Year of publication	Design	Results	Level of evidence
<i>Construção e validação de cartilha para prevenção do excesso ponderal em adolescentes</i> <sup>(15)</sup>	MOURA, Jayne et al.	2019	Methodological	Valid and reliable booklet as educational technology with adolescents. Distribution only does not change behavior.	VI
Construction and validation of educational materials for the prevention of metabolic syndrome in adolescents <sup>(16)</sup>	MOURA, Ionara et al.	2017	Methodological	The educational booklet proved to be a valid and reliable instrument, and use with other resources is critical.	VI
Readability and suitability assessment of adolescent education material in preventing hookah smoking <sup>(17)</sup>	SADEGHI, Reza et al.	2019	Methodological	The readability and sufficiency of the educational material increased significantly.	VI
<i>Construção de uma cartilha sobre educação no trânsito para adolescentes</i> <sup>(18)</sup>	LESSA, Luana et al.	2018	Methodological, qualitative	Booklet was considered a new teaching material for health education with a focus on traffic accident prevention.	VI
<i>Cartilha sobre prevenção de uso de drogas para adolescentes</i> <sup>(19)</sup>	MOURA, Maria et al.	2019	Methodological, qualitative	A booklet entitled "Drugs: how to prevent?" proved to be a valid and reliable document to be used in health promotion.	VI
Validation of educational game for adolescents about the sexuality topic <sup>(20)</sup>	SOUSA, Marciano et al.	2018	Methodological	The material has been validated and can be used in educational practices on sexuality with adolescents.	VI
<i>Elaboração e validação de jogo educativo para smartphone sobre hábitos saudáveis para adolescentes</i> <sup>(21)</sup>	MOURA, Thais et al.	2019	Methodological	The game was validated regarding content and appearance and can be clinically validated with adolescents.	VI
<i>Construção de serious games para adolescentes com DM tipo 1</i> <sup>(22)</sup>	SERAFIM, Andréia et al.	2019	Methodological	The usability test had positive validation and the suggestions contributed to improving the game. The technology has properties to improve the care of adolescents with 1DM.	VI
Validation of Brazilian educational technology for disseminating knowledge on leprosy to adolescents <sup>(23)</sup>	FEITOSA, Mariana; STELKO-PEREIRA, ANA; MATOS, Karla.	2019	Methodological	It is believed that the technology should be used in conjunction with other materials. It was noticed that the technology is valid regarding its content and its appearance, since it promoted changes in knowledge, especially in relation to treatment and prevention of the disease.	VI
Impact of a website based educational program for increasing vaccination coverage among adolescents <sup>(24)</sup>	ESPOSITO, Susanna et al.	2018	Prospective, randomized controlled study	The use of website plus expert intervention significantly increased knowledge and prevention of diseases and reduced the fear of vaccines. There was an improvement in vaccination coverage for some classes. The results were similar in interventions involving only website.	IV
Entertainment-education videos as a persuasive tool in the substance use prevention intervention "keepin' it REAL" <sup>(25)</sup>	SHIN, YoungJu et al.	2018	Intervention and control, qualitative	As predicted, young people who found the videos more attractive reported significantly greater self-efficacy of refusal.	IV
<i>Comparação entre tecnologias educacionais sobre vacinação contra papilomavirus humano em adolescentes</i> <sup>(26)</sup>	SANTOS, Aliana et al.	2019	Analytical, intervention and control	Nursing Educational Technology has a greater benefit in the level of knowledge when compared to the Educational Technology of the Ministry of Health, and technologies in dynamic format have greater effect.	IV
<i>Conocimientos previos acerca de métodos anticonceptivos y su relación con conocimientos adquiridos después de una intervención educativa con simulador</i> <sup>(27)</sup>	MORALES, Maria; ESPINOZA, Bárbara.	2015	Descriptive	Simulator with videos and models effective tool, and new approaches related to the theme are needed for comprehensive knowledge.	VI
School-based intervention on healthy behaviour among Ecuadorian adolescents: effect of a cluster-randomized controlled trial on screen-time <sup>(28)</sup>	ANDRADE, Susana et al.	2015	Randomized cluster	The effect was observed mainly after the first stage of the intervention, focused on the reduction of behavior in screen time. However, after the completion of intervention strategies to reduce screen time behavior, the adolescents in the intervention group increased screen time again.	IV

adolescents and three<sup>(15,16,19)</sup> materials were considered valid and reliable.

The first study had the participation of 15 judges and 36 school adolescents between 14 and 18 years old. The booklet was validated, however, it is emphasized that only material distribution does not influence adolescents' behavior.<sup>(15)</sup>

In the second study, 21 experts and 39 adolescents between 14 and 17 years old and who presented at least 2 risk factors for the development of metabolic syndrome participated. The booklet included comic books, word-hunting and the game of the seven mistakes. It has been shown to be valid and reliable, but the use of other complementary resources is essential.<sup>(16)</sup>

In the third study, 10 adolescents and five experts who suggested adaptations in the material participated, which significantly increased the sufficiency and readability about the prevention of hookah use.<sup>(17)</sup>

The fourth study aimed to build a booklet focused on preventing traffic accidents; the topics addressed were pedestrians, cyclists, motorcyclists and drivers, traffic signs and tips.<sup>(18)</sup>

The fifth study developed a booklet on drug prevention and was validated by 18 judges and 40 adolescents between 12 and 16 years old.<sup>(19)</sup>

Four approaches<sup>(15-19)</sup> included, therefore, the target audience in material preparation, which brings adolescents closer to the themes discussed. Only one study<sup>(18)</sup> used the traditional educational approach, i.e., both in the definition of the themes and in material validation, there was no participation of the target audience.

## Category 2 - Games

Four studies comprised the approach with games,<sup>(20-23)</sup> and all were considered valid educational technologies to approach different themes with adolescents. The sixth study developed a card game and included questions about body changes, relationships, Sexually Transmitted Infections (STIs) and contraceptive methods. Paulo Freire's pedagogical framework was used, which proposes dialogued actions and considers the knowledge and experiences of students. Material assessment and validation was performed by 16 judges.<sup>(20)</sup>

The seventh article aimed to develop a game for smartphones. The game presented different scenarios, addressed the selection and ingestion of food and the practice of physical activity; the technology was assessed by 15 experts and 10 adolescents between 10 and 12 years old. The approach to building the game was based on serious game, an inactive game that focuses on the persuasive aspect for behavior changes. It was considered a technology that encourages the adoption of protective behaviors to health.<sup>(21)</sup>

In the eighth study, a reference center was conducted in the care of patients with type 1 Diabetes Mellitus that gathered the needs and suggestions of 16 adolescent patients between 10 and 19 years and 6 care professionals. There was the development of a game prototype that was submitted to tests with five adolescent patients between 12 and 17 years. In addition to the serious game strategy, the pedagogical reference of significant learning was used - which re-elaborates previous knowledge and proposes complementary knowledge, favoring reflections and new behaviors - and user-centered design. After changes, the game in the serious game format was validated in the usability test with the target audience.<sup>(22)</sup>

In the ninth study, the leprosy game prototype was initially assessed by 17 adolescents and seven expert researchers. After changes, the board game and two questionnaires were applied to 43 adolescents who validated content and appearance.<sup>(23)</sup>

All studies<sup>(20-23)</sup> in the games category are characterized as problematizing educational approaches, since they include adolescents in situational diagnosis, in the elaboration process and validation of educational technologies<sup>(21-23)</sup> or propose the exchange of knowledge through dialogue in the tool applicability.<sup>(23)</sup>

## Category 3 - Videos

An article addressed the use of video as an educational technology to approach adolescents, aiming to assess its influence on the vaccination coverage of adolescents. It divided the public into three randomized groups: one group did not receive intervention; another group used only website as educational technology; and the third group used the

website and witnessed an activity with experts in the subject. Participants were 748 adolescents from four schools aged between 11 and 13 years and adolescents between 14 and 18 years old. The approach that used, in addition to the website, the face-to-face educational action significantly increased the knowledge about vaccines and increased vaccination coverage in some schools.<sup>(24)</sup>

Video and face-to-face educational action consolidated a problematizing educational technology. The content appropriate to the reality of adolescents, their participation in the whole process and the use of different methodologies to approach the themes contributed to the increase in vaccination coverage of adolescents in some schools.

#### Category 4 - Websites

Educational actions with websites were another approach found; in the selected study, 1,464 adolescents in the 7<sup>th</sup> grade assessed the set of five videos on prevention of substance use - alcohol and drugs. Data analysis highlighted the difference in perceptions between young residents of the urban and rural areas, which proves the importance of the relationship between context and narrative, as well as identification with the characters. The results showed significantly higher refusal behavior by young people who considered the videos more attractive, since cultural identification directly influenced public engagement.<sup>(25)</sup>

The websites portrayed different realities and characters, which determined the identification of the target audience with the exposed scenario. Thus, the individuals felt they belonged to the contexts and, consequently, modified their choices. This finding brings the websites used closer to a problematizing technology.

#### Category 5 - Simulations

The study with the approach of simulations, intervention and control type, developed the theme on vaccination against human papillomavirus. The population consisted of female adolescents between nine and 13 years old from eight public schools. Technology based on Nola Pender's educational health promotion model included play and a play

on myths and truths. The educational model provides for the interrelation of individual characteristics and experiences, feelings and knowledge about the behavior one wishes to achieve and health promotion behavior. The results showed that educational technologies performed by nursing demonstrate a higher level of scientific knowledge and technologies with dynamics have a greater effect.<sup>(26)</sup>

In another study of the category, 295 adolescents between 10 and 20 years old, students of a public school, participated. Educational technology addressed the theme of contraceptive methods, included demonstrations in models, information on the advantages and disadvantages of each method, and prevention of STIs. Moreover, the approach was based on the Meaningful Learning Theory, which considers prior knowledge on the subject, the appropriate material, the time according to the students' learning style, the interaction with the learning object to build their own knowledge, the feedback that assesses the need for another didactic when goals are not achieved and the interaction between teacher and student. Simulators demonstrated efficacy since students acquire knowledge when interacting with the learning object.<sup>(27)</sup>

Both studies<sup>(26,27)</sup> used problematizing technologies, including individual experiences, prior knowledge of the themes and greater interaction between teachers, students and learning objects. Thus, adolescents adopted an active attitude in the process, which determined content assimilation and the effectiveness of the use of these educational technologies.

#### Category 6 - Practical interventions

Only one study used practical interventions to reduce prolonged exposure to screens (television, video games and computers). The study included 1,440 adolescents between 12 and 15 years old from 20 schools. The intervention took place in two stages composed of individual and collective moments, in addition to a workshop for parents conducted parallel to classes with adolescents and with similar themes. The first stage focused on diet, physical activity and behavior in screen time, while the second stage focused only on diet and physical activity.

Educational actions used pre-stipulated goals, conversations with sportsmen and individual strategies to overcome barriers and become a physically active person. The approaches demonstrated significant effectiveness after the first stage; however, adolescents in the intervention group increased the screen time again, which evidenced the difficulty of long-term behavioral changes.<sup>(28)</sup>

The study's educational technology aimed not only at including the target audience and family members in the learning process, but also at long-term behavioral assessment. Furthermore, it considered individual difficulties and collective goals stipulated together with adolescents, which escapes from traditional educational approaches, bringing favorable results in the short term.

## Discussion

Most studies presented a methodological design;<sup>(15-23)</sup> five<sup>(15-19,23)</sup> aimed at the development or adaptation of printed materials, such as booklets. The authors<sup>(15,16,18,23)</sup> emphasized that this form of educational technology requires other complementary approaches in order to effectively modify behaviors. In a study on the development of educational material related to the prevention of metabolic syndrome, a significant number of participants demonstrated that they were not motivated to read the material until the end.<sup>(16)</sup> Furthermore, cultural identification proved to be essential in changing behaviors, as exposed by research participants on the effects of engaging in educational videos, who reported that identification with the main characters influenced the refusal to offer drugs.<sup>(25)</sup> Furthermore, there is a need to clinically validate educational technologies on health education with adolescents, as shown in the study that aimed to develop the game for smartphones about healthy habits.<sup>(21)</sup>

As for the methodological aspects, there was a reduced number of publications in the chosen databases and a low level of evidence. The results highlighted the existing gap regarding the clinical validation of research on health education with adoles-

cents. The applicability of the research foresees the development of educational actions, which effectively address the different themes with adolescents in the school context and are capable of enabling the modification of health determinants. It is worth noting that, in this context, the social determinants of health designate individualities at the same time that they relate to each other in a complex way in a given time-space. Therefore, they influence, individually, socially and culturally, the critical analyzes of the different realities and respective behaviors.<sup>(29)</sup>

The determining factors in the acquisition of knowledge and motivation to adopt certain practices, in addition to the chosen methodology, were the approach to multicultural issues<sup>(25)</sup>, the valuing of individual experiences and the consideration of adolescents' perceptions, especially on topics considered taboo such as sexuality.<sup>(20)</sup> An integrative review of educational actions in schools on HIV/AIDS prevention<sup>(30)</sup> reiterated the idea that interventions are more effective when respecting the entire biopsychosocial context of the participants. Some results showed that many actions do not reach the expected impact because they do not consider risk behaviors and the different sociocultural contexts.

Regarding the resources used, the use of different approaches simultaneously proved to be more effective in changing behavior.<sup>(24)</sup> Research on active learning strategies highlighted that most students are familiar with digital information and communication technologies; however, it does not recognize the educational importance of these resources, as they consider them to be merely playful moments.<sup>(31)</sup> Although educational technologies are tools that help the learning process, they alone do not promote results. Therefore, it is necessary that professionals develop skills, such as the proper reception of the target audience, the development of empathy and that they build spaces for adolescents to feel comfortable exposing their positions, anxieties and doubts.

Another point brought up by studies and reiterated in the scientific literature was the difficulty of adolescents in recognizing their autonomy and making decisions about their own health. Parental influ-

ence often determines adolescents' choices.<sup>(26,32,33)</sup> The Brazilian National Adolescent Health Survey (*Pesquisa Nacional de Saúde do Escolar*) showed that 36% of boys and 19.5% of girls between 13 and 17 years old declared to have had a sexual relationship at some point.<sup>(34)</sup> It is noteworthy, therefore, that sexual practice is part of adolescents' experiences, and the issue of sexual health must be addressed from the perspective of comprehensive care.

Although health promotion practices facilitate the search for individual and collective solutions to health problems, it was investigated how difficult it is for adolescents to acquire behaviors in the long term.<sup>(28,33)</sup> The study on educational processes in health reiterated that there is no adequate planning in order to include the concerns and questions of adolescents in health actions.<sup>(33)</sup> Furthermore, the study corroborates the critical reflection on the importance of investing in the continuous training of health professionals involved in educational activities in schools, since teachers do not have a specific curriculum component on health.<sup>(31,33)</sup>

Knowledge by itself does not guarantee changing habits; however, the lack of qualified information approach can lead to inappropriate practices and choices. This review finds that the effectiveness of educational technologies for adolescent health approaches depends on, in addition to the simultaneous use of different methodologies and consideration of different sociocultural aspects, the continuous improvement of health professionals' skills.

## Conclusion

Therefore, this research reached the objective of knowing and synthesizing the scientific production on educational technologies for health approaches with adolescents. The lack of theoretical pedagogical deepening in the tool planning and assessment was evidenced. The use of problem-solving educational technologies contributed to the best findings in studies with adolescents. The most significant results included interactions between actors at different educational moments, as the subjects took an active stance and technologies helped in the health

education process. Therefore, health professionals need to develop new skills in order to build innovative technologies and encourage the active attitude of adolescents towards the learning process. Adapting technologies according to different sociocultural contexts is essential, as well as adapting approaches according to the needs of each reality. Thus, new studies with greater scientific pedagogical depth are needed, as well as clinical validations which include the participation of adolescents and other subjects of the community both in the development, use and assessment of educational technologies.

## References

1. Fundo de População das Nações Unidas no Brasil (UNFPA). Relatório sobre o estado da população mundial. Situação da população mundial 2019. Brasília (DF): UNFPA; 2019. p.164-71.
2. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo 2010. Rio de Janeiro: IBGE; 2021 [citado 2021 Set 26]. Disponível em: <https://censo2010.ibge.gov.br/>
3. Costa TR, Marchetti MA, Teston EF, Solon S, Marques FB, Knoch M, et al. Health education and adolescence: challenges for family health strategy. *Cien Cuid Saude*. 2020;19:e55723.
4. Moura LR, Torres LM, Cadete MM, Cunha CF. Factors associated with health risk behaviors among Brazilian adolescents: an integrative review. *Rev Esc Enferm USP*. 2018;52:e03304. Review.
5. Souto RM, Barufaldi LA, Nico LS, Freitas MG. Epidemiological profile of care for violence in public urgency and emergency services in Brazilian capital, Viva 2014. *Cien Saude Colet*. 2017;22(9):2811-23.
6. Brasil. Presidência da República. Casa Civil. Subchefia para Assuntos Jurídicos. Lei nº 7.498 de 25 de junho de 1986. Dispõe sobre a regulamentação do exercício da enfermagem e dá outras providências. Brasília (DF): Presidência da República; 1986 [citado 2021 Set 26]. Disponível em: [http://www.planalto.gov.br/ccivil\\_03/leis/l7498.htm](http://www.planalto.gov.br/ccivil_03/leis/l7498.htm)
7. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas e Estratégicas. Proteger e cuidar da saúde de adolescentes na atenção básica. Brasília (DF): Ministério da Saúde; 2018 [citado 2021 Set 26]. Disponível em: [https://bvsms.saude.gov.br/bvs/publicacoes/proteger\\_cuidar\\_adolescentes\\_atencao\\_basica\\_2ed.pdf](https://bvsms.saude.gov.br/bvs/publicacoes/proteger_cuidar_adolescentes_atencao_basica_2ed.pdf)
8. Machado VA, Pinheiro R, Miguez SF. Education and freedom in school health promotion: comprehensive perspectives on political action as a power in school communities. *Interface*. 2021;25:e200035.
9. Machado FC, Lima MF. O uso da tecnologia educacional: um fazer pedagógico no cotidiano escolar. *Scientia Cum Industria*. 2017;5(2):44-50.
10. Monteiro RS, Feijão AR, Barreto VP, Silva BC, Neco KK, Aquino AR. Ações educativas sobre prevenção de HIV/AIDS entre adolescentes em escolas. *Enfermeria Actual Costa Rica*. 2019;(37):206-22. Review.
11. Galvão CM, Sawada NO, Trevizan MA. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. *Texto Contexto Enferm*. 2008;17(4):758-64.

12. da Costa Santos CM, de Mattos Pimenta CA, Nobre MR. The PICO strategy for the research question construction and evidence search. *Rev Lat Am Enfermagem*. 2007;15(3):508-11.
13. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):e1000097.
14. Melnik BM, Fineout-Overholt E. Making the case for evidence-based practice and cultivating a spirit of inquiry. In: Melnyk BM, FineoutOverholt E. Evidence-based practice in nursing & healthcare. A guide to best practice. Philadelphia: Lippincott Williams & Wilkins; 2005.
15. Moura JR, Silva KC, Rocha AE, Santos SD, Amorim TR, Silva AR. Construction and validation of a booklet to prevent overweight in adolescents. *Acta Paul Enferm*. 2019;32(4):365-73.
16. Moura IH, Silva AF, Rocha AE, Lima LH, Moreira TM, Silva AR. Construction and validation of educational materials for the prevention of metabolic syndrome in adolescents. *Rev Lat Am Enfermagem*. 2017;25:e2934.
17. Sadeghi R, Mahmoodabad SS, Fallahzadeh H, Rezaeian M, Bidaki R, Khanjani N. Readability and suitability assessment of adolescent education material in preventing hookah smoking. *Int J High Risk Behav Addict*. 2019;8(1):e8311.
18. Lessa LP, Silva RK, Rocha GA, Leal JD, Araújo AK, Pereira FG. Construção de uma cartilha sobre educação no trânsito para adolescentes. *Rev Enferm UFPE On line*. 2018;12(10):2737-42.
19. Moura MI, Leal JB, Leal JB, Correia VG, Leal JB, Silva MG, et al. Cartilha sobre prevenção de uso de drogas para adolescentes. *Rev Enferm UFPE On line*. 2019;13(4):1106-14.
20. Sousa MG, Oliveira EM, Coelho MM, Miranda KC, Henriques AC, Cabral RL. Validation of educational game for adolescents about the sexuality topic. *Rev Fund Care Online*. 2018;10(1):203-9.
21. Moura TN, Moreira TM, Sousa AD, Santos Neto AC, Sousa RX, Lima LH. Elaboração e validação de jogo educativo para smartphone sobre hábitos de vida saudáveis para adolescentes. *Texto Contexto Enferm*. 2019;28:e20180252.
22. Serafim AR, Silva NA, Alcântara CM, Queiroz MV. Construction of serious games for adolescents with type 1 diabetes mellitus. *Acta Paul Enferm*. 2019;32(4):374-81.
23. Feitosa MC, Stelko-Pereira AC, Matos KJ. Validation of Brazilian educational technology for disseminating knowledge on leprosy to adolescents. *Rev Bras Enferm*. 2019;72(5):1333-40.
24. Esposito S, Bianchini S, Tagliabue C, Umbrello G, Madini B, Pietro G, et al. Impact of a website based educational program for increasing vaccination coverage among adolescents. *Hum Vaccin Immunother*. 2018;14(4):961-8.
25. Shina Y, Miller-Day M, Hecht ML, Krieger JL. Entertainment–education videos as a persuasive tool in the substance use prevention intervention “keepin’ it REAL”. *Health Commun*. 2018;33(7):896–906.
26. Santos AS, Sousa GJ, Nicodemos RL, Almeida PC, Chaves EM, Viana MC. Comparação entre tecnologias educacionais sobre vacinação contra papilomavírus humano em adolescentes. *Rev Baiana Enferm*. 2019;33:e28054.
27. Morales MN, Espinoza BM. Conocimientos previos acerca de métodos anticonceptivos y su relación con conocimientos adquiridos después de una intervención educativa con simulador. *Enfermería Actual Costa Rica*. 2015;28:1-13.
28. Andrade S, Verloigne M, Cardon G, Kolsteren P, Ochoa-Avilés A, Verstraeten R, et al. School-based intervention on healthy behaviour among ecuadorian adolescents: effect of a cluster-randomized controlled trial on screen-time. *BMC Public Health*. 2015;15:942.
29. Marim TD, Partelli AN. Determinantes sociais de saúde na ótica de adolescentes: foto voz. *Rev Enferm UFPE On line*. 2019;13:e239114.
30. Monteiro RS, Feijão AR, Barreto VP, Silva BC, Neco KK, Aquino AR. Acciones educativas sobre prevención de VIH/SIDA entre adolescentes en escuelas. *Enfermería Actual Costa Rica*. 2019;37:206-22.
31. Urio A, Haag FB, Zanettini A, Filho CC, Franscechi VE, Souza JB. Challenges in the use of active learning strategies with students in a public school. *Rev Enferm UFPE On line*. 2017;1(12):4866-74.
32. Ysis M, Gonçalves DE, Martins AK. Tecnologias educacionais como estratégia para educação em saúde de adolescentes: revisão integrativa. *Rev Saúde Digital Tec Educ*. 2020;5(1):66-82.
33. Oliveira SF, Machado FC. Percepção dos profissionais da estratégia saúde da família sobre processos educativos em saúde. *Rev Cien Plural*. 2020;6(1):56-70.
34. Instituto Brasileiro de Geografia e Estatística (IBGE). Pesquisa Nacional de Saúde do Escolar – PeNSE: 2015. Rio de Janeiro: IBGE; 2016. Disponível em: <https://biblioteca.ibge.gov.br/visualizacao/livros/liv97870.pdf>