

EDUCATIONAL TECHNOLOGIES FOR ADOLESCENT HEALTH PROMOTION: EVIDENCE FROM THE LITERATURE

TECNOLOGIAS EDUCACIONAIS PARA PROMOÇÃO DA SAÚDE DE ADOLESCENTES: EVIDÊNCIAS DA LITERATURA

TECNOLOGÍAS EDUCATIVAS PARA LA PROMOCIÓN DE LA SALUD DE LOS ADOLESCENTES: EVIDENCIA DE LA LITERATURA

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ABSTRACT

Objective: identifying which educational technologies are used to promote adolescent health.

Method: an integrative literature review conducted at LILACS, SciELO, MEDLINE and CINAHL, with initial selection of 759 references, selected for publication in Portuguese, English and Spanish, in the last ten years (2010 to 2019) and with full-text availability. There were analyzed 19 studies.

Results: the use of digital applications and printed technologies, such as games, booklets, comic books and plays, was identified to promote adolescent health. Technologies contemplated sexuality in adolescence; promotion of healthy habits, prevention of obesity and drug use; vaccination; prevention of chronic diseases. **Conclusion:** technologies to promote adolescent health enhance the development of healthy knowledge, skills and attitudes, passing through the use in health services, school spaces and daily use.

Descriptors: Educational Technology; Health Promotion; Adolescent; Health Education; Comprehensive Health Care; Adolescent Health Services.

RESUMO

Objetivo: identificar quais tecnologias educacionais são utilizadas para promoção da saúde dos adolescentes. **Método:** revisão integrativa da literatura, realizada na LILACS, SciELO, MEDLINE e CINAHL, com seleção inicial de 759 referências, selecionadas quanto a publicação em português, inglês e espanhol, nos últimos dez anos (2010 a 2019) e com disponibilidade de texto completo. Foram analisados 19 estudos. **Resultados:** identificou-se o uso de aplicativos digitais e tecnologias impressas, como jogos, cartilhas, histórias em quadrinhos e peças teatrais, para promoção da saúde do adolescente. As tecnologias contemplaram a sexualidade na adolescência; promoção de hábitos saudáveis, prevenção de obesidade e do uso de drogas; vacinação; e prevenção de doenças

crônicas. **Conclusão:** tecnologias para promoção da saúde do adolescente potencializam o desenvolvimento de conhecimentos, habilidades e atitudes saudáveis, perpassando a utilização em serviços de saúde, espaços escolares e uso cotidiano.

Descritores: Tecnologia Educacional; Promoção da Saúde; Adolescente; Educação em Saúde; Assistência Integral a Saúde; Serviços de Saúde do Adolescente.

RESUMEN

Objetivo: identificar qué tecnologías educativas se utilizan para promover la salud de los adolescentes. **Método:** se trata de una revisión integradora de la literatura realizada en LILACS, SciELO, MEDLINE y CINAHL, con selección inicial de 759 referencias, seleccionadas para su publicación en portugués, inglés y español, en los últimos diez años (2010 a 2019) y con disponibilidad de texto completo. Se analizaron 19 estudios. **Resultados:** se identificó el uso de aplicaciones digitales y tecnologías impresas, como juegos, cuadernillos, cómics y obras de teatro, para promover la salud de los adolescentes. Las tecnologías contemplaban la sexualidad en la adolescencia; promoción de hábitos saludables, prevención de la obesidad y consumo de drogas; vacunación; prevención de enfermedades crónicas. **Conclusión:** las tecnologías para promover la salud de los adolescentes mejoran el desarrollo de conocimientos, habilidades y actitudes saludables, pasando por el uso en los servicios de salud, los espacios escolares y el uso diario.

Descriptores: Tecnología Educacional; Promoción de la Salud; Adolescente; Educación en Salud; Atención Integral de Salud; Servicios de Salud del Adolescente.

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How to quote this article:
Pereira LM, Leite PL, Torres FAF, Bezerra AM, Vieira CMA, Silva MRF, Machado LDS. Tecnologias educacionais para promoção da saúde de adolescentes: evidências da literatura. Rev enferm UFPE on line. 2021;15:e247457 DOI: 10.5205/1981-8963.2021.247457

INTRODUCTION

Adolescence comprises the cycle of changes between childhood and adulthood, delimited from ten to 19 years of age and characterized by psychological, social and biological transformations. These changes mark the social evolution and constitution of an individual's own identity, encompassing inclusion and belongings in social groups and body maturation, in transition to the adult body.¹

In this phase of human development, adolescents become vulnerable to the elements of risks and health problems that permeate them, such as those resulting from behaviors not appropriate to quality of life, such as violence, alcohol and/or other drug abuse and unprotected sexual practices.²

In epidemiological terms, a study conducted with Brazilian school adolescents (N=10,813) indicates that 61% of them self-assess their health as very poor and that the search for health services is directly associated with socioeconomic conditions, such as female gender, white color and private school, as well as the presence of risk behaviors and health-related aspects, which are punctuated by alcohol consumption, sexual intercourse without condoms, physical violence and attitudes towards one's own weight.³

However, a representation of adolescents as a healthy public that does not need health care, reinforcing a biological view of health, is reflected in the imaginary.²

It is worth recognizing the exposures to situations of vulnerabilities that promote risk behaviors to well-being, ensuring the need for the implementation of interventions directed to health promotion, understood as community training to act in the face of the social determinants of the health-disease-care process, ensuring quality of life, coping with health inequities and based on scientific evidence, ethics, justice and social participation.⁴

In coping with health problems due to marked vulnerabilities in adolescence, the use of educational activities as effective strategies to provide the necessary knowledge for empowerment is considered. The use of educational technologies in the health education process has been expanded by making the themes more attractive, promoting engagement and encouragement to users.⁵

Educational technologies as useful tools for health promotion are presented as an available method, able to facilitate the teaching-learning process in health, providing the construction of skills that produce knowledge for care and self-care. The technological tool inserted in the modality of health education should be understood as a systematic set of procedures and purposes, which make feasible the planning, execution and monitoring of the educational process.⁶

In this context, it is today to recognize the use of technologies to promote adolescent health, in the face of new social trends resulting from the pandemic by COVID-19, which imply new

ways of being and being in front of society. Thus, these technologies materialize as timely tools for care, promoting actions to respond to situations of disease and vulnerability, offering subsidies to health and its promotion.⁷

From this perspective, it is recognized in the literature that there is still a prevalence of reductionist practices of health promotion, limited to behavior change and biological character. Therefore, studying health promotion proposals in its most current aspects and associated with the use of technologies that can enhance its effectiveness contributes to overcoming gaps by consolidating evidence and presenting possibilities in the face of the plurality of existing technologies, with different applications.^{1,3-4}

Considering the diversity of educational technologies used, a review of the literature capable of summing up the most used types of technologies, as well as what themes are attributed and applied to the adolescent public, is relevant to assist in professional decision-making.

OBJECTIVE

Identify which educational technologies are used to promote adolescent health.

METHOD

A bibliographic, descriptive, and literature review survey that adopted as a methodological path the stages of identification of the northern question, design of search crosses, establishments of inclusion and exclusion criteria, searches in the databases, selection of articles, critical evaluation and extraction of data and construction of the synthesis.⁸

In the first stage, the PICO strategy was used to formulate the research question: What educational technologies have been used to promote adolescent health?

For the design of the crosses, the descriptors educational technology, adolescent and health promotion were considered, according to DeCS and MeSH, articulated in search equations by Boolean operators AND and OR, according to Chart 01. Synonyms were also used to sensitize the search and allow the capture of a greater number of studies.

BOARD 1- Search strategies and articles identified by data source (N=759). Iguatu, Ceará, 2020.

Search strategies	LILACS	SciELO	MEDLINE	CINAHL	Total
Educational Technology AND Teen AND Health Promotion	3	2	-	2	7
Educational Technology AND Adolescent	29	12	-	5	46
Educational Technology AND Health Promotion	25	19	1	2	47

("educational technology" OR "instructional technology" OR "multimedia") AND ("health promotion" OR "health promotion" OR "promotion of well-being") AND ("adolescents" OR "adolescence" OR "young" OR "young" OR "youth")	-	1	-	2	3
Educational Technology AND Adolescent AND Health Promotion	3	2	9	19	33
Educational Technology AND Adolescent	28	11	219	46	304
Educational Technology AND Health Promotion	25	36	55	83	199
("Educational Technology" OR "Instructional Technology" OR "multimedia") AND ("Health Promotion" OR "Promotion of Health" OR "Promotional Items") AND ("Adolescents" OR "Adolescence" OR "Teens" OR "Teenagers" OR "Youth")	-	4	42	74	120
Total	113	87	326	233	759

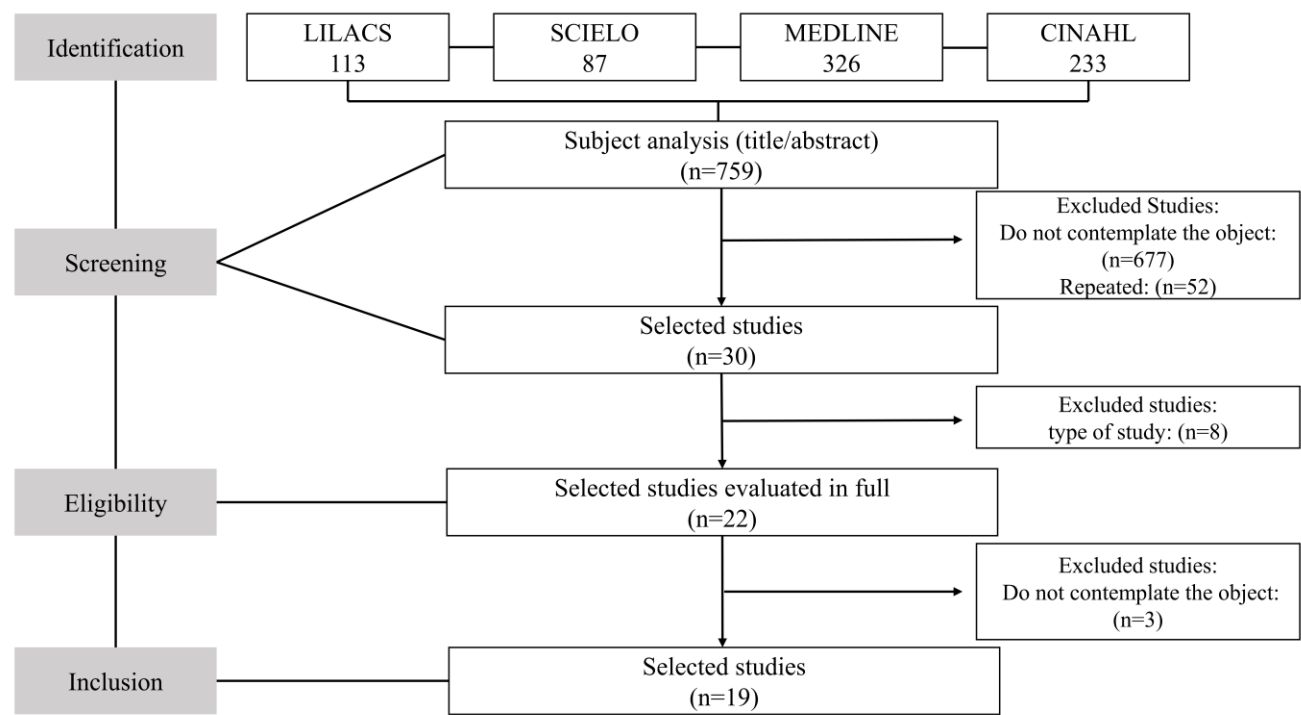
SciELO: *Scientific Electronic Library Online*; LILACS: *Latin American and Caribbean Literature on Health Sciences*; MEDLINE: *Medical Literature Analysis and Retrieval System Online*; CINAHL: *Cumulative Index to Nursing and Allied Health Literature*.

To specify the analysis of the studies, we included studies that addressed the object of study technologies for the promotion of adolescent health, published in Portuguese, English and Spanish, in the last ten years (2010 to 2019) and with availability of full text. Repeated and duplicate studies, thesis, dissertation, monograph and other literature reviews and articles that did not contemplate the study issue were excluded.

The search was carried out in a paired manner, and in situations of divergences, a third evaluator was assigned to perform the reading process and formulate a new opinion, aiming to ensure constancy and rigor to the process of inclusion of the studies. Data were collected in April 2020 through the journal portal of the Coordination for the Improvement of Higher Education Personnel (CAPES), in the Latin American and Caribbean Literature in Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) databases via PubMed and cumulative index to nursing and allied health literature (CINAHL) and in the Virtual Library Scientific Electronic Library Online (SciELO), using advanced search.

A total of 759 references were identified, analyzed according to descriptive eligibility criteria and schematized in Figure 1, according to the PRISMA flowchart.

FIGURE 1 - Process of searching and selecting articles through crossings of the terms DeCS and MeSH, via databases and virtual library. Iguatu, Ceará, 2020.



After identification, the studies were submitted to sorting, by the process of analysis of the article, with reading of the title, abstract and analysis according to the inclusion and exclusion criteria, resulting in 19 articles.

After the selection, the studies underwent an evaluation of methodological quality, being performed based on the Critical Appraisal Skills Programme (CASP) instrument, which classifies the articles into two categories: (A) comprising those with good methodological quality and reduced bias (scores between six to 10 points) and (B) for those with satisfactory methodological quality, but with increased risk of bias (with score below 6 points). In the results of the scores of the two researchers, 12 were classified as A and seven in category B.

After the evaluation of methodological quality, the data were extracted according to the instruction constructed by the authors, contemplating authorship, year of publication, place, journal, technology used, and theme addressed. The data were summarized and presented in the form of descriptive synthesis. The analysis of the evidence was made in comparison between the selected articles and current literature pertinent to areas.

RESULTS

We selected 19 articles that address the study question.

Most of the analyzed studies were published in 2019 (36.85%, N=7) and 2017 (15.8%, N=3). The predominant language in publications was Portuguese 79% (N=15), followed by English 21%

(N=4). In a few years, 15 of the publications were conducted in Brazil, in different cities and states, three in the United States and one in Canada, demonstrating the attention to this theme in Brazilian research.

Regarding the general profile of publications, it is possible to observe the trend in technological innovations to promote adolescent health, since the studies bring satisfactory results regarding the research issue, covering several educational technologies. Of the studies, nine^{11,13-14,17-18,20-22,27} used digital applications and the others presented printed technologies, such as games^{10,12,19,23}, booklets^{15-16,25}, comics²⁶ and proposals for actions, such as plays^{9,24}. Varying in relation to the themes, seven selected productions contemplated sexuality in adolescence^{10-11,13,18,20,22,26}; six promoting healthy habits, preventing obesity and drug use^{15-17,25,27}; two vaccination against the human papilloma virus (HPV)^{9,24}, two on the prevention of chronic diseases^{14,19}, one on breastfeeding¹² and one on depression²³.

Of the studies analyzed, 12 (63.15%) presented classification A, according to CASP criteria of evidence level, and seven classification B (36.84%).

Regarding digital applications, we identified the use of a hypermedia technology composed of modules all related to the epidemiological aspects of STIs, main characteristics, nursing care, a syndromic approach and their management in primary health care, aimed at undergraduate nursing students at a federal public university in the Northeast region. The authors state that this technology obtained good acceptability by the target audience, revealing itself as a facilitating method for learning¹.

Other technologies have also shown good acceptance by teenagers, such as the creation and use of online games. Associating experiences and knowledge about the care of adolescents aged 10 to 19 years old in the condition of DM1, one of the research brought real-world situations contextualized in the virtual world with experiences and confrontations during daily care¹⁴.

In another thematic aspect, the use of games by young people aged 14 to 18 years allowed the simulation of realities, invention and interpersonal relationships about sexuality and gender relations. It was found that the potential of the game makes the technology attractive and stimulating for adolescents to create a singular learning route in the area of sexuality¹⁸.

Understanding the importance of promoting adolescent health regarding healthy habits, two studies developed in Brazil^{17,27} and one in Canada²¹, addressed this theme in the developed technologies and proved that the use of social media and multimedia programs, respectively, are essential tools to encourage changes in the adolescents' lifestyle.

As for the printed technologies found, the use of a domino-style game aimed at students from Ceará from 14 to 19 years old contemplated themes such as concepts of female and male

anatomy, puberty and adolescence, sex/sexuality, STIs/HIV/AIDS, pregnancy and means of prevention, achieving successful experiences by favoring the educational phenomenon through the intercropping of information, debate, reflection, reciprocal influence and group participation of adolescents¹⁰.

Corroborating this verification, a game on breastfeeding, infant feeding and child health during the pregnancy-puerperal cycle proved effective in understanding the main doubts that permeate the daily life of adolescent mothers, encouraging the practice of breastfeeding¹². Other studies that developed and applied the technologies printed with adolescents from elementary and high school emphasized their contribution to the promotion of knowledge and empowerment on topics such as Leprosy¹⁹, depression²³ and promotion of sexual and reproductive health²⁶.

Nursing educational technologies such as dramatization and dynamics also showed a positive influence for health promotion. Studies conducted in municipal schools linked to the Family Health Strategy (FHS) through the School Health Program (SHP) with adolescents aged between 9 and 13 years, revealed mysteries and clarified doubts about HPV vaccination to expand knowledge on the subject through the play and dynamics^{9,24} compared to traditional folder⁹.

Moreover, it is emphasized that educational technologies go beyond the informative character, making adolescents active in the learning process, in the construction of knowledge for health, as well as to make them aware of the problems presented.

DISCUSSION

Technologies aimed at the adolescent public are educational strategies used to stimulate more autonomous and appropriate behaviors with the scenario of life and needs of adolescents. They are shown as tools that encourage health promotion and disease prevention, being able to act according to the particularities of this group.²⁸

Educational technological innovations help to produce knowledge, intending to modify the empirical approach in scientific. They aim at behaviors for health achievement, including learning, adding knowledge, attitudes and skills for care in the health-disease-care process, in the damages that require temporary or permanent changes, and in the understanding of risks and vulnerabilities within groups that need greater attention.²⁹

Corroborating the findings in which the greater use of technologies occurs through digital applicative, digital games gain prominence with adolescents because it is a method routinely manufactured due to the recurrent use of smartphones, which makes access easier, pleasurable and aligned with the interests of the public in question. It reveals that the educational approach based

on electronic applications can be useful, with good receptivity, besides adding playful characteristics to specific subjects, thus motivating the learning process of adolescents.³⁰

A study on the use of Social Media Facebook, it was recanted that its use focused on sexual education in the school environment favors the expansion of the knowledge of adolescents, which reveals the practicality and ease in the use of this media, enabling its use to approach knowledge and remove their doubts at any time. In this study, social media Facebook was used in partnership with two schools and a Family Health Strategy (FHS), to expand the possibilities of knowledge about sexual and reproductive health, structuring itself as a strategy to bring adolescents closer to the health service, considering that the public's demand for health services is still hampered because there are issues such as : shame, taboos and myths³¹

In this sense, the use of Facebook in educational activities in health does not be suppressed in a space of questions and answers, but by breaking the barriers of health services, it contributes considerably to the approximation with adolescents, through the creation of bonds between them and health professionals.³¹

The educational technologies that address sexual and reproductive health gain prominence because, besides being a relevant content, it arouses curiosity in adolescents about specific axes of this theme, since digital games, of a confidential and nature of each player, encourage open discussions about sexuality, since society still involves this subject with taboos. Thus, it is possible, from the use of games, to adapt the messages according to the need of each player making them motivators.³²

The use of mobile technologies is more used in the educational environment, where they make the proximity between theory and applicability of situations through Digital Information and Communication Technologies (DICT), performing health promotion in school and thus bringing adolescents closer to health services. In a study with the validation of an application on postural education, it was evidenced that mobile technologies open opportunities for a new type of learning, when students have contact with information at anytime and anywhere, being able to do activities and appropriate the learning process. Adolescents consider the internet a connection with the world, where relationships happen as an expansion of face-to-face relationships.³³

The use of an online environment in learning teaching spaces such as schools and universities are widely used, presenting positive points for students as well as for teachers, favoring autonomy to create proposals that enable different forms of teaching, improving these teaching spaces. The teacher is a leader for applying and facilitating access to these technologies, in the search to provide affinities between people of different knowledge and cultures, aiming to improve learning.³⁴

A Spanish study shows that the use of technologies with adolescents, mainly the use of electronic devices, online games and social or mobile application networks are reproduced with a relevant role in promoting healthy habits, allowing an approximation between health and technology in adolescence. Considering that in addition to being able to answer questions and find answers about various contents, technologies help the public to feel better by sending motivating messages, thus improving, in addition to their physical health, emotional and emotional, reinforcing self-esteem.³⁵

Adolescents need information beyond those addressed in technological activities, such as the controlled and discriminated use of these technologies, as well as what negative effects they can cause. With the advent of the use of media, human well-being can become vulnerable to the degree to which free time is misused, bringing sedentary lifestyle, changes in sleep patterns, feeding and aggressive behaviors, which can generate long-term consequences.³⁶

However, it is worth mentioning that the use of DICT, when too much, can contribute to negative health factors, such as anxiety and aggressiveness, present both in terms of abstinence and excessive use of electronics.³⁷

Other educational technologies are also widely used are printed ones, such as booklets, characterized as an instrument that enables an effective understanding of the theme by the public, easily accessible and interactive, contemplating verbal and non-verbal language, and capable of application with adolescents in various scenarios, such as student and health services. They are relevant for the potential to promote expressive results, with a better understanding of language and, consequently, some knowledge quickly.³⁸

The use of booklets as an educational tool proves to be a good attraction for adolescents, considering that the public is disinterested in lectures and debates, described by them as tiresome. Once different methods are explored for the application of themes, it establishes a certain competence to attract attention and stimulate interest in the theme addressed. It is emphasized, therefore, that the appropriate and coherent association of the resources used, such as those that motivate reading, makes the educational booklet an easy-to-manipulate method, allowing the handler to explore the contents and broaden their view of the theme.³⁹

The applicability of a booklet must comply with the scenario and context where it will be used, because it is necessary to investigate the suitability of the public, since, even if the subject is valid and understandable, it is important that the technology is timely for its use to be feasible. The language of the booklet should be evaluated by the target audience, because if the approach is not clear and understandable, this technology will not have good support.⁴⁰

In the construction and validation of a booklet for the adolescent public in Piauí, a consultation with the target audience was promoted, so that the content addressed was related to the edu-

cational needs identified, and the information was presented and story mode, with adolescent main character, mixed with interactive games, such as word-hunting and game of the seven errors, to ensure interaction.¹⁶ Thus, it is effective the inclusion of adolescents in the construction of the material for better adequacy and validation of its content, progressing to the acceptance of the technology.

The illustrations used stand out as a challenge to the use of booklets, because sometimes they are not compatible with the reading and the language used, based on technical terms, which makes it difficult for lay people to understand the content. It is also worth mentioning that, because it is a printed material, with detailed verbal and nonverbal language, many professionals understand it as a complete technology that does not need explanations, so they make the distribution of it, without reaching the doubts of the public. It is pertinent to emphasize that the use of these booklets occurs more in health education activities performed by health professionals, because it is a viable and easy-to-elaborate resource, where it can be distributed to individuals to reinforce a health issue already explained, both in consultations and in lectures.⁴¹

Like booklets, printed technologies such as boards, roulettes, comics, among others performed as group dynamics, favor the interaction and sharing of knowledge among individuals as well as instigate the exposure of the dialogue of life reports, allowing adolescents to expose their opinions as well as exchange relevant information with other participating members. The interest of adolescents in this type of group activity is linked to the need to show their ideas, considering what they know at that moment, for what needs to be detailed.⁴²

The use of educational technologies for adolescents is crucial in the development of health education, since they aim to exceed the traditional way for the axis of the production of autonomy and knowledge itself, in which adolescents become protagonists in educational practices. The limitation of this study is the scant description of the processes of construction of the analyzed technologies, making it impossible to better understand their adequacy to the health promotion of adolescents, as well as almost experimental studies that use these technologies demonstrating the effectiveness of their use.

CONCLUSION

Educational technologies for health promotion are presented in a wide spectrum of possibilities, with digital applications, booklets and educational games in greater use and passing through the use in health services, school spaces and daily use. The use of technologies to promote health with this public aims to improve the training of adolescents and their empowerment in health. Thus, the recommendations and the use of these technologies are effective to ensure the develop-

ment of knowledge, skills and more satisfactory attitudes. Thus, it contributes to the education of thinking, critical and acting adolescents in the exercise of the solution of their health and care needs.

The study contributes to the synthesis of technologies constructed and adopted to promote the health of adolescents, enabling health professionals, managers, teachers, parents and adolescents to know which technologies are most adopted and which themes they address. Thus, the adoption of technologies for health promotion is enhanced, listing the possibilities and pointing out gaps in the production of these tools.

CONTRIBUTIONS

It is reported that all authors also contributed to the conception of the research project, collection, analysis and discussion of the data, as well as in the writing and critical review of the content with intellectual contribution and in the approval of the final version of the study.

FINANCING

Scientific Initiation Scholarship from the State Fund to Combat Poverty/ Regional University of Cariri-URCA.

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Submissão: 27/07/2020

Aceito: 14/04/2021

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