



## EDUCATIONAL TECHNOLOGIES IN HEALTH FOR ADOLESCENT AND YOUNG LGBTI+: INTEGRATIVE REVIEW

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### ABSTRACT

**Objective:** to analyze the development and use of educational health technologies for adolescent and young lesbians, gays, bisexuals, transvestites, transsexuals, intersex people and more of sexual and gender diversity (LGBTI+). **Method:** integrative literature review, conducted by the PICO strategy, with search in the databases: MEDLINE via PubMed, CINAHL, Embase, Scopus, LILACS and Web of Science updated in April and May 2023. In the selection stage, the bibliographic survey was organized by the reference manager Mendeley® with the aid of collaborative software in Rayyan®. **Results:** eleven articles composed the final sample, evidencing the use of virtual the use of focus groups and virtual discussion forums as significant resources developed as digital health interventions for adolescent and young LGBTI+. **Final Thoughts:** the technologies analyzed have the potential to reach them consistently, supporting their knowledge processes and decision making about their health, being significant sources of information and learning, with virtual access representing a key opportunity in the context of digital health. Scientific-based digital sources are recommended in the health care of adolescent and young LGBTI+.

**Keywords:** Adolescent. Health education. Gender diversity. Sexual and gender minorities. Educational technology.

### INTRODUCTION

Adolescence is an intense and significant period of human development, characterized by biopsychosocial and emotional variations, by the beginning of maturity, increased independence and adoption of new attitudes and habits of life that may last for the rest of life<sup>(1-3)</sup>.

In this phase, the manifestations of sexuality and the intensity of curiosities are significant characteristics, in which the questions linked to the search for self-comprehension of affective-sexual orientation and gender identity are also presented. The World Health Organization (WHO) considers adolescence between 10 and 19 years of age and circumscribes youth from 15 to 24 years, behaving consequences, identifying

young adolescents (from 15 to 19 years) and young adults (from 20 to 24 years); it also defines sexuality, involving aspects of sex, gender identity, sexual orientation, pleasure, intimacy, eroticism and reproduction<sup>(4,5)</sup>.

In the expression of sexual and gender diversity, lesbians, gays, bisexuals, transvestites, transsexuals, intersex people and more of sexual and gender diversity (LGBTI+) representation and its recognition marked by the protagonism of adolescents and young people, which increasingly expand and give visibility to new understandings, meanings and experiences of affection, sexual attraction and involved in the scenarios of the exercise of their sexualities in the modern world<sup>(3,6,7)</sup>.

In line with this context, adolescent and

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young LGBTI+ have been effectively accepting and assuming their sexual orientation and gender identity, facing, in this way, several obstacles, such as stigma, prejudice, stress and various forms of violence perpetrated on minorities, with a profound influence on their quality of life and, consequently, health<sup>(3,4,8)</sup>.

LGBTI+ people constantly suffer prejudices and expressions of oppression, intolerance and exclusion, characterized as forms of LGBTIphobic violence, reaching the extreme of homicides, often accompanied by the absence of support, which may lead to the development of anxiety, mental disorders, use and abuse of psychoactive substances, depression, suicidal ideation and suicide, including<sup>(3,9)</sup>.

This scenario is shaped, mainly, in social contexts in which the collectivity often imposes a pattern of conformations on right and wrong, making vulnerable to those people who do not fit into this set, opening space for non-acceptance of the different and the various other forms of expressions of gender identity and sexual diversity that are sometimes considered as out of “normality”<sup>(3,8)</sup>.

Health education is a technology that is increasingly being used in the sharing of information and in the construction of knowledge and individual and collective developments, favoring reflection and gradual changes in the ways of acting, thinking and feeling<sup>(10-11)</sup>. Analyzing the progress of the current means of communication, it is perceived that the modes of interaction between adolescents have undergone a major change with the rise of technology and with transformations that have provided a new paradigm, especially in the ways of life and relationships of these people<sup>(10,12)</sup>.

It reflects on the importance of knowledge about gender, gender expressions and their role in society, as a transformative, strategic and representative instrument in the prevention of prejudice and the various modes of discrimination, redefinition of these themes in the present<sup>(4)</sup>.

For the proposition of this study, the comprehensiveness of the definition of the term educational considering the breadth and feasibility of digital interventions in health and technological educational resources as

innovative and mediating tools in the improvement of teaching-learning processes, in the production of constructive education, access to information<sup>(13)</sup>.

It is understood that the understandings of gender identity and attitudes to LGBTI+ people, especially for adolescents and young people, should not be based on heterocisnormative and binary approaches, but on interventions that require a comprehensive, inclusive and health promotion, especially mental, of these adolescents and young people and in the prevention of LGBTIphobic violence<sup>(14,15)</sup>.

In this review, we investigated the search for educational health technologies aimed at adolescent and young LGBTI+ and questioned whether they had the potential to disseminate access to information and how their understanding could be integrated, issues and discussions of the contexts of sexual and gender diversity, as well as in health promotion and would improve the quality of life of this vulnerable population and that still does not have the due prominence in the discussions and implementation of public health policies<sup>(15,16)</sup>.

Therefore, the objective of this study was to analyze the development and use of educational technologies in health for adolescent and young LGBTI+.

## METHODS

This is an integrative literature review, conducted by the peak strategy, considering “P”: Population (adolescent and young LGBTI+), “P”: Phenomenon of interest (development and use of educational technologies in health) and “Co”: Context (scientific evidence) to define the following guiding question: What is the scientific evidence on the development and use of educational technologies in health for adolescent and young LGBTI+? This study was guided by the guide Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), building this review based on this Checklist.

Six stages of research were followed with the formulation of the theme and the guiding question; choice of databases most relevant to the research; development of search strategies and definition of inclusion and exclusion

criteria; analysis and interpretation of the results; classification of included studies; synthesis of evidence and presentation of the review<sup>(17)</sup>.

The searches were carried out in November 2022 and updated in April and May 2023, through virtual access through the Portal of the Coordination of Improvement of Higher Education Personnel (CAPES) via the Cafe platform (Federated Academic Community) making it possible to include both articles with open access content and articles with subscription access in the following databases: Medical Literature Analyses and Retrieval System On-line (MEDLINE) via National Library of Medicine National Institutes of Health (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, Web of Science (WoS), Latin American Health Sciences Literature (LILACS) and Embase.

The search strategies were formulated through controlled vocabularies, using the Health Sciences Descriptors (DeCS) and their correspondents in the English language in the Medical Subject Headings (MeSH), with a survey of articles by combining the following descriptors, related with the Boolean operators AND and OR, in Portuguese, English and Spanish, observing the specificities inherent to each database: “Adolescent” AND “Health Education” OR “Educational Technology” OR “Sexual Education” OR “Sexual and Gender Minorities” AND Homosexual OR Gay OR Bisexual OR Lesbian OR “Transgender People” OR “LGBTI+ People” OR “Gender Diversity”.

The inclusion criteria were original articles, in English, Portuguese and Spanish or with translation into these languages, without year restrictions, available in full and related to the development and use of educational health technologies for adolescent and young LGBTI+, considering technological tools, digital health interventions and other educational resources supported by technology. The exclusion was conditioned to theses, dissertations, editorials, books or book chapters, newspaper articles, integrative or systematic reviews of the literature, experience reports and case studies, in addition to repeated articles between the bases.

The entire bibliographic survey was organized by the use of the data manager and references Mendeley®, enumerating the articles and excluding the duplicates. The files containing the initial selection have been compressed into file format. BibTeX® and imported into the collaborative software in reviews and selection of bibliographic references Rayyan® where there was a careful analysis for the selection of articles, identifying those who met the leading question of this study, inclusion and exclusion criteria listed.

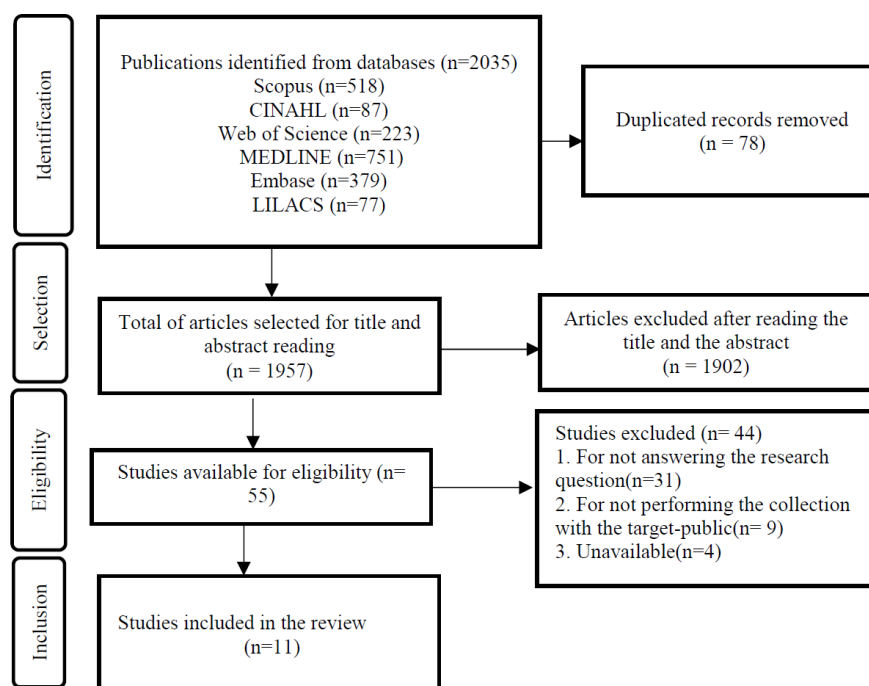
For articles that met all the selection criteria, title and abstract were read and those that entered for eligibility were read in full. All analysis was performed by peers and independently, with a third reviewer to establish consensus on the selection of articles that were part of the final sample.

The included studies were classified by the level of evidence, namely: Level 2 - evidence from at least one randomized controlled trial; Level 3 - evidence from well-designed trials without randomization; Level 4 - evidence from cohort study and case-study control well delineated and Level 6 - evidence of a single descriptive or qualitative study<sup>(18)</sup>. Except for the levels of evidence whose classification of the study was discarded by the exclusion criteria of this review.

To extract the information from the articles of the final sample, synthesis tables were produced, through the use of its own instrument, containing the most important information of each article. Finally, the results were presented after interpretation of the relevant findings that emerged from this synthesis, with the analysis of the scientific evidence found in the included studies, also listing two categories discussions and arguments relevant to this study.

## RESULTS

Eleven articles that met the selection and eligibility criteria composed the final sample. Next, Figure 1 shows the flowchart of the phases of article selection, with the stages that constituted the final sample of evidence found.



**Figure 1.** Flowchart of the article selection stages for review, according to the Preferred Reporting Items for Systematic Reviews and MetaAnalyses (PRISMA) recommendation. Recife, PE, Brazil, 2022

The articles included in this review were synthesized and analyzed according to identification code (ID), authors, year of publication, main information, journal and

classification by the level of evidence<sup>(18)</sup>, scientifically supporting the discussions before the theme studied, as shown in Table 1.

**Table 1.** Summary of included studies according to author/year of publication, main information, journal and level of evidence. Recife, PE, Brazil, 2022.

Nº	Author/Year of publication	Main information	Level of evidence
1	Ybarra ML, et al. 2014	Use of online focus groups and discussion forums as an HIV* prevention program for gay, bisexual and queer male adolescents <sup>(19)</sup> .	VI
2	Mustanski B, et al. 2015	This study evaluated the effectiveness and acceptance of an online multimedia sexual health promotion program (Queer Sex Ed) tailored for LGBTI+ youth <sup>† (20)</sup> .	II
3	Ybarra ML, et al. 2019	A randomized clinical trial evaluating Guy2Guy, a mobile health HIV prevention program for boys from sexual minorities aged between 14 and 18 years. This program uses text messages to deliver targeted educational information <sup>(21)</sup> .	II
4	Ybarra ML, et al. 2020	Study describes the interactive development of Girl2Girl, an early-stage text messaging-based pregnancy prevention program with a randomized clinical trial conducted with 160 lesbian, gay, bisexual and other sexual minority (LGBTI+) girls aged 14 to 18 ) in the United States. It also conducted online focus groups to better understand why LGBTI+ girls choose or not to have sex and “give voice” to the sharing of sexual experiences and experiences of these adolescents with intervention messages <sup>(22)</sup> .	II
5	Tan R, et al. 2020	Pragmatic randomized clinical trial designed to evaluate an online video series developed by a community organization in Singapore for gay, bisexual and queer youth about testing for HIV and other sexually transmitted infections <sup>(23)</sup> .	II

6	Decker MJ, et al. 2020	Introduces the In the Know program – an intervention that combines face-to-face sexual health education with a web-based component (downloadable app or website) to provide the necessary and timely skills, information and resources to improve sexual and reproductive health and the general well-being of adolescents. In particular, it is designed to address the needs of homeless and unstable youth, LGBTI+ youth, and black youth <sup>(24)</sup> .	II
7	Kirchner S, et al. 2020	This study assesses the perceptions of LGBTI+ adolescents and young adults about a selection of videos from the “It Gets Better” program, in the areas of suicide prevention and counseling for LGBTI+ youth. The “It Gets Better” project is a multinational media campaign that aims to reduce suicide among LGBTI+ teens by providing personal narratives of hope delivered primarily to LGBTI+ people <sup>(25)</sup> .	VI
8	Cahill SR, et al. 2021	A study assessed the attitudes of male adolescents aged 13 to 18 years who have same-gender attraction, engage in same-sex behavior, or identify as gay/bisexual or other non-heterosexual identity about sexual health, sexual health education and barriers/facilitators to accessing HIV prevention through four focus groups (two in online format and two in face-to-face format) with qualitative data analyzed through content analysis <sup>(26)</sup> .	VI
9	Ybarra ML, et al. 2021	Still on the description of Girl2Girl (a text message-based teen pregnancy prevention program for lesbian, gay, bisexual and other sexual minority (LGBTI+) girls aged 14 to 18 in the United States) this is another clinical trial randomized with Girl2Girl whose investigation examines the behavioral outcomes associated with behavior-changing content delivered via text messages, particularly one that targets complex behaviors such as pregnancy prevention. Trial conducted with 948 LGBTI+ girls ages 14 to 18 assigned to Girl2Girl or an attention-matched control group <sup>(27)</sup> .	II
10	Anderson A, et al. 2022	Introduces Male Youth Pursuing Empowerment, Education, and Prevention Around Sexuality (MyPEEPS) Mobile - a health app for cisgender youth who have sex with men to promote health and reduce sexual risk. It sought to better understand approaches to adapting MyPEEPS for young male transgender people. Qualitative study that explains the adaptation of MyPEEPS Mobile for young male transgender people. To this end, young trans men, ages 13 to 18, who reported being attracted to or having sex with cisgender men were recruited to participate in focus groups in four major cities across the United States <sup>(28)</sup> .	VI
11	Mustanski B, et al. 2023	Introducing SMART - a tiered care package of eHealth interventions that comprehensively addresses online sexual and HIV prevention needs for male adolescents with same-gender attraction, ages 13-18. This study presents the first stage of this program: SMART Sex Ed, analyzing the HIV prevention attitudes, skills and behaviors of the target audience of this intervention <sup>(29)</sup> .	II

\*HIV: Human Immunodeficiency Virus; †LGBTI+: Lesbian, Gay, Bisexual, Transvestite, Transgender, Intersex and more

Based on this table, the main technologies found through this review study are: Web-based intervention programs, interactive videos, focus groups and online discussion forums, presented below, in two thematic categories.

### Web-based intervention programs for LGBTI+ adolescents and youth

A mixed method analysis evaluated the effectiveness and level of acceptance of an innovative program for LGBTI+ adolescents, named: Queer Sex Ed (QSE), designed to promote comprehensive sexual health. The QSE

consisted of an online multimedia intervention with the objective of promoting various nuances of sexuality among LGBTI+ adolescents<sup>(20)</sup>.

Other program, Male Youth Pursuing Empowerment, Education, and Prevention Around Sexuality (MyPEEPS) Mobile was a health application developed for young cisgenders who have sex with men to promote health and reduce sexual risk whose research under analysis adapted this tool for young trans men in order to make it effective and functional for this public<sup>(28)</sup>.

In general, participants considered MyPEEPS Mobile a useful educational platform for sexual

health education and discussed the expansions of this technology with detailed suggestions to serve the young trans male audience by addressing interpersonal issues and holistic for health promotion with improvements in functionality, inclusivity and customization<sup>(28)</sup>.

In the Know (ITK) has incorporated the combination of face-to-face sexual health education with a web-based component for adolescents aged 13 to 19, developed especially to meet the needs of vulnerable adolescents, including LGBTI+ adolescents, with objectives centered on well-being and improvement of factors related to sexual and reproductive health, contextualizing scenarios about the use of methods to protect sexual health problems, awareness of healthy relationships, stress management and violence reduction<sup>(24)</sup>.

Girl2Girl, an interactive pregnancy prevention program consisting of text messages for girls of sexual and gender minorities in the United States of America (USA) was analyzed, as well as Guy2Guy, a mobile HIV prevention program for boys of sexual and gender minorities aged 14 to 18 years, also using text messages to provide targeted educational information<sup>(21,22)</sup>.

The evaluations of Guy2Guy demonstrate hesitant results in the provision of oriented educational information, expressing its viability and acceptability by adolescents<sup>(21)</sup>. In addition, in the application experience for the use of the Girl2Girl program, online media proved to be significant as a viable method for population recruitment. Observations were also mentioned that the program can be useful as an extensive approach to sex education beyond abstinence messages and even complement the merely heterocisnormative perspectives of school programs<sup>(22)</sup>.

A comprehensive package of online interventions is also presented: SMART, focusing on the first stage of this program, the SMART Sex Ed, with four modules in which participants navigated in any order they chose with the following media assets presented on the scroll screen (similar to social media feeds): slide shows with narration recorded with voice actors, videos, games, quizzes and GIFs, as well as Emojis making the topics and lessons more relatable to participants<sup>(29)</sup>.

SMART Sex Ed highlighted sexual health as more than just the absence of disease, presenting information on healthy romantic relationships, pleasurable sexual experiences and self-acceptance, as well as information on the transmission and prevention of HIV. This intervention is evaluated as an alternative to traditional sex education, qualifying it as promising for effective sex education of male adolescents who are attracted to the same gender<sup>(29)</sup>.

### **The use of videos, focus groups and online discussion forums in the interactive context of digital interventions for LGBTI+ adolescents and youth**

A study that evaluated the perceptions of adolescent and young LGBTI+ adults on a selection of videos with the theme of suicide prevention and counseling of adolescents of sexual and gender minorities is analyzed, showing that this tool showed significant potential in the provision of information and in the dissemination of positive messages, favoring the reception and even the identification of adolescents and young adults with the protagonists of the videos<sup>(25)</sup>.

Another analysis of a randomized clinical trial conducted with gays, bisexuals and queers, designed to evaluate a series of online videos developed by a community organization in Singapore on testing for HIV and other sexually transmitted infections (STIs) positive results favorable to the public's intention to perform the tests and changes in the patterns of knowledge and understanding of self-reported risks for HIV and other STIs, in the perception of topics such as self concealment of sexual orientation, LGBTIphobia perceived and internalized in relations with the LGBTI+ community, among other relevant issues, presenting a range of results indicated by the scope of this intervention<sup>(23)</sup>.

As for the experience with focus groups and online discussion forums, a study included in this review suggests that discussions and sharing of different types of experience by LGBTI+ adolescents in this modality have substantial aptitude to promote a welcoming environment, in order to motivate proactive attitudes towards

the daily challenges of sexual and gender minorities, as well as reducing the negative impacts of stigma suffered mainly by the adolescent and sexually active population. It is noteworthy that the presence of a group moderator in these discussions is important in stimulating carefully guided discussions, with components that are likely to lead to self-reflection and in-depth sharing of experience and beliefs<sup>(19)</sup>.

In addition, a study exploring the perceptions and beliefs associated with identity formation, sexual health education, relationships, behaviors, and barriers to HIV prevention and comprehensive sexual health care, of a group of male adolescents who have same-sex attraction, engage in same-sex behavior or identify as gay/bisexual or other non-heterosexual identity, using as a method two online focal groups and two face-to-face focal groups, found that online recruitment was higher than face-to-face, placing the lower number of face-to-face recruitments as a research limitation<sup>(26)</sup>.

It was also evident that the technique of online focus groups facilitated recruitment, reduced barriers to adolescent participation, and they reported a feeling of familiarity with other participants. Moreover, the most convincing and detailed answers of the participants were found in the format of the virtual groups, associating this particularity with the probability that these adolescents had more time and opportunity to carefully articulate their own answers to each question, qualifying this technique of groups in online format as a superior method for data quality<sup>(26)</sup>.

## DISCUSSION

The internet is a broad and revolutionary source in disseminating information to adolescents, especially those of sexual and gender diversity, that use cyberspace to seek answers to their own questions and even their individual curiosities, and can be used to provide support and fill gaps in the appropriate development, especially sexual health<sup>(30,31)</sup>.

Analyzing the Web-based intervention programs for adolescent and young LGBTI+ found, it is verified that all of these were developed on the theme of sexual, reproductive

and sexuality of this population, and, although, all these themes reinforce the need for knowledge and discussion of these very significant contents in the contexts experienced by LGBTI+ adolescents, the development of programs with the inclusion of the theme of mental health and protective factors of impact to the mental health of these adolescents, whose scarcity was unveiled in this review study.

Discussing the adolescence of LGBTI+ youth involves the issues related to what they experience at this stage of life, often marked by contexts of family and social exclusion, discrimination and stigmatization. This phase, in general, is characterized by negative feelings and non-belonging, with desires that cause damage to their mental health and quality of life<sup>(15,32)</sup>.

In the sphere of using interactive videos as digital interventions for this public, it is notorious the presentation of the study of counseling adolescents of sexual and gender minorities with the theme of suicide prevention, identification of the individual receiving the message with the context, and even with the characters presented, makes this elementary scenario in the use of this technological resource in the provision of scenes and narratives in which the viewer identifies with the circumstances presented<sup>(25)</sup>. The only technology of the findings of this review, which presented the theme involving the psychological health of this population.

The evidence found in the articles included in this review reports on the significance of health interventions based on technologies and in the virtual environment, the development of these tools and the use of digital content by LGBTI+ adolescents as a mechanism for health protection and vulnerability reduction.

Promising findings support the thesis and the feasibility of using digital health interventions based on technology for behavior changes and knowledge acquisition, especially with the adolescent public. Such tools have been growing and gaining popularity, whose evidences of applicability and usability still lack studies with considerable rigor of evaluation regarding the results in the medium and long term<sup>(24)</sup>.

The development of the Queer Sex Ed program (QSE), for example, was guided by a model of skills that estimates that the spread of

health behaviors results from the individual's information about a particular health problem, taking into account the motivation and behavioral skills of engagement of this person to engage in healthy behaviors, motivation being a significant elementary component. The results suggest the feasibility of offering online education in comprehensive sexual health, and the internet is a significant resource in the development of sexual health<sup>(20)</sup>.

Results observed in the study of the SMART program also suggest this relevance, being this program even more peculiar for its scope and the dimension of media assets used, bringing a unique perspective, not presented by the other studies examined, in a more holistic context, involving several nuances, the proportion of which positively impacted the sexual patterns and emerging behaviors of male adolescents who have attraction to the same gender with a decrease in risk and HIV prevention<sup>(29)</sup>.

In this perspective, attention is paid to the need to create health technologies that can incorporate not only the physiological context of the problem to be addressed, but also the multiple factors that involve the issues related to the needs of the public target for which the tool will be produced. It is pointed out, opportunely in SMART Sex Ed, that the program was remarkably adequate to meet the needs of anonymity and privacy of LGBTI+ adolescents in learning about sexual health and their sexualities, that needs to be especially incorporated into the development of technologies for this audience<sup>(29)</sup>.

It is a fact that both the internet access tools and the concept of mobile learning have been transformed, increasing the offer of knowledge in articulation with the social context<sup>(30,33)</sup>.

It was found that the publications identified in this review occurred between 2014 and 2023, demonstrating a greater regularity of research and development of educational technologies in health for adolescent and young LGBTI+ in the period from 2019 to 2023, especially in 2020 with the presentation of four studies with technological tools, three of which were randomized clinical trials<sup>(18)</sup>.

This datum reveals prominence for this period, which corroborates the advance of modern means of communication and the

technological rise in the bringing the facilities of internet access and mobile technologies revolutionizing and reframing several transformations in the scenarios and perspectives of this moment<sup>(12,30)</sup>.

In the current and knowledge promotion scenarios, interactive technologies and computers incorporate this reality with vast potential for attractiveness. These tools, when associated with several other elements, arouse the interest and attention of people. In the daily life of health education, the use of educational videos has been relevant in teaching and learning processes with the use of this element in various pedagogical experiences<sup>(34,35)</sup>.

Thus, we still experience a very difficult time in the field of confronting struggles related to the sphere of rights and duties in the exercise of sexuality with regard to sexual and gender diversity, mainly with regard to a reactionary part of society, with ideologies and attitudes that try to reverse several clashes already conquered in these aspects<sup>(16)</sup>.

In this perspective of the absence of social support, it becomes cogent to consider that prejudice and gender violence happen, mainly, by the lack of information and knowledge, peak of the origin of social prejudice, revealing the need for transformations in cultural and social behaviors and behaviors<sup>(32,36)</sup>.

Therefore, although the invisibility of the LGBTI+ adolescent is related to several factors, it is reiterated about the importance of health education in overcoming these sufferings, especially the psychic ones, which affect and cause direct limitations in the social life and daily contexts of these adolescents<sup>(15)</sup>.

It is observed that none of the studies found in this review are of Brazilian origin, being mostly American studies, whose scenario demonstrates the need for the development of educational technologies in health reducing vulnerabilities and promoting the health of this population with great potential for strengthening public health policies LGBTI+ and empowerment of these LGBTI+ adolescents, who suffer much insecurity with the disrespect and stress of gender minorities<sup>(32,37)</sup>.

Deepening the investigation of other relevant digital information technologies in the interactive context of health and sexual and



gender diversity for LGBTI+ adolescents, there are some accessible and low-cost strategies such as the use of focus groups and virtual discussion forums, as evidenced by a study included in the final sample of this review<sup>(19)</sup>.

Intervention resources such as these contribute substantially to increasing the range of positive behaviors and to stimulating the approximation and conformation of constructive bonds with the LGBTI+ community, which may have important protection benefits for adolescents<sup>(19)</sup>. It is expressed, then, the importance of cost-benefit in the anchoring and development of these technologies, so that they can qualify them as viability and accessibility, in which the low cost can be a requirement of indispensable notability for use of these tools.

It is known that the findings of the interactive program Girl2Girl emphasize the use of the participatory approach of the target audience in the development of the intervention<sup>(22,27)</sup>. Thus, the importance of active participation of this population in the production of these technologies is emphasized in order to narrow gaps and meet the specific needs of this public, becoming cogent to consider cooperation and sharing of ideas, reflections and formation of critical sense.

The development of educational technologies is a tool that goes in favor of the construction of knowledge and the formation of skills and competences, in a transformative perspective, in the search for the integral formation of the human being, individuals are constantly challenged for new ways of acting and thinking. These considerations refer to reflections that contribute to the possibilities of transformation of the environment, through technologies and digital, in a society, which is increasingly involved in these devices and resources, which if well used, disseminate new knowledge, skills and abilities<sup>(10,12,38)</sup>.

It is emphasized the care to the LGBTI+ adolescent considering several aspects and nuances, in the direction of their capabilities and in the understanding of reality and their vulnerabilities, which are routinely targets of bullying, stigma, verbal, psychological and, in addition, also live with social discrimination that consistently affects their quality of life and psychological well-being, despite causing them

negative feelings, symptoms of anxiety and other behaviors vulnerable to health<sup>(7,8,15,37)</sup>.

The conceptions of health education overcome the transmission of knowledge in the articulation between the teaching-learning process and the exchanges of experiences and experiences, in an expansive combination guiding the empowerment to the practices of life and health, both individual and collective, in a reflective configuration of self-analysis and personal and social responsibility<sup>(39)</sup>.

In this review, studies with level of evidence 2 were predominant, in which randomized clinical trials are an important tool for evidence-based decision-making, for its high degree of significance and robustness regarding studies involving evaluation and experimental intervention<sup>(40)</sup>. Although this data is relevant, it is highlighted the low number of studies found in the final sample, which reiterates the small number of studies with development of educational technologies in health for adolescent and young LGBTI+, importance of this review.

In view of the above, this research presents as a limitation the scarcity of investigations, especially in the making evident the need for more studies that consider the specificities of adolescents of sexual and gender minorities and the performance of digital health interventions in the dissemination of knowledge and information in a virtual way.

We recommend scientific-based digital sources in the health care of adolescent and young LGBTI+, which is a new reality that is presented in the daily life of a globalized society, especially for the young public, whose internet is a habitual and expressive source of communication and content search.

## FINAL THOUGHTS

The use of intervention programs in the virtual environment and interactive videos are expressive sources for the guidance and development of new health interventions, with online access representing a key opportunity to learning and disseminating information in the context of sexual and gender health and diversity. Affordable and cost-effective resources such as the use of focus groups and virtual discussion forums also contribute

substantially to the sharing of information, especially experiences.

With these findings, it is emphasized that technologies aimed at adolescent and young LGBTI+ have the potential to consistently reach them, supporting their knowledge processes and decision making about their health. Technologies are significant sources of learning and provide new insights into educational health scenarios.

The results of this review are relevant for the

advancement in knowledge, development and use of technologies in the virtual environment focused on health education and comprehensive teaching-learning, considering the approach of vulnerabilities that permeate the scenarios involving adolescent and young LGBTI+, and this context should be viewed not only in biological aspects, but also in its various political, social, cultural, beliefs and values nuances.

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## TECNOLOGIAS EDUCACIONAIS EM SAÚDE PARA ADOLESCENTES E JOVENS LGBTI+: REVISÃO INTEGRATIVA

### RESUMO

**Objetivo:** analisar o desenvolvimento e o uso de tecnologias educacionais em saúde para adolescentes e jovens lésbicas, gays, bissexuais, travestis, transexuais, pessoas intersexo e mais da diversidade sexual e de gênero (LGBTI+).

**Método:** revisão integrativa de literatura, conduzida pela estratégia PICO, com busca nas bases de dados: MEDLINE via PubMed, CINAHL, Embase, Scopus, LILACS e Web of Science atualizada em abril e maio de 2023. Na etapa de seleção, o levantamento bibliográfico foi organizado pelo gerenciador de referências Mendeley® com auxílio do software colaborativo em revisões Rayyan®. **Resultados:** onze artigos compuseram a amostra final, evidenciando o uso de programas de intervenções virtuais, do vídeo interativo e a utilização de grupos focais e fóruns de discussão virtual como recursos significativos desenvolvidos como intervenções em saúde digital para adolescentes e jovens LGBTI+.

**Considerações Finais:** as tecnologias analisadas têm potencial para lhes alcançar de modo consistente, apoiando seus processos de conhecimento e as tomadas de decisões sobre sua saúde, sendo fontes significativas de informação e aprendizagem, com o acesso virtual representando uma oportunidade-chave no contexto da saúde digital. Recomendam-se fontes digitais de base científica nos cuidados à saúde de adolescentes e jovens LGBTI+.

**Palavras-chave:** Adolescente. Educação em saúde. Diversidade de gênero. Minorias sexuais e de gênero. Tecnologia educacional.

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## TECNOLOGÍAS EDUCATIVAS EN SALUD PARA ADOLESCENTES Y JÓVENES LGBTI+: REVISIÓN INTEGRADORA

### RESUMEN

**Objetivo:** analizar el desarrollo y uso de tecnologías educativas en salud para adolescentes y jóvenes lesbianas, gays, bissexuales, travestís, transexuales, personas intersexuales y más de la diversidad sexual y de género (LGBTI+). **Método:** revisión integradora de la literatura, conducida por la estrategia PICO, con búsqueda en las bases de datos: MEDLINE vía PubMed, CINAHL, Embase, Scopus, LILACS y Web of Science actualizada en abril y mayo de 2023. En la etapa de selección, el estudio bibliográfico fue organizado por el gestor de referencias Mendeley® con ayuda del software colaborativo en revisiones Rayyan®. **Resultados:** once artículos compusieron la muestra final, evidenciando el uso de programas de intervenciones virtuales, del vídeo interactivo y la utilización de grupos focales y foros de discusión virtual como recursos significativos desarrollados como intervenciones en salud digital para adolescentes y jóvenes LGBTI+.

**Consideraciones finales:** las tecnologías analizadas tienen potencial para alcanzarles de manera consistente, apoyando sus procesos de conocimiento y las decisiones sobre su salud, siendo fuentes significativas de información y aprendizaje, con el acceso virtual representando una oportunidad clave en el contexto de la salud digital. Se recomiendan fuentes digitales de base científica en el cuidado de la salud de adolescentes y jóvenes LGBTI+.

**Palabras clave:** Adolescente. Educación en salud. Diversidad de género. Minorías sexuales y de género. Tecnología educativa.

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**Submitted:** 18/01/2023

**Accepted:** 16/05/2023