The Use of Educational Technologies in Health: An Integrating Literature Review

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ABSTRACT

It is understood as Educational Technology a set of mediators devices of the teaching-learning process that must contain a logical organization, so that they can be systematically planned, observed, understood and transmitted. In this scenario, the objective of this study was to analyze the literature on Educational Technologies applied to Health. As an methodology, an integrative review was carried out, consisting of a broad analysis of theoretical and empirical literature that aims to understand a certain phenomenon from studies above. The search was carried out in the CAPES database, the main Brazilian database, between 2013-2018, in Portuguese, English, French and Spanish through the descriptors "Educational technologies" and "Health", which were duly translated into the other languages correspondents. As a result, 30 articles were analyzed in two moments: individually from a literature review protocol developed and validated by the author of the study and together from the Content Analysis technique. In general, sixteen dependent and four independent technologies were found and it was realized that they were validated mainly by specialists in the field and by the target audience for whom they were intended. The theoretical anchorage found in the literature for the basis of the development of technologies was the Arch of Mangueares and six categories of analysis were found that discuss their use. Thus, it is concluded that technologies help in the process of training health professionals and empowerment for the process of treatment of users of services. Resources such as the applications end up facilitating access to health services, and the insertion of new technologies, especially those mediated by the Internet, has modified the educational paradigms

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INTRODUCTION

The purpose of this study is to analyze the literature on Educational Technologies aimed at Health. We assumed that the promotion of integral individual-collective health, in order to be fully effective, requires the adoption of educational technologies aimed at health needs of the population. These issues pervade transdisciplinary areas, among them cyberculture, culture, education and society. Teixeira et al. (2011) point out that it is necessary to recover the dimension of education in the context of the health-disease process and to establish the articulations between these two fields. We also need to expand to other interdisciplinary areas

Salci et al (2013) propose that health education is a complex, yet executable area. This is due to the joining of several areas of knowledge that are part of it, with various political, cultural, philosophical, group biases, etc. Falkenberg et al. (2014) cite Morosini et al. (2008) and discuss this important political pedagogical bias. They emphasize that subjects need to think critically, and reflexively, for reality to be unveiled. These actions emerge as characteristics of emancipation of the subjects. And in this process educational technologies serve as a tool for health promotion. For UNA-SUS (2018), affiliated with the university of which we are part of, Educational Technologies (ET) serve as mediators in the process of knowledge construction and dissemination. They are instruments and / or mechanisms that should be used in these processes, as they are facilitators, since they have a well defined target audience. For Teixeira et al (2014) ETs are organized into two types:

A) Dependents: when they depend on electrical resources for use and / or production. Ex: Computer, Internet and its tools, commercial television;

B) Independents: when not dependent on electrical resources for use and / or production. Ex: Poster, Serial Album, Brochures, Folder, Manual, Guide, Comics, Illustration / Engraving, Newspaper, Textbook, Mural, Scrap

In this sense, we believe that it is necessary to use ETs focused on health issues because they are emerging guidelines in society. We start from the understanding that health technologies involve any experience, whether of systematized professional care, is developed for new service situations introduced, or for service situations that require updating and / or adaptation, which may be mediated by other technologies, in the if the ET. (UNA-SUS, 2018)

The TEs are appropriate to work in health, from prevention to recovery, in which health education operates for the well-being of people is essential. However, it should be considered that only the use of technology is not a guarantee of a better education, and there is a need to develop pedagogical actions that allow a critical point of view linked to reality, built on the autonomy and cooperation of the subjects (SILVEIRA, COGO, 2017). Each developed technology, which expresses work in act, constitutes a particular fact for each unit / reality applied. It can thus represent a viable and applicable example in other themes, in a dynamic way, because each situation of work in action requires updating or adaptation to the present situation as well as allows the use of ET (MERHY, 2012). From the foregoing, the question that guides this study is: What has been produced about Health Education Technologies in recent years? This question unfolds in the specific objectives of this study, where it was sought to identify the educational

health technologies described in the literature, to describe its typology and theoretical anchoring, and to discuss its validation processes

Initiatives such as this seek to build a process of articulation between teaching, research and social intervention, creating a space for discussion, exchange and democratization of research on Health Education, putting in dialogue knowledge that provides subsidies for the exercise of social control and the elaboration of educational technologies that are in line with the need to know the target public population. Today Brazil is recognized worldwide as a technology production hub, with several factories and institutes focused on the creation and production of equipment. It is also a pole of academic and scientific production of technological researchers. This will be an opportunity to connect the human and social sciences, health sciences and technological sciences with possibilities of knowledge production for health education. A daring proposal of interdisciplinarity

This adopted perspective converges with Emerson Merhy's Light Technology conception. It is a different type of technology, which aims at the living work between health professionals and people served in the units and services, which could be enhanced by the use of ETs.

METHODOLOGY

This work consists of an integrative bibliographical review, with a qualitative character that consists of a "broad literature review that aims to understand a certain phenomenon from previous studies (BROOME, 2000), to review theories and evidences and to analyze methodological problems of a particular topic, among others. The methodology will follow the one proposed by Whittemore and Knafl (2005) and Mendes, Silveira and Galvão (2008), since they propose the inclusion of both experimental and non-experimental studies, more appropriate to the object of study in question. Technically, this modality of integrative review has in its core rigor and review and combine studies with divergent methodologies. Always focusing on the maintenance of methodological rigor, being able to combine several areas of knowledge (USP, 2011).

According to the authors Whittemore and Knafl (2005), the integrative review had the following steps: After the identification of the problem (in this work, it is proposed a greater understanding of the phenomenon of the production of educational technologies for health registered in the literature) "Educational technologies" and "Health", linked by the AND particle. These descriptors were validated in the Decs database (virtual health descriptors) From this, the inclusion criterion was defined, being: indexed periodical articles that approach the subject of Educational Technologies in / for health, whose survey will correspond to the period between January 2013 and December 2018. The publication should contain as a theme of study in questions in English, Portuguese, Spanish and French (it is emphasized that the descriptors have been translated into the respective languages proposed here, for a more comprehensive collection as possible). And the publications whose processes did not conform to the theme addressed by this work, as well as the exclusion of publications prior to the period of 2013 and which are not in the format of scientific articles (theses, dissertations and the like) were excluded.

The next step was the collection of data in the CAPES database. The basis was chosen for integrating studies from both health sciences and human sciences, as proposed by Whittemore and Knafl

(2005). We followed the criteria of relevance of the publications proposed by CAPES, that is, we selected the first 50 results. After the collection, all the articles were organized in an Excel spreadsheet, for the primary treatment, organization and initial exclusions. From the collection with descriptors in Portuguese along with the application of the inclusion / exclusion criteria, 349 articles were obtained, from which the first 50 were selected, 1 being excluded because it is a glossary, 1 being treated of a review, 1 for being written in English and 3 for being repeated. In that first moment, 44 articles remained.

By applying the translated descriptors to the Spanish language, 51 results were obtained. Of these, 3 were excluded because they were editorials, 1 was found repeatedly, 2 were not available online anymore and another 8 articles were initially excluded because they were indexed in other languages (7 in Portuguese and 1 in English). In the Spanish language, 37 articles were initially left. In French, we obtained 43 results in the initial collection and 4 were excluded because they were editorial, 1 because it was an interview, 1 because it was a book summary and 6 because they were repeated in the database. In this language, 31 articles were initially obtained. No articles were found indexed in other languages in this collection. The greatest results emerged with the application of the descriptors translated into English. There were 50017 results found. Of these, by the criterion of relevance, the first 50 were selected, and after the initial agreement, 4 were excluded because they were editorial, 2 because they were written in Russian, 3 because they were written in Spanish, 5 because they were repeated in the base and 2 by not available online anymore. Until then, 34 articles remained.

It is noticed the problems of indexation, the articles have been reorganized in order not to lose any possibility of publication. Seven articles excluded by the Spanish language collection were added to those already collected in Portuguese, and there were 51 articles in that language. Three articles in Spanish were added to those already collected, totaling 40 studies in that language and referring to the English language, 2 more were added, totaling 37 articles. The next step was the beginning of the evaluation of the data collected: firstly, all the titles, abstracts and key words for the second section were read, which refers to the initial evaluation of the articles: Of the 51 articles in Portuguese language, 35 were excluded for not presenting themselves within the theme of this work (we are left with 16 articles). Of the 37 articles in the English language, 22 were excluded for the same reason (remaining 15 articles), already referring to the 31 articles in the French language, 28 were excluded in this stage (4 articles remaining) and, were excluded (13 articles remaining).

Continuing the evaluation process of the 48 articles included so far and based on Galvão, Sawada and Trevizan (2004), an Integrative Review Protocol was elaborated. This protocol, according to Evans and Pearson (2001), should contain: the review question, the inclusion criteria and the search strategies, then our instrument contains: i) the identification (article title, journal title published article, journal area, major qualis of the journal, abstract keywords, database, language, year and authors and country of publication); ii) study methodology, research objective and study sample iii) the main considerations / results and research question (through the specific objectives and iv) a field to justify if the study is excluded from the final sample

As a data analysis technique, we used the Content Analysis (CA), which is a set of methodological tools that have as a common factor a controlled interpretation based on inference, aiming to obtain

quantitative or qualitative indicators that allow the inference of relative knowledge to the production / reception of messages (CASTRO, ABS, SARRIERA, 2011). Content Analysis traditionally works with written textual materials, but there are already surveys with audios, especially when using software for qualitative analysis, such as NVivo and MaxQda. There are two types of texts that can be worked on by AC: texts produced in research, through interview transcripts and observation protocols, and existing texts produced for other purposes, such as scientific publications, which are the focus of this project (CAREGNATO, MUTTI, 2006).

The content analysis is documented in some phases, being: Pre-exploitation phase of the material. Once the corpus to be analyzed has been selected, the floating readings of all the material are selected, with the aim of apprehending and organizing in an unstructured form important aspects for the next phases of the analysis. The second phase is the selection of the units of analysis, where the researcher is guided by the research questions that need to be answered. More often, the units of analysis include words, sentences, sentences, paragraphs, or a full text. The third stage is the process of categorization, where categories can be characterized as large statements that cover a variable number of topics, according to their degree of proximity, and that can through their analysis express important meanings and elaborations that meet the objectives and create new knowledge, providing a differentiated view on the proposed themes (CAMPOS, 2004).

RESULTS

After reading the 48 articles in full, 18 were excluded because they did not bring relevant information to the discussion proposed here. The final sample consisted of 30 articles. Of which 11 were published in Portuguese, 8 in the English language, 3 in the French language and 8 in the Spanish language. As for the countries of the publications, 16 articles were published in Brazil, 2 articles in Colombia, 1 in Ecuador, 1 in Peru, 2 in the USA, 1 in Canada, 3 in France, 3 in Spain and 1 in the United Kingdom. As for the years of the publications, there were no articles published in 2012. In the year 2013, 4 publications were found. 5 publications corresponded to the year 2014, 3 to the year 2015, 4 to the year 2016, 9 publications per year of 2017, being the year with the largest number of publications on the subject, according to the search in this research and 5 articles were published in 2018. The highest qualis evaluation of each journal was also raised, and 7 international journals did not have a qualis evaluation until the date of the investigation. 5 journals had higher qualis for Nursing (being B1, B2 and A2). One journal had a B1 evaluation for Psychology, two periodicals presented evaluation B2 and A2 for Teaching. Already 2 other periodicals presented A2 qualifications for Education. A journal (in which three articles were found) presented qualis A2 for Linguistics and Literature. Another journal presented qualis B5 for Biological Sciences and another one presented the same qualis for the area of Biological Sciences II. For Environmental Sciences, a journal presented qualis B1. For the Interdisciplinary and Social Sciences areas, qualis B2 (a journal for each area, respectively) was found. We also found a qualis A2 for collective health and the same evaluation was found in another journal, but in the area of Political Sciences and International Relations, while for Public Administration and Human Sciences, qualis B3 and B1, respectively. Given this, it is noticed that the most diverse areas are interested in the subject matter in this article.

As for the research method, 13 theoretical studies (essay, narrative review and documentail analysis), 4 experience reports, 7 qualitative articles and 5 quantitative researches (longitudinal and transversal research, technology development study, methodological study) and a research with mixed character. A table was prepared with the layout of the articles analyzed, the same is shown in table 1, below:

Article	Author/Year	Journal	Method
Construção de manual sobre cirurgia segura para profissionais de saúde	SOUZA, G. S. L.; RIBEIRO, M. R. R./2017.	Cogitare Enfermagem	Qualitative
O uso de aplicativos de saúde para dispositivos móveis como fontes de informação e educação em saúde	DE OLIVEIRA, A. R. F.; ALENCAR, M. S. de M./2017	RDBCI: Revista Digital Biblioteconomia e Ciência da Informação	Theoretical
Tecnologia educacional no processo de formação de enfermeiros	PISSAIA, L. F. et al /2017	Cinergis	Qualitative
ISE-SPL: uma abordagem baseada em linha de produtos de software aplicada à geração automática de sistemas para educação médica na plataforma E-learning	CARVALHO, T. de P. M. et al/2013	Revista Brasileira de Engenharia Biomédica	Qualitative
Validaçao de conteúdo e aparência de um curso online para a vigilância da influenza	SILVA, A. S. R. /2017	Ver. Ibero-Amer. de Est. em Educ.	Theoretical
Telessaúde: dispositivo de educação permanente em saúde no âmbito da gestão de serviços	CARNEIRO, V. F.; BRANT, L. C. /2013	Revista Eletrônica Gestão & Saúde	Theoretical
Telefonoaudiologia como estratégia de educação permanente na atenção primária à saúde no estado de Pernambuco	NASCIMENTO, C. M. B. et al./2017	Rev. CEFAC	Experience report
Capacitação em saúde auditiva: avaliação da ferramentanoprograma de telessaúde brasil	CONCEIÇÃO, H. V.; BARREIRA-NIELSEN, C, /2014	Rev. CEFAC	Qualitatuve
Tecnologia educacional para mediar práticas educativas sobre alimentação complementar na Amazônia: estudo de validação	Viana, L. R. et al/2018	Revista lbérica de Sistemas e Tecnologias de Informação	Mixed
Programa de educação em síndromes genéticas: avaliação motivacional de um material educacional on line	PICOLINI, M. M.; MAXIMINO, L. P./2014	Rev. CEFAC	Quantitative

Concepção e Avaliação de Tecnologia mHealth para Promoção da Saúde Vocal	CARLOS, D. A. O. et al/2016	Revista lbérica de Sistemas e Tecnologias de Informação	Qualitative
Les jeux vide´o se´rieux en pe´diatrie	DRUMMOND, TESNIE`RE, D. A.; HADCHOUELA. /2017	Archives de Pe´diatrie	Theoretical
L'e-santé, un colosse aux pieds d'argile	WERNETTE, F./2014.	Actualités pharmaceutiques	Theoretical
Ame´lioration de la sante´ orale des enfants avec autisme: les outils a` notre disposition	ROUCHES, A. et al/2017	Archives de Pe´diatrie	Theoretical
The distance-learning mode as a strategy in the heath professionals' continuous improvement	BONE, A. A. N. S.; CAZELLA, S. C.; COSTA, M. R./2015	Revista Cuidado é Fundament.	Theoretical
The game as strategy for approach to sexuality with adolescents: theoretical-methodological reflections	SOUZA, V. et al/2017	Revista Brasileira de Enfg.	Qualitative
Educational Technology in Medical Education	HAN, H; RESCH, D. S.; KOVACH, R. A. /2013	Teaching and Learning in Med.: An Inter. Journal	Theoretical
Development of an educational video for the promotion of eye health in school children	JUNIOR, J. C. R. et al/2017	Texto Contexto Enferm.	Experience Report
Construction and validation of an educational game for pregnant women	D'AVILA, C. G.; PUGGINA, A. C.; FERNANDES, R. A. Q. /2018	Esc Anna Nery	Quantitative
On the use of digital technologies to reduce the public health impacts of cannabis legalization in Canada	BEDROUNI, W./2018	Canadian Journal of Public Health	Theoretical
A Pilot Study Using Educational Animations as a Way to Improve Farmers' Agricultural Practices and Health Around Adama, Ethiopia	BELLO-BRAVO, J.; OLANA, G. W.; PITTENDRIGH, B. R. /2015	Information Technologies & Inter. Development	Qualitative
Medical students' online learning technology needs	HAN, H.; NELSON, E.; WETTER, N. /2014	The clinical teacher	Quantitative

Acceso, uso y preferencias de las tecnologías de información y comunicación por médicos de un hospital general del perú	VÁSQUEZ-SILVA, L. et al/2015	Rev Peru Med Exp Salud Publica	Quantitative
Promoción de la salud en entornos educativos. El empleo de ntic en el aprendizaje en salud	LELLIS, M., CALZETTA, C., GÓMEZ, T. /2014	Revista iberoamericana de educación	Theoretical
E-salud: prevención del consumo de sustancias psicoactivas mediante la educación virtual	QUINTERO, L. F. C., ESCOBAR, S. M. R. /2018	Revista Colombiana de Ciencias Sociales	Theoretical
Experiencia universitaria con blogs en educación para la salud	GARCÍA, E. P.; MARCHENA, J. A. M. /2016	International Journal of Educational Research and Innovation (IJERI)	Experience Report
Ambientes virtuales de aprendizaje utilizando realidad aumentada	GARCÍA, D. N. M.; FLORES, V. M. D../2018	Enfermería Investiga, Investigación, Vinculación, Docencia y Gestión	Theoretical
Tecnología Educacional - Panel Integrado Salud-Ambiente – en la formación del enfermero: investigación descriptiva	MONIZ, M. A.; PEREIRA, J. M.; MARQUES, T. S./2016	Online Brazilian Journal of Nursing	Qualitative
Técnicas didácticas: método de caso clínico con la utilización de video como herramienta de apoyo en la enseñanza de la medicina	MEJÍA, O. R.; GARCÍA, A.; GARCÍA, G. A. /2013	Revista de la Universidad Industrial de Santander	Experience Report
Experiencia didáctica con mapas conceptuales interactivos con estudiantes universitarios sobre las áreas de intervención socio-laboral del educador social	CANO, E. V.; MENESES, E. L. /2016	Aula de Encuentro	Theoretical

Table 1 - Articles analyzed. Source: Bibliographic search

DISCUSSION

The technologies found in the final sample of this research are presented in Table 2 below.

Tecnologias encontradas/discutidas na literatura Technologies found / discussed in the literature	Authors	Type of Technology
Case study video about anamnesis care and physical examination of a 58 year old female patient.	MEJÍA, GARCÍA, GARCÍA, 2013	Dependent
Interactive mental map from web blogs.	CANO, MENESES, 2016	Dependent
"Integrated Health - Environment Panel" technology: proposal of an active education-learning methodology on the resonance of socio-environmental transformations in the health-disease process in a territory.	MONIZ, PEREIRA, MARQUES, 2016.	Independent
Videogame applied to pediatrics	DRUMMOND, TESNIE`RE, HADCHOUEL, 2018	Dependent
Vídeo educativo para detecção precoce da dificuldade para enxergar em crianças em idades escolares.	JUNIOR et al, 2017	Dependent
O vídeo educacional sobre boas práticas agrícolas e saúde	BELLO-BRAVO, OLANA, PITTENDRIGH, 2015	Dependent
Facebook as a network used to share medical information.	VÁSQUEZ-SILVA et al, 2015	Dependent
Manual on safe surgery, presenting procedures and phases for quality surgeries and safe	SOUZA, RIBEIRO, 2017	Independent
Mobile Technologies and Your Internet Connection Applied to Health: Laptop, Tablet, Mobile Phone, Pager, Portable Media Player, Portable Electronic Book Readers, Smartphones	HAN, NELSON, WETTER, 2014; DE OLIVEIRA, ALENCAR, 2017; (ROUCHES, et al. 2018).	Dependent
Health discussion applications (Mobile Health)	DE OLIVEIRA, ALENCAR, 2017; (WERNETTE, 2015):	Dependent
E-learning, where one of the tools used is the ISE - Interactive Spaced-Education, used in research and in the medical teaching of the University Hospital Onofre Lopes - HUOL	CARVALHO et al., 2013	Dependent
Online course, in the distance mode, for influenza surveillance	SILVA et al., 2017	Dependent

Online educational material on genetic syndromes for elementary school students. Entitled as Cybertutor	PICOLINI, MAXIMINO, 2014	Dependent
Mobile application that assists voice professionals in vocal health management	CARLOS et al, 2016	Dependent
Health educational sites (blogs): The purpose is to educate patients about a particular disease or treatment.	WERNETTE, 2015; GARCÍA, MARCHENA, 2016; GARCÍA, MARCHENA, 2016	Dependente
Dental care panels for children with Autism	ROUCHES, et al. 2018	Independent
Papo Reto: an online game, with an approach to sexuality and gender relations.	SOUZA et al, 2017	Dependent
Educational game for the guidance of pregnant women about their rights and good practices in the process of birth (off line).	D'AVILA, PUGGINA, FERNANDES, 2018;	Independent
Digital platforms to offer special programs for prevention and treatment directed to the use of cannabis (based on counseling modules based on theory and practice).	BEDROUNI, 2018	Dependent
The use of augmented reality to complement a health learning environment (Virtual Reality as exemplified in the Second Life feature)	GARCÍA, FLORES, 2018	Dependent

Table 2: Technologies arranged in the final sample of articles included in this research; Source: Bibliographic search

Validation of technologies

Validation aims to assess the degree to which each element of technology is relevant and representative, in which the "elements" are all aspects of the measurement process that can affect the functionality and goals of the technology. The validation makes it possible to verify what was not understood, what should be added or improved, in addition to perceiving some distance between what was understood and what was understood by the target population (SILVA et al., 2017). For a technology to have applicability, mainly for the training of human resources, it is necessary to submit it to a process of validation by judges, a technique that can be used to verify the validity of the content or structure of a technology. The concept of validity is approached to the extent that an instrument / proposal is appropriate to measure what it is supposed to achieve or achieve. Thus, when an instrument is submitted to the validation procedure, it is verified whether the proposed educational object achieves its objective (SILVA et al., 2017).

These judges were selected because they were experts in these health areas in which technologies were being developed (NASCIMENTO, et al, 2017, CARLOS et al, 2016, JUNIOR et al, 2017), but also

by professionals who were not from the respective areas (SOUZA et al, 2017), in order to capture as other audiences and the target public itself (D'AVILA, PUGGINA, FERNANDES, 2018). The professionals did the analysis of the technologies regarding the general structure, ease of use and attendance to the proposed objectives, divulgation, fruition, relaxation, applicability, ludicity, limits and possibilities of autonomy of the users (CARLOS et al, 2016; SOUZA et al, 2017). As observed in the collection of the articles, some of these were specific research for the validation of educational technologies for the health area, with its own methodological contribution (the so-called mixed approach methodological study) (VIANA et al, 2018)

Theoretical Anchorage

Educational technology is considered as a set of mediating devices of the teaching-learning process that must contain a logical organization, so that they can be systematically planned, observed, understood and transmitted. In addition, technology as a material should also be recognized as an important component in educational work and be seen as a facilitating instrument, which, together with other strategies, makes the educational system more complete in its planning and execution activities . Thus, an educational technology can be characterized as being of process or product (MONIZ, PEREIRA, MARQUES, 2016). The Arch of Maguerez was presented in the literature collected as a theoretical basis for the development of educational technologies. It is worth remembering that this methodology has five stages, which are the observation of reality, survey of key points, theorization, hypotheses of solution and application to reality (BONE, CAZELLA, COSTA, 2015):

1. It starts from the observation of the reality for the identification of problems and the choice of one of them for the development of the investigation.

2. Reflect on the possible factors and major determinants of the chosen problem and define the key points of the study.

3. Research each of the key points, seeking information wherever they are and analyzing them to answer the problem, thus composing theorizing;

4. Elaboration of solution hypotheses for the problem.

5. Application of one or more of the solution hypotheses, such as a return of the study to the investigated reality.

In general, the literature has pointed out that changes are being made in the health area, raising the need to adapt the pedagogical and social processes for the integral formation of the future professional in face of the new forms of access to health due to the contemporary technological scenario, since the use of a technological teaching model directly influences the health professionals' fields of work, which pre-sets the need for training aimed at meeting the demands in different care contexts, where technological teaching encompasses an endless range of methodologies and tools (PISSAIA et al., 2017).

In this paper, we present the results of the study. The advent of new emancipatory technologies enabled the health professional to innovate ways of exchanging knowledge with the public, as it addresses the content addressed in reality, in addition to arousing interest and promoting better learning (JUNIOR et al, 2017). The generation of new technological tools and the implementation of ICT in teaching techniques allows a greater understanding of the development of the disease and its characteristics, as well as helping

to make professional, in the sense of appropriation of management techniques and interviews, analyzes and the like. (MEJÍA, GARCÍA, GARCÍA, 2013).

Faced with the challenges posed by the various health problems in the world, the use of educational health technologies has been seen as an opportunity to achieve the empowerment of people in relation to their own health status, so that they can be informed, cared for, even intervened in websites, applications and other tools (QUINTERO, ESCOBAR, 2018). In areas of health such as nursing, the uses of new teaching methodologies allow the understanding of different scenarios through technologies that reproduce educational experiences promoted through Virtual Learning Environments (PISSAIA et al, 2017).

There are some challenges in using this new learning paradigm. Professionals from the most diverse areas present resistance and difficulty in using the technology, but also need to have special abilities for their implantation (CARVALHO et al., 2013). In addition, the lack of investment of public policies in relation to technological education makes it difficult for the permanent process of qualification to be constantly updated, not to mention the connectivity in Brazil, which still constitutes a great challenge for the development of technology-mediated education (CARNEIRO , BRANT, 2013).

Regarding the advantages of using new technologies related to educational health processes, it is possible to discuss the rapid access of users to an unlimited range of educational resources and information in real life, flexibility in the time and space dedicated to learning and information, adoption of more innovative, interactive and adapted pedagogical methods for different types of public (QUINTERO, ESCOBAR, 2018).

Categories of analysis

Table 3 below shows the main categories of analysis that emerged from the CA.

Categories of analysis	Authors
E-Health: Information and communication technologies in teaching / learning and health services.	QUINTERO, ESCOBAR, 2018; LELLIS, CALZETTA, GÓMEZ, 2014; CANO, MENESES, 2016; DE OLIVEIRA, ALENCAR, 2017; HAN, NELSON, WETTER, 2014; BEDROUNI, 2018.
Telemedicine and Telehealth - Strategies for the use of technologies in the education and provision of health services.	NASCIMENTO, et al, 2017; CARNEIRO, BRANT, 2013; JUNIOR et al, 2017.
Prevention of drug-mediated abuse of alcohol and other drugs.	QUINTERO, ESCOBAR, 2018; BEDROUNI, 2018.
Video games applied to health	DRUMMOND, TESNIE`RE E HADCHOUEL, 2018.
Simulation Technology and its use in health training	HAN, RESCH, KOVACH, 2013.
App's applied to health	WERNETTE, 2015

Table 3: Categories of analysis Source: Bibliographic research

E-Health: Information and communication technologies in teaching / learning and health services

The use of information and communication technologies in the service of health processes was defined in the literature as "E-Health", including health services, health surveillance and documentation, as well as health education, knowledge and research (WHO, 2005 apud QUINTERO, ESCOBAR, 2018). E-Health involves the constitution of communication devices developed through new information and communication technologies, such as web pages, Facebook and other social networks, can be thought of as a reference for transferring learning, for example (LELLIS, Page 6 Likewise, with the integration of blogs into the university experience, the student is media literate and trained in digital competence, it also helps to develop repositories of learning experiences for upcoming student promotions, a goal that is considered fundamental in the development of skills generic / transversal in the new curricula of the university courses in health. It is about making technology available to students, so they analyze reality and create jobs and materials differently from traditional written works (CANO, MENESES, 2016)

Among the thousands of health applications available today on the major download platforms, we find tools that can be very useful in the fields of education and health information. One can cite the applications that integrate Information and Communication Technologies are ranges of emerging technology tools that take advantage of web 2.0 devices to capture, store, retrieve, analyze, receive and share information. Because they are technologies developed for use in mobile devices, they bring with them the possibility of being personalized and individualized (DE OLIVEIRA, ALENCAR, 2017).

The advantages and benefits of mobile learning are innumerable, and before that, guidelines have been adopted for the best application of this educational variant. UNESCO developed a policy guide for mobile learning aimed at educators, which argued that it is necessary to create or update policies concerning mobile learning to use effectively and then to articulate a network of teacher training on learning through technologies mobile, creating and improving educational content for use in mobile devices, always working to assure gender equality for students in accessing mobile content and technologies, thus promoting the safe, responsible and healthy use of mobile technologies (DE OLIVEIRA, ALENCAR, 2017).

Students' daily use of technology can be easily re-used for learning. The use of online learning technology by students is determined not only by perceived ease but also by utility. Mobile learning environments have pedagogical potential, especially for internship curricula, providing more flexible and ubiquitous learning experiences (HAN, NELSON, WETTER, 2014). On the other hand, the limitations of E-Health strategies should be considered. The appropriate incentive structures to ensure continued involvement with E-Health platforms are not well-designed and there is no clear data on the retention rates of these interventions in a real-world setting. In addition, there is the potential for abuse in the form of privacy breaches, since an E-Health intervention, particularly Internet-based applications, will need to be rigorously evaluated for security and privacy by developers and the potential for psychological harm to users should not be discarded and a complementary solution should be considered for the minority of target people who may not have access to cell phones and / or Internet services (BEUDRONI, 2018).

Telemedicine and Telehealth - Strategies for the use of technologies in education and provision of health services

The Brazilian Ministry of Health instituted the National Telehealth Program in 2007, with the objective of developing actions to support health care, especially permanent education. In 2011, it was named National Telehealth Network Brazil Program, now with the objective of supporting the consolidation of Health Care Networks (NASCIMENTO, et al, 2017). In addition to Telehealth, we also discuss Telemedicine, which emerged as one of the newest technological evolutions aimed at distance assistance (CARNEIRO, BRANT, 2013). According to the Brazilian Council of Telemedicine and Telehealth, the term "telemedicine" is restricted to medicine, the activities of physicians and "telehealth" is more comprehensive, since it includes all professionals and activities related to health: nursing, dentistry, public health, etc. In addition, the term telemedicine encompasses distance medical education through the use of assistive and educational technology for the purpose of a continuation of knowledge (CARNEIRO, BRANT, 2013).

Telehealth, as a health education technology, seeks to improve health work processes through a management that is critically reflected through Permanent Health Education, allowing national qualification with low cost and high efficiency, contributing to the organization of services (CARNEIRO, BRANT, 2013). Telehealth also covers so-called tele-education. But it is not restricted to this, being also used as support in management, telemedicine besides health research. How tools can use from synchronous (Skype) or asynchronous video conferences such as e-mails and discussion forums. Telemedicine uses some modalities to promote assistance in situations where there is no need for physical displacement, such as the Teleconference: Guidance and clarification by telecommunication to a professional or institution experienced in clinical practice; Telesurveillance: Remote monitoring of the patient by the professional or the health institution, Teleassistance: Distance assistance to the patient. This can be totally isolated, with telemedicine as the only form of assistance and Teleconsultoria: it is a modality that seeks to meet the needs of professionals who do not always have an information support (CARNEIRO, BRANT, 2013).

During the audiovisual broadcast, it is essential that the communication between the characters is consistent with the level of knowledge of the viewers. For this, dialogues with scientific terms and complex phrases used by the characters in the script of the video have been replaced by more common language, with playful definitions to facilitate understanding for the public. Using play definitions means making content more attractive, fun and simplified, contributing to learning and building knowledge (JUNIOR et al, 2017).

Prevention of drug-mediated abuse of alcohol and other drugs

The literature pointed out that virtual education in the prevention of the use of psychoactive substances has focused on: information on drugs, visual and interactive content using the Internet and mobile phones. Also identified two tendencies in its uses, the first oriented to the information as the traditional models in the prevention, and the second emphasizing the interaction with the content, which raises a protagonist position of the user. Although both trends seem to have positive effects, there are no evaluation studies that prove this (QUINTERO, ESCOBAR, 2018). Bedrouni's (2018) research has argued

that anonymous online counseling can avoid the risks of social stigma and provide a convenient alternative for cannabis users who wish to have access to treatment. The web-based intervention successfully reached individuals who would not have sought assistance in any other way, demonstrating the unique ability of digital technologies to overcome accessibility challenges. With the advent of cell phone technologies and their growing popularity with youth, interventions such as user-friendly mobile applications should be considered to maximize access and portability, while popular social media platforms can be co-opted for targeted advertising and distribution of such applications.

Video game applied to health

Drummond, Tesnie`re and Hadchouel (2018) present a research that discusses the use of video games in pediatric medical care. From this research, the main theoretical considerations for the use of this technology will be presented below, according to the authors. Video games can finally be used for rehab purposes. They are then "prescribed" as are other treatments. In pediatrics, most video game games were developed for the therapeutic education of patients. The strengths of video game games for children's health education are similar to those for games for the general public: meaningful appeal, immersion and reduction of psychological distance, promoting the acquisition of new behaviors and interactivity, enabling active learning and more effective. Video games also allow children to increase their sense of self-efficacy and control over their illness. The goal of a therapeutic education videogame is to show the child that as he gains knowledge and adopts the right behaviors, his illness is better controlled. The child realizes that he may be an actor in his care, just as he is a player in the video game. This awareness is a first step toward self-management, which is associated with increased self-esteem. In general, the use of video games generally improves patient awareness, but rarely causes a change in their behavior, and almost never an objective improvement in their health. To be truly effective, they need to be integrated into broader therapeutic education programs (DRUMMOND, TESNIE`RE, HADCHOUEL, 2018).

Two major applications of video games already exist in the context of (re) education in health: The first is to increase children's physical activity, either as part of a program to manage overweight or obesity, or as part of a program of Physical Rehabilitation. The motion sensors associated with the new video game consoles (Wii, Nintendo, Kinect, Microsoft) allow to associate a physical exercise with the virtual game. Here, the motivational power of video games has the goal of maintaining the effort for a longer period than during a conventional health care session (DRUMMOND, TESNIE`RE, HADCHOUEL, 2018).

The second application of video games is the neurological therapeutic pathology. As repeated use of a muscle during exercise leads to its development, repeated use of neural circuits during intellectual exercises leads to the reinforcement of these circuits. Thus, video game players have better abilities in certain aspects of vision, spatial representation and attention, so videogames could be a new method of correcting neuronal abnormalities (DRUMMOND, TESNIE`RE, HADCHOUEL, 2018).

The use of video games for the training of health professionals is still timid, but is developing at high speed. The games have been inserted in the training of doctors in proposals for various surgeries and in medicine, games must find their place in the curriculum in the coming years since virtual simulation can be very interesting for students to apply their theoretical knowledge in realistic contexts without risk to the

patient (and the learner) in an active and experiential way (DRUMMOND, TESNIE`RE, HADCHOUEL, 2018).

Simulation Technology and its use in health training

Simulation technology is not the simple use of simulators, but involves the creation of opportunities and technological processes for the deliberate practice and transfer of knowledge that leads to better results for the training of professionals and consequently, better results in the treatment of patients. The benefits of integrated simulation systems are not limited to undergraduate and postgraduate medical education but have great potential to teach new procedures and protocols to practitioners in practice and to update their knowledge and skills.

One area where simulation technology is particularly relevant for continuing medical education and for continuing professional development is interprofessional training that addresses the complexities of health systems and the skills and performance of various health care providers, but one The biggest obstacle to advanced simulation is cost. Huge financial support is needed to create a large simulation training center (HAN, RESCH, KOVACH, 2013).

App's applied to health

The health app's are intended for professionals and patients. Its use is still relatively limited at the moment, due to the disparity of offers and the absence of control organs for the validity of the information. However, the low cost of achievement combined with the advantages of the internet (hyperconnectivity, instantaneity, simple updating), make them new health tools. Smartphones and tablets then become health devices where most health-related Internet users are looking for information about a disease, its treatments and testimonials from other patients suffering from the same pathology, and doctors have quickly adapted to the new technologies and now include them in their daily practice. It is argued that health devices aid in treatment, because if a patient can understand their treatment and illness at the hospital / UBS, but may well forget a little of the explanation or do something wrong once arrived home. This is why the health app's provide ways to better reach the therapeutic education of patients and exchange them with health professionals (WERNETTE, 2015).

CONCLUSIONS

The review allowed the understanding that the ETs discussed in the literature are mostly of the type dependent, mainly of the internet for its executability and dissemination. Most of the analyzed articles were published in Brazil, corroborating with the one quoted at the beginning of this paper, where it is argued that Brazil is a pole of ETs production. Still, the use of ETs is still a challenge in all aspects of its development / use since this field requires resources and updating of technological processes constantly. In addition, it was pointed out that the management of public policies can also be an obstacle in the development of ETs.

Access to the Internet in areas further away from urban areas can also be included as a barrier to their dissemination and use. Even with the difficulties listed above, ETs have brought about several changes

in the paradigms of education / health. Immediate access to information and the possibility of flexible learning in training are issues that are constantly redefining due to the new forms of social coexistence that the technologies are causing.

The literature has pointed out only a proposal of theoretical basis (Arco de Mangurez) for the formulation of ETs and although we consider this anchorage to be of extreme relevance, we wonder if this proposal addresses the different contexts of ET formulation, here is the criticism of that, although we are considered a reference point of production of ETs, we are still in a timid development, considering the speed in which new technologies are created in the society.

Nevertheless, ETs enhance the quality of training of professionals, also assisting in the continued training of these professionals. We conclude the work by suggesting new research that contemplates the most diverse contexts that need ETs in health, given the enormous possibilities of their applicability.

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