



REVISIONES

Serious games in nursing teaching: a scoping review

Serious games no ensino da enfermagem: scoping review

Serious games en la enseñanza de enfermería: scoping review

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ABSTRACT:

Objective: To identify and map the serious games that are produced to teach nursing.

Method: This is a scoping review. Data collection took place in March 2017, in 14 national and international databases. The following indicators were used for data extraction: year of publication, country of origin, objective of the study, classification of the serious games, thematic area addressed by the serious games, and main results.

Results: The sample consisted of seven articles. The studies were published between 2011 and 2017, and six (85.7%) were produced in Brazil. The subjects addressed by the serious games were mental health, patient safety, neonatology care, child health, drug administration, and arterial gasometry.

Conclusion: The serious games produced for teaching nursing addressed different related themes: mental health, child health, neonatology, patient safety, drug administration, and arterial gasometry.

Keywords: Educational Technology; Technology; Teaching; Nursing Education; Nursing.

RESUMO:

Objetivo: Identificar e mapear os *Serious Games* que são produzidos para o ensino da enfermagem.

Método: Trata-se de uma *scoping review*. A coleta de dados ocorreu em março de 2018, em 14 bases de dados nacionais e internacionais. Para extração dos dados utilizou-se os indicadores: ano de publicação, país de origem, objetivo do estudo, classificação do *Serious Games*, área temática abordada pelo *Serious Games* e os principais resultados.

Resultados: A amostra do estudo foi composta por sete artigos, publicados entre 2011 e 2017, com seis (85,7%) produzidos no Brasil. Os conteúdos abordados nos *serious games*, foram: saúde mental, segurança do paciente, cuidados em neonatologia, saúde infantil, administração de fármacos e gasometria arterial.

Conclusão: Os *serious game* produzidos para o ensino da enfermagem abordaram diferentes temáticas relacionadas: a saúde mental, saúde da criança, neonatologia, segurança do paciente, administração de fármacos e gasometria.

Palavras chave: Tecnologia Educacional; Tecnologia; Ensino; Educação em Enfermagem; Enfermagem.

RESUMEN:

Objetivo: Identificar y mapear los *Serious Games* que son producidos para la enseñanza de enfermería.

Método: Se trata de una *scoping review*. La colecta de datos ocurrió en marzo de 2018, en 14 bases de datos nacionales e internacionales. Para la extracción de los datos se utilizaron los indicadores: año de publicación, país de origen, objetivo del estudio, clasificación de los *Serious Games*, área temática abordada por los *Serious Games* y los principales resultados.

Resultados: La muestra del estudio estuvo compuesta por siete artículos, publicados entre 2011 y 2017, seis de estos (85,7%) producidos en Brasil. Los contenidos abordados en los *serious games*, fueron: salud mental, seguridad del paciente, cuidados en neonatología, salud infantil, administración de fármacos y gasometría arterial.

Conclusión: Los *serious game* producidos para la enseñanza de la enfermería abordaron diferentes temáticas relacionadas: la salud mental, salud del niño, neonatología, seguridad del paciente, administración de fármacos y gasometría.

Palabras clave: Tecnología Educativa; Tecnología; Enseñanza; Educación en enfermería; Enfermería.

INTRODUCTION

Serious games are games that have a purpose beyond entertainment and fun. They are characterized by having a predetermined educational objective, built for the user to learn or achieve a goal⁽¹⁻³⁾.

Another relevant aspect of this technology is allowing teachers to monitor the performance and development of the students. In this setting, the teacher becomes able to understand the strengths and deficiencies of the students and, as such, they can generate situational diagnoses of the class for an effective education⁽¹⁻³⁾.

In general, serious games guide the user in the construction of a certain knowledge, depending on how they was programmed and idealized. Currently, they are already widely used in different areas, like Education, Professional Training, Military Training, Advergaming, and Health^(2,3).

In the health field, the use of these technologies becomes an enhancer for teaching and simultaneously presents itself as a new challenge. The use of games transcends traditional teaching methods both in theoretical and practical classes. The use of this technology provides students with another type of approach and, thus, can positively contribute for their learning⁽³⁾.

It is also worth mentioning the different aspects of the use of serious games, which involve from theoretical to practical contents. This technology was conceived and developed to provide students with materials for theoretical studies, in addition to the use of case studies and simulations that reflect the practical environment, in order to promote students with other learning possibilities^(3,4).

In this context, the use of serious games in the educational environment, especially in the field of health, favors the process of teaching-learning, emphasizing its relevance in the training of students in fields such as nursing^(3,5).

Nursing students, during their practical work, deal directly with the patient and perform different procedures and care. Therefore, serious games act as tools that can help the teaching-learning process of the skills of the nurse, which will lead to a safe and qualified health practice^(3,5).

As a result, serious games can be used as tools to support nursing education, as they favor the development of these students' clinical reasoning. They also promote the construction of different knowledge and skills, by creating simulation environments that can offer students a first approximation with real practice^(3,6).

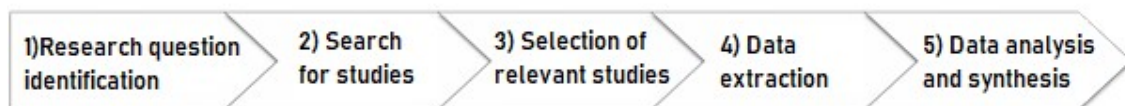
In view of the importance of meaningful learning among nursing students, and in order to train qualified and prepared professionals to work efficiently and safely in the health team, it is essential to use teaching methods that will meet the needs of current students and consequently favor learning. Thus, the use of serious games is paramount, since it is an innovative method to support teaching.

In this context, the following research question was outlined: which serious games are produced for teaching nursing? The aim of this study is to identify and map the serious games that are produced focusing on teaching nursing.

METHOD

This is a scoping review, according to the recommendations of the JBI Institute Reviewer's Manual⁽⁷⁾ and the theoretical framework proposed by Arksey and O'Malley⁽⁸⁾. This type of study aims to map content related to the subject being investigated. It allows the identification of gaps, and consists of five steps, as shown in Figure 1.

Figure 1 - Steps for the Scoping Review according to Arksey and O'Malley. Natal, RN, Brazil, 2018.



Thus, for the first stage, the following research question was identified: Which serious games are produced for teaching in the nursing area?

Regarding the search for studies, it was divided in three stages: Stage A: preliminary investigation in the databases JBI CONNECT +, DARE, The Cochrane Library, and PROSPERO. There were no protocols and/or reviews with a similar theme found; Stage B: identification of the main keywords and standardized terms used in the studies that address the topic of interest from the combination of the MeSH terms defined for the research mnemonic on the U.S. portal National Library of Medicine (PubMed) and in the Cumulative Index to Nursing & Allied Health Literature (CINAHL); Stage C: final search in the databases: PubMed, CINAHL, *Web of Science*, Scopus, Latin American and Caribbean Literature in Health Sciences (LILACS), *PsychINFO*, ERIC, CAPES Theses and Dissertations portal, DART-Europe E-Theses Portal, Electronic Theses Online Service (EThOS), Portugal Open Access Scientific Repository (RCAAP), *National* ETD Portal, and Theses Canada.

For the selection of papers, this study considered those published in full in Portuguese, Spanish, English, or French, and whose object of investigation was the use of serious games in the teaching of nursing. Editorials, experience reports, theoretical essays, and integrative reviews were excluded. There was no time delimitation.

Data were collected in March 2018, and through the search strategy outlined, 6.285 studies were identified. From them, 275 had their abstracts available for evaluation, and in accordance with the established inclusion and exclusion criteria, only 234 were studies that discussed the use of serious games. From these 234 studies, only seven addressed serious games produced for teaching nursing, which corresponds to the final sample.

Data extraction considered the following information: year of publication, country of origin, objective of the study, classification of the serious games, thematic area covered by the serious games, and main results. Data were descriptively organized and analyzed in a spreadsheet built in *Microsoft Excel* 2010. The approval of the ethics committee was not necessary, since the objects of this study are in the public domain and do not involve human beings.

RESULTS

Seven studies composed this investigation. They were published between 2011 and 2017, with greater prevalence in the years 2014 and 2016, with two (28.5%) each. The others took place in 2011, 2015, and 2017, one (14.3%) each year.

As for the country of origin, Brazil had six studies (85.7%) and one (14.3%) was from the United States of America. Six (85.7%) studies used a methodological method and one (14.3%) was an experimental study.

Regarding the aim of the studies, three distinct objectives were presented, one (14.3%) proposed to develop and validate a serious game, three (42.8%) only to validate a serious game, and the others (42.8%) to develop the technology.

Regarding the type of game listed to build serious games, Point and Click was used in three (42.8%) studies, followed by board games, in two (28.5%), while one (14.3%) used Quiz and Tower Defense games (strategy games).

The publications listed point to the use of serious games in several areas of nursing practice. Two (28.5%) used them in Mental Health themes and the others addressed different contents, such as: Patient Safety, Neonatology Care, Child Health, Administration of Drugs, and Arterial Gasometry. The findings regarding the main results of the researches are shown in Chart 1.

Chart 1 - Main Results found in the studies, Natal, RN, Brazil, 2018.

Study	Main results
Study 1 ⁽⁹⁾	<p>In the validation stage, the judges considered the use of serious games relevant in terms of enhancing the teaching and learning process of Patient Safety. In addition, modifications were suggested to improve the game.</p> <p>The study also highlights the importance of the theme for nursing and the use of technologies for teaching.</p>
Study 2 ⁽¹⁰⁾	<p>The experts reported appreciation for the technology and its objectives.</p> <p>However, although the authors and judges consider its relevance as a strategy to support teaching, its use did not point to a significant impact on cognitive learning.</p>
Study 3 ⁽¹¹⁾	<p>The validation process of this technology highlighted the importance of using serious games, especially regarding the practical nursing classes, such as drug administration process.</p> <p>The study points out the importance of the development of this technology for improvements in health care.</p>
Study 4 ⁽¹²⁾	<p>The validation process considered this technology to be an important instrument for teaching topics that were little discussed in the training of nurses.</p> <p>Furthermore, the serious games are a uniquely useful tool, since, in addition to their contribution to the teaching process, they are also a relevant assistive technology, which can be used with patients during health care.</p>
Study 5 ⁽¹³⁾	<p>The study presented, as one of its main results, the opportunity given to students to obtain a practical experience in a simulated safe environment and thus favor the learning of arterial blood gases.</p>
Study 6 ⁽¹⁴⁾	<p>Describes the process of building a serious game to enhance the teaching of personality disorders to nursing students.</p> <p>It points out the importance of using technologies in education, since the use of digital technologies is an innovation of teaching methods and meets the new demands arising from the profile of contemporary students.</p>
Study 7 ⁽¹⁵⁾	<p>The results of this study report the game's validation process. The judges indicate good gameplay of the game and include suggestions for improvements to the serious game.</p> <p>The study also highlights the importance of the type of game (a strategy game) which may favor the learning process by causing users / students to think more carefully on the subjects.</p>

DISCUSSION

Among the publications that were selected for this study, it stands out how recent the productions for nursing are. All were published between 2011 and 2017. This fact corroborates the worldwide encouragement, in recent decades, for the development of products and studies focusing on the production of health technologies. This aims to promote improvements to health care with the support of technological resources ⁽¹⁶⁾.

However, despite the fast technological development of recent years, in addition to the production of research and policies that support the use of these technologies in the health field, the insertion and dissemination of information technology in the field of nursing has taken place since the 1960s. This discussion began in developed countries as United States, Germany, Japan, France, and Finland, mainly to produce resources for the administrative and managerial support of nursing activities ⁽¹⁶⁾.

These data are in disagreement with the findings of this study, in which there is a predominance of recent researches, dating from the beginning of the last decade. In addition, these were produced in Brazil, a country where development of information technology in nursing occurred from the 1990s onwards and went beyond the scope of management, producing materials for direct patient care⁽¹⁶⁾, as opposed to being produced in the aforementioned countries, which began their research and production in the area of nursing informatics as early as in the middle of last century.

However, regarding the production of serious games for health, the production of this technology only gained visibility in 1992 in the United States. This shows the technology as more recent when compared to the production of software for management, assistance, among others, in the field of health and nursing ⁽¹⁾.

As for the objectives of building and / or validating serious games proposed by the studies, the works found were equivalent, both in the construction of technologies and in their validation. Thus, it appears that the studies seek to build valid technologies for the development of new teaching methods for nursing, which results in technological innovations for the field ⁽¹⁷⁾.

Regarding the validation process, the studies stem from the need to ascertain the effectiveness of the technologies produced, to confirm that they can achieve the aim for which they were proposed. This type of objective is extremely relevant to the serious games produced for the teaching of nursing, since it gives legitimacy to the benefits regarding the use of the technology proposed in the teaching-learning process⁽¹⁷⁾.

Regarding the game mechanics developed, there was a predominance of Click and Point. This corroborates the historical profile of the construction of games, since there was a greater incidence of the application of games of this type in the beginning, since they are easier to program and for user acceptance. ⁽¹⁸⁾.

Other mechanics were implemented in the development of digital games after the click and point was. Although quiz and board games have been used for a longer period of time as physical games, they entertainment as their sole purpose. As for Tower Defense, this type of mechanics has a significant role in the teaching-learning process. These are games where it is necessary to define strategies, which generate reflection

in the player and can incite critical thinking and, as a consequence, can improve learning abilities ⁽¹⁸⁾.

About the content covered by the studies that developed technologies, serious games were built to support the teaching of different nursing subjects. They covered from specific care for each stage of life, such as child health and neonatology, to cross-sectional health care subjects, such as patient safety, care in drug administration, mental health, and arterial gasometry.

Among the themes addressed, mental health stands out in this research. This field was discussed in the construction of two serious games. This may indicate that there are investments and incentives for the dissemination and effective learning for this area in nursing. This represents an important factor of growth, development and popularization of content related to mental health ⁽¹⁹⁾.

This is an essential characteristic for this specific field, since mental health has been and still is the target of negative stereotypes regarding its care process, especially considering that, since 2001, it has been seeking to provide humanized assistance, centered on the individual and their needs. Thus, the construction of technologies that enhance this teaching process contributes positively to changes in student learning and professional performance ⁽¹⁹⁾.

It is also worth highlighting the relevance of digital games in other areas, such as child health and neonatology, which are characterized by specific and dynamic knowledge, and constantly updated in accordance with the socio-cultural demands of society. Therefore, this area has extensive content, since it involves care at a specific stage of life. As a result, it becomes pertinent for the teacher to use strategies that favor the effective learning of these themes. In this context, technologies such as serious games can solve these requirements by promoting the construction of knowledge in a dynamic way ^(1,10).

As for cross-sectional themes, the construction of materials for teaching patient safety stands out, since these contents are considered complex, and are part of the nurse's work process in various fields of action (administrative, managerial, educational, and care). This makes it necessary for nurses to conduct their practice based on aspects of patient safety, in order to promote quality and safe nursing care ⁽²⁰⁾.

However, despite the relevance of patient safety to the quality of health care, strategies that promote awareness and training on this topic are recent. As a result, it is essential to use tools that promote both the dissemination of these contents and the training of students and professionals. Therefore, the production of serious games for patient safety is an important strategy, since it is based on an innovative teaching proposal ^(10,20).

CONCLUSION

Serious games are still not widely used for teaching in the nursing field, which is made clear by the low number of studies that were found in this scope review. However, the evaluated researches aimed to build and/or validate this tool and stand out for addressing the teaching of different subjects. Fields like mental health, child health,

neonatology, patient safety, drug administration, and arterial gasometry were discussed.

Thus, the relevance of the development of this technology for teaching became clear, since it can encourage students to play an active role in their teaching-learning process.

However, in order to use serious games effectively, the teacher must act as a facilitator, to guide students in the construction of knowledge.

Furthermore, this study highlights the importance of technologies in the field of education. The development of serious games as strategies to strengthen teaching in nursing becomes significant, given the innovative character when using game-based learning, and thus, adapting the educational tools to the current profile of the students.

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