*Promoção da Saúde*
DOI: 10.17765/2176-9206.2025v18e12878

# Instructional Design Contextualized in the production of technological resources in health care: a scoping review

## *Design Instrucional Contextualizado na produção de recursos tecnológicos na saúde: revisão de escopo*

***Bianka Nóbrega Fernandes Torres[1*], Gabrielly Oliveira de Souza[1]; William Caracas Moreira[2], Mirian Alves da Silva[3], Mailson Marques de Sousa[3], Simone Helena Dos Santos Oliveira[4]***

[1]Master's Student in Postgraduate nursing program, Federal University of Paraíba (UFPB), João Pessoa (PB), Brazil, [2]Master's degree in Nursing in Postgraduate nursing program, State University of Paraíba (UFPB), João Pessoa (PB), Brazil, [3]Professor at Department of Clinical Nursing, Federal University of Paraíba (UFPB), João Pessoa (PB), Brazil, [4]Head Professor at Professional and Technological Center of the Federal University of Paraíba (UFPB), João Pessoa, (PB), Brazil.

***Autor correspondente**:Bianka Nóbrega Fernandes Torres – *Email*: biankanobregaf@gmail.com

**ABSTRACT**
Map scientific evidence on technological resources aimed at the health area and developed with the application of contextualized instructional design. Recommendations of Joanna Briggs Institute for scoping reviews were adopted. Searches of national and international databases were conducted without limitations on year of publication and guided by the following review question: "What health technologies are produced from contextualized instructional design?". Out of 285 identified studies, 17 were considered eligible for the final sample, all published in Portuguese between 2010 and 2021. Technologies developed included mobile apps, online courses, games, virtual learning objects, and blogs, with a predominant focus on applied research for technological production. These technologies approached education and health promotion in a playful, interactive, flexible way. The results highlighted the contributions of contextualized instructional design in the creation of various technologies for the health sector, combining rigor with the necessary flexibility.

**Keywords:** Digital health technologies. Education, distance. Health education. Health promotion. Information technology.

**RESUMO**
Mapear evidências científicas sobre recursos tecnológicos direcionados à área da saúde e desenvolvidos com aplicação do Design Instrucional Contextualizado. Foram adotadas as recomendações do Joanna Briggs Institute for Scoping Reviews. A busca foi realizada em bases de dados nacionais e internacionais, sem recorte temporal e guiada pela questão norteadora: "Quais as tecnologias da área da saúde produzidas a partir do design instrucional contextualizado?". Dos 285 estudos identificados, 17 publicados no idioma português e entre 2010 e 2021 foram considerados elegíveis para compor a amostra final. Foram desenvolvidos aplicativos móveis, cursos online, jogo, objeto virtual de aprendizagem e blog, com o uso predominante de pesquisas aplicadas de produção tecnológica. As tecnologias abordaram o processo educativo e a promoção da saúde de forma lúdica, interativa e flexível. Os resultados evidenciaram as contribuições do Design Instrucional Contextualizado na produção de diferentes tecnologias aplicadas ao contexto da saúde, com o rigor e flexibilidade necessários.

**Palavras-chave:** Educação em saúde. Educação online. Promoção da Saúde. Tecnologia da informação e comunicação. Tecnologias em saúde.

## INTRODUCTION

Technological advances highlight the need to adapt health care technologies to better engage both health care workers and users[1]. To enhance learning and continuous professional development, information and communication technologies (ICTs)-such as smartphones, tablets, and laptops connected to the Internet-allow access to diverse content and the sharing of information anytime, anywhere[2].

The use of ICT as a tool to support learning can be significantly enhanced through a planning process based on contextualized instructional design (CID). This process involves identifying a learning problem or need and designing solutions to address it. The "solution" consists of a series of steps known as the ADDIE model—an acronym for Analysis, Design, Development, Implementation, and Evaluation. These steps facilitate the creation of various learning models, including courses, degree programs, learning paths, instructional videos, tutorials, and applications[3].

In essence, CID is a model that requires and allows for the combination of mechanisms to make a planned proposal more flexible and context-specific[4]. During the ADDIE process, when designing technological resources using the CID methodology, conditional rules must be anticipated to meet potential learner needs[3].

The CID methodology has gained prominence with technological advances in healthcare because it recognizes the nuances of the human process within the technological environment when designing educational interventions. It can assist health care workers in patient care, helping to clarify diagnoses and provide therapeutic guidance. In addition, the likelihood of successful treatment adherence increases when professionals and/or patients have access to relevant information. Therefore, technology can enhance the benefits of disseminated information, especially given its anytime, anywhere accessibility[5].

For example, to improve critical thinking and decision-making skills needed in complex clinical environments, a virtual reality-based nursing education program was developed in South Korea by using the ADDIE model. During the evaluation process of the program, educational scenarios based on themes selected through literature analysis and interviews with professionals and students were presented to both a control and experimental group. The evaluation results showed that the program was an effective tool for helping nursing students develop self-confidence, critical thinking, and problem-solving skills[6].

In China, the ADDIE model guided the rigorous development and evaluation of an illustrated book for caregivers and children with autism spectrum disorder. The book was shown to be effective in reducing psychological distress among caregivers. The authors emphasized that the development of the book was multidisciplinary and evidence-based, ensuring the quality of its content and illustrations[7].

In health care, nursing technologies encompass the knowledge, techniques, and procedures that are integral to professional practice and can be categorized into three types: Soft technologies: relationships between professionals and users; soft-hard technologies: techniques and professional knowledge; and hard technologies: equipment, materials, systems, and resources[8]. The use of hard technologies is increasingly inseparable from health care, making it essential to promote their use by professionals in the field[9].

This requires an understanding of the technologies available, their purposes, and the development process. The model that guides the creation of such technology should include systematic and well-defined procedures that provide the necessary guidance to create a robust and useful technology that can meet most instructional needs[7].

Since CID is a model that incorporates these characteristics, we reviewed the literature to answer the following review question: "What health technologies have been developed by using CID?". Thus, the aim of this review is to map the scientific evidence on healthcare technology resources developed using CID.

## METHODOLOGY

This scoping review was conducted in accordance with the Joanna Briggs Institute (JBI)[10] recommendations for scoping reviews and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Review (PRISMA-ScR) guidelines[11]. A protocol was submitted to the Open Science Framework (https://osf.io/) on November 6, 2023, with the DOI <10.17605/osf.io/fg4w9>.

The review followed these steps: 1) identifying the guiding question; 2) identifying relevant studies; 3) selecting studies based on inclusion and exclusion criteria; 4) analyzing and extracting data; and 5) presenting and synthesizing results[11].

The Population/Problem, Concept, and Context (PCC) strategy was used to identify the key elements of the research question and to guide the focus of the scoping review[12]. The population/problem consisted of describing the technologies developed, the concept included CID and its stages of development, and the context related to applications developed for the health care field.

In the absence of indexed search terms within the Health Sciences Descriptors (DeCS/MeSH), non-standardized descriptors were used to develop the following search equation: "design instrucional contextualizado" AND "saúde" AND "tecnologia da informação OR tecnologia da educação." Due to its higher sensitivity, especially in English, using the terms "contextualized instructional design" AND "health" AND "information technology OR education technology," this string was chosen to search the literature, as standardized descriptors yielded few or no relevant results.

Literature search was conducted from August to October 2023. Eligible articles were full-text original studies with no time or language restrictions. Exclusion criteria included guidelines, editorial letters, books and book chapters, opinion articles, and all types of reviews.

The following databases were searched: Medical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed, Latin American and Caribbean Health Sciences Literature (LILACS), Nursing Database (BDENF), Spanish Bibliographic Index in Health Sciences (IBECS), National Database of Paraguay (BDNPAR), Virtual Health Library (VHL), Scopus, Web of Science, Google Scholar, and the Brazilian Digital Library of Theses and Dissertations (BDTD) of the Coordination for the Improvement of Higher Education Personnel (CAPES).

The files were exported to the Rayyan QCRI® reference manager, where duplicates were filtered and resolved[12]. Initially, titles and abstracts were read to pre-select studies relevant to the scope of this review. Then, the full texts were evaluated, and those that addressed the review question and met the eligibility criteria were deemed eligible. Two reviewers independently examined the articles, and no discrepancies were found.

Data were extracted using a Microsoft Excel® spreadsheet that included the following fields: authorship, year of publication, language, objectives, study design (including type and approach), and details on the technological resource developed using the CID methodology. These data were independently consolidated and later verified for research conformity by a third reviewer. The results are presented narratively, summarized in figures and tables, with the final sample selection displayed using a PRISMA flow diagram[13].

## RESULTS

A total of 285 studies were identified across the databases, with 208 of these classified as grey literature. Of these, 77 were removed due to duplication or lack of full-text availability. After the initial review of titles and abstracts, 175 studies were excluded for not meeting the established eligibility criteria. The full text of 33 studies was reviewed, resulting in the exclusion of 16 studies that did not describe the development of educational technologies for the healthcare sector using Contextualized Instructional Design (CID) (Figure 1). Figure 1 illustrates the flowchart for study selection following the PRISMA-ScR guidelines.

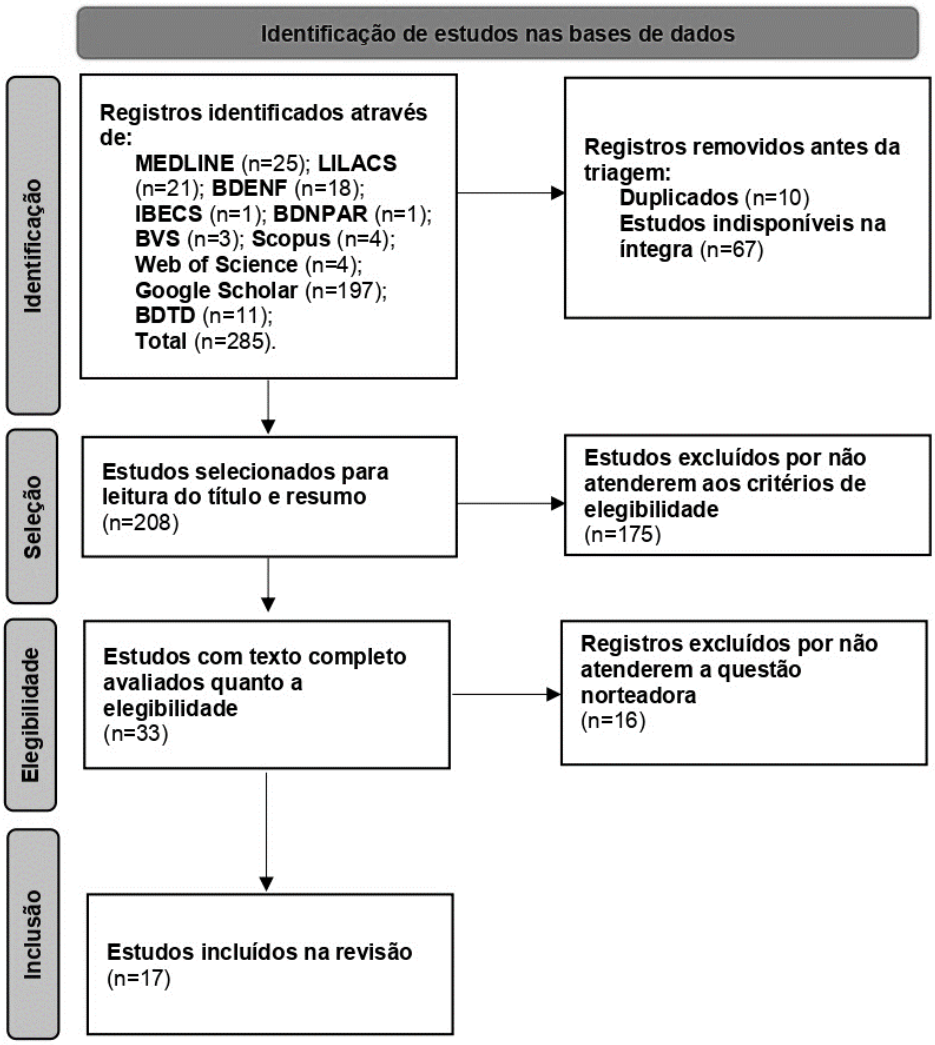


**Figure 1 -** Study selection diagram according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Review (PRISMA-ScR) Checklist. João Pessoa, PB, Brazil, 2024
**Source:** Prepared by the author, adapted from Tricco et al. 2018[11].

The 17 studies included in this review were published between 2010 and 2022, with the highest number of publications in 2020 and 2021 (17.65% in each year). Regarding the language of publication, all selected studies were in Portuguese and originated from Brazil. Among them, 9 studies (52.94%) were conducted in the state of São Paulo[15,17,19,20,23,24,26,27,28]; 2 (11,76%) in Minas Gerais[16,21]; 2 (11,76%) in Santa Catarina[2,18]; 1 (5,88%) in Ceará[14], 1 (5,88%) in Rio Grande do Norte[22], 1 (5,88%) in Piauí[25]; and 1 (5,88%) in Paraná[29].

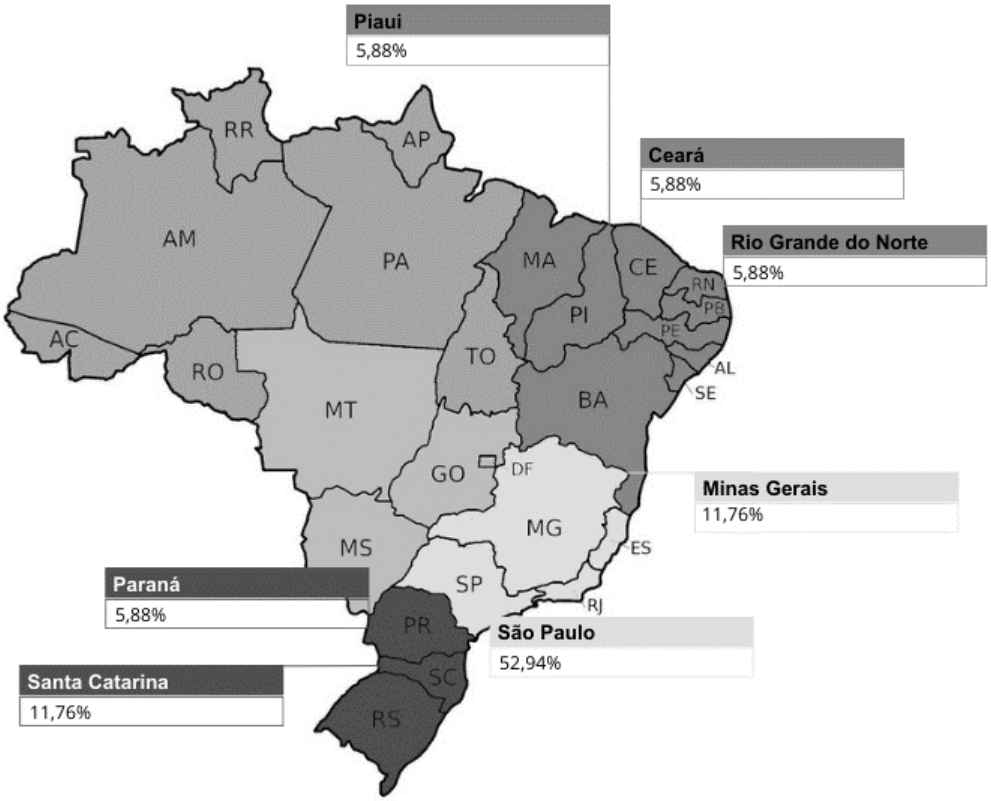


**Figure 2.** Distribution of studies included in the review by Brazilian states. João Pessoa, PB, Brazil, 2024.

**Table 1.** Characteristics of studies included in the review (n=17). João Pessoa, PB, Brazil, 2024.

| Author | Year, Country | Objective | Study design | Technological resource | Main characteristics |
|---|---|---|---|---|---|
| Vianna LS[14] | 2021<br>Brazil | Develop and validate an interactive mobile game as an educational technology for drug abuse prevention and suicide risk. | Methodological study of technological development involving the creation and validation of a mobile app. | Interactive game "SerTão Bom" | Quiz-style game aimed at raising awareness of suicide risk among drug users. Features three main categories: Drugs, Suicide, and Harm Reduction. |
| Heimann C[15] | 2012<br>Brazil | Develop and evaluate an online training course in pedagogy for nursing educators. | Applied research focused on technological production with an exploratory-descriptive analysis. | Online training course in pedagogy for nursing educators on the Moodle (Modular Object-Oriented Distance Learning) platform. | A virtual tutor was created, and the course was divided into 10 units featuring videos, discussion forums, chats, games, surveys, and assessments. |
| Motta DS[16] | 2021<br>Brazil | Develop and validate a multimedia app on a mobile platform for teaching Basic Life Support to nursing/health students in Juiz de Fora. | Applied research in the form of technological production. | Mobile app "SBVida" | Developed for Android, featuring updated content, scientific articles, summaries, diagrams, and |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | instructional videos. |
| Silveira PC[17] | 2017<br>Brazil | Develop the course "Information Technology in Research and Distance Education in Healthcare" using Contextualized Instructional Design in a virtual learning environment. | Descriptive, cross-sectional, and quantitative-qualitative study. | Course "Information Technology in Research and Distance Education in Healthcare" | Developed in modules and stages for an online learning format, with the goal of creating a Research Project. |
| Mendez CB[18] | 2017<br>Brazil | Develop a prototype of an educational mobile app for nursing follow-up with patients diagnosed with peripheral arterial disease. | Technological production using prototyping. | Mobile app prototype | Designed for professionals to monitor the progress of patients. |
| Galvão ECF[19] | 2012<br>Brazil | Develop and evaluate a multimedia app on a mobile platform for teaching central venous pressure measurement. | Applied research in the form of technological production. | Mobile app "Pressão Venosa Central" | Divided into topics, aimed at teaching students the concept of CVP, measurement, reference values, indications, contraindications, and complications. |
| Pires WG[20] | 2019<br>Brazil | Propose the development of a mobile app for children with autism spectrum disorder. | Qualitative research for the development of a mobile app. | Mobile app "TEA-AVD Higiene" | Interactive app with sequenced illustrations of daily hygiene activities, developed for the Android operating system. |
| Salomé GM, Rocha CA[21] | 2020<br>Brazil | Develop a mobile app to assist in the assessment, prevention, and treatment of incontinence-associated dermatitis. | Applied research for technological health production. | Mobile app "DIAPERSKIN" | Standardized therapeutic procedures for IAD treatment, suitable products for intimate hygiene, with illustrations and hyperlinked texts |
| Queiroz JF[22] | 2020<br>Brazil | Develop a mobile app aimed at providing women with information for gynecological and sexual self-care. | mHealth-based research, quantitative, applied, descriptive, experimental, and conducted as technological production. | Mobille app “SexGynCare: saúde ginecológica e sexual” | Focused on gynecological and sexual health education, featuring images and hyperlinked texts, developed for Android and iOS. |
| Amaral PRQ[23] | 2018<br>Brazil | Develop a mobile app to help children with Type 1 Diabetes (DM1) and their families count carbohydrates. | Applied research developed according to the design and development method chosen for the app. | Mobile app “Carbotower” | Aims to support children with DM1 in tracking their daily routine and counting carbohydrates. |

| | | | | | |
|---|---|---|---|---|---|
| Batista DFG[24] | 2019<br>Brazil | Develop a blog for teaching and learning adult cardiopulmonary resuscitation for nurse training. | Applied research for technological production involving the development of an LMS - blog - on CPR in intra- and extra-hospital settings. | Learning Management System - Blog on Cardiopulmonary Resuscitation | Content is divided into sequential modules, arranged in study folders, readable, with images, illustrations, videos, and hyperlinked texts |
| Barros WCTS; *et al.*[2] | 2015<br>Brazil | Describe the development of an app titled "OMAC" for assessing consciousness levels in adults. | Technological production study according to CID stages. | Mobile Assessment Object for Consciousness Level (OMAC) | Designed for assessing consciousness levels using consciousness scales, pupil assessment, reflexes, and respiratory patterns. |
| Santiago RF; *et al.*[25] | 2020<br>Brazil | Describe the process of constructing and evaluating a Virtual Learning Object on prenatal care for pregnant adolescents in the context of primary care. | Methodological, technological study with a quantitative approach. | Online educational program virtual learning object (VLO) on prenatal care for pregnant adolescents in primary care. | Includes multimedia scripts, images, audios, videos, and discussion forums; information for pregnant adolescents in primary care. |
| Domingues NA[26] | 2021<br>Brazil | Evaluate nursing students' cognitive learning using virtual simulation through a serious game on patient safety in an online course. | Methodological and exploratory-descriptive study with a quantitative approach and experimental intervention design with pre-test and post-test with an equivalent control group. | Serious game “Cuidando bem: segurança do paciente” | Clinical cases are presented through nursing care simulations; players interact with the game to advance through stages. |
| Faria NGF[27] | 2010<br>Brazil | Develop and evaluate an online course on digital wound photography for nurses. | Applied research in the form of technological production. | Online course on digital wound photography in nursing. | Online course using a Virtual Learning Environment (VLE). |
| Afonso VLM[28] | 2014<br>Brazil | Describe and analyze, according to the instructional design matrix, virtual classes constructed by nursing undergraduates. | Exploratory-descriptive research of a documentary type. | Virtual classes in the nursing degree course | 33 classes created by nursing undergraduates within the Moodle platform, relevant to professional nursing education. |
| Souza GP[29] | 2022<br>Brazil | Develop an app for self-development of nursing leadership. | Applied research in technological development. | Mobile app "EuLíder" | Available for Android, with main features: Leadership Diary; Self-Knowledge; and Self-Development. |

**Source:** Research Data (2024).

Among the selected studies, applied research and technological production studies stand out, accounting for 40.05% of the total included manuscripts.

Regarding the technological resources developed for the healthcare sector, 10 (58.83%) were mobile apps or app prototypes[2,14,16,18,19,20,21,22,23,28]; 2 (11,77%) were online courses[19,27]; 1 (5,88%) was a course delivered in a virtual environment[17]; 1 (5,88%) consisted of a series of virtual classes[29]; 1 (5,88%) was a serious game[26]; 1 (5,88%) was a virtual learning object (VLO)[25]; 1 (5,88%) was a blog in a Virtual Learning Environment (VLE)[24].

Of the educational technologies developed, 10 (58.83%) were designed for use by professionals or students, aiming to enhance knowledge related to healthcare, provide training, assist, and develop new skills for the work process[2,16,17,18,19,24,26,27,28,29]. Additionally, 6 (35.29%) technologies were created for individuals with specific health conditions or issues, with the goal of preventing health complications, assisting in daily living activities, providing relevant information to specific populations, and motivating and supporting self-care[14,20,21,22,23,25]. Only 1 (5.88%) study focused on training nursing faculty[15].

## DISCUSSION

The methodology of CID has been increasingly applied in the healthcare sector across various formats that support the learning of students, professionals, educators, and users. CID provides designers with flexibility throughout all stages of creating a technological resource, enabling interaction with media and dynamic content delivery[15].

In developing an educational proposal, it is essential to follow the steps of the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation[3]. The technology's operationalization begins with identifying the health care users' needs, diagnosing their limitations and potential, which allows for the enhancement of the tools to be produced while involving user participation to contextualize the proposal[14]. This approach was observed in the studies analyzed.

Starting with the initial assessment of learners' needs, technological resources are molded and adapted for dissemination to large groups, thereby improving health education—a key goal of CID[23].

In the analysis phase, some studies conducted thorough literature reviews, leading to studies that identified the state of the art regarding the desired educational content[2,14,15,18,20,21,23,24], learning needs assessments[18,19,20,23], and subsequent construction of the instructional design matrix, detailed in the studies[15,16,17].

In the study focused on drug abuse prevention, the authors showed sensitivity by choosing an app name ("SerTão Bom") that resonates with a specific regional geographic setting while also conveying a positive connotation. This approach creates a lighter atmosphere for discussing a delicate topic with divergent opinions, emphasizing the authors' concern about treating the subject without a criminalizing perspective. Additionally, the app's creative and challenging learning format aims to engage young people in a playful experience[14].

During the design and development stages, attention was paid not only to the program content but also to app colors, font size and type, and suitable illustrations to enhance user engagement and continuity[20,21]. It is recommended that inclusive graphic design include 12-point sans-serif fonts, simple and familiar icons, and a color palette with high contrast beyond just black and white[30].

In the development of educational games, CID was used to systematize the desired educational process, ensuring that all content creation stages were aligned[14]. This characteristic of CID allows for simultaneous flexibility and contextualization of an educational proposal, enabling a model applied to a small group to be replicated for larger groups with similar characteristics[3].

Successful experience was also noted in developing an online course. The authors highlighted the familiarity of the new generation of students with technology and the promising results regarding the acceptance of using VLE and

Google® resources. These findings reveal that the use of technological resources in the teaching-learning process makes it more meaningful. They also argued that it is possible for the mediator/instructor to assess student presence through interaction in addressing questions and completing assessments[15].

The creation of online courses and classes within VLEs[15,17] can enhance the dynamism of education, promote knowledge sharing, and foster participation among members through the establishment of non-imposed partnerships, considering previous experiences. Additionally, in online education, using visual resources, hypertexts, quizzes, and simulations supported by CID provides flexibility in teaching and allows for constant updates in the virtual environment, preventing content from becoming obsolete[15].

A serious game was used as an educational tool in an online course aimed at disseminating information about patient safety. Pre- and post-tests were conducted to assess the cognitive learning of groups created through randomization, revealing a significant increase in learning in the experimental group compared to the control group. The serious game, developed with CID support, was evaluated by participants as an interactive and engaging learning tool. CID facilitated the steps and was considered a useful framework for guiding the development of educational technology[26].

Serious games are widely used as educational tools due to their ability to facilitate the transmission of concepts and provide immediate feedback. In healthcare, these games focus on promotion, prevention, and treatment of diseases and can be considered innovative strategies in teaching, particularly concerning virtual simulations[31].

In constructing a VLO for pregnant adolescents, multimedia scripts were condensed into videos, modules, and discussion forums to facilitate the engagement of pregnant adolescents by primary healthcare nurses. The authors noted that most adolescents participating in the study had never engaged in educational activities during prenatal care. They believe that using VLOs could help healthcare professionals develop educational activities that impact health promotion and prevent maternal-infant health issues in these adolescents[25].

During the design phase, representatives of the target audience were consulted to assess their learning needs related to antenatal care, which were reflected in the content of the tool. However, although the target group was involved in the implementation of the tool, its evaluation was carried out by a panel of experts, including nurses and IT professionals, a limitation noted by the authors due to the lack of involvement of the pregnant adolescents in this phase[25].

The authors concluded that developing educational technology required a systematic yet flexible process, considering the learning needs of the target audience. This approach allowed the provision of a complementary resource to the educational process, especially for nurses and primary health care workers[25].

Among the strategies used in the selected studies, blogs were highlighted as an easily accessible ICT with low cost and a reverse chronological order, where the first post is the last entry, while the most recent is displayed first. The development of a blog in a VLE aimed at teaching cardiopulmonary resuscitation procedures yielded good results in expert evaluations. However, the “Forum and Chats” section was deemed “unsatisfactory” due to the lack of discussion space, attributed to an error in the product's development[24].

Some studies faced limitations during the implementation and evaluation phases, receiving feedback from experts who suggested improvements to the technology produced[14,16,19,24,25]. However, other studies did not conduct these phases[20,21,22] or highlighted the need for evaluation by the target audience to verify the effectiveness of the product[19,25].

The teaching-learning method supported by educational technologies is recognized for its significant contributions, such as enhancing work and educational processes without compromising the affective, subjective, and human aspects[2]. Furthermore, using educational technologies can offer the target population opportunities to improve their skills in daily routines[23], improve quality of life[20], guide professional practice[27], and enrich knowledge[16].

Mobile devices as teaching support tools provide just-in-time learning, allowing users to access information anytime, thereby promoting personalized learning, knowledge dissemination, and information sharing[23]. Additionally, learners have the autonomy to decide when, where, in what sequence, and how they will study the content[2].

In health care, education supported by technological tools is gaining prominence for its ability to invigorate traditional methodologies through interactive interfaces[15]. The application of technological resources in health education is significant for promoting approaches that cater to population interests, emphasizing understanding through playful methods to raise awareness and meet user demands through relevant innovations and thematic advances[32].

Considering the need for promising outcomes in increasing knowledge, strengthening positive health beliefs, and promoting adherence to therapeutic and self-care practices, it is essential that technological tools be designed based on consistent and flexible theoretical and methodological frameworks. This approach ensures the provision of relevant information to a target audience, translating into behavior that allows for positive changes[33].

Among the studies analyzed, particularly regarding methodological aspects, the adequacy of CID phases was evident in guiding the methodological pathway for constructing technological tools aimed at healthcare, with the necessary rigor and flexibility. Following CID, even with adaptations in development, it is possible to identify not only the strengths of the created tools but also the weaknesses in the process, contributing to more refined future research.

This study synthesizes valuable information regarding the different possibilities of technological tools applicable to the healthcare context. These tools, structured from an organized and systematic model, present feasibility for application and significant potential to support health promotion and disease prevention efforts by professionals and researchers in the field.

One of the limitations of this study was the difficulty in locating research that used the contextualized instructional design methodology and the restriction to studies developed solely in the Brazilian context. This limitation may be attributed to the fact that CID is not indexed among the Health Sciences Descriptors, which may necessitate the future replication of similar studies, including descriptors capable of identifying more technological productions using this method.

## CONCLUSÃO

With technological advancements across various fields of knowledge and the importance of leveraging these advancements to improve societal well-being, it is essential for healthcare to keep pace with modernization. This ensures that professionals engaged with technology find motivation and affinity with the tools and materials necessary for performing their daily care activities.

This study explored the use of CID in developing educational technologies for healthcare, providing insights into various technological resources and how they can assist in the educational process and health promotion in a playful, interactive, and flexible manner.

The technologies developed and incorporated into this research ranged from preventive measures and healthcare interventions to proposals for health training courses. CID was applied and adapted to different contexts, yielding promising results. This underscores the importance of investing in applied research using this methodology, which can disseminate new possibilities for developing technological resources aimed at improving public health. Furthermore, it highlights the role of CID in supporting teaching and learning processes, both in professional training and health education, while recognizing the essential value of personal interaction and face-to-face engagement, whether in healthcare education or in patient education under the care of professionals in this field.

**REFERENCES**


1 Chaves AAS, França FAC, Pereira Álvaro IS, Ribeiro FAA, Lima LVL, Araújo RC, Carneiro PLS. Information and communication technologies in educational practices: a literature review. RSD [Internet]. 2022;11(8):e47311831155. https://doi.org/10.33448/rsd-v11i8.31155

2 Barros WCTS, Dal Sasso GTM, Alvarez AG, Ramos SF, Martins SR. Aplicativo para avaliação do nível de consciência em adultos: produção tecnológica em enfermagem. Cogitare enferm. [Internet]. 2019;24:e60338. https://doi.org/10.5380/ce.v24i0.60338

3 Filatro A. DI 4.0: Inovação corporativa. 1. ed. São Paulo: Saraiva Educação, 2019.

4 Filatro A, Piconez SCB. Design instrucional contextualizado. São Paulo: Senac, 2004.

5 Silveira MA, Nobrega MS, Goyatá SLT, Ribeiro PM, Giacomelli B, Moreira DS. Aplicativos móveis em saúde baseados no método Design Instrucional Contextualizado: revisão integrativa. Contribuciones A Las Ciencias Sociales. 2023;16(8):11233-53. https://doi.org/10.55905/revconv.16n.8-127

6 Lee P, Baek G. Development and effects of adult nursing education programs using virtual reality simulations. Healthcare (Basel). 2024;12(13). https://doi.org/10.3390/healthcare12131313

7 Yang L, Ye J, Zhu H, Tang Y, Li X. Development and evaluation of a family-child reading picture book on reducing autism spectrum disorder caregivers' psychological stress: a mixed method study. Front Psychiatry. 2024;15:1390430. https://dx.doi.org/10.3389/fpsyt.2024.1390430

8 Oliveira MT, Ferigato SH. A atenção às mulheres vítimas de violência doméstica e familiar: a construção de tecnologias de cuidado da terapia ocupacional na atenção básica em saúde. Cadernos Brasileiros de Terapia Ocupacional. 2019;27(3):508-21. https://doi.org/10.4322/2526-8910.ctoAO1729

9 Costa IKF. Evidências da construção e validação de um curso a distância de suporte básico de vida. Natal. Tese [Doutorado em Ciências da Saúde] – Universidade Federal do Rio Grande do Norte; 2017. Available from: https://repositorio.ufrn.br/handle/123456789/24121

10 Aromataris E, Munn Z, editors. JBI Manual for evidence synthesis. Adelaide: Joanna Briggs Institute; 2020. https://doi.org/10.46658/JBIMES-24-01

11 Tricco AC, Lillie E, Zarin W, O'brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018;169(7):467-73. https://doi.org/10.7326/M18-0850

12 The Joanna Briggs Institute. Joanna Briggs Institute Reviewers' Manual: 2015 [Internet]. Adelaide: JBI; 2015 [cited 2016 Nov 30]. Available from: https://reben.com.br/revista/wp-content/uploads/2020/10/Scoping.pdf

13 Dourado AS, Melo DO. PRISMA 2020 – checklist para relatar uma revisão sistemática [Internet]. Estudantes para Melhores Evidências (EME) Cochrane. Available from: https://eme.cochrane.org/prisma-2020-checklist-para-relatar-uma-revisao-sistematica/

14 Viana LS. Construção e validação do jogo interativo "SerTão Bom" sobre uso abusivo e problemático de drogas e o risco de suicídio. Sobral. Dissertação [Mestrado em Saúde da Família] – Universidade Federal do Ceará; 2021. Available from: https://repositorio.ufc.br/handle/riufc/63817

15 Heimann C. Capacitação pedagógica de docentes de enfermagem: desenvolvimento e avaliação de um curso a distância. São Paulo.

Dissertação [Mestrado em Fundamentos e Práticas de Gerenciamento em Enfermagem e em saúde] – Escola de Enfermagem da Universidade de São Paulo; 2012. https://doi.org/10.11606/D.7.2012.tde-11052012-105441

16 Motta DS. Desenvolvimento e validação de um aplicativo móvel de suporte básico de vida para estudantes de graduação em enfermagem. Juiz de Fora. Dissertação [Mestrado em Cuidado em Saúde e Enfermagem] – Universidade federal de Juiz de Fora; 2021. https://doi.org/10.34019/ufjf/di/2021/00014

17 Silveira PC. Design instrucional para disciplina de tecnologia da informação na pesquisa e na educação à distância na área da saúde. São José do Rio Preto. Dissertação [Mestrado em processo do Trabalho em Saúde] – Faculdade de Medicina de São José do Rio Preto; 2017. Available from: https://bdtd.famerp.br/handle/tede/387

18 Mendez CB. Protótipo de um aplicativo móvel educativo e de follow up para pacientes com diagnóstico de doença arterial periférica. Florianópolis. Dissertação [Mestrado em gestão do Cuidado em Saúde e Enfermagem] – Universidade Federal de Santa Catarina; 2017. Available from: https://repositorio.ufsc.br/handle/123456789/188751

19 Galvão ECF, Püschel ECF. Aplicativo multimídia em plataforma móvel para o ensino da mensuração da pressão venosa central. Rev Esc Enferm USP. 2012;46(esp):107-15. https://doi.org/10.1590/S0080-62342012000700016

20 Pires WG. Aplicativo de suporte de atividades de vida diária para crianças com transtorno do espectro autista. Lorena. Dissertação [Mestrado Profissional em Design, tecnologia e inovação] – Centro Universitário Teresa D'Ávilla; 2019. Available from: https://unifatea.edu.br/wp-content/uploads/2019/10/Aplicativo-de-Suporte-de-Atividades-de-Vida-Diária-para-Crianças-com-Transtorno-de-Espectro-Autista.pdf

21 Salomé GM, Rocha CA. Aplicativo móvel para avaliação, prevenção e tratamento da dermatite associada à incontinência. Rev Enferm Contemp. 2020;10(1):8-16. https://doi.org/10.17267/2317-3378rec.v10i1.2963

22 Queiroz JF. SexGynCare: Desenvolvimento de Sistema de aplicativos móveis para assistência ginecológica e sexual. Natal. Dissertação [Mestrado em Ciências da Saúde] – Universidade Federal do Rio Grande do Norte; 2020. Available from: https://repositorio.ufrn.br/handle/123456789/31357

23 Amaral PRQ. Um app feito pra mim: desenvolvimento de tecnologia móvel para crianças com diabetes mellitus tipo 1 e suas famílias. Ribeirão Preto. Dissertação [Mestrado em Ciências] – Universidade de São Paulo; 2018. https://doi.org/10.11606/D.22.2019.tde-29032019-184818

24 Batista DFG, Nascimento JSG, Oliveira JLG, Alves MG, Silva MD, Dalri MCB. Blog do ensino da ressuscitação cardiopulmonar: uma ferramenta para a formação do enfermeiro. Rev enferm centro-oeste mineiro. 2020;10:e3643. https://doi.org/10.19175/recom.v10i0.3643

25 Santiago RF, Andrade EMLR, Mendes IAC, Viana MCA, Nery IS. Avaliação do objeto virtual de aprendizagem sobre pré-natal para adolescentes grávidas na atenção básica. Acta Paul Enferm. 2020;33:1-12. https://doi.org/10.37689/acta-ape/2020AO0063

26 Domingues NA. Simulação virtual por meio de um serious game sobre segurança do paciente: um estudo experimental. Ribeirão Preto. Tese [Doutorado em Ciências] –

Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo; 2021. https://doi.org/10.11606/T.22.2021.tde-14122021-165816

27 Faria NGF. Fotografia digital de feridas: Desenvolvimento e avaliação de curso online para enfermeiros. São Paulo. Dissertação [Mestrado em Ciências] – Escola de Enfermagem da Universidade de São Paulo; 2010. https://doi.org/10.11606/D.7.2010.tde-14122010-122722

28 Afonso VLM. Aulas virtuais no curso de licenciatura em enfermagem: os estudantes como autores. São Paulo. Dissertação [Mestrado em Fundamentos e Práticas de Gerenciamento em Enfermagem e em Saúde] – Escola de Enfermagem da Universidade de São Paulo; 2014. https://doi.org/10.11606/D.7.2014.tde-06082014-091553

29 Souza GP. EuLíder: Aplicativo para autodesenvolvimento da liderança do enfermeiro. Curitiba. Dissertação [Mestrado em Prática do Cuidado em Saúde] – Universidade Federal do Paraná; 2022. Available from: https://hdl.handle.net/1884/80163

30 Farias BSS, Landim PC. Design gráfico inclusivo para terceira idade. HDF [Internet]. 2019;8(15):35-48. https://doi.org/10.5965/231679630815201903 5

31 Junqueira ALC, Sirqueira TFM. Serious Games: Aplicação no ambiente educacional. Caderno de Estudos em Engenharia de Software. 2023;4(2). Available from: https://seer.uniacademia.edu.br/index.php/engsoftware/article/view/3320

32 Oliveira PMP, Pagliuca LMF. Avaliação de tecnologia educativa na modalidade literatura de cordel sobre amamentação. Rev Esc Enferm USP. 2013;47(1):205–12. https://doi.org/10.1590/S0080-62342013000100026

33 Sousa MM, Almeida TCF, Gouveia BLA, Freire MEM, Oliveira SHS. Validation of persuasive audiovisual communication to reduce salt consumption by people with heart failure. Rev Esc Enferm USP. 2021;55:e03751. https://doi.org/10.1590/S1980-220X2020006503751

Received: 17 june. 2024
Accepted: 25 july. 2025