**Artigo Original EN**

Eliane S. Gazire, Leila J. B. L. S. Guimarães, Marceli V. Marques, Jessica J. Ribeiro, Thaís B. Tavares
Enhanced learning in public health: interdisciplinarity and innovation in technical education in nursing and computer science

# Enhanced learning in public health: interdisciplinarity and innovation in technical education in nursing and computer science

Potencializando aprendizagem na saúde coletiva: interdisciplinaridade e inovação no ensino técnico de enfermagem e informática

Aprendizaje mejorado en salud pública: interdisciplinaridad e innovación en enfermería y educación técnica en informática

**RESUMO**

Objetivo: mapear estudos recentes que apontam evidências científicas no contexto das mídias sociais e ao tempo de tela como fatores de risco para a obesidade infantil. Métodos: Caracteriza-se como uma Scoping Review, baseada no protocolo proposto pelo Joanna Briggs Institute e organizada pelo Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews. Resultados: Foram identificados 211 artigos. Após o processo de seleção por título, resumo, disponibilidade na íntegra, restaram 21 estudos, que foram analisados de forma criteriosa. Foram excluídos 9 artigos após a leitura na íntegra por indissociabilidade com o tema abordado, totalizando 12 artigos incluídos. Conclusões: Conclui-se que o tempo de tela e as mídias sociais, quando usadas excessivamente, apresentam resultados negativos para a saúde infantil, bem como atraso no desenvolvimento e comportamento, inatividade física ou tempo menor de atividades que estão ligadas à parte motora, sobrepeso, obesidade, sono irregular, dentre outros.
**DESCRITORES:** Tempo de Tela; Obesidade Infantil; Mídias Sociais.

**ABSTRACT**

Objective: To map recent studies that point to scientific evidence in the context of social media and screen time as risk factors for childhood obesity. Methods: This is a Scoping Review, based on the protocol proposed by the Joanna Briggs Institute and organized by the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews. Results: 211 articles were identified. After selection by title, abstract and availability in full, 21 studies remained, which were analyzed carefully. After reading the full text, 9 articles were excluded due to their inseparability from the topic, making a total of 12 articles included. Conclusions: It can be concluded that screen time and social media, when used excessively, have negative results for children's health, such as delays in development and behavior, physical inactivity or less time spent on activities linked to motor skills, overweight, obesity, irregular sleep, among others.
**DESCRIPTORS:** Screen Time; Childhood Obesity; Social Media.

**RESUMEN**

Objetivo: Mapear los estudios recientes que apuntan a la evidencia científica en el contexto de los medios sociales y el tiempo frente a la pantalla como factores de riesgo para la obesidad infantil. Métodos: Se trata de una Scoping Review, basada en el protocolo propuesto por el Instituto Joanna Briggs y organizada por la extensión Preferred Reporting Items for Systematic Review and Meta-Analyses for Scoping Reviews. Resultados: Se identificaron 211 artículos. Tras la selección por título, resumen y disponibilidad en su totalidad, quedaron 21 estudios, que se analizaron detenidamente. Tras la lectura del texto completo, se excluyeron 9 artículos por ser inseparables del tema tratado, totalizando 12 artículos incluidos. Conclusiones: Se puede concluir que el tiempo de pantalla y los medios sociales, cuando son utilizados en exceso, tienen efectos negativos en la salud de los niños, como retrasos en el desarrollo y en el comportamiento, inactividad física o menor tiempo dedicado a actividades motoras, sobrepeso, obesidad, sueño irregular, entre otros.
**PALABRAS CLAVE:** Tiempo de Pantalla; Obesidad Infantil; Medios Sociales.

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## INTRODUCTION

Changes in the educational environment are accompanied by increased use of the Internet with a focus on communication, and the applications of new technologies are increasingly having a major impact on people's lives. 1

Interdisciplinarity has proven to be an effective pedagogical approach to promote the integration of knowledge from different areas of knowledge. In the context of technical courses in Nursing and Computer Science, the interaction between these disciplines can result in significant synergies and opportunities for innovation. 1;2

The pace of innovation in digital technologies has accelerated social change, driving major changes in social relations and bringing new ways of accessing and using information. 3 Information acquisition increasingly occurs in an online digital environment, allowing time savings and broad access to various sources of information. One of the new technological tools that has revolutionized human interaction with machines is chatbots.

With chatbots, the world is rapidly moving from graphical user interfaces to conversational interfaces. Chatbots are software that run within communication applications to simulate human conversations while sending messages, allowing smooth user interaction with digital devices in a more dynamic and secure way. 4

In this study, we explore the interdisciplinary integration between these courses, with the aim of developing a chatbot for the Public Health discipline, considering that access to information increasingly occurs in the digital environment.

Creating chatbots is not just an information technology (IT) process, but a practice of content, communication and information. The space of human relationships can be reconfigured by chatbot tools by focusing on those who use them and on interactions.

Chatbots are one of the new technological tools that are currently revolutionizing human-computer interaction. They are software that seek to interact with humans in a humanized way and perform tasks within a specific domain of knowledge.5 A chatbot is a messaging and relationship bot (as in robot) that enables personalized and automated responses. It is therefore considered versatile, capable of being useful in different communication channels. The main idea is to automate processes to optimize interaction management, in this case between students and the course content. 5

From this perspective, the chatbot was designed to provide information on public health for nursing students to study in this context. They function as a kind of assistant, communicating and interacting with students through automated text mes-

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sages. The program was developed based on public health guidelines and protocols, ensuring the reliability of the information provided.

The chatbot was designed to provide information on public health for nursing students to study in this context. They function as a kind of assistant, communicating and interacting with students through automated text messages. The program was developed based on public health guidelines and protocols, ensuring the reliability of the information provided.

The use of technological tools, such as applications and online platforms, combined with the application of the Design Thinking methodology, such as student engagement and the use of information in new ways of constructing learning and knowledge are operationalized, above all, with access to the Web environment. It provides students with a more interactive, collaborative and contextualized learning experience. This innovative approach encourages the development of essential 21st century skills, such as critical thinking, problem solving and creativity, preparing students for the challenges of the contemporary world.

*It is necessary to develop the natural ability of the human spirit to place all this information in a context and as a whole. It is necessary to teach the methods that allow us to establish mutual relations and reciprocal influences between the parts and the whole in a complex world. 6*

With an eye on digital reality, cognition is constructed in a social context, supported by artifacts that give it meaning and a specific purpose, sensitive to a particular repertoire and proficiency acquired from each individual's experience. The digital generation articulates Google searches and bot responses in conversational interfaces. Intelligently developed with analytics, interaction with bots can be useful for students.

Engagement can be increased through the use of chatbots to direct personalized content, enabling interactive visualizations and helping students to agree on activities that facilitate access to the material with great agility.

It is important to establish knowledge of knowledge, which involves the integration of the knower in his knowledge, and must be, for education, a permanent principle and necessity. The integration of reality, culture, and context in the construction of contextualized content to affirm the introspection of the acquired "knowledge". 6

In this way, by incorporating technologies in favor of education, it is clear that their advantages are applicable to both students and teachers. In other words, through their use, students find another way to learn and teachers to pass on content and teach.

## OBJECTIVE

Describe and present the construction of a conversational interface of a chatbot for the Public Health discipline, interrelating the knowledge of the Nursing and Computer Science courses.

## METHOD

This is a descriptive, qualitative study in the form of an experience report, based on the experiences of technical course teachers in the first semester of 2023, between May and June, when they planned and encouraged students to create a messaging device.

It is important to note that scientific bases were used to conceptualize what a chatbot is and identify the main characteristics of contemporary teaching. Thus, the article describes the process of creating a chatbot, from initial planning to its implementation and use by students, highlighting the benefits and challenges encountered along the way.

The study took place at a private institution, where some students pay for their own studies and others participate in government projects. For this report in question, the classes included were those that were in progress at the Institution in the morning period and that were taking courses related to the study topic, as this would allow the construction of the artifact by the students to be aggregated with the theoretical content taught in the learning spaces. Both the Nursing and Computer Science classes are made up of students belonging to the Trilhas de Futuro Program, considered an initiative of the Government of Minas Gerais that offers free courses to high school students and former students.

The chosen subject for selecting the chatbot content was Public Health, which is an integral part of the nursing course curriculum. The reason this subject was chosen was because laws, legislation and regulations guide its content, which can cause some learning difficulties for students.

The vocational school is located in the states of São Paulo and Minas Gerais. Its academic community is made up of around twenty-two thousand students across technical courses (administration, accounting, systems development, nursing, pharmacy, IT, aesthetics, marketing, radiology, human resources and occupational safety), training courses (elderly care) and improvement courses (venipuncture, first aid and occupational nursing).

The school's purpose is to provide quality education that generates real jobs for students, transforms and develops our country. It believes in an innovative pedagogical approach, uses active methodologies, including digital platforms and gamification, as well as the development of an excellent team. Therefore, teachers identified the need to create methodological and pedagogical strategies that could meet the Institution's mission and vision combined with 21st century teaching perspectives.

*Education should foster the natural aptitude of the mind to formulate and solve essential problems and, in a related way, stimulate the full use of general intelligence. This full use requires the free exercise of curiosity, the faculty most expanded and most alive during childhood and adolescence, which education often extinguishes and which, on the contrary, it seeks to stimulate or, if it is dormant, to awaken. 6*

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Thus, during an informal meeting in the Teachers' Room, while discussing their pedagogical routines, the idea arose to structure, plan strategies and tools that could provide an interdisciplinary, technological, and innovative experience that would provide additional support to students.

It was in the midst of this reflection that the following guiding questions for this article were formulated: How could the development of a chatbot improve the learning experience of students? What are the main needs of students in technical nursing and computer science courses that can be addressed through a chatbot? What platform or tool will be used to create and implement the chatbot? What will the construction process be like? How will the courses be able to interact?

In this context, two lines of work were established: one guideline was directed towards the construction of the chatbot, which was left more in the hands of the teachers and students of the technical computer science course, while the other aspect of the work was the responsibility of the nursing team, which focused on the content to be implemented in the artifact. The entire dynamic process took place through cycles of activities based on Design Thinking, with practical meetings (sprints) that validated and structured the new construction stages, a modeling process followed by prototyping and restructuring according to the insights from the meetings. 7 The process was based on the centralization and protagonism of the student.

## THE DISCIPLINE IN THE CONTEXT OF LEARNING: PUBLIC HEALTH

The interdisciplinarity between the Nursing and IT technical courses was transformative in this work, since it expands the sources of information for Nursing students and allows them to find the answers they need about what the SUS is.

The choice of the Public Health discipline was strategic to allow for the expansion of information about the topic, which in addition to the Health content contained in it, also involves an exercise in citizenship. The precise information offered by the chatbot provides students with a reliable source of information about the current Health System in our country. Although it is clear to most people that the SUS is responsible for guaranteeing universal, comprehensive and free access to health services, especially for Nursing students, it is essential to have this knowledge in a consolidated, broad, in-depth manner and with various sources of consultation about its dimension. This dimension includes not only Health, but also actions of sanitary surveillance, epidemiological surveillance, occupational health and therapeutic and pharmaceutical assistance. Thus, the dimension of Public Health, implemented in the SUS, which serves all people, regardless of their social or economic status, becomes clear. 8

When we talk about Public Health, it is important to remember that it emerged in Brazil in the 1970s, linked to the fight for democracy and the Health Reform movement, being enshrined in the Right to Health achieved by the Federal Constitution of 1988, when the State assumed the responsibility of providing health to all. 8;9

Nursing technicians, who dedicate themselves to studying the health and disease process that will permeate their professional lives, are broadly inserted in the context of Public Health, which in turn is consolidated by the SUS in our country, established by article 196 of the Federal Constitution of 1988. It is important to highlight that, despite being a right, the SUS faces several challenges to ensure its effective implementation, including the lack of adequate resources, precarious infrastructure, lack of health professionals, regional inequality in access to services and bureaucracy.

Matsumoto, Mishima and Pinto (2001) reaffirm the importance of interdisciplinary public health, that is, nursing must assume its core competence and responsibility, care. 10 This care focuses on the patient and not the disease - crossing individual and collective subjectivities - and which requires, in order to be made viable, the use of knowledge from different disciplines.

It is essential that society is engaged in defending and strengthening the SUS, demanding improvements and contributing to its improvement. In addition, it is important that the State fulfills its role of guaranteeing the right to health, investing adequately and prioritizing actions aimed at promoting health and universal access to services. Providing students with a reliable and accessible source of research through the chatbot strengthens learning and forms professionals who are aware of reality, capable of implementing in their professional practice, when entering the job market, a strong position based on the robust theory offered with the help of IT.

## CONSTRUÇÃO DO CHATBOT

The methodological contribution was directed towards the challenge of building a technological product (artifact) sensitive to the user's context – a chatbot called Susan – using Design Thinking. Innovation-driven design emerged in the process of transformation and evolution of technology, directing itself through new meanings, centered on the human aspect and needs to provide a good experience (emotional, cognitive or aesthetic) in an iterative process and construction of knowledge. 7

> *Design thinking is a humanistic approach to innovation and creativity, centered on collaborative work and based on a multidisciplinary perspective based on principles of engineering, design, arts, social sciences and discoveries from the corporate world. 10*

Design Thinking can be used on three fronts: innovation, teaching-learning and lastly, problem solving. 7 By analyzing these fronts, it is possible to perceive the possibility of interconnecting them to solve more complex problems, which combine multidisciplinary concepts and are centered on the person. The design thinking process is centered on the user, on those who have desires, need the information and will be the protagonist: in our case, the students

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of the Public Health discipline.

The Design Thinking approach seeks new experiences and creates empathy, creating value through process innovation by guiding the micro and macro aspects in a cyclical way, centered on the user, from immersion in the environment to the suggestion of improvements, tracing gaps, difficulties, failures, dissatisfaction, etc. 11;12

Using their knowledge of front-end and web interface programming languages, students in the computer science course developed an application that connects to an artificial intelligence engine structured with information about the Public Health discipline, creating a good exchange of messages. In this context, the aim was to work on the interaction between the speakers (student and bot), in addition to establishing a basis for exchanging messages, through coordinated actions, temporal identity, and centered on an objective. The aim was to generate an emotional process of pleasant sensations, kind responses, and polite language in the dialogues constructed, focusing on the qualified experience of pseudo-dialogues.

The chatbot content was developed taking into account the main doubts reported by nursing students when studying for the exams. As a study strategy, the teachers asked the students to create questionnaires in their notebooks addressing their specific doubts. This approach allowed the students to identify the topics in which they had the most difficulty and that required additional clarification.

Based on this dynamic, the nursing professors directed the IT professor to the chatbot content.

During the chatbot interaction, it is worth highlighting the fact that it mediates communication and integrates the information from the proposed simulation. A chatbot will only respond to intended requests, those for which it has relevant information in its knowledge base. Chatbots work mainly on messaging channels, with text being the main form of interaction, which is why they are called messengers. 4;5; 13;14

This approach based on students' dou-bts aimed to meet the specific learning needs of each student. By addressing the main doubts and difficulties faced, the chatbot becomes a useful tool for reviewing and consolidating knowledge, helping students to adequately prepare for exams.

Therefore, the chatbot's content was developed according to the main doubts reported by nursing students, providing a targeted and personalized study strategy, with the aim of strengthening learning and improving performance in exams.

Information presentation and representation technologies in these contexts provide an efficient way to support students in interacting with information as they acquire, use, retrieve and disseminate it for learning, education and knowledge creation, to be part of the current emerging paradigms and to be able to face the difficulties inherent in the information communication process.

The constructed artifact was intended to serve as a contribution to the context of students in the Public Health discipline and was generated iteratively with the participation of professors and students from the Nursing and Computer Science courses. The aim was to measure aspects of the experience in using the bot related to reliability, ease of interaction in the pseudo-dialogs for accessing and retrieving information.

## RESULTS AND DISCUSSION

The interdisciplinary integration between the Nursing and Computer Science technical courses resulted in the successful development of the chatbot for the Public Health discipline. It is worth noting that the chatbot process is still evolving through the learning established in the pseudo-dialogues, since by analyzing the interactions it is possible to understand and improve the conversational process established by Susan.

The chatbot "Susan" (figure 1) acts as a virtual assistant capable of providing information and guidance on the SUS, studied in the public health discipline, promoting access to relevant and reliable content for future nursing technicians.



Figura1 – Website, incubadora da Susan
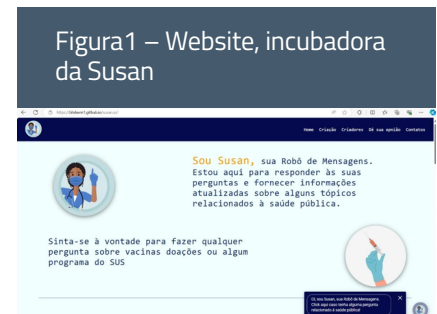
*Source: Prepared by the authors*

The combination of knowledge between the Nursing and IT technical courses, through the development of the chatbot "Susan" for the Public Health discipline, is an inspiring example of how interdisciplinarity and innovation can expand learning possibilities, improve the provision of health services and strengthen the training of professionals involved. This initiative represents a bridge between the fields of health and technology, demonstrating the transformative potential of collaboration and the joint application of knowledge for the benefit of society.

The chatbot has the flexibility to adapt to different needs. It can actively provide learning materials and topics through texts, images, videos, documents, etc.

The points of interest of the students during the experience are contributions to achieving the specific objective of the bot, in which the information has a well-structured narrative flow and makes sense to those who use the artifact, since establishing a clear journey can make users more relaxed when making decisions, serving experienced users quickly and flexibly for lay users. The chatbot (figure 2) demonstrated the ability to provide quick and accurate responses, directing nursing students to studies on the Unified Health System. The collaboration between students of technical courses allowed the exchange of knowledge and the practical application of the concepts learned, enriching the learning experience.

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Figura 2 – Diálogos/Mensagens da Susan
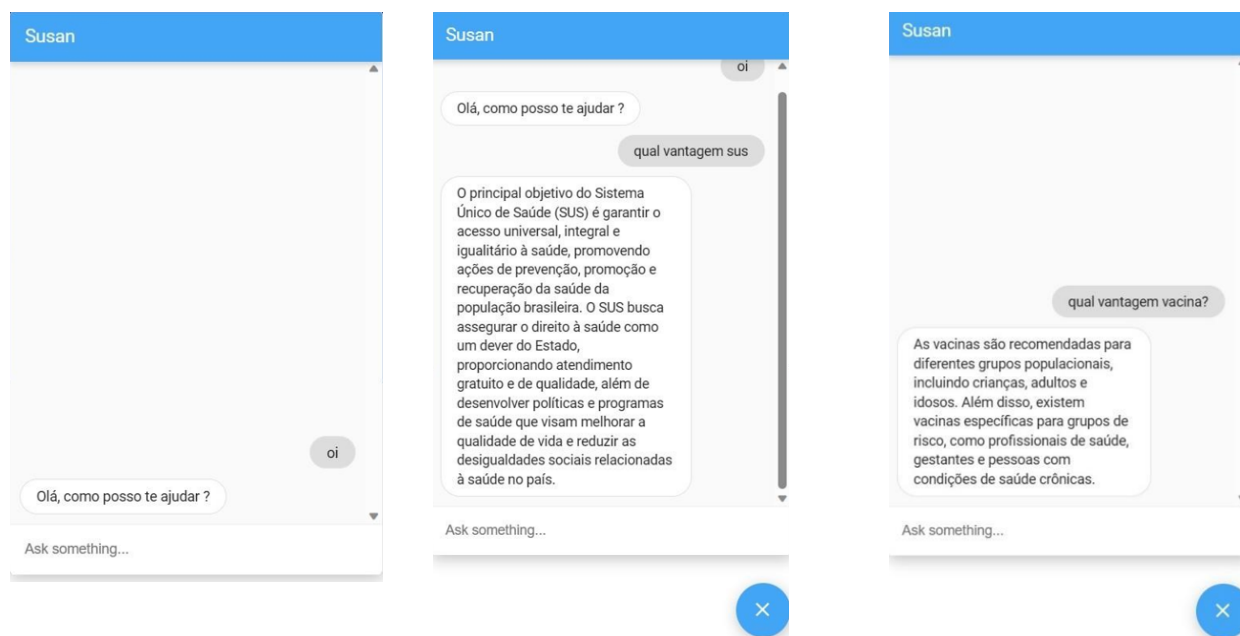


In the educational context, we have noticed several advantages in its application. In addition to providing agile communication (highly relevant to young people), chatbots in education encourage active participation from students (and even potential students), who can ask questions at "any time" without fear.

## CONCLUSION

The work raises reflections regarding the need to adapt to the new current demands imposed by the demands of the 21st century, which led us to question the traditional education model in search of new ways of teaching and learning. 1

All the learning that came from this experience had a strong impact and contributed to professional training, allowing teachers to self-evaluate their performance as a teacher, in addition to acquiring knowledge and an attitude towards this teaching activity. 1,2,17

To answer the questions about interaction with the artifact, the Susan bot, meetings were held with students of the discipline and students of Computer Science on how to use the artifact.

In view of the perceptions that resulted from the interaction of the students in the use of the Susan chatbot, adjustments were planned to meet the requests for improvements in the interaction and use process, seeking assertiveness of the results by verifying and validating the process and considering the ideas of use, usefulness and learning.

Regarding the expectations of use for learning, the students were unanimous in stating that they considered it interesting and innovative, in the process of presenting answers and contributing to learning. An important reflection emerges from this statement, which is in agreement with the objective of this work that, through the design thinking approach, seeks to support teaching-learning practices contextualized in the digital environment, through the conversational process of the bot.

Regarding the understanding of the teaching-learning construction in the interaction with the bot, the daily practices of students in searching for answers on the subject of Public Health were addressed iteratively, with a view to strengthening the evalua-

tion of the artifacts and, consequently, the knowledge generated about the learning practices of students in the applied context. The messaging environment facilitates and is facilitated by the context of use. 14;17

Messaging through applications is articulated in the dynamics of conversation that calls for immediate attention, often changing the experience of enjoying time and the way of learning. One aspect that contributed to the development of the artifact – chatbot Susan – was the optimization of time in its learning demands through responses focused on improving the learning experience and knowledge, through dynamic and structured conversational processes.

In the evolution of society, technologies were directed towards innovations that incorporated more than one functionality, focusing on multipurpose and universality. It was in this context that the idea of the chatbot Susan emerged. Thus, the authors of the work conclude that although the process is still in a constructive structuring, the bot Susan serves as a model for teaching in accordance with students' practices, enhancing learning. 16;19

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