Experience Report

TEXTO & CONTEXTO ENFERMAGEM
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DEVELOPMENT OF THE EDUCATIONAL TECHNOLOGY CALLED *"COLA NA PROFE!"* FOR CLASSROOM USE

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ABSTRACT

Objective: to develop a teaching resource for use in the classroom, involving smartphones and focused on Nursing students.
Method: this is an applied technological production research aimed at teachers and students of undergraduate and postgraduate Nursing courses. The study was structured based on the health product and service design model, which includes briefing, data collection, problem analysis, concept, generation of alternatives, selection of the best alternative, solution refinement, prototype, tests, modifications, and implementation. The project was developed in the second semester of 2022 by four doctoral students, a master's student and two PhDs in Nursing, during the discipline of Technologies and Management in Education and Work in Health and Nursing of the Graduate Program in Nursing at the Federal University of Santa Catarina.
Results: an educational technology was developed to assists in learning and interactions in the classroom. "*Cola na Profe!*" was created as a didactic and technological strategy. The objective was to integrate students and encourage their participation and attention in classes through the use of smartphones in the virtual learning environment.
Conclusion: the use of the teaching resource "Cola na Profe!" contributes to the teaching-learning process, linking the virtual world to the classroom and contributing to the interaction of those involved, which makes students protagonists of their own learning.

DESCRIPTORS: Nursing. Education Nursing. Technological innovation. Internet. Smartphone. Educational technology. Learning. Active learning.

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DESENVOLVIMENTO DA TECNOLOGIA EDUCACIONAL *"COLA NA PROFE!"* PARA USO EM SALA DE AULA

RESUMO

Objetivo: desenvolver um recurso didático para uso em sala de aula, envolvendo *smartphones* e centrado nos estudantes de enfermagem.
Método: trata-se de uma pesquisa aplicada de produção tecnológica voltada aos docentes e discentes do curso de graduação e pós-graduação em Enfermagem. Estruturou-se o estudo a partir do modelo de projeto de produtos e serviços em saúde, que contempla: *briefing*, levantamento de dados, análise do problema, conceito, geração de alternativas, seleção da melhor alternativa, refino da solução, protótipo, testes, modificações e implementação. O projeto foi desenvolvido no segundo semestre de 2022, por quatro doutorandas, uma mestranda e duas doutoras em Enfermagem, durante a disciplina de Tecnologias e Gestão na Educação e Trabalho em Saúde e Enfermagem de um programa de pós-graduação em Enfermagem da Universidade Federal de Santa Catarina.
Resultados: desenvolveu-se uma tecnologia educacional que auxilia na aprendizagem e na interação em sala de aula. O "*Cola na Profe!*" foi criado como uma estratégia didática e tecnológica. O objetivo é integrar os alunos e estimular a participação e atenção deles em sala, por meio do uso do *smartphone* no ambiente virtual de aprendizagem.
Conclusão: o uso do recurso didático *"Cola na Profe!"* contribui com o processo de ensino-aprendizagem, vinculando o mundo virtual à sala de aula e contribuindo para a interação dos envolvidos, o que torna o estudante, protagonista do seu aprendizado.

DESCRITORES: Enfermagem. Educação em enfermagem. Inovação tecnológica. Internet. Smartphone. Tecnologia educacional. Aprendizagem. Aprendizado ativo.

DESARROLLO DE LA TECNOLOGÍA EDUCATIVA LLAMADA *"COLA NA PROFE!"* PARA SER USA EN SALONES DE CLASE

RESUMEN

Objetivo: desarrollar un recurso didáctico para ser usado en salones de clase, con utilización de *smartphones* y centrado en estudiantes de Enfermería.
Método: investigación aplicada de producción tecnológica dirigida a docentes y estudiantes de la carrera de grado y cursos de postgrado en Enfermería. El estudio se estructuró a partir del modelo de diseño de productos y servicios de salud, que contempla lo siguiente: *briefing*, sondeo de datos, análisis del problema, concepto, generación de opciones, selección de la mejor opción, refinamiento de la solución, prototipo, pruebas, modificaciones e implementación. El proyecto fue desarrollado en el segundo semestre de 2022 por cuatro estudiantes de Doctorado, un estudiante de Maestría y dos Doctoras en Enfermería, durante la disciplina académica de Tecnologías y Gestión en Educación y Trabajo en Salud y Enfermería de un programa de postgrado en Enfermería de la Universidad Federal de Santa Catarina.
Resultados: se desarrolló una tecnología educativa que asiste en el aprendizaje y en las interacciones en salones de clase. "*Cola na Profe!*" se creó como una estrategia didáctica y tecnológica. El objetivo es integrar a los alumnos y estimular su participación y atención en la clase recurriendo al uso de *smartphones* en el ambiente virtual de aprendizaje.
Conclusión: utilizar el recurso didáctico *"Cola na Profe!"* contribuye al proceso de enseñanza-aprendizaje, vinculando el mundo virtual con el salón de clase y facilitando la interacción de todas las personas involucradas, lo que convierte a los alumnos en los protagonistas de su propio proceso de aprendizaje.

DESCRIPTORES: Enfermería. Educación en enfermería. Innovación tecnológica. Internet. *Smartphone*. Tecnología educativa. Aprendizaje. Aprendizaje activo.

INTRODUCTION

Technology has undergone significant advances since the mid-1950s and, day after day, it is increasingly harder to imagine life without its aid. According to the 2019 National Home-based Care Survey (*Pesquisa Nacional de Atenção Domiciliar*, PNAD), the most used Information and Communication Technology (ICT) was the mobile phone, followed by microcomputers, television and tablets, with the young population as the main users of these devices connected to the Internet. It is also known that such use was higher among students (88.1%) than among non-students (75.8%), and the highest percentage of Internet use was for sending and/or receiving text messages, voice or images by means of communication apps other than email (95.7%), which characterizes the use of mobile phones with a complex operating system (smartphones) that differentiates them from common devices[1].

In addition to that, using the Internet via smartphones, as a communication modality through social networks, is also expressive and increasing, as shown in the 2022 global digital report, reaching 58.4% of the global population this year[2]. These data show the importance and impact of this technology, motivating increasing investments in the development and qualification of hardware and software resources available for use in smartphones, as well as constant updates of the existing resources[3].

Digital Information and Communication Technologies (DICTs) are defined as communication resources that use Internet as a means for connecting and transmitting information. The influence of these technologies has been transforming the work, teaching and research processes in such a way that they are structured in order to adapt to the technological models[4]. In view of this, the report of the International Commission on Education for the 21st Century recognizes the use of technologies for the development of teaching and learning in classrooms, recommending DICTs to be part of the teachers' lives as a complementary tool in the classroom practice, generating a communicative environment quickly and practically[5].

"The teaching practice is facing an immense challenge. There is no more time to adjust it, it needs to be reinvented!"[6:190]. This assertion represents the current moment experienced by teachers and students, requiring both to reinvent themselves and to develop strategies that meet both the learning demands and their social needs[6–7]. Educational technologies accessible through mobile devices are presented as a facilitating pedagogical tool for educators in all knowledge areas, helping students interact with technology to obtain information, generating greater involvement and increasing spontaneous learning in an active and appealing way[8].

However, it is possible to teach classes suggesting that each student use their own smartphone as a complementary device to the methodology chosen by the teacher, causing an interactive outcome[9]. Classes that allow using smartphones and educational apps provide the integration of a technological component to a traditional teaching environment, conferring an innovative feature to a natural action that would be copying a given text in a notebook, for example[9].

The use of smartphones as well as other mobile technologies is increasing among students, with emphasis on exponential growth during the social distancing period[10]. A number of studies point to pathological problems arising from this habit, resulting from their indiscriminate use. In classrooms, the impact of this habit consists in students getting distracted in their digital universes, reducing their attention and participation in class[11]. Directing smartphone use to the classroom environment can improve the students' learning experience, making it more appealing[10].

From this problem, the use of an educational technology in combination with the opportunity to research on the content to be learned becomes indispensable in the development of an innovative tool. Given the above, this study was guided by the following question: "How can smartphone use be incorporate into classroom activities, preventing Nursing students from distracting themselves using

their devices?". The objective of this research was to develop a didactic resource for classroom use, involving smartphones and focused on Nursing students.

METHOD

This is an applied research of technological production, developed during the second half of 2022 in the academic discipline of Technologies and Management in Education and Work in Health and Nursing, which is part of the PhD Program in Nursing of *Universidade Federal de Santa Catarina* (PEN/UFSC). Applied research was chosen because it consists of a method where research is conducted based on a real problem, generating an applied solution[12].

This paper was based on the development of a technological product, available to foster the students' concentration on the content taught by the professor. The Stein Method for the development of health products and services was used for this purpose, comprised by the following eleven stages: 1) Briefing; 2) Data survey; 3) Analysis of the problem; 4) Concept; 5) Generation of alternatives; 6) Selection of the best alternative; 7) Refinement of the solution; 8) Prototype; 9) Tests; 10) Modifications; and 11) Implementation[13]. The summary corresponding to the methodological development of this project is presented in Figure 1.

Methodological Stage	Project development process
Briefing	Nursing students that get distracted in the classroom due to smartphone use. Identification and detailing of the problem.
Data survey	How do Nursing teachers use smartphones as a didactic instrument? Reflection and search for what has been published on the subject matter.
Analysis of the problem	Target audience: Nursing teachers and students. Characteristics of the solution: practicality, simplicity, usefulness.
Concept	Key concepts: feminine, connectivity and creativity.
Generation of choices	A free-access and easy-to-handle tool that uses resources already known by the students and teachers.
Selection of the best choice	*Cola na Profe!* A digital didactic resource consisting in collaborative content production to assist in the conduction of evaluative activities.
Refinement of the solution	Creation of the project visual identity, definition of the technological resources used, and conception of the presentation and interactivity modalities.
Prototype	Creation of the prototype in the Padlet software and incorporating of its resources into Moodle.
Tests	A class-test is performed with the authors of the project, needs for improvement are identified.
Modifications	Adjustments are made in presentation of the tool and in the interactivity settings.
Implementation	Brand registration at the INPI and implementation in the Writing of Scientific Articles academic discipline.

Figure 1 – Summary corresponding to the process to develop a product according to the methodological stages proposed by the Stein Method, associated with the Double Diamond Method. Florianópolis, SC, Brazil, 2023.
Source: Adapted[13].

The briefing was developed in the first class of the academic discipline, where the professors shared the problem in a contextualized way. The problem that was shared consisted in excessive smartphone use in the classroom by Nursing students, and a first discussion moment was built.

Data survey consists in defining the problem's requirements and the necessary attributes to solve it. To such end, a search for the scientific productions on the subject matter was conducted. This methodological stage took place based on a narrative literature review, guided by the following question: "which mobile DICTs do Nursing teachers use in classrooms?" The search for records was conducted in September 2022 based on *Biblioteca Virtual de Saúde* (BVS), with the following search terms: *Educação em enfermagem* (*Education in Nursing*); *Estudantes de enfermagem* (*Nursing students*); *Smartphone*; and *Tecnologia educacional* (*Educational technology*), associated with the OR and AND Boolean operators. It was followed by the literature review proposal, systematizing specific information, evaluating and summarizing all the information found through which exploratory research of documents in electronic format was carried out.

Analysis of the problem, which takes into account the target audience and the resolution feasibility, took place after the critical reading of scientific studies, where it was defined that the target audience would be Nursing teachers and students and the essential characteristics of the product were identified. This stage was developed through proposal debates, based on which it was possible to clearly understand the problem and the indispensable factors for its resolution.

What can be compared to the second diamond of the Double Diamond[13], was initiated: definition of the concept contemplated the key elements for the project. The stages of generating alternatives and selecting the best alternative were developed from virtual and face-to-face meetings, in which intuitive development methods were used. To such end, two in-person and three virtual meetings were held.

The stage of refinement of the solution and prototyping were structured from creation of the visual identity of the tool through the Canva® software and using the Padlet® and Moodle open access software programs to build the prototype. The aesthetic and browsability characteristics of the tool were specified in this phase.

The test phase took place through the use of the educational tool in a test class, involving the authors of the project, after which the necessary adjustments were identified and made to its implementation, contemplating the stage of modifications. This technology was implemented once the "*Cola na Profe!"* brand had been registered at the Industrial Property National Institute.

This technological production project followed the ethical precepts regarding research with human beings, regulated by Resolutions Nº. 466 of December 12th, 2012, No. 510 of April 7th, 2016, and No. 580 of March 22nd, 2018. It was not necessary for the study to be approved by any Committee of Ethics in Research with Human Beings.

RESULTS

This technological innovation project resulted in a mobile educational technology called *"Cola na Profe!"*, which was registered by the Innovation Department of *Universidade Federal de Santa Catarina* (SINOVA-UFSC), forwarding the trademark registration with the National Institute of Intellectual Property (*Instituto Nacional de Propriedade Intelectual*, INPI) under case number 929888936.

Narrative literature review

The objective of the literature review on the theme was to better understand the problem and its possible solutions. The search in *Biblioteca Virtual de Saúde* (BVS) resulted in 218 records, distributed among the following databases: MEDLINE (183 records), *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (LILACS) (27 records), Índice *Bibliográfico Español en Ciencias de la Salud* (IBECS) (5 records), *Bibliografia Nacional en Ciencias de la Salud Argentina* (BINACIS) (2 records) and ColecionaSUS (1 record), of which 182 were available as full texts. The studies identified were reviewed regarding their titles and abstracts, through which the researchers selected 22 papers published between 2011 and 2022, which were read in full allowing immersion, clarity, ideation and choice of the pedagogical tool.

Of the studies retrieved, 11 were developed in Asia: six in South Korea, two in Turkey, one in Taiwan and another one in China. Ten studies were developed in the American continent: four in Brazil and six in the United States of America. One study was developed in Australia.

Among the 14 studies that used comparative methods, only 7 describe significant differences in learning between the intervention (with the use of mobile technology) and control (conventional teaching methods) groups, identifying greater learning retention in the late post-test (with a time gap between one and four weeks after applying the technology)[14,15,16,17,18,19,20]. However, all the studies described the results from using mobile technologies in Nursing teaching as positive.

Among the contents taught with technology mediation, the following were identified: communication skills; Nursing procedures and records; and management and decision-making.

Only one study described an experience of using a technological resource available on smartphones for educational purposes, in which the students used video clip editing resources to perform activities related to nurses' leadership, also reporting a positive result in acceptance by the students[4].

Creation of the tool called *"Cola na Profe!"*

After research and discussions, it was established that the target audience of this project would be both Nursing students and professors and that, therefore, the solution should meet these two audiences. As there were both Nursing students and professors among the authors, the group's experiences and expectations were thoughtfully considered. The need to develop a practical, simple and useful resource was evidenced, as well as to address the concept of the feminine, connectivity and creativity in the discussions, indicating the paths to be taken.

Among the suggested alternatives, the development of a mobile educational technology was chosen, based on existing tools accessible to students and teachers as the best alternative to solve the problem. The Padlet® educational technology[21] was chosen because it is a software program that allows creating virtual charts for content organization, contributing to study routines, in addition to allowing sharing and contribution of several users simultaneously, conferring the connectivity and interactivity objectified in this project. It was decided to use the free version of the system found in the Play Store app store for smartphones with Android or IOS (iPhone Operating System). Choice of Padlet® was also due to the possibility of interfacing with Moodle[22], an open access virtual learning environment used in UFSC undergraduate and graduate Nursing courses. The Wall is presented in Figure 2.

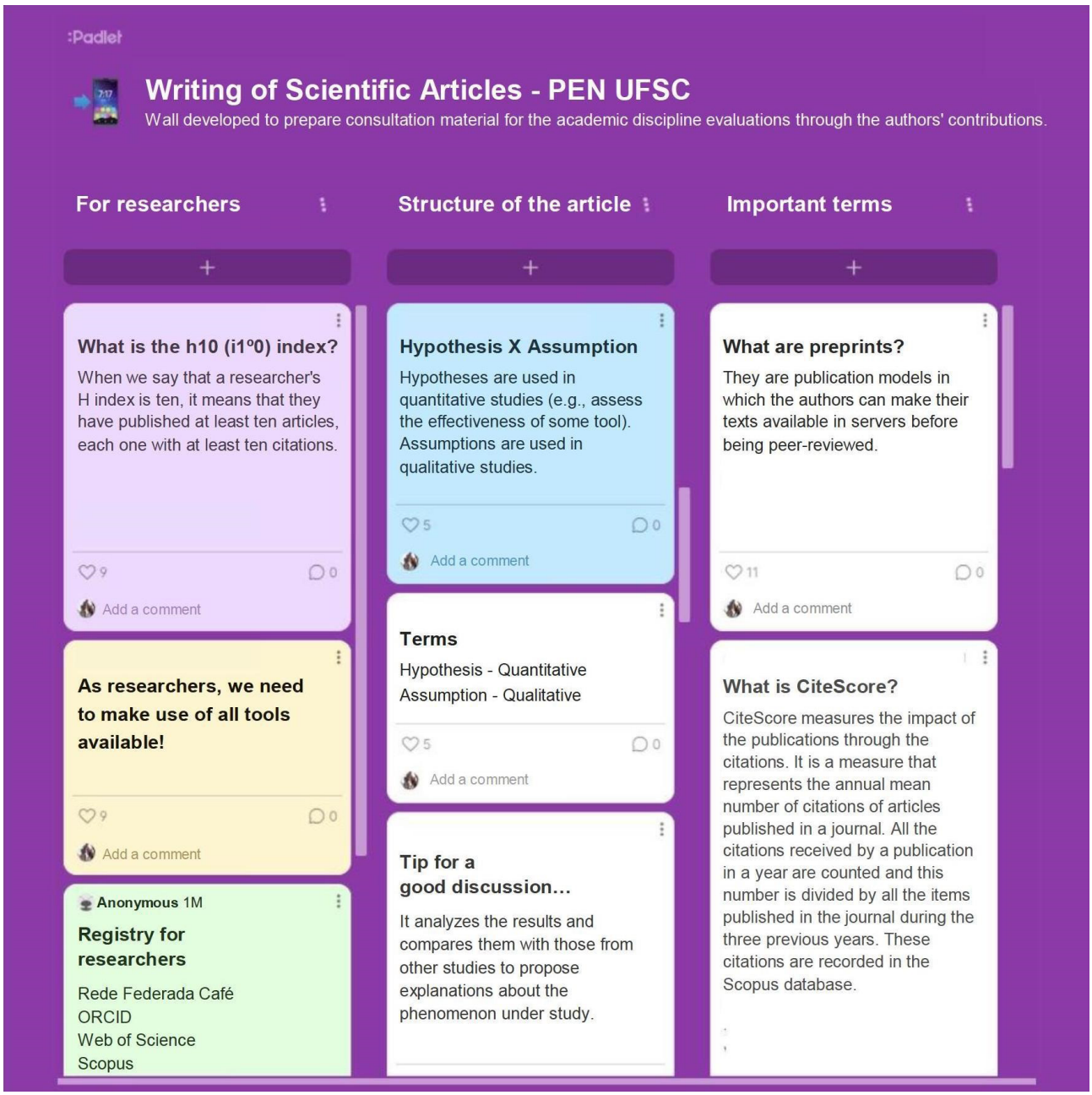


Figure 2 – Image captured from the Padlet® software screen, exemplifying the wall design, where the text boxes at the top contain the title of the contents and the students' comments below them. Florianópolis, SC, Brazil, 2023.

Called *"Cola na Profe!"*, this pedagogical and technological strategy was developed with the objective of encouraging participation and retaining the attention of students attending Higher Education in Nursing, promoting a qualified and active academic path from the point of view of the teaching-learning process, through ease of access and integration of class information favored by the tool and Internet use and the possibility of gathering students and teachers in a virtual environment connected to the real environment.

The communication objectives of creating the visual identity were independence, technology and the feminine. Based on a free research study on the creation of logobrands, several proposals were prepared through the Canva® software[23] until reaching the final version of the brand. This path is represented in Figure 3. The incorporation of *"Cola na Profe!"* on the page of the Technologies and

Management in Education and Work in Health and Nursing and Writing of Scientific Articles academic disciplines on the Moodle/UFSC platform was authorized by the teachers and their guidelines and access were incorporated into the wall of the disciplines by creating a label for the activity (Figure 4), allowing each student, who in this case are also authors of this project, to contribute to building the wall during the class. The product prototype was structured in this way.

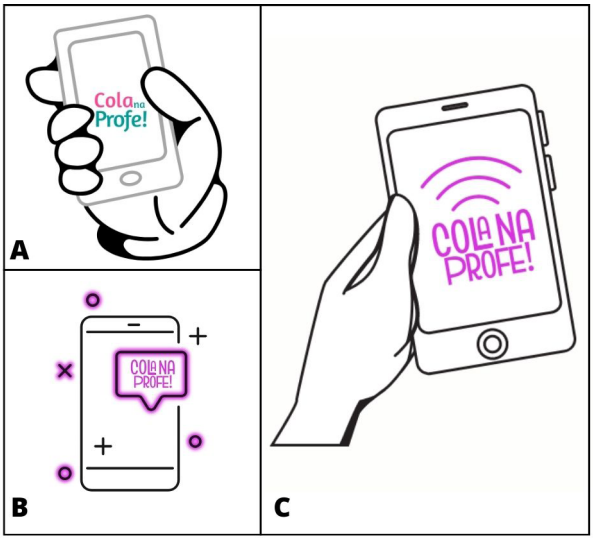
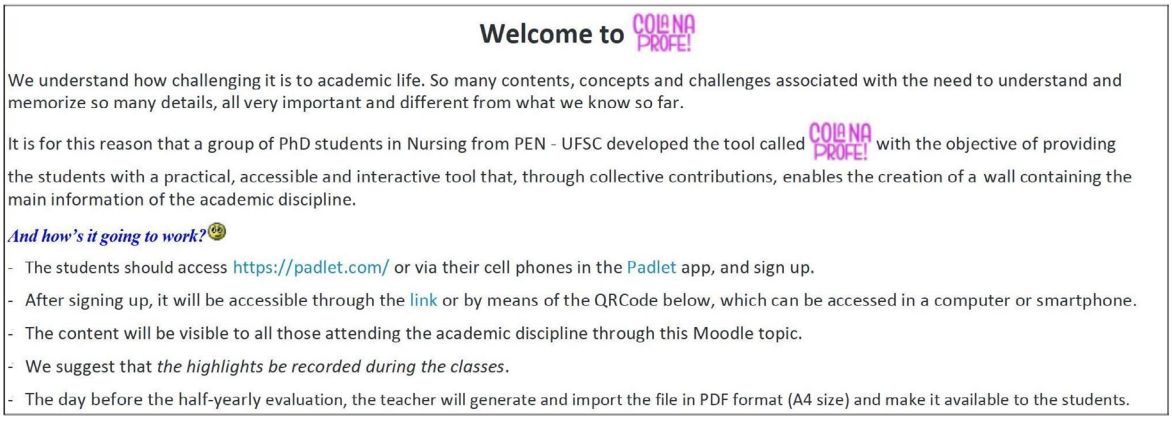


Figure 3 – Path taken to develop the visual identity of the product. A: Initial proposal presented to the group; B: Result obtained during the development process; C: Brand chosen to represent the "*Cola na Profe!*" tool. Developed in Canva®. Florianópolis, SC, Brazil, 2022.



Welcome to COLA NA PROFE!

We understand how challenging it is to academic life. So many contents, concepts and challenges associated with the need to understand and memorize so many details, all very important and different from what we know so far.

It is for this reason that a group of PhD students in Nursing from PEN - UFSC developed the tool called COLA NA PROFE! with the objective of providing the students with a practical, accessible and interactive tool that, through collective contributions, enables the creation of a wall containing the main information of the academic discipline.

And how's it going to work?

- The students should access https://padlet.com/ or via their cell phones in the Padlet app, and sign up.
- After signing up, it will be accessible through the link or by means of the QRCode below, which can be accessed in a computer or smartphone.
- The content will be visible to all those attending the academic discipline through this Moodle topic.
- We suggest that *the highlights be recorded during the classes*.
- The day before the half-yearly evaluation, the teacher will generate and import the file in PDF format (A4 size) and make it available to the students.

Figure 4 – Label incorporated into the Moodle/UFSC platform presenting the tool use guidelines to the students. Florianópolis, SC, Brazil, 2022.

The testing phase was developed in two different moments: one of them, in which due to unfeasibility of the face-to-face meeting, the *"Cola na Profe!"* was presented and tested in a remote class in the academic discipline where the tool was being developed, with the participation of all authors of the project. In this phase, some adjustments in the text and in interactivity of the technology were identified and implemented. Some necessary adjustments were also identified to increase information access security, by installing user identification locks.

The second test moment took place in the Writing of Scientific Articles academic discipline from the UFSC Graduate Course in Nursing, conducted in the in-person format. Once all the students attending the academic discipline have accessed the tool, the teacher began her explanation about the content proposed and the students were able to interact through comments, with records of important

points of the class. This enables active sharing of tips or information considered fundamental about the class. The students can then choose to replace the writing of tips in the notebook with writing directly on the *"Cola na Profe!"* wall in an interactive way with their peers.

At the end of the disciplines, it is possible to generate a compilation of all the information produced collectively, fostered by teamwork and participation of all those involved. A PDF document can be generated and serve as support material for future studies and assessments. For this to be possible, some rules should be agreed upon (Figure 5).

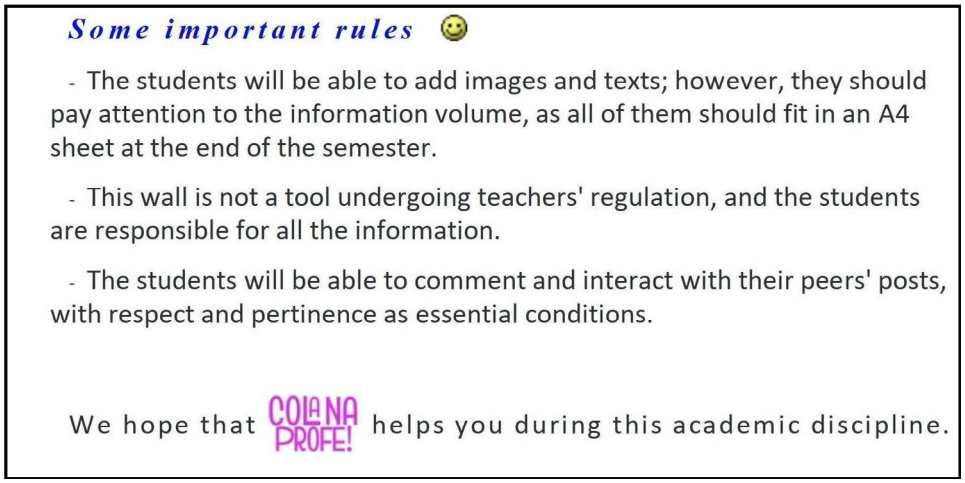


Figure 5 – Label incorporated into the Moodle/UFSC platform presenting the tool use rules, proposing an agreement with the students. Florianópolis, SC, Brazil, 2022.

DISCUSSION

Discussions about the inclusion of DICTs in teaching-learning processes and the impact that this exerts on the teaching practice have occupied a growing space in the academic universe. Although there are frequent publications that aim at qualifying and adapting the teaching practice to the presence of DICTs[10,20], it is observed that there are still few references about applicability and access to such resources, especially among less developed populations[24,25]. According to Demo, this technological advance is still limited for many students and the public education system needs to better weigh its use[26].

It is known that technological advancement influences and modifies a given society. This has been experienced since the discovery of electricity, with the advancement of industry and of atomic and biological technologies. Each time that some technological advance is incorporated into social everyday life, society is significantly influenced by it, especially if we consider communication technologies[26]. It is necessary to observe and accept to what extent the digital world has been causing interference in learning, inserting itself in the social structure of schools and universities[27].

In order to develop learning, teachers have at their disposal a wide variety of digital technologies; however, it is necessary to use them in an appropriate way for the objectives proposed[28]. A frequent example of inappropriate use of technologies is the translation of face-to-face meetings into video classes, in a mechanistic way. Some face-to-face classes are useful; the problem is when such moments do not translate into learning. In addition to that, it becomes necessary to instigate and motivate students to learn[26].

Another frequent misconception is to believe that access to technological resources will automatically result in teachers and students capable of using them. Students need to be taught how to use Digital Information and Communication Technologies (DICTs) efficiently[28]. For this, teachers

need to return to their position as learners and seek support to incorporate the use of technologies to their pedagogical practice[29].

Despite technological advances, the teaching environment still assumes a 19th century format, with students occupying portfolios and teachers delivering knowledge[28]. However, a technological invasion is added, such as uninterrupted access to smartphones, which promotes constant sending of information and offers countless resources and tools. These devices require attention from the users, who oftentimes immerse themselves in this universe, seeking more and more information, without, in fact, appropriating it. Even if the connections and convergences that mobile technologies contribute to socialization, interaction and access to knowledge, they can generate pathological behaviors in the users when used indiscriminately and without direction[30].

The students' interest in using mobile digital technologies as an entertainment tool in the home and school environments is notorious. They enable multiple functions that can be leveraged and favor the students' autonomy and protagonism, through the creative exploration of ideas and work proposals[10]. It is to be considered that the pedagogical possibilities with ICTs are fundamental to converge the students' interest in technologies with academic activities that involve important knowledge for the connection with new learning, favoring in-depth learning[8].

Historically conducted in-person, Nursing Education was faced with the imposition of remote teaching due to the Covid-19 pandemic. This event enhanced the discussions on the hybridization of Nursing Education. Even if there is a tendency for maintaining exclusively face-to-face teaching, a recent systematic review did not identify any loss in the learning quality due to the use of technology-mediated teaching, when well experienced[7]. However, it becomes necessary to consider the students' access conditions to technological resources as a determinant for the viability of this format[24]. Thus, the incorporation of ICTs into face-to-face teaching emerges as a coherent alternative.

The mobile learning methodology (*m-learning*), which resorts to mobile devices, is a recent methodology that generates antagonistic reactions in the academic community. Although it allows several use modalities, this pedagogical resource requires mastery and involvement of both teachers and students for its successful implementation. This study found several favorable arguments for its use in the literature, both for learning retention by the students[4] and to improve their satisfaction with the learning process[16]. The discussions and paths taken during the development of *"Cola na Profe!"* converged with these scientific findings. Based on the researchers' experiences, both as teachers and as students, similar challenges to those described in the literature were identified. Thus, the possible solutions developed in the process approached those identified in the literature.

In this context, the tool called *"Cola na Profe!"* allows teachers to use an *m-learning* technology that, associated with the usual resources of their teaching process, exerts impacts on knowledge production. It is a didactic resource centered on the students and which has its benefits described in the recent scientific literature[10]. Given this, it is indispensable that there is expansion, encouragement and familiarization of its use by teachers so that the tool achieves its intended objectives.

The limitations of this study emerge from the lack of financial resources, which required the authors to empirically and creatively search for knowledge in areas related to Information Technology and to Design, making it necessary to search for open access software, thus limiting some of the tool's customization resources.

CONCLUSION

The incorporation of technologies in the education field is a reality. Within the scope of Nursing courses, this reality was driven by the Covid-19 pandemic, which imposed the need to adapt to the digital world on both teachers and students. This need for change has become irreversible, when,

although face-to-face meetings are possible, the behavioral influence caused by intense digital interaction is found in the classrooms.

For this reason, this study has developed a solution through an applied research of technological production, combining the need for constant interaction with smartphones to face-to-face meetings in the classroom, in order to make it appealing and connected. "*Cola na Profe!*" proposes using an educational technology that aims at keeping the students' attention in the classroom through the use of smartphones.

This educational technology consists of a didactic resource that explores and expands Nursing students' scientific knowledge, creativity and interactivity. This resource was developed by female PhD students in Nursing and tested as a pedagogical solution of the Technologies and Management in Education and Work in Health and Nursing and Writing of Scientific Articles academic disciplines of the Graduate Program in Nursing (PEN/UFSC). As it uses open access software programs, this tool can be replicated in different teaching environments.

Using technological resources such as "*Cola na Profe!"* makes it possible to link the virtual world to the real world. In addition to offering a resource targeted at creative knowledge construction, centered on the students' protagonism, this study aims at contributing to discussions about the incorporation of digital technologies to classrooms, as their results suggest a positive potential from using DICTs in face-to-face teaching environments. However, the need to develop more robust studies on the topic in Brazil stands out.

REFERENCES

1. Brasil, Ministério da Economia, Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios Contínua. Notas Técnicas [Internet]. Rio de Janeiro, RJ(BR): IBGE; 2021 [cited 2023 Feb 11]. 118 p. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv101733_notas_tecnicas.pdf
2. Hootsuite. DIGITAL 2022. Global overveiw report [Internet]. Digital 2022 Global Overview Report; 2022 [cited 2023 Feb 11]. 300 p. Available from: https://hootsuite.widen.net/s/gqprmtzq6g/digital-2022-global-overview-report
3. Aravena CA, Delazari LS. Development of an app for indoor navigation assistance. Rev Bras Cartogr [Internet]. 2021 [cited 2023 Feb 11];73(2):530-41. Available from: https://doi.org/10.14393/revbrascartogr
4. Newton RH. Digital Innovation: Transition to practice using apple clips to teach nursing leadership. Digit Innov Transit to Pract Using Apple Clips to Teach Nurs Leadership [Internet]. 2020 [cited 2022 Oct 31];59(5):283-6. Available from: https://doi.org/10.3928/01484834-20200422-09
5. Delors J, Al-Mufti I, Amagi I, Carneiro R, Chung F, Geremek B, et al. Educação: um tesouro a descobrir [Internet]. Relatório para a UNESCO da Comissão Internacional sobre Educação para o Séc. XXI. São Paulo, SP(BR): Cortez Editora; 1998 [cited 2023 Feb 12]. 288 p. Available from: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Educação:+um+tesouro+a+descobrir.+Relatório+para+a+UNESCO+da+Comissão+Internacional+sobre+Educação+para+o+século+XXI#0
6. Silva JF da, Martins TC, Alves EJ, Garcia LG, Nascimento LR do, Martins JL. A epistemologia da complexidade, docência e discência na era da indústria 4.0. In: Garcia LG, editor. Possibilidades de aprendizagem e mediações do ensino com o uso das tecnologias digitais: desafios contemporâneos. Palmas, TO(BR): EDUFT; 2021. p. 170-207.
7. Kim JY, Kim M-E. Can online learning be a reliable alternative to nursing students' learning during a pandemic? A systematic review and meta-analysis. Nurse Educ Today [Internet]. 2023 [cited 2023 Feb 12];122:105710. Available from: https://doi.org/10.1016/j.nedt.2023.105710

8. Yalcinkaya T, Yucel SC. Determination of nursing students' attitudes toward and readiness for mobile learning: A cross-sectional study. Nurse Educ Today [Internet]. 2023 [cited 2023 Feb 12];120:105652. Available from: https://doi.org/10.1016/j.nedt.2022.105652

9. Oliveira RM de, Corrêa Y, Trindade SD. Avaliação formativa em contexto digital com tecnologias digitais interativas. Estud Avaliação Educ [Internet]. 2022 [cited 2023 Feb 11];33:e08329. Available from: https://doi.org/10.18222/eae.v33.8329%0AAVALIAÇÃO

10. Ibragimov AG, Gimaliev VG, Khrisanova EG, Aleksandrova NS, Omarova LB, Bakiev AG. Assessing the effectiveness of smartphones in education: A meta-analysis of recent studies. Online J Commun Media Technol [Internet]. 2023 [cited 2023 Feb 12];13(2):e202310. Available from: https://doi.org/10.30935/ojcmt/12877

11. Lobo LM das GA, Évora YDM, Santos AMR dos, Gouveia MT de O, Andrade EMLR. Factors associated with smartphone addiction risk in nursing students. Texto Context Enferm [Internet]. 2022 [cited 2023 Feb 12];31:e20210045. Available from: https://doi.org/10.21203/rs.2.12654/v1

12. Sarma GP, Levey A, Faundez V. The physician-scientist, 75 years after Vannevar Bush–rethinking the 'bench' and 'bedside' dichotomy. Nat Med [Internet]. 2020 [cited 2023 Feb 10];26(4):461-2. Available from: https://doi.org/10.1038/s41591-020-0828-1

13. Stein M, Costa R, Gelbcke FL. Nursing and design in the creation of health products: Aproaching areas and solving problems. Texto Context Enferm [Internet]. 2023 [cited 2023 Jan 5];32:e20220160. Available from: https://doi.org/10.1590/1980-265X-TCE-2022-0160en

14. Choi M, Park JH, Lee HS. Nursing students' satisfaction with mobile academic electronic medical records for undergraduate clinical practicum. Stud Heal Technol Inf [Internet]. 2016 [cited 2022 Oct 31];225:1005-6. Available from: https://doi.10.3233/978-1-61499-658-3-1005

15. Chuang Y-H, Lai F-C, Chang C-C, Wan H-T. Effects of a skill demonstration video delivered by smartphone on facilitating nursing students' skill competencies and self-confidence: A randomized controlled trial study. Nurse Educ Today [Internet]. 2018 [cited 2022 Oct 10];66:63-8. Available from: https://doi.org/10.1016/j.nedt.2018.03.027

16. Coelho MMF, Miranda KCL, Melo RCO, Gomes LFS, Monteiro ARM, Moreira TMM. Use of a therapeutic communication application in the nursing undergraduate program: Randomized clinical trial. Rev Lat Am Enfermagem [Internet]. 2021 [cited 2022 Jun 28];29:e3456. Available from: https://doi.org/10.1590/1518-8345.4461.3456

17. Hu H, Lai X, Li H, Nyland J. Teaching disaster evacuation management education to nursing students using virtual reality mobile game-based learning. Comput Inf Nurs [Internet]. 2022 [cited 2022 Oct 31];40(10):705-10. Available from: https://doi.org/10.1097/CIN.0000000000000856

18. Kang SR, Shin H, Lee J, Kim SJ. Effects of smartphone application education combined with hands-on practice in breast self-examination on junior nursing students in South Korea. Jpn J Nurs Sci [Internet]. 2020 [cited 2022 Oct 31];17(3):e12318. Available from: https://dx.doi.org/10.1111/jjns.12318

19. Kim H, Suh E. The effects of an interactive nursing skills mobile application on nursing students' knowledge, self-efficacy, and skills performance: A randomized controlled trial. Asian Nurs Res (Korean Soc Nurs Sci) [Internet]. 2018 [cited 2022 Oct 31];12(1):17-25. Available from: https://doi.org/10.1016/j.anr.2018.01.001

20. Kurt Y, Öztürk H. The effect of mobile augmented reality application developed for injections on the knowledge and skill levels of nursing students: An experimental controlled study. Nurse Educ Today [Internet]. 2021 [cited 2022 Oct 31];103:104955. Available from: https://doi.org/10.1016/j.nedt.2021.104955

21. Sese C. O que é Padlet? [Internet]. 2022 [cited 2023 Feb 12]. Available from: https://padlet.help/l/en/about-padlet/what-is-padlet

22. Moodle Corporation. Sobre o Moodle [Internet]. 2023 [cited 2023 Feb 12]. Available from: https://docs.moodle.org/all/pt_br/Sobre_o_Moodle

23. Canva. Sobre o Canva [Internet]. 2023 [cited 2023 Feb 12]. Available from: https://www.canva.com/pt_br/about/

24. Organização Pan-Americana de Saúde. Importância estratégica do investimento nacional em profissionais de enfermagem na Região das Américas [Internet]. Organização Pan-Americana de Saúde; 2022 [cited 2023 Feb 10]. 42 p. Available from: https://iris.paho.org/handle/10665.2/56063

25. Einloft FMS, Dornfeld D, Soster CB, Ferreira MDR. Processo educativo na saúde: como tornar "vivo" o ensino nos ambientes virtuais de aprendizagem, em um momento de pandemia? Holos [Internet]. 2020 [cited 2023 Feb 11];5(36):e10540. Available from: https://doi.org/10.15628/holos.2020.10540

26. Demo P. Universidade: questionar para defender. Adm Ensino & Pesqui [Internet]. 2022 [cited 2022 Jun 9];23(1):173-208. Available from: https://doi.org/10.13058/raep.2022.v23n1.2223

27. Lee SM, Trimi S. Convergence innovation in the digital age and in the COVID-19 pandemic crisis. J Bus Res [Internet]. 2021 [cited 2023 Feb 12];123:14-22. Available from: https://doi.org/10.1016/j.jbusres.2020.09.041

28. Silva FTM, Augusto KL. Use of technology in health education – Perspectives and applicability. Rev Eletrônica Comun Inf Inov Saúde [Internet]. 2022 [cited 2023 Feb 12];16(2):473-87. Available from: https://doi.org/10.29397/reciis.v16i2.2439

29. Ojo E, Lorenzini E. Global higher education beyond pandemics in a future of uncertainties. Texto Contexto Enferm [Internet]. 2021 [cited 2022 Jun 15];30:e20210101. Available from: https://doi.org/10.1590/1980-265X-TCE-2021-0101 1/4

30. Seo B, Hwang Y, Cho H. Mental health and personality characteristics of university students at risk of smartphone overdependence. Int J Environ Res Public Heal [Internet]. 2023 [cited 2023 Feb 12];20(3):2331. Available from: https://doi.org/10.3390/ijerph20032331

NOTES

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