

Experience report

Integration of digital educational technologies in a website on home care for newborns: experience report

Integração de tecnologias educativas digitais em *website* sobre cuidados domiciliares com recém-nascidos: relato de experiência

Integración de tecnologías educativas digitales em un sitio web sobre atención domiciliar al recién nacido: relato de experiencia

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Abstract

Objective: to describe the experience in the development and integration of digital educational technologies in health on a website focused on home care for newborns. **Method:** experience report systematized in five stages (starting point, initial questions, recovery of the lived process, background reflection and arrival points), from 2020 to 2024. It focused on the development of digital educational technologies in a technological and social research and development project linked to university outreach activities. **Results:** the development of digital technologies involved the construction, validation and evaluation of two animated videos, two mobile applications, a booklet, twenty-two podcasts and a website that integrated the 28 technologies produced. **Conclusion:** the experience was innovative, promising and relevant. The multifaceted and integrative approach reflects a diversity of strategies to meet the educational needs of families, demonstrating to be effective in disseminating information.

Descriptors: Infant, Newborn; Technology; Digital Health; Home Care Services; Health Education

Resumo

Objetivo: descrever a experiência no desenvolvimento e integração de tecnologias educativas digitais em saúde em um *website* voltado para os cuidados domiciliares com recém-nascidos. **Método:** relato de experiência sistematizado em cinco tempos (ponto de partida, perguntas iniciais, recuperação do processo vivido, reflexão de fundo e pontos de chegada), no período de 2020 a 2024. Concentrou-se no desenvolvimento de tecnologias educativas digitais em um projeto de pesquisa e desenvolvimento tecnológico e social vinculado à extensão universitária. **Resultados:** o desenvolvimento das tecnologias digitais envolveu a construção, validação e avaliação de dois vídeos animados, dois aplicativos móveis, uma cartilha, vinte e dois *podcasts* e

um *website* que integrou as 28 tecnologias produzidas. **Conclusão:** a experiência foi inovadora, promissora e relevante. A abordagem multifacetada e integradora reflete uma diversidade de estratégias para atender às necessidades educativas das famílias, demonstrando ser efetiva na disseminação de informações.

Descritores: Recém-Nascido; Tecnologia; Saúde Digital; Serviços de Assistência Domiciliar; Educação em Saúde

Resumen

Objetivo: describir la experiencia en el desarrollo e integración de tecnologías digitales educativas en salud en un sitio web enfocado a la atención domiciliar del recién nacido.

Método: relato de experiencia sistematizado en cinco etapas (punto de partida, preguntas iniciales, recuperación del proceso vivido, reflexión de antecedentes y puntos de llegada), en el periodo 2020 a 2024. Enfocado al desarrollo de tecnologías educativas digitales en un proyecto de desarrollo tecnológico e investigación y desarrollo social vinculado a la extensión universitaria.

Resultados: el desarrollo de tecnologías digitales implicó la construcción, validación y evaluación de dos videos animados, dos aplicaciones móviles, un folleto, veintidós podcasts y un sitio web que integró las 28 tecnologías producidas. **Conclusión:** la experiencia fue innovadora, prometedora y relevante. El enfoque multifacético e integrador refleja una diversidad de estrategias para satisfacer las necesidades educativas de las familias, demostrando ser eficaz en la difusión de información.

Descriptores: Recién Nacido; Tecnología; Salud Digital; Servicios de Atención de Salud a Domicilio; Educación en Salud

Introduction

The United Nations General Assembly, at its 2015 meeting, established the 17 Sustainable Development Goals (SDGs), with the commitment to achieve them by 2030, continuing the proposals outlined by the Millennium Development Goals (MDGs) 15 years earlier. These objectives mainly aim to ensure healthy lives and promote well-being for all, highlighting, among their goals, the direct or indirect relevance to neonatal health. The third SDG, for example, aims to eliminate preventable newborn deaths and reduce neonatal mortality to at least 12 in every 1,000 live births in all countries.¹

Infant mortality is categorized into neonatal and post-neonatal, and the first (zero to 27 days of life) is the main component of infant mortality. Globally, it is estimated that 45% of deaths of children under five years of age occur in the neonatal phase, resulting in an annual loss of 2.6 million lives.² Deaths occurring during the early neonatal period (zero to six days of life) are the most recorded, especially in the first 24 hours. Preventable causes are often associated with neonatal deaths, many of them related to failures in pre, intra and postpartum care.³⁻⁴

To mitigate preventable deaths in newborns, simple interventions such as exclusive breastfeeding, proper hygiene (including umbilical stump care), and maintaining proper temperature are essential. However, inadequate care can result in harm to the health of the newborn, affecting its survival. In addition, the traditional knowledge of families is not always aligned with the best scientific evidence, highlighting the need for effective communication between family members and health professionals to ensure safe postnatal care.⁵

Health technologies, derived from scientific knowledge, are developed to solve health-related problems.⁶ Thus, health education, through digital educational technologies, in person or at a distance, such as apps, videos, websites and games,⁷ emerges as a valuable support for health teams, particularly nurses, who, through guidance, encourage the participation of families in care and health promotion.⁸

To clarify doubts about home care practices with the newborn, innovative digital solutions can be developed within the scope of educational health technologies in neonatal nursing. The integration of these solutions aims to provide access to adequate care in different contexts, in line with the principles of Digital Health. These tools, based on daily practices, contribute to the systematization of knowledge to be applied in a practical way, facilitating the promotion of humanized care and strengthening health education.⁹

The internet, as a remarkable tool, offers access to a complete database anytime and anywhere, allowing for easy and fast querying of information. The rapid dissemination of the use of mobile devices, especially smartphones, favors the role of nurses as health educators, as health technologies enable the construction of knowledge, active participation and support for families, promoting the autonomy of individuals.¹⁰ Therefore, health education should value the social participation of individuals as builders of their own learning, including in the digital environment, allowing improvements in their quality of life.¹¹

The construction and integration of digital educational technologies for home care with the newborn have the potential to be incorporated into the Unified Health System (SUS). These tools can be used by managers, health professionals and families, providing qualified and updated information, in line with the objectives and attributions of SUS in the scientific and technological development of the country. Thus, given the limited research

approach in the sphere of neonatal nursing on the possibilities of integrating these technologies, it is urgent to expand the scope of studies that not only serve as a reference, but also stimulate the development of new technologies and the use of existing ones, by professionals in the area, which justifies this experience report. Thus, the objective is to describe the experience in the development and integration of digital educational technologies in health in a website focused on home care with newborns.

Method

Systematized experience report,¹² referring to the years 2020 to 2024. The study focused on the development and integration of digital educational technologies aimed at home care for newborns, inserted in a technological and social research and development project linked to university outreach activities at Fluminense Federal University.

The outreach group, aimed at pregnant women, postpartum women and their families, was composed of a coordinating teacher, a collaborator and other partner teachers of the child health research group. The group included 16 students, 14 from the undergraduate nursing course and two master's students. The reported digital educational technologies were produced by different authors of this research group, under the guidance of the project coordinator, one of the authors of this report.

The act of systematizing implies the understanding of concrete practical experiences, encompassing dynamic and complex social processes, in order to extract learning and share information. The process is outlined in five stages: starting point, initial questions, recovery of the lived process, background reflection and arrival points. The first half is characterized by the participation of the members and the recording of the experience; the second involves considerations about the purpose of systematization, the experience to be systematized and the central aspects to be highlighted; the third consists of the ordered and classified reconstruction of history; the fourth covers the analysis, synthesis and critical interpretation of the experience process; and the fifth half refers to the elaboration of conclusions and communication of learning resulting from experience.¹²

As this is an experience report, it was not necessary to send the project to an Ethics Committee, in accordance with Resolution 510, of 07/04/2016 of the National

Health Council. In any case, ethical issues were fully respected, ensuring the confidentiality of personal information and the anonymity of social media users.

Results

The starting point (first time) of this report concerns the set of investigations on the development of educational technologies in health of a research group, linked to technological development and university outreach activities, related to child health at the Fluminense Federal University, in a countryside campus located in the coastal lowlands of the state of Rio de Janeiro. In this context, members of the project identified the importance of developing, validating and evaluating digital educational technologies, especially those aimed at home care for newborns.

The central objective of this project was to contribute to the continuous production of scientific and technological knowledge in this specific area. To achieve this purpose, in addition to the development of new technologies, the team also sought to carry out a comprehensive validation and evaluation process, thus ensuring the quality and effectiveness of these educational tools.

A crucial aspect of this initiative was the wide availability of the products developed, allowing this knowledge to be accessible and beneficial to a diverse audience, including health professionals, students, families and other interested parties. Thus, we sought not only to generate innovations, but also to effectively disseminate these contributions to the academic community and society in general.

For this, six stages were followed throughout the experience: 1) Mapping of the best scientific evidence that supported the processes of elaboration, validation and evaluation of educational technologies in health; 2) Development of specific digital educational technologies on home care with newborns; 3) Validation of content, appearance and semantics of the technologies produced involving experts and the target audience; 4) Evaluation of the usability of digital educational technologies validated with the participation of experts and the target audience; 5) Formal registration of digital educational technologies on home care with newborns; 6) Integration and availability of digital educational technologies produced, validated, evaluated and registered on home care with newborns, in video, booklet, application and podcast format, on an educational website.

As for the initial questions (second moment), the intention to systematize the path taken by the project occurred due to the need to expose the innovative experience in the scientific sphere, since the production, validation and evaluation of digital educational technologies enables the instrumentalization of families throughout the pregnancy-puerperal process, since the technologies are combined with health promotion and disease prevention. Thus, the objective was to describe the trajectory of the project so that professionals and students know the different stages of this process. In addition, we sought to encourage the incorporation of these products into the daily lives of these professionals, serving as inspiration for the development of new technologies in the health area, in addition to the use of existing ones.

Thus, on the recovery of the lived process (third moment), to date, 28 digital educational technologies have been produced, namely: two animated videos, two mobile applications, a booklet, twenty-two podcasts and a website, designed between 2020 and 2024.

In 2020, a cartoon educational video entitled "How to bathe the newborn at home" was developed for family caregivers of newborns, with duration of six minutes and 23 seconds. The video addresses the theme of home bathing of full-term newborns, presenting all the steps to perform the bath safely and with quality. In addition, guidance is offered on the organization of the environment, the materials to be used and the necessary care for the umbilical stump after bathing.

After its development, the video was validated by experts in the areas of nursing and social communication. In the global evaluation, it obtained a Concordance Index (CI) of 0.99 (99%). Despite the satisfaction with the validation and the reach of CI greater than 80% in the evaluated questions, suggestions were considered and incorporated in the adaptation of the scenes, when possible, in order to ensure a greater qualification of the educational video. Regarding the evaluation by the target audience, with parents and caregivers of newborns, the mean CI of all questions also exceeded 0.8 (80%), indicating a satisfactory evaluation, with an overall mean value of 0.99 (99%), without the need for changes.

The evaluation of the effectiveness of the video in knowledge by the target audience, with puerperal women and family caregivers of newborns was also developed through three stages (pre-test, intervention and post-test) in another study with a quasi-experimental design. The technology proved to be effective in increasing knowledge

about home bathing of full-term newborns. After this process, the video had its rights reserved by the Register of Works number 211581636. Thus, it can be used as a digital educational technology with families.

Also in 2020, an application for mobile devices was developed, aimed at pregnant women, postpartum women and family caregivers of newborns and infants, entitled "Uncomplicating Breastfeeding". This innovative educational technology aims to provide a more accessible and didactic understanding of breastfeeding, aiming to give autonomy to family caregivers regarding this theme. The application includes a homonymous educational booklet with several guidelines and a quiz composed of 15 questions, addressing the main doubts about breastfeeding.

This application was validated with expert nurses and evaluated by the target audience (pregnant women, postpartum women and family members of newborns). Significant global mean CIs were reached, these being 0.96 (96%) with the experts and 0.99 (99%) with the target audience. In addition, the target audience attributed a score of 93 to the evaluation of the application's usability. It is noteworthy that the educational material was adjusted according to the recommendations of the experts, through modifications in items considered inconsistent and improvements through enhancing of information, terminology, images, layout and fonts.

Due to its versatility, this technology can be applied as a digital educational tool for pregnant women, postpartum women and family members, contributing to the health educational process. In a master's thesis, the use of "Uncomplicating Breastfeeding" in the construction of knowledge of family members of premature newborns was evaluated. After the intervention with the application, there was a 28.9% increase in the total number of correct answers, showing the effectiveness of the technology in preparing for discharge from the neonatal unit. The application has a computer registration certificate granted by the National Institute of Industrial Property (INPI), under number BR512021001467-7.

Sequentially, in 2021, the animated educational video "Encouraging breastfeeding with family members" was developed, aimed at pregnant women, postpartum women and family caregivers of newborns, lasting seven minutes and 38 seconds. This video aims to serve as a tool to stimulate breastfeeding in families, addressing in an innovative

and creative way several issues related to breastfeeding, such as the benefits, the correct picking technique and the importance of the involvement of the father and people who support the woman in this process.

This video was validated by experts (nurses, nutritionists, physicians and other health professionals), including its evaluation by family caregivers, using the global CI, which was 0.97 (97%) and 1.00 (100%), respectively. All items evaluated reached indices equal to or greater than 0.95 (95%). Despite the satisfactory evaluation, several contributions were suggested by the experts in order to make the material even more complete and efficient to be made available to the target audience. After the evaluation by the target audience (pregnant women, postpartum women and family members), there were no adjustments in view of the excellent evaluation.

This digital educational technology has the potential to be incorporated into the clinical practice of health professionals, including nurses, at different levels of health care, with the purpose of guiding and encouraging families regarding the practice of breastfeeding. The video had its rights reserved by the Register of Works number 211581639. The evaluation of its effectiveness with the target audience is in progress in an undergraduate course completion work.

From 2021 to 2024, multiple podcasts were designed and made available on Spotify, directly or indirectly addressing topics related to newborns and intended for family members in a research and technological project called "COVID-19 UFF Project". Topics cover a variety of matters, such as the use of masks and 70% concentration alcohol in childhood, stimulation of the newborn, vaccination against COVID-19, breastfeeding, child violence, immune system and feeding in times of COVID-19, visit to the newborn, autism and heart diseases in children, among other topics.

All episodes are available on Spotify and it is evident that this platform enabled the sharing of information based on reliable scientific evidence during the pandemic. In this way, family members have the ability to listen to podcasts while performing their daily activities, thus proving to be an innovative and promising health educational tool.

This growing relevance has resulted in the need to understand the use of the podcast from the target audience perspective, which includes parents, guardians, family members, professionals and/or health students. To meet this demand, a subproject was

conducted in order to evaluate this educational technology, revealing its usefulness and accessibility. The study, of a descriptive and exploratory nature, with a qualitative approach, involved the participation of 41 listeners. This technology proved to be enlightening, practical, accessible and attractive, exploring important themes in the expansion of listeners' knowledge. Its nature in audio format simplified the apprehension of the content, allowing integration into everyday activities.

In 2022, the development of the mobile application "Nasci Bem" began, aimed at health professionals in the delivery room, pregnant women and family members of newborns at usual risk. The application integrates care practices for the newborn, categorized as "recommended", "recommended with discretion" and "not recommended", consolidating this information in a single platform. Its purpose is to equip and empower the target audience, facilitating decision making through innovative and accessible technology.

The application presents different tabs in an interactive and dynamic way, addressing content related to the theme to expand the audience's knowledge in a practical way. The tabs are segmented for health professionals and family members, adopting technical language in the first and accessible in the second. Both include specific booklets and an interactive quiz, offering similar content targeted to each audience, covering topics such as good practices, identification of good vitality, immediate actions after delivery, practices to be postponed, vitamin K administration, prevention of neonatal ophthalmia and simple care to prevent preventable deaths.

In the validation, the application obtained an overall CI of 0.97 (97%) with the experts and 0.99 (99%) in the evaluation with the target audience (health professionals of maternity and pregnant women, puerperal women and family members of newborns). Usability in the first version presented an overall CI of 0.92 (92%) and a Usability Score of 93. In the second version, the overall CI was 0.93 (93%), with a score of 94, indicating an improvement in usability since the first version. Despite the satisfactory evaluation, adjustments suggested by the experts were incorporated to optimize the application, considering feasibility aspects.

The app represents an essential tool for healthcare professionals, empowering them in humanized care practices for the usual-risk newborn. In addition, it provides support to family members, promoting the construction of knowledge about the best practices of baby care from the prenatal period, making learning practical and accessible.

This application is available for free download on the Android system, via Google Play Store, with the evaluation of its effectiveness foreseen in a scientific initiation project with scholarship. The application has a computer registration certificate granted by INPI, under number BR512024 000739-3.

Also in 2022, the educational booklet entitled "Home Care with the Newborn" was designed for pregnant women, postpartum women and family caregivers of newborns. The purpose of this material is to provide a reliable and quality source for consultation and clarification of doubts to the target audience. The booklet addresses several topics, including the discharge process from maternity, the arrival of the baby at home, visits, sleep, bathing, umbilical stump care, diaper change, skin care, breastfeeding, choking, transportation, vaccines, general danger signs and monitoring in health services.

The content of the booklet, which has a virtual and printed version, was based on reference bodies, such as the Ministry of Health and the Brazilian Society of Pediatrics, in addition to benefiting from information from scientific articles and materials relevant to the subject. A comparative study is underway between the two versions of the booklet, in order to evaluate the effectiveness of each one in the knowledge of family caregivers through a scientific initiation project with scholarship. After this phase, its Work Registration will be carried out.

Finally, in 2023, there was a desire to integrate these digital educational technologies produced, validated and/or evaluated related to home care for newborns, allocating them in a didactic way on a health educational website. This project aimed to provide tools to pregnant women, puerperal women and their families, in an expanded way, on home care with the newborn, meeting the learning demands and contributing to the best practices to prevent diseases and reduce child morbidity and mortality.

The idealization of the integration of technologies in a single digital location emerged from the need to offer a centralized and accessible platform for users, facilitating access to a variety of resources in an organized manner. In addition, this integration extends the audience's reach, meeting the diverse preferences and needs of users, which can range from watching videos, listening to podcasts and/or interacting with applications.








The health educational website represents an effective tool for communication, propagation of scientific information and a fast means to inform, share and exchange experiences. In the development of this study, the *Analyze, Design, Develop, Implement and Evaluate* (ADDIE) model was used, a guide composed of five stages: Analysis, Design, Development, Implementation and Evaluation.

The website page was created using the Wix platform, a simplified website creation, customization and administration tool. This platform allowed the choice of a customizable template, making it easy to modify elements intuitively. The pages were developed with Hyper Text Transfer Protocol Secure (HTTPS) security protocol and optimized for viewing on mobile devices. The tabs were allocated desiring to offer quality navigation to users, containing the items: Home Page; Educational booklets; Educational videos; Apps and Podcasts; Virtual Library; Frequently Asked Questions; About Us; and Contact Us. The website has an interactive Chat for clarification of doubts, search box for search, help tutorial to facilitate navigation, Security and Privacy Policy in full, evaluation/feedback tool, among other accessibility features.

The validation of the website, conducted with experts (nurses and professionals in the area of social communication or informatics with experience in websites), showed a CI greater than 0.7 (70%) in all questions, reaching an overall mean value of 0.91 (91%). In the evaluation with the target audience, pregnant women, postpartum women and family members of the newborns, all items received a maximum score, resulting in an overall mean value of 1 (100%). The evaluation of its effectiveness with the target audience will still be carried out.

It should be noted that the technologies are available on different platforms, as summarized in Table 1, and the link to the website that integrates all the technologies of the project is www.dopartoaodomicilio.com.br. This initiative aims to provide practicality and accessibility to the teaching-learning process of families with regard to home postnatal care with newborns. The website has a computer registration certificate granted by INPI, under number BR512023004232-3.

Table 1 – Digital educational technologies integrated into the website aimed at home care for newborns. Rio das Ostras, RJ, Brazil

Website - From Delivery to Home		
		
Digital educational technologies integrated into the website		
<p>Video - How to bathe a newborn at home</p> 	<p>Application - Making breastfeeding easier</p> 	<p>Video - Encouraging breastfeeding among family members</p> 
<p>Application - Born Well</p> 	<p>Podcasts – Covid-19 UFF Project</p> 	<p>Booklet - Home care for the newborn</p> 

Regarding the background reflection (fourth moment), it is noteworthy that knowledge and conduct must be based on the best scientific evidence, whose data come from reliable sources. Therefore, in order to provide reliable and easy-to-understand guidelines and accessibility for the public and aiming at reducing inadequate care for the newborns and neonatal morbidity and mortality, the development of different digital educational technologies based on the best scientific evidence on the subject was considered.

However, in the process of developing these technologies, it is necessary to be concerned with the accessibility of the information made available. Thus, the need for knowledge translation arose, as scientific texts have an elaborate language, not always easy to understand for the lay public, which required the team to take care that the

content was in a simple and clear language. In addition, the team was concerned with representing the diversity of the Brazilian population in the products.

Each stage takes time, resources and specific personnel, generating a long and arduous work to be done. Among the technologies, most of them needed specialized professionals to perform various functions, such as the elaboration of animations and images, for example, which led the group to adapt the project's ideas to the financial resources available. In addition, not all technologies had financial support, or even some extrapolated the budget offered, requiring researchers to bear the costs individually.

As for the arrival points, the educational video "How to bathe the newborn at home" was posted on the YouTube platform, on the "From Delivery to Home" channel in December 2020 and by February 2024 had 426 views and 30 likes. The educational video "Encouraging breastfeeding with family members" was posted on the same platform/channel in August 2021 and until February 2024 had 317 views and 27 likes.

With regard to the "Uncomplicating Breastfeeding" app, until February 2024, 435 users downloaded this technology. In addition, it was rated by 35 people, all of whom gave the app five stars. It also got 24 comments, all of which were positive. With regard to the "Nascido bem" app, since it was recently launched on the Play Store, it is not yet possible to measure the statistics.

By February 2024, the project's podcasts had reached an audience of 568 impressions, indicating the number of playbacks of the episodes. The most popular themes were child violence in a pandemic scenario, the use of 70% alcohol, autism and COVID, in addition to the use of screens and masks in childhood. The global distribution of listeners revealed a majority presence in Brazil, corresponding to 87% of the audience, followed by the United States (9%), Portugal (2%), among others.

About the booklet, until February 2024, 200 copies were distributed to pregnant women, puerperal women and their families. However, the data on the virtual modality of this educational booklet could not yet be accounted for. As for the metrics attributed to the website, in 2023, it had 378 views to posts and 57 unique visitors. Among the posts, 'The maternity discharge process' stood out as the most accessed, followed by 'The arrival of the baby at home' and 'The baby's bath'. The month of May was identified as the period of greatest access to the website's content.

Discussion

Infant mortality is considered a crucial indicator for child health, reflecting the quality of care provided and signaling possible gaps in health care.¹³ In this scenario, digital educational technologies play an essential role in the dissemination of safe, evidence-based care to families. Outreach actions play a key role in bridging the gap between academic knowledge and the community, promoting child development and contributing to the translation of scientific knowledge.¹⁴ Therefore, the production, validation and evaluation of digital educational technologies and their integration into a single site enriches health practices related to childhood among the population, representing an effective strategy to offer a more comprehensive and accessible educational experience.

Regarding the digital educational technologies produced by the project, they obtained satisfactory evaluations.^{10,15-18} The use of videos, for example, emerges as a promising, relevant and increasingly adopted instructional strategy, with the potential to improve the quality of teaching and provide relevant information to families. This perception is supported by a study conducted in Japan, which concluded that educational videos were effective in increasing knowledge, regardless of the demographics of babies, parents, and the postnatal situation.¹⁹

The world is immersed in a technological scenario, demanding the production of materials aligned with global needs and that provide quality information to the population. Educational materials play a key role in health education. Educational tools developed for smartphones or other mobile devices allow access regardless of location and time.²⁰ Smartphones have revolutionized the way people live, learn, work, communicate, and play,²¹ and this interaction is more accessible through specific websites that provide quick and convenient access to a variety of educational resources.

In the health field, mobile applications and web-apps can be used to support decision-making, clinical monitoring and decision making, regardless of time and place, by patients, family members and health professionals.²² Due to the ease and usability of the applications, it is important to use them as a means of disseminating knowledge. In this directive, the “Uncomplicating Breastfeeding” application has been useful, standing

out for its positive reviews and comments, which are also expected from the “Nasci Bem” application, both integrated into the website.

The podcast, due to the flexibility in its means of reproduction and sharing, stands out as an innovative technology that can be used according to the convenience of the individual and sharing information without geographical barriers.²³ During the COVID-19 pandemic, the podcast played a crucial role due to the need for social distance, the fight against fake news and the dissemination of secure information. Its integration to the site offers an even more complete experience to users, allowing easy and convenient access to listen to episodes.

The booklets, in printed and digital versions, are among the technological and technical resources that can be used to favor the educational process in health education.²⁴ The project developed a booklet in both modalities, however, a new study is being carried out to compare which version, printed or digital, is more effective, providing a metric to intensify dissemination based on its usability. Regardless of the results of this study, the availability of the digital booklet on an educational website proves to be a necessary strategy. The digital version allows easy access to content by a wide audience, eliminating the physical and geographical restrictions inherent in the distribution of printed versions.

The choice of a website as a platform to make all educational technologies available was due to its ability to offer an interactive and content-rich experience. Websites are characterized by virtual pages with versatility of content, containing images, videos and texts,²⁵ which makes them ideal for presenting content in a dynamic and attractive way. The built website takes advantage of this flexibility, grouping several types of technologies and materials, such as applications, booklets, videos, among others, allowing the users to access several information simultaneously. In addition, all educational technologies gathered on the site were previously validated and evaluated, ensuring the quality and security of the information shared.

The synergy between different technologies on the same website creates a more complete educational environment, meeting the diverse needs and preferences of users. The interconnection of these resources also strengthens the effectiveness of teaching, allowing users to explore content in a comprehensive and engaging way, which enriches the educational experience. The creation of a website in the area of nursing has demonstrated

the feasibility of developing digital technologies that integrate care practice with teaching and research, but continuous evaluation of the content and usability of the website is essential to ensure that the target population is effectively reached.²⁵

This study has limitations considering that educational technologies were developed and evaluated in a specific context, aimed at home care for newborns. Therefore, generalization to other areas of health or populations may require adaptations. Another limit is the dependence on financial resources for the production and distribution of some technologies, which may restrict the accessibility and dissemination of these materials in certain contexts, especially in regions with restricted resources. Finally, it is important to recognize that the technological landscape is constantly evolving and users' preferences as well as educational design best practices may change over time. Future research and updates in the technologies developed are necessary to keep up with these changes.

Building, validating and evaluating digital educational technologies are challenging tasks, but of importance for the area of neonatal nursing, considering the technological scenario in which the world is immersed. This process meets contemporary demands and provides several benefits, both for those who develop the technologies and for those who use them, representing a two-way gain in advancing knowledge, promoting effective neonatal care and disseminating valuable information to society. Integration into a single site not only enhances accessibility, but strengthens the visibility and recognition of the project, consolidating it as a reliable source of information. The unified approach demonstrates an ongoing commitment to innovation and excellence in health promotion, providing a central point for learning and support on issues related to newborn health.

Conclusion

The experience in the development and integration of digital educational technologies in health focused on home care for newborns proved to be innovative, promising and relevant. The multifaceted and integrative approach, which aggregated videos, podcasts, apps, and playbook on a website, reflects a diversity of possible strategies to meet the educational needs of families. In addition, the integration of

scientific evidence with innovative approaches has proven to be an effective strategy in disseminating relevant information and promoting safe practices.

The consolidation of several digital educational technologies into a single site represents a breakthrough, facilitating centralized access and management. This approach not only simplifies the user experience, allowing access to a variety of resources in one place, but also optimizes management and continuous updating, ensuring relevance and alignment with best practices and scientific evidence, as well as space for future technologies.

The adaptation to the current technological scenario, with emphasis on accessibility through smartphones and mobile devices, highlights the project's ability to reach its target audience in a broad, flexible and inclusive way. This approach reflects an ongoing commitment to innovation and excellence in promoting child health, consolidating the project as a reliable and comprehensive source of educational health information.

References

1. Kumar S, Kumar N, Vivekadhish S. Millennium development goals (MDGs) to sustainable development goals (SDGs): addressing unfinished agenda and strengthening sustainable development and partnership. *Indian J Community Med.* 2016;41(1):1-4. doi: 10.4103/0970-0218.170955
2. Domingues RMSM, Dias MAB, Nakamura-Pereira M, Pacagnella RC, Lansky S, Gama SGN, et al. Perinatal mortality, severe maternal morbidity and maternal near miss: protocol of a study integrated with the Birth in Brazil II survey. *Cad Saúde Pública.* 2024;40(4):e00248222. doi: 10.1590/0102-311XPT248222
3. Bernardino FBS, Gonçalves TM, Pereira TID, Xavier JS, Freitas BHBM, Gaiva MAM, et al. Tendência da mortalidade neonatal no Brasil de 2007 a 2017. *Ciênc Saúde Colet.* 2022;27(2):567-78. doi: 10.1590/1413-81232022272.41192020
4. Lucena DBA, Guedes ATA, Cruz TMAV, Santos NCCB, Collet N, Reichert APS. Primeira semana saúde integral do recém-nascido: ações de enfermeiros da Estratégia Saúde da Família. *Rev Gaúcha Enferm.* 2018;39:e2017-0068:1-8. doi: 10.1590/1983-1447.2018.2017-0068
5. Góes FGB, Silva MA, Santos AST, Pontes BF, Lucchese I, Silva MT. Postnatal care of newborns in the family context: an integrative review. *Rev Bras Enferm.* 2020;73(Suppl 4):e20190454:1-10. doi: 10.1590/0034-7167-2019-0454
6. Silva NVN, Pontes CM, Sousa NFC, Vasconcelos MGL. Tecnologias em saúde e suas contribuições para a promoção do aleitamento materno: revisão integrativa da literatura. *Ciênc Saúde Colet.* 2019;24(2):589-602. doi: 10.1590/1413-81232018242.03022017

7. Amorim Júnior JS, Sousa ASJ, Jorge HMJ, Andrade EMLR. Contribuição das tecnologias educacionais digitais, concebidas para os pais, na promoção do aleitamento materno: revisão integrativa. *Texto Contexto Enferm.* 2023;32:e20230036:1-12. doi: 10.1590/1980-265X-TCE-2023-0036pt
8. Saldan GG, Figueiredo FSF, Misawa F, Rêgo AS, Salci MA, Radovanovic CAT. Construção de tecnologia educativa para cuidado domiciliar após acidente vascular encefálico: relato de experiência. *Rev Enferm UFPE On Line.* 2017;11(4):1784-93. doi: 10.5205/reuol.9763-85423-1-SM.1104201729
9. Santos BRF, Nascimento MHM, Teixeira E, Oliveira MFV, Miranda SVRS, Valois RC. Mobile application for first-time parents - newborn care: an experience report. *Rev Enferm UFSM.* 2023;13(e12):1-14. doi: 10.5902/2179769270394
10. Souza AN, Góes FGB, Mello NC, Silva LF, Silva ACSS, Barcellos TMT. Tecnologia educacional sobre aleitamento materno para dispositivos móveis. *Cogitare Enferm.* 2021;26:e78118. doi: 10.5380/ce.v26i0.78118
11. Góes FGB, Campos BL, Soares IAA, Lucchese I, Borges JO, Silva MA. Educação em saúde nas mídias sociais sobre cuidados domiciliares com recém-nascidos em tempos de covid-19. *Rev Enferm Cent-Oeste Min.* 2022;12:e4371. doi: 10.19175/recom.v12i0.4371
12. Holliday OJ. Para sistematizar experiências. 2ª ed. Brasília (DF): Ministério do Meio Ambiente; 2006.
13. Lautharte CAS, Pires WKFL, Pimenta PRS, Pantoja VJC, Costa GPV, Nascimento RO, et al. Estratégias de redução da mortalidade infantil no Brasil: revisão integrativa. *Contemporânea (São José dos Pinhais).* 2023;3(8):11100-16. doi: 10.56083/RCV3N8-063
14. Costa P, Palombo CNT, Silva LS, Silva MT, Mateus LVJ, Buchhorn SMM. Ações de extensão universitária para translação do conhecimento sobre desenvolvimento infantil em creches: relato de experiência. *Rev Esc Enferm USP.* 2019;53:e03484:1-8. doi: 10.1590/S1980-220X2018020603484
15. Campos BL, Góes FGB, Silva LF, Silva ACSS, Silva MA, Silva LJ. Elaboração e validação de vídeo educativo sobre o banho domiciliar do recém-nascido a termo. *Enferm Foco.* 2021;12(5):1033-9. doi: 10.21675/2357-707X.2021.v12.n5.4684
16. Dantas DC, Góes FGB, Santos AST, Silva ACSS, Silva MA, Silva LF. Produção e validação de vídeo educativo para o incentivo ao aleitamento materno. *Rev Gaúcha Enferm.* 2022;43:e20210247:1-14. doi: 10.1590/1983-1447.2022.20210247.pt
17. Góes FGB, Nunes NGF, Borges JO, Souza AN, Soares IAA, Lucchese I. Transmídia na enfermagem pediátrica para orientações aos familiares no enfrentamento da COVID-19: relato de experiência. *Rev Enferm UFSM.* 2023;13:e2:1-20. doi: 10.5902/2179769271376
18. Lucchese I, Góes FGB, Souza AN, Silva ACSS, Silva LF, Soares IAA. Avaliação do aplicativo móvel "Descomplicando a Amamentação" por familiares de recém-nascidos. *Rev Latinoam Enferm.* 2023;31:e4085. doi: 10.1590/1518-8345.6883.4085
19. Isumi A, Fujiwara T, Sampei M. Effectiveness of an educational video on infant crying for prevention of shaken baby syndrome among Japanese caregivers of infants. *Nihon Koshu Eisei Zasshi.* 2019;66(11):702-11. doi: 10.11236/jph.66.11_702. PMID: 31776312
20. Mello NC, Góes FGB, Pereira-Ávila FMV, Moraes JRMMM, Silva LF, Silva MA. Construção e validação de cartilha educativa para dispositivos móveis sobre aleitamento materno. *Texto Contexto Enferm.* 2020;29:e20180492:1-14. doi: 10.1590/1980-265X-TCE-2018-0492

21. Lee M, Bin Mahmood ABS, Lee ES, Smith HE, Tudor Car L. Smartphone and Mobile App Use Among Physicians in Clinical Practice: Scoping Review. *JMIR Mhealth Uhealth*. 2023;11:e44765. doi: 10.2196/44765
22. Mendes LA, Antunes CC, Alves TF, Manzo BF. Educational apps to support patient safety in hospitals: a technology perspective. *Online Braz J Nurs*. 2024;23:e20246671:1-11. doi: 10.17665/1676-4285.20246671
23. Leite PL, Torres FAF, Pereira LM, Bezerra AM, Machado LDS, Silva MRF. Construção e validação de podcast para educação em saúde sexual e reprodutiva de adolescentes. *Revista Latinoam Enferm*. 2022;30(N Esp):e3706:1-13. doi: 10.1590/1518-8345.6263.3706
24. Alves SAA, Silva KN, Machado MFAS, Cavalcante EGR, Albuquerque GA, Bezerra IMP, et al. Cartilha digital sobre práticas sustentáveis para a promoção da saúde do adolescente. *Ciênc Saúde Colet*. 2023;28(8):2215-26. doi: 10.1590/1413-81232023288.07222023
25. Picinato-pirola M, Ribeiro MGG, Magalhães RG, Seles TP, Corrêa CC. Tele-education about cleft lip and palate: development of an educational website about cleft lip and palate. *Audiol Commun Res*. 2021;26:e2419:1-10. doi: 10.1590/2317-6431-2020-2419

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