

## Elaboration of interprofessional self-instructional educational game about breastfeeding for students of the health area

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### Abstract

**Background:** The prevalence rates of exclusive and non-exclusive breastfeeding worldwide remain well below levels recommended as desirable by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). Unquestionably, this scenario results in negative consequences for women, children and communities. Since inadequate training of healthcare professionals to manage the difficulties faced by breastfeeding mothers has been highlighted as one of the factors linked to this issue, training strategies that include innovative inter-professional tools may help tackle this problem. Such tools should address the current generation of undergraduates in healthcare-related courses, a population group well adept in the use of digital technology. The primary aim of this study was to elaborate and validate an inter-professional, educational game on breastfeeding designed for students in healthcare-related fields, with a view towards improving breastfeeding rates in northeastern Brazil. **Methods:** A self-study game intended to increase knowledge on breastfeeding was created within a distance education module using the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model. The game was developed by a group of specialists in information technology, while a panel of experts from the Pan American Health Organization and the *Faculdade Pernambucana de Saúde* validated its content and the distance learning techniques. The internal review board of the *Faculdade Pernambucana de Saúde* approved the study protocol (CAAE: 62652122.8.0000.5569). **Results:** An inter-professional educational game on breastfeeding for

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use by healthcare professionals was constructed to stimulate their acquisition of basic knowledge on breastfeeding and as a means of providing information to the public. **Conclusions:** The rules of the validated game, baptized “The Milky Way”, are easily understood and its implementation will contribute significantly to training future healthcare professionals with respect to breastfeeding. **Keywords:** breastfeeding; professional training; inter-professional education; health education; experimental games.

## **Background**

Currently, the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) recommend exclusive breastfeeding for the first six months of an infant’s life and continued non-exclusive breastfeeding for two years or longer [24]. This recommendation is based on the well-known immediate and long-term benefits of breastfeeding for the health of the mother and infant [11,13].

The advantages of breastfeeding for the mother include, among others, a lower risk of developing breast, ovarian and endometrial cancer, faster return of the uterus to normal size, a reduced risk of postpartum hemorrhage, lower stress levels, and a lesser likelihood of developing osteoporosis [6,24]. The benefits to the infant’s health encompass a lesser likelihood of developing arterial hypertension, better oral motor skill development, and a lower risk of acute malnutrition, otitis, necrotizing enterocolitis and other pathologies [19].

Recognizing the importance of breastfeeding, the Global Breastfeeding Collective defined the following goals to be achieved by 2030: 70% of newborn infants to begin breastfeeding in the first hour of life; 70% of infants under six months to be exclusively breastfed; 80% of women to continue to breastfeed their children for at least one year and 60% for two years or longer [25].

However, despite a recent increase in global rates and the efforts made to encourage breastfeeding, the adoption of this practice remains inadequate, with the breastfeeding rate at 12 months being below 20% in most high-income countries [23]. Although rates are better in low- and middle-income countries, rates of exclusive breastfeeding and of early initiation of breastfeeding remain unsatisfactory [23].

In Brazil, there has been a clear and positive change in recent years. In 2019, 62.4% of infants were breastfed in the first hour of life and the country achieved a 45.8% rate of exclusive breastfeeding in infants under six months [8]. Nevertheless, breastfeeding rates in the country remain below those recommended by the WHO [8]. When the geographic regions are analyzed

separately, the prevalence of exclusive breastfeeding of infants under six months was found to be lower in the north and northeast of the country [8]. Furthermore, the northeast was the region in which the use of baby feeding bottles, either regular bottles or the smaller versions, by infants under two years of age was greatest [8]. On the other hand, that was the region with the highest rates of continued breastfeeding [7]. With respect to Recife, the state capital city of Pernambuco, a study conducted in the primary healthcare network showed that the median duration of exclusive breastfeeding was around two months and the duration of non-exclusive breastfeeding was approximately six months, values well below the recommended levels [16].

Since it has been shown that the support of healthcare professionals can affect a mother's decision to initiate and/or maintain breastfeeding, a reasonable conclusion is that the current inadequate breastfeeding rates occur to a certain extent due to the unpreparedness of these professionals [1,21,26]. Indeed, many of them lack confidence, competence and knowledge on breastfeeding, making it impossible for them to adequately support mothers finding breastfeeding difficult [1,12]. Furthermore, the use of non-standardized approaches contributes to a reduction in the duration of breastfeeding [1].

The imminent need to improve the training of future healthcare professionals to deal with situations related to breastfeeding is clear. Consequently, breastfeeding should be included as a specific and multidisciplinary subject in technical and university courses for all healthcare professionals [1].

Bearing in mind the current prevalence of undergraduate students of generations Y and Z, generations that are highly adept in the use of digital technology, integrating education with technology becomes important in encouraging learning [15,18,22]. In fact, the negligible use of electronic devices as a teaching resource has created a distance between the teaching environment and the social setting of these groups [17].

Electronic games stimulate interest, creativity and memory, awaken curiosity and motivate participants, facilitating the acquisition of information [4,14]. Therefore, the use of interactive technology allows the creation of new spaces in which to acquire knowledge as well as new teaching and learning strategies better adapted to the needs of generations Y and Z [18].

Perceiving the changes in the preferences, motivation and expectations of current generations in relation to education and understanding the benefits resulting from the use of digital technology in teaching, a group consisting of faculty members and students at the *Faculdade Pernambucana de Saúde (FPS)* set out to construct an inter-professional educational game on breastfeeding designed for students in health-related courses [18]. The main objective

was to encourage contact with technology in the teaching of undergraduates of healthcare-related courses to prepare students for the professional challenges involved in managing breastfeeding more effectively [18].

## **Methods**

This self-study, inter-professional educational game was developed for distance learning using the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model, widely used in classic teaching. The game was aimed at increasing students' knowledge on breastfeeding [2].

The study was conducted between August 2021 and May 2023 at the FPS, in Recife, Pernambuco, Brazil. The FPS was selected because of the institution's focus on health-related undergraduate courses (nursing, nutrition, physiotherapy, odontology, physical education, psychology, pharmacy and medicine) and master's degree courses (professional master's degrees in health psychology and in health education). Furthermore, the *Instituto de Medicina Integral Professor Fernando Figueira* (IMIP) is the teaching hospital for the FPS. IMIP has an outstanding multi-professional team experienced in promoting, protecting and supporting breastfeeding and was the first hospital in the country to receive the accolade of "*Baby-Friendly Hospital*."

The study methodology included two stages. In the first stage a comprehensive literature review was conducted in order to formulate the content of the inter-professional educational game (ADDIE analysis step), with the ADDIE design and development steps following on. In the second stage, an expert panel validated this content.

As part of the analysis step, the literature review was conducted using the Scielo, PubMed and Cochrane databases and the keywords "*breastfeeding*," "*experimental games*" and "*inter-professional education*" for the time period between 2015 and 2021. The search retrieved two studies that were excluded because their publication years were 2001 and 2012 respectively. Based on this comprehensive review of selected studies, a list was made of the educational needs of the target population with respect to the subject of breastfeeding. In the design step, the learning objectives to be achieved during the game were defined, following Bloom's revised taxonomy [9]. During the development step, the questions to be included in the game were elaborated based on the information obtained during the design step. The entire content of the game, the activities involved, and the evaluations were developed in accordance with the hypothesis of dialogic talk for self-study materials.

In the second stage, a panel of specialists consisting of members of the Pan-American Health Organization and faculty members from the FPS validated the content of the game. The group of specialists met remotely using Cisco Webex Meetings. The discussion was recorded and only began after all the participants had given their consent to participate in accordance with the regulations stipulated in Resolution 510/2016 of the Brazilian National Health Council.

The whole project was conducted in compliance with the guidelines and regulations for research involving human beings established by the National Health Council and proposed in Resolution 510/2016. The internal review board of FPS approved the study protocol under reference CAAE: 62652122.8.0000.5569.

## Results

An educational game based on a self-study approach was developed and validated to facilitate the acquisition of knowledge on breastfeeding by future healthcare professionals. It was baptized “*The Milky Way*” and was constructed based on learning objectives that were contextualized and inserted in a fictitious setting to simulate situations that would occur in professional practice. The ultimate expected result is that healthcare professionals will be better equipped to deal with breastfeeding and their advice to the public will be more effective.

Figure 1: Initial screen



When initiating the game, the student will be shown an opening screen, as illustrated in Figure 1. Next, the student will have access to two videos. The first video provides an explanation regarding why the name “*The Milky Way*” (the pathway to breastfeeding) was

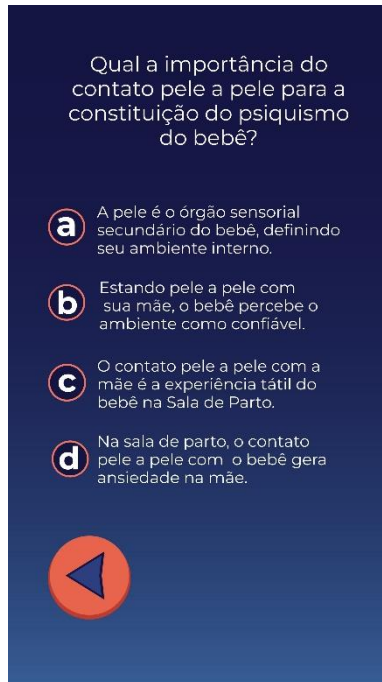
chosen for the game. The second video emphasizes the role of FPS in encouraging breastfeeding and highlights the relevance of creating the game as a means of training future healthcare professionals with respect to breastfeeding.

Figure 2: Screen to initiate an animated movie to contextualize the question



After that initial introduction, the students are directed to the questions. Before each question, an animated movie is shown presenting a fictional situation (Figure 2) that resembles a situation experienced by healthcare professionals in their day-to-day practice. This allows the topic and the specific objectives of that question to be introduced.

Figure 3: Screen showing the question to be answered



All the questions in the game (Figure 3) follow this same pattern, beginning with an introductory animated film, then a question, and finally four alternative answers. Three of these answers are incorrect, while only one is correct and adequately answers the question.

Figure 4: Screen shown if the answer given is correct



After answering the question, the student will be directed to a page showing both the relevant question and the answer selected, which will be marked as correct (Figure 4) or incorrect (Figure 5).

Figure 5: Screen shown if the answer given is incorrect



If the answer is correct, the student may then access the references associated with that particular subject for in-depth understanding and return to the game later, or, otherwise, simply proceed immediately to the next stage in the game. Throughout the game, each question answered correctly will lead to the “*Consolidating Knowledge*” section in which a brief video provides additional information on the learning objectives related to that particular question.

If an incorrect answer is given, the student will be directed to the necessary information in a list of available references. In this way, the student is the protagonist in the learning process. After self-studying the material provided in the references, the video that contextualizes that question is shown again followed by the question and the alternative answers, allowing the student to then select the correct answer and proceed to the subsequent question.

The game ends and a final screen opens when the student has answered all the questions correctly.

## **Discussion**

The objective of this study was successfully accomplished with the development and validation of a self-study, inter-professional, educational game on breastfeeding for students of health-related courses. The game is designed to improve the training of healthcare professionals and standardize knowledge on breastfeeding in the various healthcare-related fields.

Currently, the negligible use of electronic devices as a teaching resource has created a distance between the learning environment and the social reality of the students [17]. Therefore,



there is a need to increase the use of digital technology in education to create a new environment in teaching communication and in individual and group learning [5].

Consequently, an educational game was created for its capacity to optimize learning and improve professional training. Games are known to stimulate interest and creativity, improve memory, awaken curiosity and involve a motivating factor, facilitating the acquisition of information [4,14]. In a randomized controlled trial conducted by Boada et al. with undergraduate nurses at the University of Girona, the nursing students who used a serious game as part of the learning process performed better than students exposed to the classic teaching methodology [3].

Likewise, a systematic review conducted by Van Gaalen et al. found that the use of games has the potential to optimize learning in healthcare professionals, a result reflected in the high user satisfaction rates and the positive changes in their behavior and learning. Nevertheless, the number of studies on this subject is limited [20].

Furthermore, a systematic review conducted by Gorbanev et al. on serious games found that most of the games are intended exclusively for medical students [10]. Therefore, creating an inter-professional game designed for use in the eight health-related courses at the FPS (nursing, nutrition, physiotherapy, odontology, physical education, psychology, pharmacy and medicine) was highly relevant. This connection between the health-related fields is essential when dealing with breastfeeding, since a comprehensive literature review conducted by Almeida et al. showed that the absence of a common approach, coordination and collaboration between healthcare professionals undermines women's trust in relation to breastfeeding, reducing breastfeeding rates [1].

## **Conclusion**

A self-study, inter-professional, educational game on breastfeeding intended for students of health-related fields was created. After the game had been developed, a specialist group from the Pan American Health Organization and the FPS validated the theoretical content of the game and the distance learning techniques. The learning objectives determined at the initial development of the game were successfully achieved.

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