




RESEARCH PAPER


Evaluating the Board Game “Ciclo do Poder” for Menstrual Dignity Promotion


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Abstract. Although menstruation is a recurring physiological phenomenon, even in the 21st century, it is still taboo, fueling stigmas and inequalities. The cooperative board game *Ciclo do Poder* aims to facilitate the dialog about menstruation and promote attitudes that support menstrual dignity. This article presents findings from observations of game sessions conducted in non-formal educational spaces to assess the contributions of the game to dissemination information about the menstrual cycle. In addition, it examines player performance, the importance of mixed groups, cards that raised doubts, and the duration of the game. The methodology consisted of mediated game sessions and observation sheets completed by the research team. As a result, the observations helped to verify the values incorporated into the game, the importance of mediation, the benefits of mixed groups, the necessary design and wording adjustments to the cards, and the game’s balance.

Keywords: Board Games, Menstrual Dignity, Menstruation, Women’s Health, Educational and Promotional Materials

Edited by: Marcelo da Silva Hounsell  | **Received:** 29 March 2026 • **Accepted:** 13 May 2026 • **Published:** 23 May 2026

1 Introduction

Although menstruation is a recurring physiological phenomenon, even in the 21st century, it is still understood—socially and culturally—as a taboo, fueling stigmas and inequalities [Willig and Schmidt [2024]]. Sexism and misogyny still permeate menstruation today, and poverty and racism exacerbate these issues [(Menegotto and Ribeiro [2024]). Culturally, menstruation is marked by prejudice, expressed in the fear and embarrassment of having clothes stained with blood, or in stereotypes related to premenstrual syndrome (PMS) that delegitimize women. At the same time, pain or discomfort during the menstrual and premenstrual periods are neglected and underestimated in our societies [Prado [2024]] .

The topic of menstrual dignity denounces menstrual poverty, a complex, transdisciplinary, and multidimensional phenomenon experienced by menstruating people due to the lack of access to the resources, infrastructure, and knowledge needed to manage menstruation effectively [UNFPA [2021]]. Menstrual dignity is the claim for a set of strategies to ensure access to menstrual products, supplies, infrastructure, and information. Laws and public policies should establish strategies to hold the State responsible for the provision of these rights—within the human rights framework and, in the Brazilian case, also within the principle of universal access to healthcare [Prado [2024]].

In 2014, the United Nations (UN) publicly recognized the right to menstrual dignity and access to menstrual hygiene products as a public health matter and a basic human right [ONU [2014]]. According to data from the United Nations Ed-

ucational, Scientific and Cultural Organization, period poverty directly affects the quality of life of approximately 12% of girls worldwide [UNESCO [2014]].

Despite Brazil instituting the Program for the Protection and Promotion of Menstrual Health and Dignity in 2023, we still feel the weight of decades in which menstruation was absent from the public agenda. In 2026, the Brazilian Institute of Geography and Statistics (IBGE) published the results of the 2024 National School Health Survey (PeNSE), which indicated that 15% of teenage girls missed school at least once a year due to lack of sanitary pads [Muniz [2026]]. Prado [Prado [2024]] notes that shame, associated with the lack of menstrual hygiene supplies, exacerbates school absenteeism related to this issue. In addition, she highlights that sanitary pads are not the only necessities; minimum hygiene standards and infrastructure in school bathrooms, such as water, soap, toilet paper, and stall doors, are also required. She also argues that public policies must address the broader issues of gender equity and social emancipation.

Recognizing that menstruation remains taboo in society, we present the development and testing of a board game named *Ciclo do Poder* (Cycle of Power), whose objective is to facilitate dialog on the topic in educational spaces, allowing participants to interact and ask questions about menstrual dignity. The game provides basic information on the menstrual cycle and menstrual health, contributing to health education for young people from age 10 onward.

Game development followed the Values At Play (VAP) methodology [Flanagan and Nissenbaum [2016]], which comprises three phases: discovery, implementation, and verifica-

tion, during which game designers identify the values relevant to the project, implement these values within the game, and assess whether the proposed values have been effectively realized. The process is iterative, constituting “a cyclical process of idea generation, prototyping, testing, analysis, and refinement” [Flanagan and Nissenbaum [2016]].

During the discovery phase, the team conducted a brainstorming process [Pazmino [2015]] to map values related to menstruation that could be incorporated into the game, drawing on the lived experiences of the researchers as well as on literature, including some selected non-academic books such as *A lua de Alice* (Alice’s moon) [Petrolini and Barbeiro [2020]], *A menina que virou lua* (The girl who turned into the moon) [Cardoso and Vargas [2019]], and *Os segredos de Alice no País das Maravilhas* (Alice’s secrets at Wonderland) [Fioretti [2021]] —, which approach the menstrual cycle not only from a biological point of view but also from emotional and social perspectives, often emphasizing normalization, acceptance, and the importance of dialog. The game development team also observed an educational initiative by the non-governmental organization *Ciclo do Amor* (Cycle of Love) at a school in Rio de Janeiro, which included awareness-raising activities and the distribution of ecological sanitary kits to approximately 20 sixth-grade students. The observation revealed that although most of the participants had already experienced menarche, few understood menstruation as a cyclical process and many had limited access to gynecological guidance and significant doubts about menstrual symptoms.

Based on these findings, the team defined the physiology of the menstrual cycle as a core value of the game, along with the doubts, fears, and feelings of shame associated with its onset. Additional elements included bodily changes during puberty and common discomfort throughout the cycle. Furthermore, the team established design requirements to ensure applicability in school contexts: the game should be easy to learn and intuitive, drawing on familiar mechanics; quick to play, fitting within a class time; and capable of accommodating large groups of up to 10 players.

During the implementation phase, the researchers conducted a benchmarking study on *BoardGameGeek* and *Ludopedia* using the keywords *period*, *cycle*, and *menstruation*, as well as their Portuguese counterparts. Only two games explicitly addressed the menstrual cycle, among which *The Period Game* [Gilsanz and Murphy [2014]] stood out. This competitive race-based game employs a 3D ovarian model in which players rotate each round to release white or red pearls, indicating menstrual phases, and introduces various menstrual technologies.

However, consistent with the iterative nature of the design process, it was decided that, in contrast to *The Period Game*, the proposed game should be cooperative and dialog-based—two core values of the project. Cooperative games are known to promote positive social interaction skills, increase self-esteem, and encourage commitment, while also providing fun [Spiegel [2022]]. Therefore, in *Ciclo do Poder*, players are invited to discuss and find the best solutions to the issues brought by Cris, a fictional character who is going through their first menstrual cycle. Since trans males and non-binary people can also menstruate, the character of the game has

a neutral name to emphasize diversity and ensure inclusion. Therefore, we also use the pronouns “they/them” in this paper when referring to the character Cris.

The game is composed of a circular board with 28 spaces representing the days of a regular cycle. Before entering this main board, the protagonist progresses along an initial center track, where they acquire characteristics associated with puberty (e.g., breast development and changes in body odor) in preparation for menarche. After acquiring three such characteristics, Cris experiences their first menstruation and enters the circular board to navigate the stages of their first menstrual cycle. Each menstrual phase has a specific deck from which players draw cards representing pages of Cris’ diary, where they record their fears, questions, and concerns. Players may use cards in their hands to propose ways to help Cris. In doing so, players confront the particularities of each phase of the cycle, engage with different menstrual technologies, and encounter terms such as menstrual dignity and period poverty, as well as information about the Brazilian federal program to combat period poverty. Examples of diary cards and solution are shown in figure 1. The game encourages dialog and consensus rather than fixed answers, in line with the understanding of menstrual experiences as complex issues that are well-suited to game-based approaches [Bartholomeus and Goodwin [2018]]. Players jointly develop knowledge about the menstrual cycle, actively participate in decision-making, and seek consensus. A facilitator mediates discussion, clarifies doubts, and fosters dialog. Figure 2 presents the game board at each stage of its development, illustrating the iterative design process with tests at each step leading up to the final design.

The game ends when Cris completes their first cycle, followed by a final round to resolve pending challenges. The group wins if they address all situations; otherwise, a score is assigned based on unresolved issues, which encourages replay. The game design aimed to promote participation by both menstruating and non-menstruating individuals (mixed groups). A tutorial showing the complete gameplay can be found in <https://youtu.be/BWZRtNy4ofQ?si=pgpKNjn3OF2b1KUg>.

The verification stage is when designers conduct tests and other evaluations to assess how the player audience receives the values identified and incorporated into the game, and whether the game reached its objectives.

In a previous study, we reported the results of internal team tests, an online meeting for women who create games, and an event held at a private school in Rio de Janeiro, which allowed multiple adjustments to mechanics, content, and values. However, there remained a need to expand the tests and the audience involved, including preteens and adolescents, and to investigate the dynamics in mixed groups that included people who menstruate and people who do not menstruate at the same table. In addition, in that article we highlighted the need to reflect on facilitator training “so that the game contributes to promoting positive values among adolescents regarding the biological process of the menstrual cycle and to creating a culture that fosters the empowerment of people who menstruate and the empathy of others” [do Valle et al. [2023]].

Thus, this article presents results from observing tests conducted in non-formal educational spaces, which con-



Figure 1. Examples of diary cards and possible solutions. First letter (from left to right): *I feel discomfort when using disposable sanitary pads, but I don't know if there are other options.* Possible solution: *reusable sanitary pads.* Third letter: *My cousin missed class because she didn't have a sanitary pad.* Possible solution: *free distribution of sanitary pads.* Decree No. 11.432/2023 Program for the Protection and Promotion of Menstrual Health and Dignity.

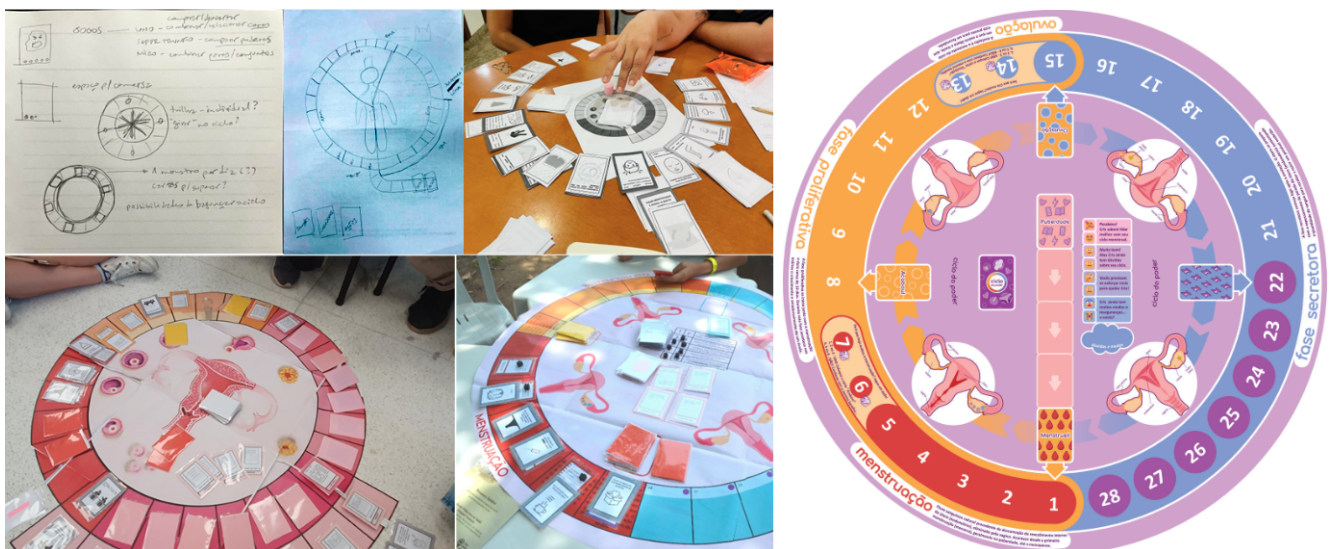


Figure 2. Development of *Ciclo do Poder* from the first sketch ideas to the final board. From the first sketch, the idea has always been a circular board representing the menstrual cycle, but central illustrations changed several times during design. Puberty came to the center of the board, instead of a track around the main cycle, and a score box was added on the last design. Also, on the first prototypes, cards were placed all around the cycle during set up, while now they are picked up by players from specific decks for each phase

tributed to the final verification of the values incorporated into the game, the importance of mediation, adjustments to card design and wording, and game balancing, as well as issues related to group composition and mediation.

2 Related Work

We searched the SBGames Proceedings, the largest academic games event in Latin America, for related work. The search included short and full papers from 2006 to 2024, using the terms “menstrual,” “non-formal,” “evaluation”, and “board game.” The proceedings from 2008 and 2009 were not available. Although work on digital games has historically dominated the conference, research on board games has grown in recent years. However, with respect to the menstrual cycle, the only work we found was the 2023 paper on *Ciclo do Poder* [do Valle et al. [2023]], which showed that the games presented and discussed at the event up to that point did not address this theme.

The paper “Dengueside survival: Providing a serious board game to fight against the *aedes aegypti* mosquito” is the closest to our proposal, since it evaluated a board game through tests conducted in non-formal settings, administering a questionnaire based on the MEEGA+ model and conducting observations of participants’ reactions [Azevedo et al. [2022]]. The paper “Gamificação e o Ensino de Suporte Básico de Vida: Uma experiência com crianças em cenário não escolar” (*Gamification and Basic Life Support Education: An Experience with Children in a Non-School Setting*) presents a case study of an activity conducted with children at the State University of Bahia. The facilitators continuously supported the activity and, at the end, a group discussion was held with the participants to systematize the knowledge. The case-study evaluation was qualitative, based on observations of the children’s attitudes, which indicated their involvement and enthusiasm [Ferreira and Santos [2018]].

3 Methodology

As proposed by the VAP game development methodology and Fullerton’s [Fullerton et al. [2008]] iterative game design process, the research team tested the game multiple times in non-formal educational spaces to evaluate it. The evaluation of the game received the approval of the Research Ethics Committee for Human Subjects of the Instituto Oswaldo Cruz - CEP-IOC (CAAE 80477724.6.0000.5248). During 2024 and 2025, we tested the game at several science popularization fairs in different Brazilian cities, inviting passersby to play. A team member explained and mediated the game and filled out an observation form at the end of each session.

Testing took place on the following events: Brazilian Society for the Advancement of Science event in Belém-PA at 2024 (SBPC-PA) and in Recife-PE at 2025 (SBPC-PE); National Week of Science and Technology events in 2024, at Fiocruz Belo Horizonte-MG (SNCT-MG), and at Brasília-DF (SNCT-DF); Girls and Women in Science event at FIOCRUZ, Rio de Janeiro-RJ in 2025 (MeM-RJ). In addition to these events, the game was also tested at the SNCT at Fiocruz in Rio de Janeiro, in Brasil Game Show (BGSP) in São Paulo, Science festival at Quinta da Boa Vista, Rio de Janeiro, among others. However, in these events, the session observation

form was not completed. The game was also presented at the Game Festival and the Arts Festival of SBGames 2024, where the public tested it and the game received awards for best analogical game and best visual art on analogical games.

The observation form contained the following information: event, date, table number, facilitator, number of participants, gender of participants, approximate age of the players, session start and end times, information about dropouts, final score, cards left unresolved at the end of the session, cards that caused some type of problem, and comments or situations that drew the facilitator’s attention during the game. In total, researchers completed 97 forms and systematized the data in a spreadsheet to facilitate quantification and interpretation. Next, we conducted a descriptive analysis of the data and created charts that illustrate player performance, duration of the session, audience profile, and the most difficult points of the game. We also discussed necessary adjustments, the importance of mediation, and participation by different audiences.

4 Results and Discussion

The term *non-formal education* is polysemous and the subject of ongoing debate. However, it generally refers to activities conducted outside formal education systems, such as museums or scientific events, whereas *formal education* is conducted within a hierarchically structured education system [Marandino [2017]]. Although we may understand this distinction as a *continuum* [Rogers [2004]], it is evident that there are differences between an educational action using a game conducted within the spatiotemporal context of a class, within a school, and a game activity proposed at a fair or scientific event.

The relationship with time and space differs: in the classroom, time is more clearly delimited, and space is more circumscribed; in a fair, space and sound are constantly interrupted, which affects the gameplay experience and even the level of immersion achieved. In a fair, time is defined by the audience’s interest in a given activity, related to their perception of “gaining” something by attending it. Despite these distinctions, in either case, when using a serious or educational game, the intent is to promote an educational impact, raise awareness, or sensitize people to a topic. However, educators can integrate varying degrees of this intentionality into a broader curriculum.

We conducted 97 sessions, with a total of 483 participants: 34 in SBPC-PA, 14 in SNCT-DF, and 5 in SNCT-BH during the second semester of 2024, and an additional 42 sessions in SBPC-PE and 2 sessions in MeM-RJ in 2025 (Figure 3). The two sessions in MeM-RJ and two of the SBPC-PE sessions were held in spaces dedicated to women and therefore could not include male participants. The remaining events included non-gender-specific publics.

From 2024 to 2025, based on data from the first 53 sessions of the first year [do Valle et al. [2025]], some adjustments were made to the game, including replacing some cards and making text modifications, which will be discussed below. In addition to these, the game had no other significant changes when comparing results from 2024 to 2025, except for unsolved cards. Therefore, all figures represent the 97

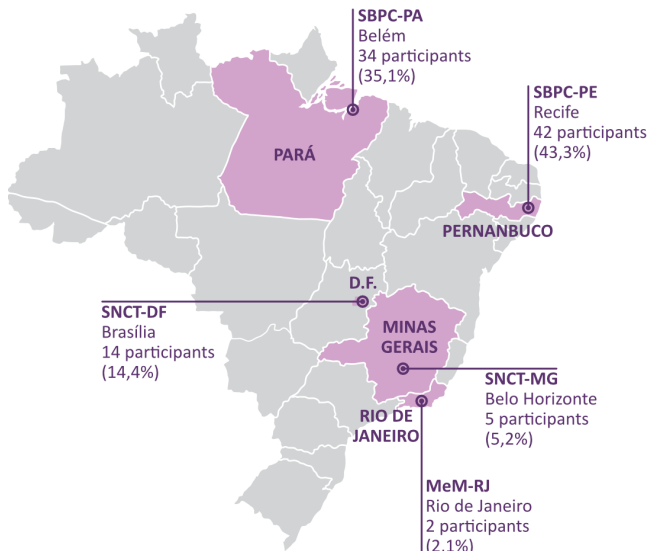


Figure 3. Distribution of sessions with the approximate location of each event on the map of Brazil.

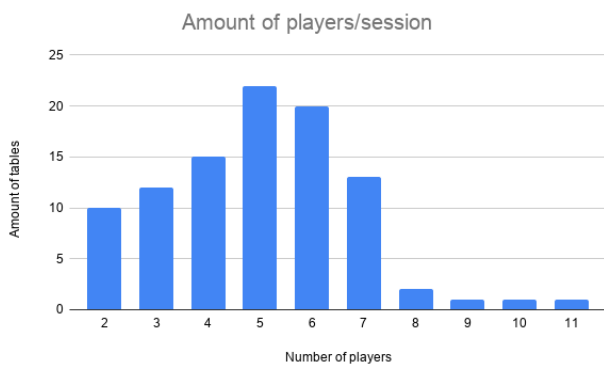


Figure 4. Number of participants per session

events as a whole, and this work discusses modifications in unsolved cards.

Each session had a varying number of participants: most of the game sessions (43%) contained 5 or 6 players, although the game supports up to 10 players (Figure 4). The dynamics of most events did not support group formation at the maximum capacity of 10 participants per session, due to limited physical space, high visitor traffic, and ambient noise. However, an average of 6 participants appeared adequate for mediation and dialog between participants. On the other hand, 22 sessions had only 2 or 3 participants, which is not ideal for fostering discussion and the sharing of experiences. In those sessions, the facilitator needed to be more active in promoting discussion among the participants, but it was possible to play with two people. Sessions with fewer participants tend to be shorter because they generate fewer discussions.

Figure 5 shows the predominant age range of the players in each table, grouped by age intervals: under 12 years of age; 12 to 16 years of age; 16 to 18 years of age; and over 18 years of age. We observed a higher proportion of tables composed of adults (aged 18 or older), but a considerable number of minors were still present. Among adults, many were education and health professionals, who expressed interest in using the game as a resource for education and to promote health and menstrual dignity. We can verify this based on the interest survey form made available to players at these fairs, which had

Estimated age of players in sessions

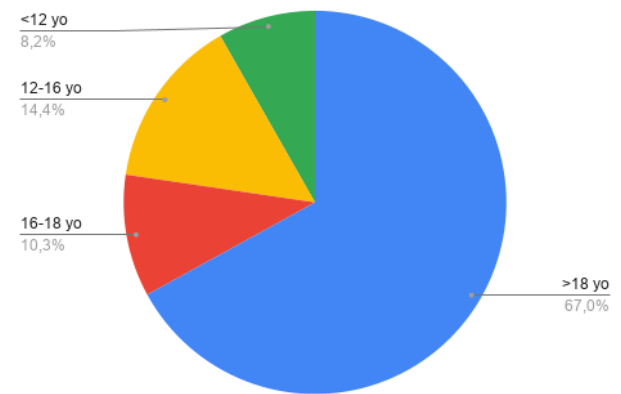


Figure 5. Estimated age range of participants

received, by the time this article was written, 317 expressions of interest. On the other hand, we observed on at least two occasions that some older people refused to play, arguing that menstruation was no longer part of their lives. Indeed, some authors discuss the difficulties of women in menopause in discussing the topic or even feeling less feminine after menstruation ceases (Costa, 2008). However, in other sessions, we registered the participation of menopausal women who participated actively in the discussion, sometimes bringing their experience to the discussion, but were also curious about the new menstrual products, such as menstrual underwear, cups, or discs, commenting that those solutions were not available *in their time*. On the other hand, we also noticed many young participants who were unfamiliar with those technologies, implying the need for greater dissemination of these products.

At the fairs where we presented the game, although we shared space with other activities and there was constant noise, the duration of the session averaged 27 minutes, with 65% of the sessions lasting from 20 to 35 minutes, which aligns with the expected duration previously tested (around 30 minutes). Two sessions (2%) lasted less than 15 minutes, which is unexpected but might occur when players are very direct and do not interact with each other. We therefore confirmed that a game session fits within a regular class period in Brazil (around 50 minutes). Depending on the interaction between the players, the possible contextualization, and a subsequent discussion, it can take more than 40 minutes, which occurred in 8 sessions (9%), reaching up to 50 minutes, which is still suitable for classroom use. Eight of the 97 sessions did not have the duration recorded.

Of the 97 sessions, 42 (43%) were in mixed groups (people who menstruate alongside others who do not). When non-menstruating participants were older (over 18), we observed engagement and enjoyment. We believe that the lack of prior-knowledge demand in the game and its openness to “solutions” from everyone help level the interaction context, allowing people who do not menstruate and sometimes are not familiar with the topic to feel capable of helping Cris, the main character of the game, and to cooperate with the group. However, in some mixed groups, non-menstruating players stated that the lived experiences of people who menstruate would make them better qualified to deliver the “final verdict” on the validity of the proposed solutions, even though

non-menstruating players were still able to propose solutions and remain open to that validation. This movement may have fostered empathy, as it places people who menstruate in the position of subjects who know their own bodies and experiences, and people who do not menstruate in a position of active listening. We even observed a non-menstruating person who refused to use the *nap* and the *meditation* cards to address PMS-related irritability, arguing that doing so would diminish the importance of PMS itself.

In mixed groups with players aged 12–13 years, we observed participation, but shyness was greater when reading the situation cards and proposing solutions. This behavior seems directly related to taboos, which the game itself seeks to overcome. However, perhaps as a single activity—outside a broader context of activities on the topic and away from their familiar spaces—the potential of the game for this specific audience may have been reduced. Thus, we reinforce the importance of mediation and contextualization in a safe space, especially for this younger audience. In formal education settings, the game can be an element, among others, in building a culture that normalizes menstruation and the issues surrounding it.

Of the 97 sessions, 19 had at least one participant dropout. In three of those, the entire group left. In some cases, we observed that other fair activities drew more attention; in others, the teacher needed to take a school group to another activity, a friend of the participant called to another activity, or a parent called to leave. Nevertheless, we considered the level of participant engagement at most tables to be very positive, even in non-formal educational spaces where there was no obligation to remain in the game, and many other activities were available.

The tests and resulting observations led to changes in multiple cards. Many changes involved wording, based on listening to the cards being read aloud, especially by adolescents and young people. We identified necessary adjustments, especially on puberty cards, such as replacing *my axilla has a different odor* with *my armpits smell different*, among others, to make the text more consistent with *plain language*, which aims to include as many people as possible and to be easily understood, without requiring the reader to reread several times or ask others for help [SaoPaulo [2020]].

Another language adjustment was replacing every mention of *getting dirty* in the card text—clothes, bed sheets, etc.—with *staining*, to avoid the association of menstruation with something dirty. Our observations led to this change because the phrasing reinforced a value that ran counter to our intent. A study commissioned by Johnson & Johnson that informed the start of the project interviewed 1,500 women ages 14 to 24 in five countries (Brazil, India, South Africa, the Philippines, and Argentina) and showed that, in Brazil, 57% of respondents feel dirty during their menstrual period [INOVA-SOCIAL [2018]]. By making this adjustment, we clarified the commitments and values identified in the game’s development: to promote a positive attitude toward menstruation, to normalize this process, and to seek ways to overcome the challenges and taboos associated with it.

In the second part of the proliferative phase, after menstruation, the deck cards present fewer issues to be solved, and most refer to other people whom Cris wants to help. The

value of empathy is reinforced at this point, as players are encouraged to support other imaginary characters. The procedural rhetoric [Bogost [2007]] reflected in the low frequency of Cris-related situations in this phase reinforces the notion that in certain phases of the menstrual cycle fewer issues arise. Many people who menstruate report feeling more energetic and having a more positive disposition during these periods. Therefore, in this phase, players have fewer issues to solve, but continue drawing solution cards. This characteristic supports game balance by increasing card access and contributing to a favorable group outcome.

The *library* card was not used as a source of information, reflecting the current landscape of access to knowledge among adolescents and young people. For this reason, we decided to incorporate a visit to the library into one of the situation cards that do not require resolution, to reinforce libraries as another pathway to information and as a place for building knowledge. We also added a *menstrual boxer* card as an alternative to the menstrual panties. This card is intended to include people who menstruate but do not identify as women. As discussed by Costa et al [da Costa et al. [2024]], there is a lack of academic work in Brazil focusing on other non-normative menstrual experiences, such as those of trans women, non-binary people and trans-masculine people, emphasizing the need to discuss the topic. A detailed list of modifications is available in Table I.

At the end of the session, players receive a “score” represented by emojis on the board, based on the number of cards that remained unresolved. The emojis represent the performance of the group in solving the proposed issues based on the number of unsolved cards, as shown in Figure 6A. The performance of the players varied, but in most cases the *score* was high. No group ended with 7 unresolved cards. (Figure 6B).

These final scores indicate that the game balance was adequate: most sessions (63%) ended with high scores (up to 2 unresolved cards). Because we designed the game for educational environments, with primarily young players, we intentionally presented challenges without being overly punitive. This decision was also because part of the challenge involves luck in drawing minimally adequate cards, combined with attention to the cards drawn, reasoning, and collective argumentation. In addition, players are more likely to play the game only once, reducing opportunities to try again and achieve a higher score. Therefore, a highly positive end conveys a sense of victory and recognition of the efforts of the group, strengthening the message of empathy and solidarity embedded in the experience.

To assess the game balance, we recorded which cards remained unsolved at the end of the sessions. Figure 7 shows the number of sessions where each card remained unresolved. The cards are grouped by color, corresponding to phases of the menstrual cycle: red—menstruation; yellow—proliferative phase; blue—secretory phase; and purple—premenstrual symptoms.

Among all 97 recorded sessions, the cards that remained the most frequently unsolved were those related to premenstrual symptoms; a total of 115 of the 177 registries (65%) of unresolved cards. Three of these cards are cravings to eat something (*wants chocolate*, *wants sweets*, and *always hun-*

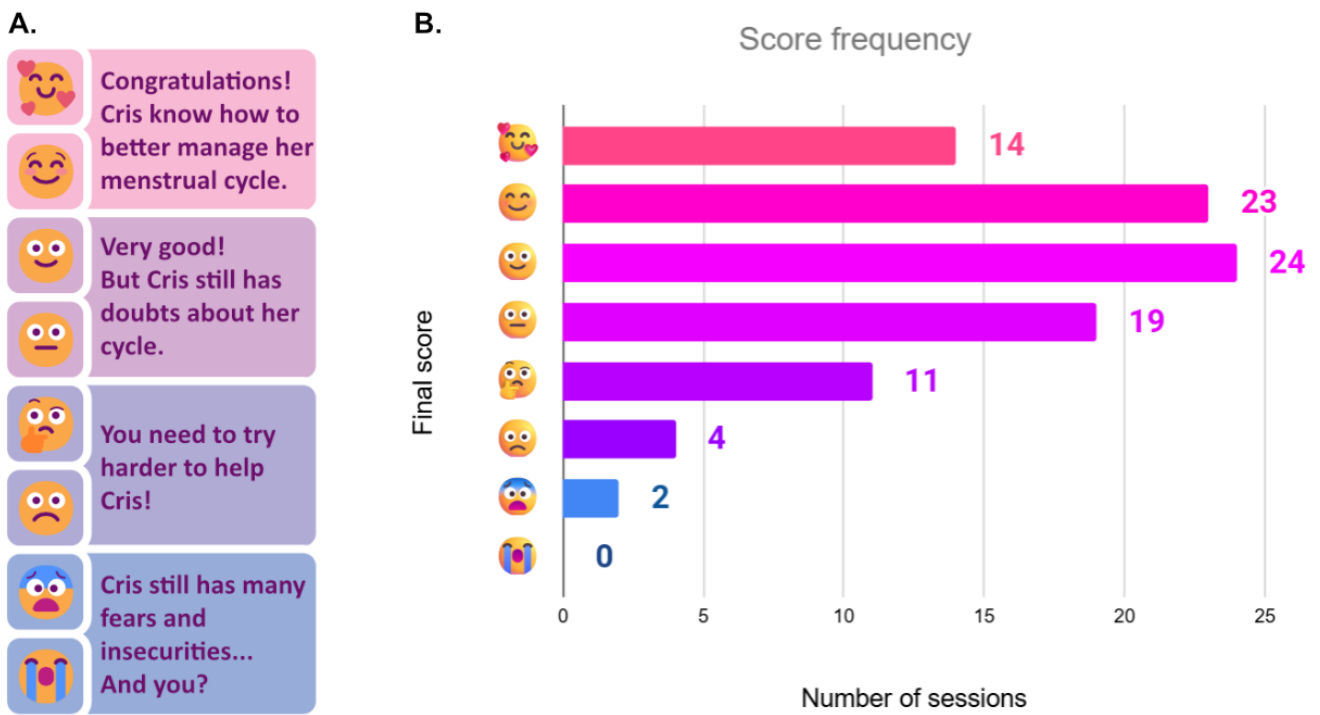


Figure 6. Emoji scale, representing the number of unsolved cards from 7 to 0 (A) and Score frequency across the 97 sessions (B)

Which cards were more often not solved at the end of game

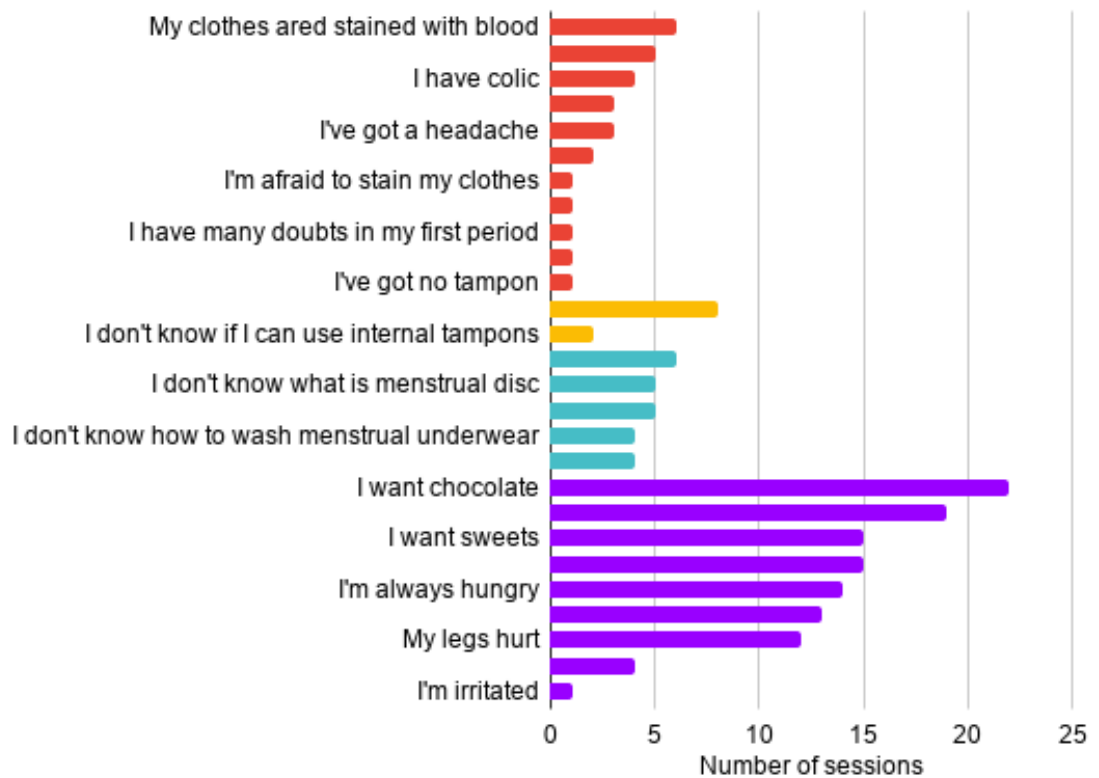


Figure 7. Number of times that each situation card remained unresolved at the end of the game

Table 1. Detailed list of cards modified from the tests made in 2024 to the ones in 2025

| Cards in 2024 | Cards in 2025 | Reason for the change |
|--|---|---|
| Texts in the puberty deck were very direct, describing the symptoms that Cris was experiencing | Texts were rewritten to sound like an experience lived by Cris, which might include a puberty symptom | The new writing looks more like a diary, and symptoms are less evident |
| In some diary cards, Cris described that their clothes were <i>dirty</i> with menstruation blood | Text was rewritten to say that clothes were <i>stained</i> with menstruation blood | The correction aimed at avoiding associating menstruation with something dirty |
| Card on the secretive phase deck: <i>My friend is 13 years old and has not started menstruating yet. Is that normal?</i> | Card moved to the proliferative phase | Increase in the number of cards on the proliferative phase deck |
| Cards mentioned Instagram or other social media | Text modified to a generic term | Suppression of commercial names that could change in the future |
| Card on the secretive phase: <i>I received a menstrual cup, but I don't know how to use it.</i> | Card substituted for: <i>I found out that my aunt uses a menstrual disc. What is that?</i> | Two cards mentioned a menstrual cup, now there is one for the cup and another for the disc. |
| Solution card: library | New Solution: black shorts. | During tests, the Library card was never used as a source of information |
| Card on the secretive phase: <i>I watched a video on how to massage my abdomen when I feel pain. I've already started practicing</i> | New card: <i>I spent the afternoon in the library researching books about menstruation.</i> | The card led to confusion because it looked more like a solution than an issue. |
| Two <i>painkiller</i> solution cards | One <i>painkiller</i> and another menstrual boxer solution card | Boxer card added to include people who menstruate but do not identify as women |
| Two <i>gynecologist</i> solution cards | One <i>gynecologist</i> and another <i>pod-cast</i> solution card | Changed to avoid two identical cards and to add another possible source of information |

gry), which together represent 51 of the 177 (29%) registries. Below are the cards *got acne*, *swollen breasts*, *back aches*, and *legs hurt* that were not solved in the 19, 15, 13, and 12 sessions, respectively. The number of unresolved premenstrual problems may have some possible explanations. As it is the last phase of the game, players have already used most of their cards to solve other issues and do not have enough game time to buy new ones. That might be the case for cards related to pain, such as *back aches* or *leg hurts*. Those are more often resolved with *pain killers*, *hot water pads*, *massages*, or *tea*. However, players may also use these solution cards during the menstrual phase to solve *cramps* or *headache*. From 2024 to 2025, we suppressed one of the *pain killer* cards, which led to more pain cards not being solved at the end of the game. 35% of the unresolved cards in 2025 were related to pain, compared to 17% in 2024. As a result, there is a need for additional pain solutions in the final version of the game. On the other hand, the proportion of unsolved issues with stained clothing decreased from 17% to 3% with the addition of the *black shorts* card. This change demonstrates how powerful card substitution can be for the game's balance.

As for the other unsolved cards, most of them have very specific solutions—in other words, few cards can solve these issues, and they may not appear due to the randomness of the deck. For instance, players can only solve the *got acne* card with soap or *non-greasy diet*. However, *soap* can also solve the card *how to wash menstrual underwear*, and *non-greasy diet* can also solve *swollen breasts*. That may cause the *got acne* card to be often left unsolved. For the three food-related diary cards, there are four food-related solution cards, but they do not always appear in the deck. However, this was not

considered problematic, since the game frequently facilitates the resolution of most issues, as demonstrated by the final scores of the session (Figure 7). Other cards that require, for example, information sources are more easily resolved in the game because of the variety of information source cards available, thereby reinforcing the importance of seeking support networks and reliable sources.

In all sessions, a team member facilitated play, gradually explaining the game: beginning with narrative contextualization, then introducing the puberty phase, and allowing players to carry out actions at each step. The game rules are relatively simple; nevertheless, we chose to explain them gradually and to encourage players to talk, help each other define solutions, and collaborate to handle cards, read and check unresolved issues, and remember that other players might have cards that could be useful. In this way, facilitation contributed to players' autonomous and collaborative stance—values we sought to embed in the game.

Although the game rules state that group consensus determines whether a solution is appropriate, in some cases facilitators needed to problematize issues—for example, when a group decision about menstrual technologies suitable for Cris' use did not take into account the character's estimated age (between 8 and 13 years) and the fact that it was their first menstrual cycle. Similarly, facilitation sought to explain less familiar menstrual technologies and to bring up the discussion of period poverty and menstrual dignity when the cards introduced these terms. All of these insights, derived from experimentation and observation during the tests, were systematized to support facilitator training and the development of a future Facilitator Notebook, thereby contributing to an

educational strategy that can later be adapted and applied in both non-formal and formal education settings.

5 Final considerations

This work presents results from observing tests of the game *Ciclo do Poder* in non-formal educational spaces. Based on observations from the game's development team, who facilitated the sessions, we verified and validated the duration and card balance of the session and, using these metrics, assessed the suitability of the game for use in formal education settings. Team observations during sessions allowed us to conclude that *Ciclo do Poder* showed strong potential to generate discussion about menstrual dignity in non-formal educational spaces, contributing to the dissemination of information and the overcoming of taboos, including among people who do not menstruate. We also confirmed that empathy and solidarity were values that the game both reflected and promoted.

Team-facilitated tests also served as a way to experiment and practice facilitation, providing information on appropriate approaches for different audiences and about the main questions and concerns raised. This experience has been fundamental in the development of a facilitator training strategy, which we recently initiated. We suggest that this experience can inform the testing and evaluation of other board games in non-formal educational spaces, as it demonstrates how assessing game design, content, writing, and embedded values can be integrated with issues related to organizing sessions for specific audiences and facilitation. The team is conducting additional tests and analyzes of participant questionnaires before printing and distributing the game to schools. Our next steps involve a training course for public school teachers to act as game facilitators in public schools in the state of Rio de Janeiro.

Declarations

Acknowledgements

The authors thank all test participants and, in particular, the Women and Girls in Science Program at FIOCRUZ, PPGBIOEXP FIOCRUZ Rondônia, and the Museum of Life/Fiocruz, which funded the game boards.

Funding

Açucena Santos holds a PIBIC-CNPq scholarship, and Rafaela Bruno and Carolina Spiegel hold CNPq productivity scholarships.

Authors' Contributions

TZV, CMD, RVB, RMM, CNS, and FGC contributed to the conceptualization of this study. Investigation was carried out by TZV, CMS, CNS, and RVB, with formal analysis performed by AMAS and TZV. FGC, AMAS, and TZV were responsible for figures and graphics (visualization). AMAS, CMD, and TZV wrote the original manuscript while FGC, RVB, CNS, and RMM contributed with review and editing. RVB and CMD perform project administration. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

The complete dataset generated during the current study is available in osf.io/utjya.

Further relevant information

This is an updated version of the article do Valle *et al.* [2025]. Chat-GPT was used to translate the original article to English and Grammarly for English proofreading. After that, authors updated and increased data, figures and text. This research was entirely conducted by menstruating people.

References

- Azevedo, G. S. d., Lima, L. S., Barbosa, I. C., and Sarinho, V. T. (2022). Dengueside survival: Providing a serious board game to fight against the aedes aegypti mosquito. *Jornal on Interactive Systems*, 13(1):1–14. DOI: <https://doi.org/10.5753/jis.2022.1881>.
- Bartholomeus, E. and Goodwin, D. (2018). *Apply play to get ahead of the game*. Studio HB.
- Bogost, I. (2007). *Persuasive games: the expressive power of videogames*. the MIT press.
- Cardoso, M. and Vargas, J. (2019). *A Menina que Virou lua*. Letramento, 1 edition.
- da Costa, C. R. N., Costa, N. C. V., and Manica, D. T. (2024). Menstruation as a research topic in the humanities in brazil: a state of the art. *Tapuya: Latin American Science, Technology and Society*, 7. DOI: <https://doi.org/10.1080/25729861.2024.2424097>.
- do Valle, T. Z., Maia, R. M., Bruno, R. V., Spiegel, C. N., Silva, I. P. R., and Dias, C. M. (2023). Ciclo do poder: desenvolvimento de um jogo sério sobre dignidade menstrual. *Anais Estendidos do XXII Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 1023–1028. DOI: https://doi.org/10.5753/sbgames_estendido.2023.234068.
- do Valle, T. Z., Santos, A. M. A., Dias, C. M., Carvalho, F. G., Spiegel, C. N., Maia, R. M., and Bruno, R. V. (2025). Avaliação do jogo "ciclo do poder" para promoção da dignidade menstrual em espaços de educação não formal. *Anais do XXIV Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 2309–2320. DOI: <https://doi.org/10.5753/sbgames.2025.10190>.
- Ferreira, S. C. and Santos, T. L. J. P. (2018). Gamificação e o ensino de suporte básico de vida: uma experiência com crianças em cenário não escolar. *Proceedings of SBGames 2018*, pages 1353–1356.
- Fioretti, B. (2021). *Segredos de Alice: no país das maravilhas uma viagem através do corpo feminino - hormônios, menstruação e autoconhecimento*. SENAC.
- Flanagan, M. and Nissenbaum, H. (2016). *Values at play: valores em jogos digitais*. Blucher.
- Fullerton, T., Swain, C., Hoffman, S., and Isbister, K. (2008). *Game design workshop: a playcentric approach to creating innovative games*. Morgan Kaufmann.
- Gilsanz, D. and Murphy, R. (2014). The period game. <https://www.periodgame.com>, Accessed on 23 May 2026.
- INOVA-SOCIAL (2018). Sempre livre lança pesquisa global sobre menstruação. <https://inovasocial.com.br/investimento-social-privado/sempre-livre-pesquisa-global-menstruacao/>, Accessed on 23 May 2026.
- Marandino, M. (2017). Faz sentido ainda propor a separação entre os termos educação formal, não formal e informal? *Ciência & Educação (Bauru)*, 23:811–816. DOI:

- <https://doi.org/10.1590/1516-731320170030001>.
- Menegotto, J. M. and Ribeiro, F. B. (2024). Period poverty behind the numbers: gender, race, and class in the menstrual experiences of girls from an urban periphery in Brazil. *Tapuya: Latin American Science, Technology and Society*, 7. DOI: <https://doi.org/10.1080/25729861.2024.2397293>.
- Muniz, B. (2026). 15% das adolescentes faltaram à escola ao menos uma vez no ano por falta de absorventes, aponta IBGE. *G1*. <https://g1.globo.com/educacao/noticia/2026/03/25/ibge-pense-2024-falta-de-absorventes.ghtml>, Accessed on 23 May 2026.
- ONU (2014). Every woman’s right to water, sanitation and hygiene. Technical report, ONU. <https://www.ohchr.org/en/stories/2014/03/every-womans-right-water-sanitation-and-hygiene>, Accessed on 23 May 2026.
- Pazmino, A. V. (2015). *Como se cria : 40 metodos para design de produtos*. Blucher.
- Petrolini, C. and Barbeiro, L. (2020). *A lua de Alice: Uma história sobre a primeira menstruação e os ciclos femininos*. Cortez.
- Prado, I. C. A. (2024). Políticas públicas sobre a saúde menstrual no Brasil: Olhares pelas lentes dos movimentos sociais da menstruação. *Mediações - Revista de Ciências Sociais*, pages 1–17. DOI: <https://doi.org/10.5433/2176-6665.2024v29n1e49150>.
- Rogers, A. (2004). Looking again at non-formal and informal education – towards a new paradigm”. in the encyclopedia of pedagogy and informal education. *The encyclopedia of pedagogy and informal education*.
- Sao Paulo (2020). Apostila do curso linguagem simples no setor público. Technical report, Laboratório de Inovação em Governo da Prefeitura de São Paulo Escola Nacional de Administração Pública (Enap). <http://repositorio.enap.gov.br/handle/1/6181>, Accessed on 23 May 2026.
- Spiegel, C. (2022). *Jogos cooperativos em sala de aula*. Devir.
- UNESCO (2014). Puberty education & menstrual hygiene management: Good policy and practice nations education. Technical report, Unesco. <https://unesdoc.unesco.org/ark:/48223/pf0000226792>, Accessed on 23 May 2026.
- UNFPA (2021). Pobreza menstrual no Brasil: desigualdade e violações de direitos. Technical report, UNFPA. https://www.unicef.org/brazil/media/14456/file/dignidade-menstrual_relatorio-unicef-unfpa_mai2021.pdf, Accessed on 23 May 2026.
- Willig, C. L. and Schmidt, S. P. (2024). “tá de chico?": Estigmas da menstruação na mídia e no território escolar. *Diversidade e Educação*, 12(1):26–50. DOI: <https://doi.org/10.14295/de.v12i1.16050>.