



e-Caminhos da Vida: A Digital Game for Discussing and Studying Ethics

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Abstract: This article presents the development of a digital educational game to teach and make players aware of ethical and moral principles, helping children make the best decisions in various situations. The research evaluated the ease of application of the game through tests in a school environment, investigating its effectiveness in fulfilling its role in educating. A case study involving 155 volunteer participants used an adapted version of the MEEGA+ Kids model to evaluate the game. The results indicated the learners' great acceptance of the game in terms of its use as a pedagogical tool, combining entertainment and education to raise awareness and encourage ethical behavior.

Keywords: digital game; ethical; moral; board game.

e-Caminhos da Vida: Um Jogo Digital para Discussão e Estudo de Ética

Resumo: Este artigo apresenta o desenvolvimento de um jogo educativo digital com o objetivo de ensinar e conscientizar seus jogadores sobre princípios de ética e moral, auxiliando crianças a tomarem a melhor decisão em diversas situações. A pesquisa avaliou a facilidade de aplicação do jogo por meio de testes em ambiente escolar, investigando sua eficácia em cumprir seu papel em educar. O estudo de caso conduzido utilizou uma adaptação do modelo MEEGA+ KIDS aplicado a 155 participantes voluntários. Os resultados indicaram grande aceitação do jogo por parte dos aprendizes no que tange ao seu uso como ferramenta pedagógica, combinando entretenimento e educação na conscientização e no incentivo da prática de comportamentos éticos.

Palavras-chave: jogo digital; ética; moral; jogo de tabuleiro.

1. INTRODUCTION

Active methodologies aim to include students in the learning process (MARQUES *et al.*, 2021), with gamification being one of the most favorable techniques for teaching with technology (SILVA; LACERDA JUNIOR, 2024). Through it, users are rewarded for successes within the application, and future teachers are learning how to use it to help propagate teaching (VENTURA *et al.*, 2021). Digital games are one way of making this possible.

There are currently various genres of games, and one that stands out in educational environments is narrative, which uses fictional scenarios to explore diverse dialogues that encourage players to make choices based on their situation (RAMOS, 2012). Implementing gamification with narrative increases players' engagement with the context



presented (de ARAÚJO; dos SANTOS CARVALHO, 2023), making it possible to convey lessons on conduct and ethics intuitively and playfully. Games with this approach have been applied by teachers as another alternative to traditional pedagogical means (dos SANTOS SANTANA; ZACCHI, 2022).

The digital educational game developed in this research is a virtual adaptation of the board game *Caminhos da Vida* (SILVA *et al.*, 2023), in which groups of up to four players take turns in drawing cards. The cards present problematic situations, in which the player must choose one of two possibilities for solving dilemmas. Based on the answer, the player is rewarded or punished by returning spaces on the board. The game aims to develop ethical and moral values in the participants, which is its main contribution. They must choose the right attitudes to educate them about decision-making despite the adversities presented on the cards. The game encourages correct behavior, considering players can face similar situations in everyday life.

For the game initial evaluation, a study was conducted with 155 child volunteers from a public and two private elementary schools, covering from the 2nd to 5th grades. A questionnaire adapted from the MEEGA+ KIDS model (GRESSE VON WANGENHEIM *et al.*, 2020) was applied to validate the participants' impressions about the game and to determine whether it could be adopted as an educational tool.

This paper is structured as follows: Section 2 discusses ethical issues and related work. Section 3 explains the research development and validation process and the proposed game design. Section 4 presents and discusses the study results, and Section 5 reports the conclusions.

2. BACKGROUND

Relationships between human beings are essential for humanity to evolve because, according to Aristotle, "man is a political animal" (ARISTÓTELES, 2021). Living together in society is fundamental to its formation, since individuals collaborate to share their knowledge and achieve great things collectively. The psychologist Vygotsky (VYGOTSKY, 2007) was responsible for numerous studies on visions of knowledge; his perspective on child formation stands out, contributing theories on its functioning. In this context, although games are mostly entertainment tools, players can be influenced by the ideologies inherent in the themes portrayed when interacting with the application (CARVALHO *et al.*, 2021). Games can also simulate situations that have never occurred in the players' lives (RAMOS, 2008), reflecting the lives that other individuals experience, from different social and moral perspectives.

Similarly, players' perception of a game can be influenced by moral principles because when making a decision, they tend to follow the path most in line with their ethical ideal (RYAN *et al.*, 2023). In addition, other factors also motivate their judgment about the options offered, such as how fond the player is of the characters in the story (HOLL *et al.*, 2020). By implementing engaging scenarios within the application, the players' reasoning in the face of the conflicts presented is promoted, developing their cognitive ability (REYNALDO *et al.*, 2021). In the school environment, gamification still raises concerns among some teachers about its adoption in classes (TODA *et al.*, 2024), as its adherence must undergo revisions to ensure that all participants have equal opportunities to participate, respecting ethical principles. Amaral and Sant'Ana (2024) also point out the scarcity of its application with educational games aimed at children. As for the implementation of educational games, storytelling is considered to be an efficient way of transmitting knowledge (OLIVEIRA; de CLASSE, 2024), since a well-developed



narrative prolongs the players' engagement with the content covered, promoting critical thinking.

2.1 Related Work

This subsection contains games related to the research, either because they present similar educational approaches or because their design and mechanics inspired the development of the proposed game. *Influência* is an online multiplayer board game in which players take on the role of social media influencers and compete to accumulate influence points. The user who achieves the highest score first is declared the winner. The characters have Internet-based themes and must meet different requirements to earn points (NASCIMENTO *et al.*, 2023). The match starts after all players have chosen a character. To score points, players must reach special spaces, which activate different scenarios, usually involving the participant who activated them. In this case, the chosen player must act out his/her character, representing his/her role in digital society. The score is set by the other competitors, who take on the role of social media consumers, assessing the relevance of their performance. The game also has a system of wasted points, shared among all players; repeated or irrelevant actions for the character add to this counter, bringing consequences for everyone. This mechanics informs users of unnecessary resource consumption and promotes cooperation, even in a competitive scenario.

Ethical Dilemmas is a visual novel game that tells the fictional story of Rose, a software engineer who works for a large company and faces a series of moral dilemmas throughout her professional routine. The player controls the protagonist, choosing the decisions they believe morally correct, and the story conclusion is altered according to the answers. The game portrays themes such as pressure in the workplace and invasion of privacy, seeking to make players aware of ethics interactively and playfully (XENOS; VELLI, 2020). *Lendas do Brasil* is a board game in which players control figures from the Brazilian folklore to advance on the board and must answer questions from cards about the country's culture to progress until they reach the finish line. Each round, a player draws a card from the deck to show to all the players, containing a character and a question about them. The questions can be objective or discursive, and the player can move around the board if they get them right (de MELO; da SILVA, 2021).

Reigns is a strategy game in which the user plays the role of governor in a fictional kingdom, where they must make the best decisions with the cards they are dealt with. The player has four attributes that must be managed carefully (NERIAL, 2016). Its main mechanics uses cards containing a scenario for the user, presenting a situation the player must solve. The card can be moved to the left or right; each side presents a different solution to solve the obstacle. Each solution has different effects when chosen, based on its context, usually favoring one of the attributes while subtracting another: religion, population, infantry, and capital. The game ends if one of the attributes is exhausted or filled. Therefore, users should choose the option that best suits them. Although this is neither an academic nor an educational game, its card mechanics inspired this research. It was adapted for an educational context by opting for one correct and one wrong answer for each problem.

The games presented above raise awareness about the ideal behavior to be represented in a society and how we should respect the culture of our community. However, they generally deal with conflicting scenarios in which there is a clear distinction between the objectively better option and the wrong one. The ethical-moral game *e-Caminhos da Vida* proposed herein sets out to guide its players through scenarios in which the answer is not always obvious, and to show them that, although it may seem



obvious, sometimes, depending on the situation, we must choose something that disadvantages us for the sake of the greater good.

3. METHOD

The game proposed in this research – *e-Caminhos da Vida* – was defined together with the authors of the original board game that inspired its adaptation into a digital version. The game alludes to the choices we make in everyday life. Another fundamental aspect is that it should appeal to children.

3.1 *e-Caminhos da Vida* Game

The *e-Caminhos da Vida* game was developed using the Unity graphics engine, one of the most popular environments for game development (COWAN; KAPRALOS, 2017). The version of the game generated in this research is for personal computers. The game assets, such as textures and models, were produced in an image editing and 3D modeling program. The game can be accessed at the following link: <https://john360boxer.itch.io/e-caminhos-da-vida>.

e-Caminhos da Vida is a digital 3D board game in which groups of two to four players determine the best approach to solving moral problems to advance along the path. Each game contains randomly drawn cards and dice rolling for movement, ensuring that each experience is unique. In *e-Caminhos da Vida*, players take turns to draw a card containing a dilemma, using problem-solving to define the best outcome of the situation. Once they have made their choice, they roll a dice to determine the trajectory of their movement; the correct alternative moves the player forward while the incorrect one moves them backwards. The game ends when one player reaches the last position and is declared the winner. At the start of the match, the order of the players is defined in ascending order based on the colors: blue, pink, yellow, and brown, respectively. The first player starts his turn, followed by the other players, returning to it after the last player completes his/her turn. A turn consists of the following moves:

- The player will draw a random card. If all cards are drawn, the game randomly reshuffles them, placing them back on the pile.
- The card, consisting of an image and a description, will be revealed. It shows a fictional scenario with a conflict. There is no time limit for reading the letter.
- When you have finished reading the card, the player will turn it over to reveal two answers that resolve the previous conflict. However, only one is the correct answer, and it is up to the player's judgment to define the best alternative. You can reread the card by turning it over.
- Once the choice has been made, the game announces the result. If the player has chosen the correct alternative, a congratulatory message will appear; otherwise, a message warning of the error will appear instead.
- After reading the message, one of two dice will appear on the screen. The type of die changes based on the correctness or incorrectness of the answer; a standard six-sided dice is shown for correct answers and a red three-sided dice for incorrect answers.
- After throwing the die and it stops moving, the game takes the face up as the result of the roll. If the player gets the alternative right, he will move the exact value of the face as squares on the board forward, while a mistake results in moving that value backwards.

- If the player reaches a gray space, his/her turn is over, and the game moves on to the next player, repeating the cycle.
- If the player reaches another type of space, a special effect occurs: if the space is blue, they roll a golden die numbered up to three, moving forward the same value as indicated on the upward numbered side of the die; if the space is red, they move back one square. Only one special effect can occur per turn.
- If the player reaches the checkered space at the end of the board, he/she will be declared the winner, ending the game.

Figure 1 illustrates the process described in the first three stages, and Figure 2 illustrates the dice rolls. Figure 3 shows a screenshot of the game, in which a player, after throwing the die, has reached a lucky space, and he/she can thus throw an additional die to move more squares. The game has 25 cards dealing with various themes, such as social interaction, preserving the environment, and combating disinformation.

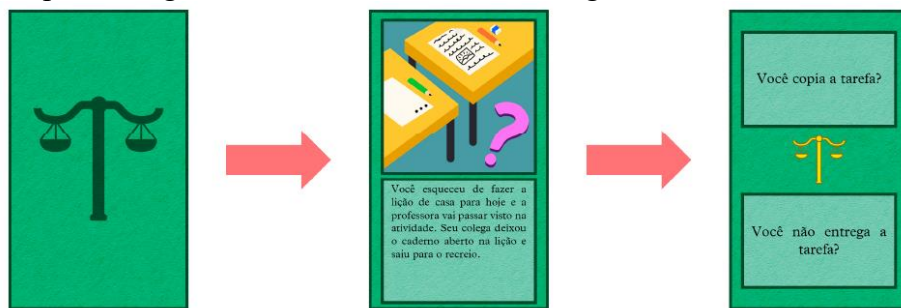


Figure 1. Illustration of the game card mechanics. Source: The authors.

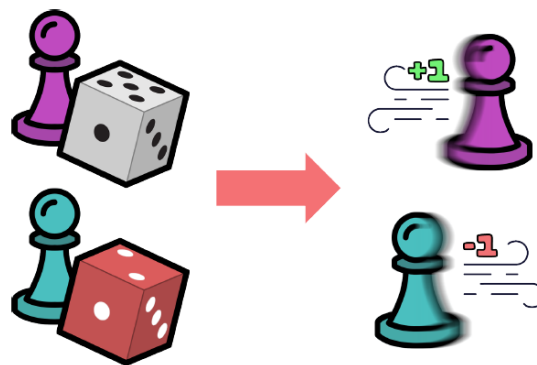


Figure 2. Illustration of the game dice mechanics. Source: The authors.



Figure 3. The fourth player activated a lucky space in his round. Source: The authors.



For game design, the game used the MDA framework (HUNICKE *et al.*, 2004), which aims to determine the best approaches to providing fun based on a game functionality and genre. It starts from the premise that the content of the game is the behavior that emerges during gameplay, not necessarily the image or the result produced that is displayed on the screen. This model structures the player's experience into three main components: mechanics, dynamics, and aesthetics. From the developers' perspective, the mechanics define the gameplay, influencing its appearance. From the user's point of view, aesthetics refers to the tone in which the rules work, determining how they should operate. It is essential to think about these two scenarios during product development because modifying one element can impact all the others. For this work, it was always necessary to have the typical user's perspective, thinking of how novice players would interact with the game and their reactions as they progressed through the game.

The model also describes the aspects that make a game fun and how the theme and genre influence the content to satisfy players. Thinking from the player's perspective, *e-Caminhos da Vida* uses lower dice values for negative hits and bonus spaces, maintaining engagement by preventing a player from being discouraged from continuing to play because they have returned several squares for getting a single question wrong, or because another player has moved several squares due to luck. The game artwork and animations seek to entertain players while conveying desirable behavior in the face of adversity and how reacting ethically and fairly can be rewarding. Using random chance mechanics, such as dice rolling, helps to relieve the tension that can arise during a match. This element introduces a degree of unpredictability, allowing all participants, including novice and inexperienced players, to compete with each other.

3.2 Participants and Method Description

An empirical study was conducted to evaluate the game by applying two questionnaires to 155 volunteer participants. As the work involved children, it was necessary to receive approval (CAAE 84178324.5.0000.0356) from the Research Ethics Committee of the Federal University of Itajubá (UNIFEI) to administer the school tests. The student volunteers and the responsible parties filled in an Informed Consent Form to authorize participation. The participant could withdraw from the study at any time during the tests without penalty or obligation. The test schedule followed the following steps to complete the evaluation: presentation of the research and operation of the game rules and commands; game sessions; and filling in the forms. The tests were conducted face-to-face in a school environment, usually reserving a normal class time for the activity. Due to the nature of the game and the time constraints, finishing a game to fill in the questionnaires was unnecessary, although this was desirable.

Since class sizes varied, the questionnaires were available on Google Forms to speed up data collection. The forms contained a brief description of the work, links to the game official website, and the questions to be answered. No sensitive data was collected, such as name, e-mail address, or other identification information. The questionnaires can be divided into two parts. The first contained objective questions and was constructed following the MEEGA+ KIDS model (GRESSE VON WANGENHEIM *et al.*, 2020), which is an adaptation of the MEEGA+ model (PETRI *et al.*, 2019), aimed at evaluating educational digital games, and is widely adopted and recognized. Compared to the original model, MEEGA+ KIDS has a reduced grammar and a few fewer questions for better understanding by children, totaling 26 closed questions following a five-point Likert scale (JOSHI *et al.*, 2015), ranging from "totally disagree" to "totally agree".



Regarding the 'Usability' quality factor, the questions in the 'Aesthetics', 'Learnability', 'Operability', and 'Accessibility' dimensions are: U1) *The game design is attractive (game board, cards, etc.)*; U2) *The font and colors of the game match*; U3) *The size and style of fonts used in the game are easy to read*; U4) *The colors used in the game are meaningful*; U5) *Learning to play this game was easy for me*; U6) *The game rules are clear and easy to understand*; U7) *I think that the game is easy to play*.

About the 'Player Experience' quality factor, the questions in the 'Confidence', 'Challenge', 'Satisfaction', 'Social Interaction', 'Fun', 'Focused Attention', and 'Relevance' dimensions are: PE8) *The organization of the content helped me to become confident that I would learn with this game*; PE9) *This game is appropriately challenging for me*; PE10) *The game provides new challenges (offers new obstacles, situations, or variations) at an appropriate pace*; PE11) *The game does not become monotonous as it progresses (repetitive or boring tasks)*; PE12) *Completing the game tasks gave me a satisfying feeling of accomplishment*; PE13) *It is due to my personal effort that I managed to advance in the game*; PE14) *I feel satisfied with the things that I learned from the game*; PE15) *I would recommend this game to my colleagues*; PE16) *I was able to interact with other people during the game*; PE17) *The game promotes cooperation and/or competition among the players*; PE18) *I felt good interacting with other players during the game*; PE19) *I had fun with the game*; PE20) *Something happened during the game that made me smile*; PE21) *There was something interesting at the beginning of the game that captured my attention*; PE22) *I was so involved in the game that I lost track of time*; PE23) *The game's content is of my interest*; PE24) *It is clear to me how the contents of the game are related to the course*; PE25) *I learned content of the course with this game*; PE26) *I prefer learning with this game than through other ways (e.g. expositive lectures given by the teacher)*.

The second part of the evaluation process presented three open questions in which the participants could freely discuss what they thought was good or bad about the game:

- 1) *What did you like about the game?*; 2) *What did you think was bad about the game?*;
- 3) *What can we improve in the game?*.

4. RESULTS AND DISCUSSION

This section presents the results and discusses the observations made in the study, which involved 155 volunteers, 45 from public schools and 110 from private schools. The classes were divided by grade, with 17 students in the second grade, 27 in the third, 53 in the fourth, and 58 in the fifth.

Figure 4 shows the results of the questions relating to the 'Usability' quality factor. Questions U1-U4 refer to the visual and aesthetic aspects of the game, while questions U5-U7 seek to understand how easy it is for the user to learn to use the game. The results showed acceptance by the students, with only a few questions showing greater variation in scores. Questions U3 and U4 indicate the possibility of making improvements for greater clarity and distinction between texts and colors. Question U6 recommends greater clarification in the rules that make up the game. The students' assessment of 'Usability' was generally excellent, with favorable opinions occupying over 94% of all questions.

Figure 5 shows the results of the questions relating to the 'Player Experience' quality factor. Questions PE8-PE11 analyzed the students' experiences with playing the game. The results showed good acceptance on the part of the participants, although there was a notable variation in some questions. The data showed that users found the game challenging. Still, improvements are needed, emphasizing balancing the cards, adding new dice or boards, and implementing new techniques to reduce repetitiveness.

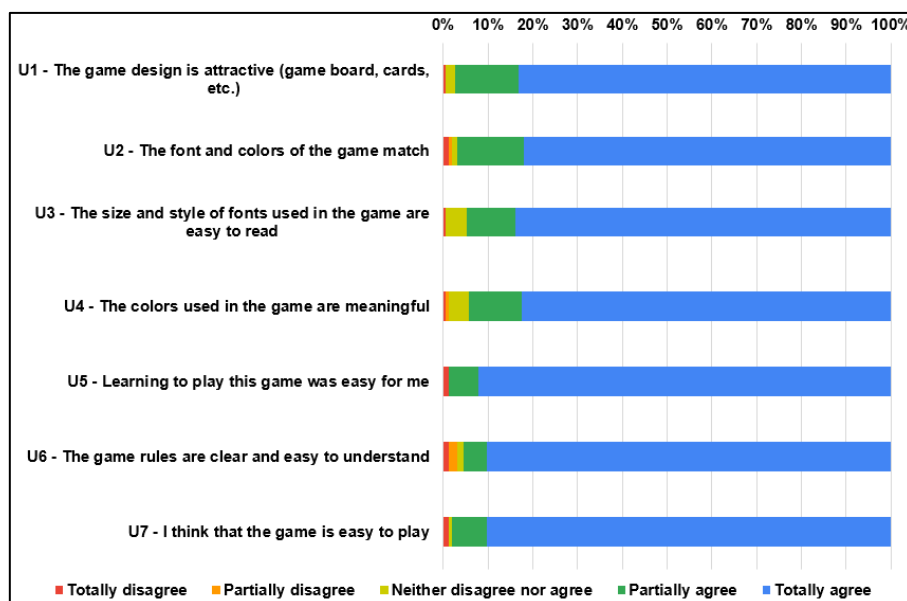


Figure 4. Answers to the 'Usability' quality factor. Source: The authors.

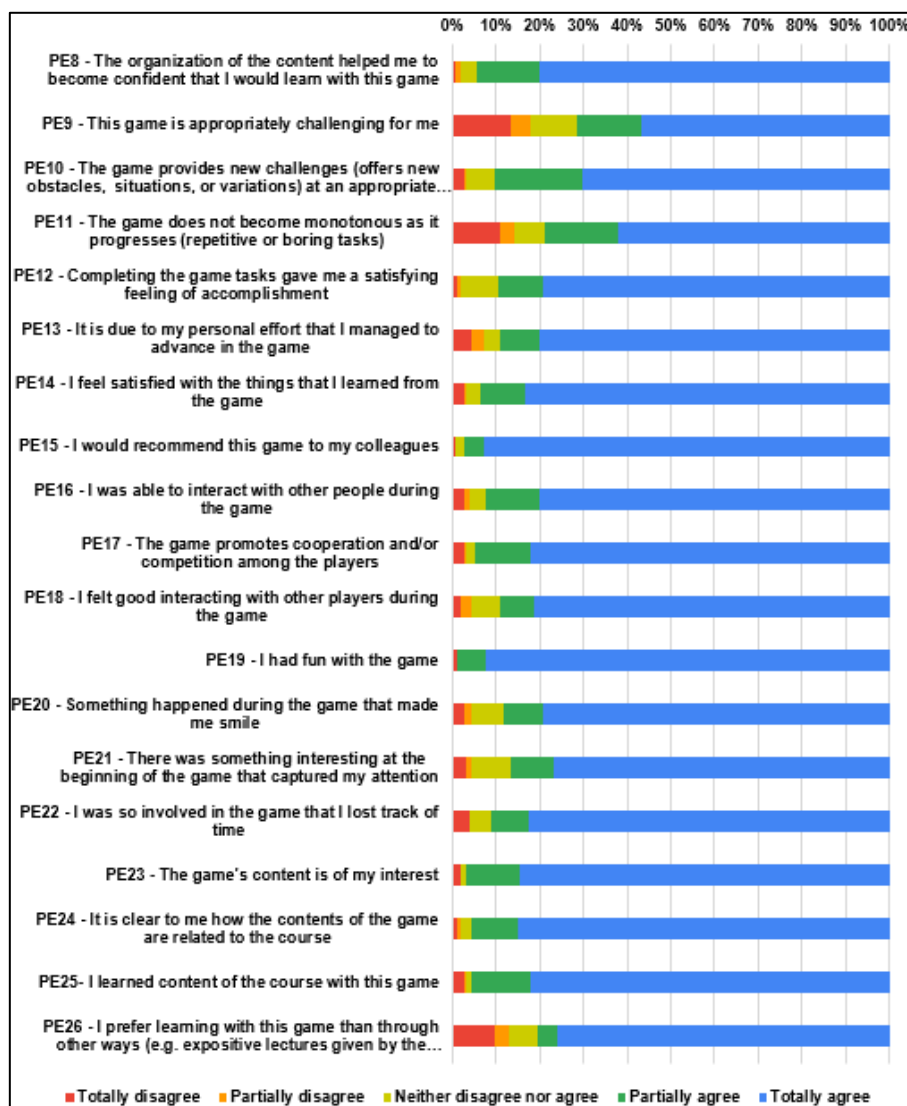


Figure 5. Answers to the 'Player Experience' quality factor. Source: The authors.



Questions PE12-PE14 sought to understand the player's satisfaction with advancing in the match. The data showed that the experience pleased the participants, but a minority believed the match outcome was out of their control. Question PE13 presents the users' reception of the lucky mechanics; many players were happy with their use, while others attributed their presence as a negative factor for the experience. It is estimated that there is no need to change the current randomness in the game, as many open comments attributed the use of the dice to luck and chance spaces as the main highlight of the game fun. Questions PE15-E18 were used to ascertain the experience of the players during the match. Question PE15 had the highest score of all the questions, comprising a single negative evaluation. It was possible to observe that most users, even those who did not like the game, would still recommend it to their friends, recognizing it as a potential teaching and entertainment tool.

Questions PE19-PE22 sought to measure the players' individual experience regarding the game enjoyment. The results showed that the students received the game very well, as question PE19 achieved a high score. This is undoubtedly the most important question related to any game. Of the 155 participants in the survey, 153 responded positively. We therefore conclude that the game was successful among the participants. This opinion was confirmed by the students' comments, who said they wanted to download it to play at home. Questions PE23 and PE24 portrayed the students' perceptions regarding the game and the content presented. The results indicated that the players were interested in the educational topics presented in the game and stated that the game uses the covered content correctly.

Questions PE25 and PE26 assessed the learning the players got from using the game compared to traditional teaching methods. The results indicated that most participants recognized its use as a teaching tool and many preferred it for learning. Question PE26 stood out for having the highest number of negative responses, since a small proportion of students said they preferred other teaching methods. As this is a preference, the topic is subjective, and there was no demand to improve this question. However, the score for question PE15 showed that even participants opting for other methods would still recommend the game to their colleagues.

Teachers were present during the tests to help the participants. Some of them commented on previous experiences they had applying educational games in the classroom, saying they had been positive and well-received by the students. In general, they expressed support for applying *e-Caminhos da Vida* in schools. Analysis of the answers to questions P23-P26 allowed us to infer that using the game as a study tool is viable in an educational environment and is even preferred by some participants. After the tests, the game was publicized through the schools official communication channels so that students and their guardians interested in the product could download it to their homes.

The second questionnaire, answered by the participants, allowed them to express their comments on the game optionally. In response to "*What did you like about the game?*", the use of various terms such as "cards and answers", "board", and "golden dice" appeared frequently, while "art", "competition", and "interaction" were mentioned to a lesser extent. Some more specific answers that stood out were "animal cards" and "names", when even something as simple as the screen to define the players' names was a favorite point for some users. The answer "*The way the game works and the lucky dice do not activate the space of bad luck*" acknowledged a mechanics intentionally implemented in the game, in which a player who reaches an unlucky space via a golden dice will not activate the adverse effect, so that they are not penalized for being lucky. For the question "*What did you think was bad about the game?*", the frequent terms



“difficulty” and “repeated cards” validated the points discussed in the analysis of questions PE9 and PE11, respectively, while terms such as “returning squares” and “board size” were repeated a few times. The answer *“Not being able to have a server on two computers and not being able to play alone, a bit boring”* describes the opinion of a user who did not like the local multiplayer, preferring other options such as playing individually or via the Internet, both of which are interesting improvements that could be implemented in future work.

In response to *“What can we improve in the game?”*, the most prevalent terms were “new cards” and “new boards”, while less frequent terms were “quick restart” and “characters instead of pins”. There were a few requests to develop a “mobile version”, but participants widely requested this during the tests. The answer *“So that the dice do not fall so far”* demonstrated a player’s desire to speed up the dice rolling process, which, due to its randomness, can sometimes take several seconds to complete. The answer *“Enlarging the letters and the board”* presented a point of accessibility, which would make it possible to add options for enlarging the sizes of texts and images to make it easier for players to understand. The possibility of expressing opinions in the open comments was essential for validating the questions in the first questionnaire, allowing participants to justify the reasons for their evaluations. Many answers are related to the scores awarded in the first questionnaire, such as the term “repeated cards,” reflecting the score awarded in question PE11.

5. FINAL CONSIDERATIONS

This research developed the *e-Caminhos da Vida* game to enable the playful and interactive study of ethical and moral principles for the development of elementary school students. To validate the educational purpose of the game, tests were carried out in three schools, a public and two private ones. A total of 155 students used the game with their classmates and then completed questionnaires to evaluate it. The form included 26 closed and three open questions, asking students to describe their experience using the game from different perspectives. Analyzing the results of the questionnaires, we can see that there was a strongly favorable evaluation of using the game as an educational tool, due to its ease of understanding and handling, the fact that it presents content that is relevant to learning and the fact that it is a fun application, as described by the students. The participants indicated their desire for a version for mobile devices. Still, they asked for improvements to make it more interactive, with greater difficulty in solving problems and a greater variety of cards. The results of the tests led us to conclude that educational games as an active methodology can be a great teaching tool, encouraging students to interact with the content covered. The concepts presented by the game are estimated to provide new perspectives for the students, and they will be able to use the interactions described on the cards to improve their relationships with their friends and family.

For future work, we suggest better evaluating the content presented so that the difficulty is more appropriate to the target audience, increasing engagement with the game. It is also recommended that the game be adapted for mobile devices, given that smartphones prevail over personal computers in contemporary society.

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