



Health-game: a serious game to inform about coronavirus and combat false information

Saúde-game: um jogo sério para informar sobre o coronavírus e combater a falsa informação

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ABSTRACT

The market for digital games in Brazil has been growing prominently in recent years. In this area, educational games have been highlighted, which demonstrate positive results for the practice of gamification in the learning process. This article presents a serious quiz game that aims to inform you about the COVID-19, highlighting the importance of sharing truthful information about the virus. Making use of a methodology for regionalization of information with emphasis on everyday situations, thus intending to combat false information in a practical, scalable and playful way. The results, obtained from the validation with 30 students who tested the game, served as supporting material for improvements in the game and point out that, even using relatively simple and already usual techniques in the serious game scenario, it is possible to innovate in this field and provide society with a tool connected to the moment and difficulties it faces.

Keywords: Covid-19. Gamification. Education. Desinformation.

RESUMO

O mercado de games digitais no Brasil tem um crescimento de destaque nos últimos anos. Nessa área têm se destacado os jogos educativos, que demonstram resultados positivos para a prática de gamificação no processo de aprendizado. Este artigo apresenta um jogo sério em formato de quiz que visa informar sobre a COVID-19, ressaltando a importância do compartilhamento de informações verdadeiras sobre o vírus. Faz-se uso de uma metodologia para regionalização de informações com ênfase nas situações cotidianas pretendendo, assim, combater falsas informações de forma prática, escalável e lúdica. Os resultados, obtidos a partir da validação com 30 estudantes que testaram o game, serviram de material de apoio para melhorias no jogo e apontam que, mesmo utilizando técnicas relativamente simples e já usuais no cenário de jogos sérios, é possível inovar nesse campo e fornecer à sociedade uma ferramenta conectada ao momento e às dificuldades por ele enfrentadas.

Palavras-chave: Covid-19. Gamificação. Educação. Desinformação.

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INTRODUCTION

Coronavirus causes a disease with a high degree of contagiousness, causing the lives of many people to be profoundly affected and the sanitary routines in cities, states, countries, and continents to need revision. With the spread of the coronavirus in several regions of the world, it has become necessary to investigate possible solutions to problems that are affected in the routine of citizens regarding the fight against the virus, where practices of prevention of the disease and combating the virus have become a priority to stop the progress of COVID-19.

Among some solutions, we can cite the dissemination of correct information using technology to strengthen the process of spreading correct information, especially those that are guided by the educational and hospital health sector, and thus combat the sharing of false information. According to the World Health Organization (WHO)¹, the dissemination of false news was one of the main causes of the high number of deaths caused by COVID-19 in Brazil and highlights the importance of awareness still in the children and youth society.

Based on this context, it is possible to verify that the use of technologies has become fundamental to be applied in society, mainly to help in the teaching-learning process of important themes such as COVID-19.

One of these technologies introduced in the scenario of the COVID-19 pandemic were the Serious Games that due to their ability to respond satisfactorily to various problems because they combine the playfulness of playing and the seriousness of informing can meet the various needs of social dissemination, including in combating the spread of false information².

Considering these aspects, on perspective of active methodologies, the Health-Game was developed, aiming to: i) disseminate correct

information about COVID-19 through gamification techniques; ii) sensitize the population to their attitudes towards the guidelines for protection and prevention of COVID-19 contamination; and iii) disseminate information and guidelines about symptoms, prevention and treatment of COVID-19 in a regionalized manner.

This document is divided into 4 sections. Section 2 will show a brief contextualization of the scenario in which the application was developed and will address the planning and development of the application, presenting all the usability factors involved. Section 3 presents the results obtained from the evaluation of the game by students from the Instituto Federal do Pará (IFPA). Finally, section 4 presents the final considerations and future work

METHODOLOGY

This software was developed by the Operational Research Laboratory (LPO) of the Federal University of Pará (UFPA) with the goal of developing a technological tool applied to the health area and that could collaborate by disseminating correct information to combat COVID-19 considering the pandemic scenario.

Some studies are shown referring to the use of technology in the practices of prevention of the disease and combating the virus that, despite the reduction, is still a cause of concern for all societies around the world.

In Brazil³ an application called "TrateCOV" was developed by the Ministry of Health, this application ensures the collection of symptoms and signs of citizens in relation to the disease, with greater simplicity to health professionals, in order to assist in the treatment of patients through diagnosis of the disease. The application enables care to be provided according to each user's specific case, in addition to the ability to suggest medications according to the system's updated knowledge base.

The "Xô corona" application was

developed to convey information about means of prevention and information about the pandemic. The digital card game makes players reflect on their actions to prevent contamination while playfully addressing the risks of accessing fake news⁴.

Gaspar⁵ developed a serious game with the goal of providing scientific information about prevention and self-care of COVID-19 during the pandemic, assessing players' knowledge about topics related to this disease. According to the authors, the gamification strategy for health education content about COVID-19 reached a young audience, generating reinforcement of specific educational measures that were implemented from the players' actions. The researchers point to an improvement in the game users' performance regarding attitudes towards the pandemic, such as adherence to the use of masks all the time.

In view of these related works, we consider that the Health-game can be a good tool to combat the misinformation about the pandemic, where the Health-game stands out from other Serious Game proposals for its regionalist approach, simple and dynamic, taking into account social, economic and cultural aspects of certain Brazilian regions. This proposal implements a gamification considering the peculiarities of the Brazilian

regions (North, Northeast, Midwest, South and Southeast), in order to bring to users information and knowledge based on local situations and particular orientations.

As pointed out by Castro⁶, regionalism is a form of political ideology that is based on regional identity. This, according to Rotelli⁷, manifests itself as an attitude of "excessive interest and love for one's own region", exacerbated in the historical process of the formation of the National State when the "political trend of favoring regional autonomies" was organized, highlighting the understanding of cultural differences between game, sport and the region, in the process of valuing and re-signifying the ludic culture⁸. However, this does not eliminate the need to disseminate general guidelines for similar cases or issues according to the guidelines of the World Health Organization.

The development of this work is given by Figure 1, where the study of the characteristics of the game is done, as well as the target audience, then the first version is made taking into account what was seen in the planning, followed then by usability tests and finally the updates made to the game.

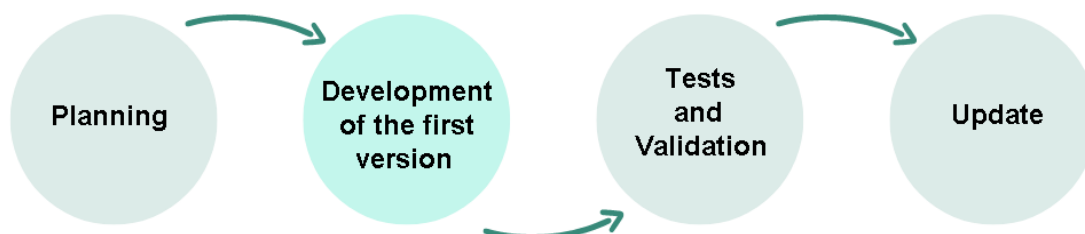


Figure 1. Methodological Development

PLANNING

Using the Agile methodology for the project development⁹, it was possible to make quick and daily approaches to the team through video calls and weekly meetings.

The choice of the game being a mobile application is due to its greater relevance in relation to other platforms, as presented by data from Fundação Getúlio Vargas¹⁰, where about 342 million mobile devices (cell phones, notebooks and tablets) were active in Brazil in June 2020,

being 234 million related to smartphones. The same data points out that the biggest users are young people between 16 and 24 years old, which ended up becoming our target audience.

Taking into account the main characteristics of games¹¹, gamification¹², and gameplay¹³, the development and design team defined some of the most relevant characteristics that should be present in the Health-Game, as shown in Table 1.

Table 1. System Requirements

Features	Reason
Game accessible on multiple platforms.	Mobile platforms such as smartphones are the most used, followed by laptops and desktop computers.
No file downloading is necessary.	A mobile application was chosen for the ease of hosting the game directly on the internal memory of the device.
No registration is required.	This project does not use confidential and/or personal data because it does not have a registration system.
It takes into account the cultural characteristics of the Northern Region of the country.	The Health-Game takes into consideration the beliefs and habits of each Northern Region when developing the questions and answers.
It keeps score in the ranking.	The player's name and the score of the first 5 players will be stored in the device.
It makes it possible to see the ranking.	The rating is located in the game's main menu, so you don't need to play the game to be able to view the rating.
It provides information about the project, the institution and the team.	There is information about the project, institution and support teams, as well as basic information about the members directly related to the development of the application, and you can view this information under "Credits" located on the main menu.

Source: Own authors

DEVELOPMENT

For the game modeling it was used the tool Unity, which is a proprietary game engine Unity Technologies¹⁴. Unity was chosen for having the possibility to create games for various platforms such as smartphones, consoles and browsers, besides having ready elements such as textures and libraries, speeding up the creation of games, besides its organized and easy to use interface.

To enable the game functionalities, the Visual Studio Code IDE - Integrated Development Environment¹⁵ was used, which has support for several programming languages, one of them being C#, used to create the game scripts.

The Health-Game follows the style of electronic games, with a friendly interface adapted for different audiences. Figure 2-A shows the initial screen; the background color was chosen after discussions and analysis by the developers, taking into consideration which would be more pleasant and would highlight both the logo and the selected image.

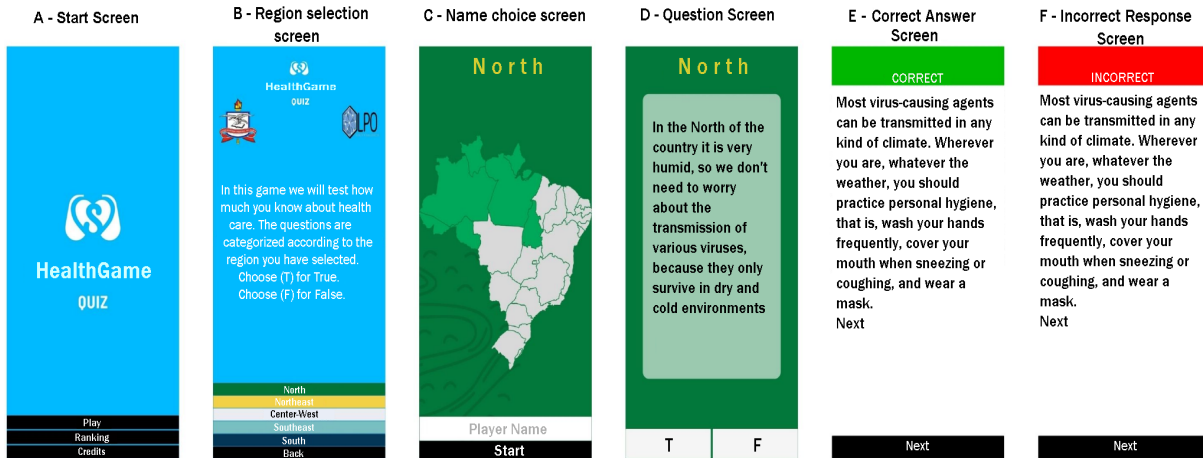


Figure 2. Screenshots of the initial version.

In the main interface of the game, lower part of the screen, shown in Figure 2-A), there are 3 buttons to access, respectively, the “Play”, “Ranking” and “Credits”. The images of the buttons are provided by the Unity tool itself, along with their texture.

By selecting the “Play” button, the user is directed to a brief explanation about the rules and conditions of the game (Figure 2-B), aiming to explain how the questions are categorized. After choosing the region, the player can enter his username (Figure 2-C), which will be assigned to the ranking if he is among the first 5.

The player has to answer several questions, each corresponding to a different measure to prevent the spread of COVID-19. The answers take into account the WHO recommendations, and with each question, information from health professionals will be shared. Each question is multiple choice, with the player able to select one of two answers (Figure 2-D). After confirming the answer, the player is presented with feedback on whether the answer is correct or wrong (Figures 2-E and 2-F, respectively).

EVALUATION

To evaluate the usability requirements of the developed application, a questionnaire

was built, seen in Table 2 with 17 questions, with answers following the Likert scale pattern. The questions were related to the game, its usability, practicality and relevance to the current scenario, with the answers ranging from “strongly disagree” (-2) to “strongly agree” (+2). The test was applied in June 2022 with 30 students from the Instituto Federal do Pará (IFPA), Ananindeua campus, with an average age of 16 years old. The students’ participation was voluntary, and they should only have a cell phone with the Android operating system. The only criterion adopted for the exclusion of participants was that the student did not completely fill out the usability test form.

The evaluation process of the game followed these steps:

- 1) Presentation of a short explanation about the game;
- 2) The student should download the game that is available on the Play Store;
- 3) Using the game in any of the available regions, they answered the online questionnaire.

The questions used in the game evaluation can be seen in Table

Table 2. Validation questions

Q1 - Is the game easy to play?	Q2 - Does the game have a clear and simple objective?
Q3 - Was I able to complete the tasks (questions) quickly?	Q4 - Was it easy to understand and learn the game functions?
Q5 - Is the game a great ally for education?	Q6 - Do you think that play and education go together?
Q7 - Does the game provide “right” and “wrong” messages that clearly tell me the answers to a given question?	Q8 - Was the information (such as regions, questions and answers) provided by the game clear?
Q9 - Did the game hold the player’s attention?	Q10 - Was the information effective in helping me answer the questions?
Q11 - The application does not tire	Q12 - Was the regionalization proposal met?
Q13 - Is the game interface nice?	Q14 - Does this game have all the features and capabilities I expect from a quiz game?
Q15 - Is the game suitable for teaching about coronavirus?	Q16 - Does the game have a wide audience reach?
Q17 - Do you consider this a good teaching method?	

Source: Own authors

RESULTS

Figure 3 shows the answers obtained from the evaluation. It was possible to verify that

the first four questions related to the practicality of the game were the best evaluated, highlighting the first question with 96.6% of positive response, showing that it was relatively easy to play.

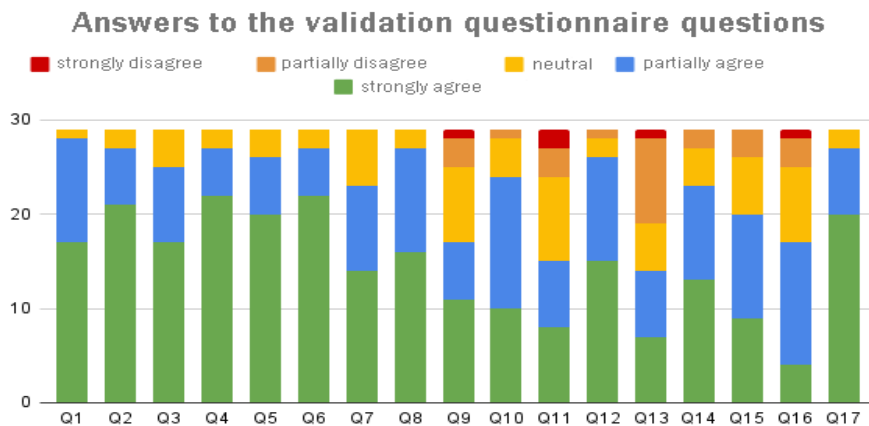


Figure 3. Graph of the respondents’ answers.

The answers to questions 5, 6, 7, and 8, in which the usefulness of the game as an educational tool is evaluated, also showed positive results. Question 6 stands out, showing how well education and playfulness work together, with only 6.6% of neutral answers and 93.3% of total or partial agreement, with 75.9% “I totally agree”, shows how the concept of gamification of learning is able to insert innovative game

strategies into daily life, raising health care, this being the main objective, but this was hindered by the repetitiveness of the game, which, according to the answers collected, we can conclude that the game became tiring over time.

The answers related to playability, aesthetics and application had a higher percentage of neutral answers, “I partially disagree” and “I totally disagree”. In some cases, as in question

13, which talks about the aesthetics of the game being pleasant, the answers are more neutral and negative than positive. Being only 48.2% totally or partially agree and only 24.1% “totally agree”, which indicates that the application still needs improvements in relation to appearance, but specifically the font and color table.

DISCUSSION

Based on these answers, improvements were made in the aesthetics of the game in order

to improve interaction with the user, correct some errors in the assembly of the application, have a more pleasant environment and better fulfill its educational role.

In the screen changes, seen in Figure 4, we can highlight the color palette for shades with less saturation, smoother borders, more rounded fonts, and more interactive and minimalist icons on the interface. In the functionalities and gameplay, there were corrections in the filling and choice of answers through some optimizations of use.

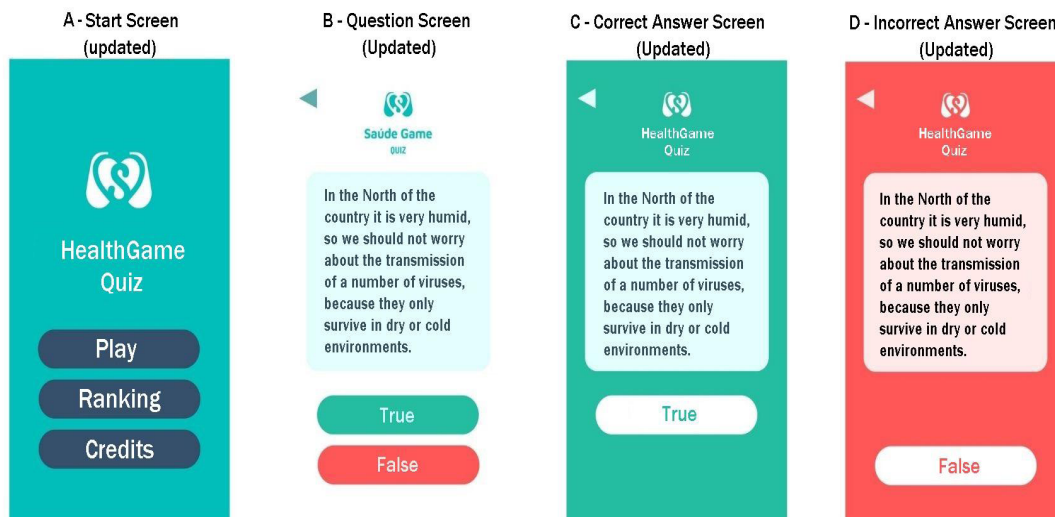


Figure 4: Game screenshots.

In addition, the game can be accessed easily and for free by users with smartphones, because it is fully compatible with the most diverse electronic devices used; thus, it will reach a wide audience, helping to bring correct information and easy access to everyone.

CONCLUSION

This work presented the Health-Game, a game in quiz format that aims to inform about COVID-19, highlighting the importance of sharing truthful information about the virus; for this, after

collecting the information obtained, the main aspects that should be changed in the game were raised, thus making a study of a new interface and how to make the game proposal clearer and make it, in this way, meet its function.

The great challenge in developing this tool was the difficulty in researching how to condense the information and guidelines coming mainly from organs such as the WHO and the Brazilian Ministry of Health and make them consistent with what is expected from a game.

As future works, we intend to account for other difficulties related to health and that

still encounter obstacles to the dissemination of proper guidelines for prevention, diagnosis, and treatment, expanded to cover other types of contexts in which it is necessary the correct orientation of young people and adolescents, such as: flu, dengue, sexually transmitted diseases (STDs), and others.

We also expect updates to the questions available in the quizzes; updates to the ranking system and levels of difficulty as users progress through the game; adaptation for the IOS operating system and new features and attributes to make it more attractive and able to meet the diverse audiences following the same concerns listed above; therefore, focusing on user needs.

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