



APRENDA PICS: STRUCTURING AND USABILITY OF A GAME ABOUT INTEGRATIVE AND COMPLEMENTARY PRACTICES IN HEALTH

APRENDA PICS: ESTRUTURAÇÃO E USABILIDADE DE JOGO SOBRE PRÁTICAS INTEGRATIVAS E COMPLEMENTARES EM SAÚDE

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ABSTRACT: The objective of this study was to report the process of structuring and analyzing the usability of a game focused on Integrative and Complementary Health Practices (ICHP). The game was developed using the Wordwall platform, and usability evaluation was conducted with 381 undergraduate health students using the System Usability Scale questionnaire, complemented by an open-ended question analyzed through thematic content analysis. Three game models were structured: Learn ICHP 1, addressing the definition of the practices; Learn ICHP 2, focusing on the modes of application; and Learn ICHP 3, related to benefits and/or limitations. The usability of Learn ICHP 1 was considered excellent, and the game proved to be capable of assisting and contributing, in a complementary manner, to teaching-learning processes related to Integrative and Complementary Health Practices.

KEYWORDS: Complementary Therapies; Primary Health Care; Educational Technology; Continuous Learning.

RESUMO: O objetivo foi relatar o processo de estruturação e de análise da usabilidade de jogo sobre Práticas Integrativas e Complementares em Saúde (PICS). A estruturação foi realizada através da plataforma Wordwall. A avaliação de usabilidade foi realizada a partir de um dos modelos, com 381 estudantes universitários da saúde, e testada através do questionário System Usability Scale com uma questão aberta, avaliada por análise de conteúdo temática. Foram estruturados três modelos de jogos: Aprenda PICS 1 que trata da definição das práticas; Aprenda PICS 2 sobre os modos de aplicação; e o Aprenda PICS 3 relacionado aos benefícios e/ou limitações. A usabilidade do Aprenda PICS 1 foi considerada excelente e o jogo é capaz de auxiliar e contribuir, de maneira complementar, nos processos de ensino-aprendizagem sobre as PICS.

PALAVRAS-CHAVE: Terapias Complementares. Atenção Primária à Saúde. Tecnologia Educacional. Educação Permanente.

INTRODUCTION

Integrative and Complementary Practices (PICS) were implemented through the National Policy on Integrative and Complementary Practices (PNPIC)¹, and discussions on the subject have increased over the years². Initially, the PNPIC legitimized practices such as phytotherapy, homeopathy, traditional Chinese medicine, anthroposophic medicine, and social thermalism. Currently, it encompasses 29 different practices³.

The implementation of PICS in Primary Health Care (PHC) services within the Unified Health System (SUS) serves as an alternative to conventional therapies. These practices enable a broader approach to health care for users, strengthen the therapeutic relationship between professionals and the community, require lower financial investments, and allow personalized treatment^{4,5}.

Regarding PICS education, many professionals report having acquired their knowledge independently through courses or self-learning, as PICS are not consistently incorporated into undergraduate curricula⁶. Overall, students' understanding of PICS is relatively limited, with many unaware of its components and variations^{7,8}.

To help change this scenario, educational technologies in health can be employed as pedagogical tools, facilitating teaching and learning processes^{9,10}. Among these resources, serious games stand out, games in which the objective goes beyond user entertainment, focusing on educational purposes¹¹, and which are capable of improving skills and facilitating learning¹². One example is the Wordwall platform, which offers 18 types of free activity templates¹³. Although this platform covers various study topics, it lacks a structured approach to PICS.

Given this context, this study aims to report the structuring process and usability analysis of an educational material focused on Integrative and Complementary Practices in Health.

METHODOLOGY

This is a study that use mixed methods of the sequential explanatory type¹⁴ for structuring and usability analysis of an educational game or serious game focused on educational processes about Integrative and Complementary Practices in Health (PICS). For structuring, three models from the Wordwall platform were used: "open the box," in which clicking on each virtual box reveals the answer inside; "quiz," a multiple-choice questionnaire where clicking the correct answer allows progression; and "TV quiz show," which includes multiple-choice alternatives, a timer, lifelines, and a bonus round¹³. Thus, three types of games were developed, each with increasing levels of difficulty.

The choice of models was based on extensive analysis since some were too playful for the target audience, others were designed primarily for language learning, and some had significant limitations, such as restrictions on the number of questions, which would hinder serious game development and fail to meet all educational needs. The selection of models was made after testing on smartphones and computers to evaluate their performance concerning visual comprehension elements. The timer settings for each model were based on pilot test simulations and defined by the content creators, ensuring that users had a good experience and could complete the game.

To construct the questions used in the game, a literature review on PICS was conducted, analyzing titles and abstracts of articles, books, book chapters, and regulatory documents. The review period lasted from January to July 2022 and covered three major thematic search blocks: concepts and/or definitions, usage modes and/or application methods, and potential benefits and/or limitations. This study did not

aim to validate the game's design or interface before a panel of experts or users since these elements are already predefined by the Wordwall platform. However, a usability evaluation was conducted on one of the developed models, intentionally selected due to the time limitations for game application.

The usability analysis considered as the eligible population the 3,436 undergraduate students in healthcare programs at the University of the Extreme South of Santa Catarina (UNESC). After calculating the sample size, considering a 95% confidence level, a 5% sampling error, and a potential 10% loss, a total of 381 participants was obtained. This sample was proportionally divided into clusters based on the number of students enrolled in each program.

Data collection took place between May and June 2023, following recommendations from course coordinators and professors regarding the best days and times, and was conducted during students' class periods. Participants were invited to a designated room until the required number for each program was reached. A general presentation of the study was given, the game was made available for participants to experience, and subsequently, the System Usability Scale questionnaire was applied, consisting of ten Likert-scale questions for usability evaluation^{15,16,17}.

For the quantitative analysis, the total score was calculated to generate a single number representing overall usability assessment. The contributions of each scored item were summed. Odd-numbered items (1, 3, 5, 7, and 9) contributed by taking the scale position minus 1, while even-numbered items (2, 4, 6, 8, and 10) contributed by taking 5 minus the scale position. The sum of all ten questions' total scores was then multiplied by 2.5 to obtain the final system usability score¹⁵.

The scale scores range from 0 to 100 points¹⁸: up to 25 points represents the worst possible scenario; from 25 to 40 points is considered poor; from 40 to 52 points is fair; between 53 and 73 points is good; from 74 to 85 points is excellent, and above 85 points represents optimal usability¹⁶.

To complement the quantitative findings, a qualitative analysis of open-ended responses was conducted using thematic content analysis, divided into three phases: pre-analysis, material exploration, and result interpretation, supported by Atlas.ti software^{19,20}.

In the pre-analysis phase, responses from the forms were organized into a Microsoft Excel file, read, spell-checked, and assigned alphanumeric codes to ensure participant anonymity. During the material exploration phase, citation recording units were selected, codes were created based on indicated themes, and similar codes were grouped into tabs. In the result interpretation phase, each code was assigned a specific color, frequency counts were calculated, data was transferred to a text file, and the author's observations were recorded, along with up to three citation excerpts that best represented each code.

The study was approved by the Research Ethics Committee under opinion number 5.821.155, and anonymity was ensured by assigning an alphanumeric code composed of the letter "P" for participant followed by a cardinal number.

RESULTS

The results are divided into two sections: the structuring of the game and the usability analysis.

STRUCTURING THE GAME APREND A PICS

The structuring of the game Aprenda PICS led to the development of three game models, named Aprenda PICS 1, 2, and 3.

"Aprenda PICS 1" (Figure 1) used the "open the box" model, consisting of 29 distinct boxes representing all PICS. Each box contained a different practice, with four answer choices, only one of which was correct. The player had to click one item at a time to reveal the content inside. The player had 1 minute and 45 seconds to answer each item, selecting the alternative that matched the image of the practice and its corresponding description, meaning the game focused on definitions and concepts. The order of the items was randomized, making each playthrough unique. If the chosen answer was incorrect, the box would reappear until the correct option was selected.



Figure 1. Aprenda PICS 1 in the Open the Box model.
Source: Survey data, 2022

"Aprenda PICS 2" (Figure 2) followed the "quiz" model and included a series of multiple-choice questions. After selecting an answer, the quiz progressed automatically until all questions were completed. There were 29 questions, covering the application modes of the Integrative and Complementary Practices. If an incorrect option was selected, the correct answer would be displayed immediately, but this did not affect gameplay, as lives were unlimited. The player had 5 minutes to complete all questions, following a progressive countdown.



Figure 2. Aprenda PICS 2 in the Quiz model.
Source: Survey data, 2022.

“Aprenda PICS 03” (Figure 3) utilized the TV quiz show model, incorporating questions about the benefits or limitations of PICS. The player has 1 minute and 10 seconds to answer each question. It is a multiple-choice questionnaire with a timer that tracks elapsed time, and its unique feature is the bonus round. After six questions, the game pauses momentarily to initiate an interactive card-based dynamic on the screen, with options that may be favorable or unfavorable to the user. The player must select one of them before continuing.



Figure 3. Aprenda PICS 3 in the TV Quiz Show model.
Source: Survey data, 2022.

The three games, along with a simplified guide on Integrative and Complementary Practices in Health (PICS), were allocated to a landing page after the completion of the study. This page was created to store the developed products and is available at: <https://aideehailla2.wixsite.com/aprenda-pics>.

USABILITY ANALYSIS OF APRENDA PICS

Three game models were structured, all sharing similar foundations but differing in interface and theme. However, only “Aprenda PICS” 1 was tested.

For usability evaluation, 10 statements were provided, and users had to respond according to a scale.

Regarding **game usage**, the predominant response was neutral ($n=142 - 37.4\%$), possibly due to participants’ unfamiliarity with the platform.

Participants did not find the **game complex** ($n=222 - 58.3\%$) but considered it **easy to use** ($n=295 - 77.4\%$), without **needing additional support** ($n=307 - 80.6\%$), which aligns with the accessibility and effectiveness of the platform in facilitating learning and providing alternative learning methods.

Despite certain limitations of the platform, participants acknowledged the **integration of features** ($n=167 - 43.8\%$) and strongly disagreed with any **inconsistency within the game** ($n=233 - 61.3\%$).

Regarding **ease of use** ($n=298 - 78.2\%$), they recognized the platform’s role in enabling learning through gamified activities.

As for **difficulty in usage**, the vast majority of participants reported none ($n=334 - 87.7\%$). They expressed **confidence in using the game** ($n=218 - 57.2\%$) and noted no **need for prior learning to understand its functionality** ($n=156 - 40.9\%$).

The final usability score, considering contributions from each item, reached 82.8 points, classifying usability as excellent.

To complement usability findings, qualitative analysis was conducted, yielding 146 citation excerpts or record units, grouped into seven codes.

Regarding the **learning and knowledge** code (n=42 – 22%), participants expressed a desire to use the game more frequently, both to reinforce knowledge and because of the platform's positive attributes. The following excerpts highlight this code:

"I found the game very interesting. I would play it more often because it seems easier to learn specific content this way. In my opinion, there's nothing to change in the game. It's easy to play." (P104)

"I think the game was very helpful in learning about PICS, particularly in defining and recognizing each practice." (P190)

Regarding the **font size and color** code (n=36 – 18.8%), which refers to question text formatting, Wordwall's platform offers predefined design themes, but few suited the study's target audience, and many were unavailable at the time of research. The selected theme was Wooden Table, chosen based on previous tests for optimal readability on both computers and mobile devices. However, data collection revealed performance differences depending on smartphone models and operating systems. The excerpts below illustrate this issue:

"One suggestion would be to review the wording of some statements—some were slightly misconfigured—but overall, I loved the game and would use it whenever possible." (P54)

"Great game. As a suggestion, I would increase the font size for questions, as well as adjust spacing between letters, since they appear too close together." (P148)

Despite design limitations, user suggestions were considered for improvement. Character count was reduced, as font resizing was not possible, and font styles were adjusted for better readability.

The **praise** code (n=19 – 9.9%) includes sentences highlighting positive aspects of the game:

"I found it interesting. Since there are two other modes explaining utilities and benefits, it turned out great." (P126)

Regarding the **ease of understanding** code (n=16 – 8.4%), participants reported that the game maintained necessary accessibility for comprehension. One of the primary objectives was to enhance learning, hence the creation of three games with increasing difficulty levels to improve engagement:

"The illustrations are very direct in relation to the themes. Combined with repeated answer choices, this can create unintended ease." (P293)

"I really enjoyed it. It was easy to use and clearly conveyed what you wanted to present." (P370)

The **incorrect answer selection** code (n=14 – 7.3%) consists of comments related to the game's response system, with suggestions for improvement:

"I found it very good. But instead of allowing another attempt, it could simply show the correct answer. We tend to learn more when we make mistakes and don't get to redo them." (P11)

However, the specific "Open the Box" model does not support this feature. Players must retry the question until they get it right or finish the game. "The Quiz" and "TV Quiz Show" models, however, do reveal the correct answer after a mistake before moving on. Interestingly, one participant appreciated the opportunity to redo incorrect answers:

"I loved the option to redo the wrong ones!" (P32)

Regarding the **platform limitations** code (n=11 – 5.8%), feedback focused on technical issues inherent to the platform. Depending on the game model, inconsistencies and delays sometimes impacted gameplay. Internet connection also influenced performance, as stable access was necessary for smooth functionality. The following comments address these concerns:

"I found it interesting, but it takes a bit too long to move from one item to the next." (P17)

"The game is good, but the platform needs optimization, it's lagging too much." (P295)

Finally, the **suggestions** code (n=8 – 4.2%) includes participant feedback on possible improvements for the game. Many suggestions were embedded within other primary themes and categorized accordingly. Here's one example:

"A version for hearing-impaired users." (P371)

DISCUSSION

Information and Communication Technologies (ICTs), especially Wordwall, can be used as pedagogical resources that contribute to the learning process and also help stimulate the initial development of the skills and competencies necessary for professional practice²¹.

It is believed that when learning occurs through action, it becomes an effort and an acquired knowledge, making its construction more meaningful²². Educational technologies in their various forms, whether in serious games or other types of games, have a motivating effect on learning. When the player develops the expected skills, they receive rewards based on response speed and the number of correct answers, with scores displayed in the final ranking. Achievement in the game corresponds to achievement in learning²³.

Active methodologies (AM) and digital technologies in education are increasingly present in academia and are highly useful tools; however, despite being complementary, they remain independent²⁴. The former positions students as protagonists in their learning, while the latter aids in pedagogical practices²⁵.

AMs break away from traditional teaching methods and can foster greater self-sufficiency and critical thinking in students. When combined with Information and Communication Technologies, they enhance the teaching-learning process. These tools facilitate learning and serve as an essential technological resource. Over the years, their significance has been recognized, as they mediate the pathway to knowledge construction, a process that enables the student's direct involvement in all developmental stages²⁶.

ICTs provide an effective means of engaging students, particularly when combined with active methodologies such as gamification. Gamification can contribute to the current educational model by granting students autonomy and leadership in executing activities, thereby fostering more meaningful learning²⁷.

Consequently, virtual education can be considered a transformative agent in learning processes because it actively participates in training, allowing for autonomous and cooperative knowledge acquisition. This type of education enables the generation of knowledge through consistent learning and a collaborative, interdependent work strategy among teachers, students, and technology²⁸.

The main aspects to be considered when developing educational products include addressing the needs of the environment, answering a research question, ensuring scientific grounding, incorporating technological dimensions, subjecting the prototype to performance tests, and publishing the final version of the product²⁹. For a serious game to achieve its goal, the planning and development process must be meticulous, clearly defining all development stages³⁰. Additionally, three essential components are required: interactive media, the game itself, and the ability to promote pedagogical action³¹.

Traditional teaching-learning methods currently do not fully meet individual demands. More skills are required for the job market, and these games can assist in that regard³². The primary objective of gamification is to diversify learning through various activities distinct from conventional teaching methods³³. In this new perspective, the use of games in educational contexts has become so significant that game-based learning has emerged³⁴: an approach that utilizes games or software as support for teaching and learning³⁵.

Serious games have proven to be more effective in enhancing learning compared to traditional methods such as lectures, reading materials, and other conventional practices³⁶.

The limitations of the game's structuring are linked to the creation platform, which presented certain restrictions beyond the researchers' control, particularly regarding editing freedom. The available models are dynamic and efficient but should offer greater adaptability to users, especially the evaluated model, where the player must redo a question until they answer correctly.

As for the study's limitations, they primarily concern the sampling process, which should ideally have been conducted individually for each student rather than using convenience sampling. This would have ensured greater representativity but would have required significant time and resources for interviewer compensation.

CONCLUSION

The study enabled the structuring of three game models focused on Integrative and Complementary Practices in Health (PICS) and the usability evaluation of one model: Aprenda PICS 1, which demonstrated excellent usability and a significant qualitative assessment reinforcing the purpose of this study.

The game presents important innovative characteristics, as it is the first model designed for PICS using the Wordwall platform, built and tested for usability by its target audience. Additionally, it aligns with the growing demand for the inclusion of digital educational tools as complements to traditional teaching methodologies.

The product serves as a didactic tool that enhances learning and contributes to the introduction of PICS for students, healthcare professionals, and the general population. Furthermore, it facilitates the

training processes of educators (by being used as a classroom aid) and, ultimately, can improve healthcare services within the SUS framework.

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