Special Section

TEXTO & CONTEXTO ENFERMAGEM
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EDUCATIONAL TECHNOLOGY VALIDITY AS A TEACHING RESOURCE IN MENTAL HEALTH NURSING TEACHING

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ABSTRACT

Objective: to validate an educational technology as a teaching resource for teaching mental health nursing.
Method: this is a methodological study, carried out through agreement among expert judges and the target audience, for content validity and appearance assessment of an educational game. A total of 11 expert judges and 114 students from two universities participated in the study. For validity, the Content Validity Index was used.
Results: the teaching-pedagogical resource assessment reached an overall Content Validity Index equal to 88.5%. Items 7 and 9 obtained an Individual Content Validity Index of less than 78%. In view of this, these items were reassessed and adjusted according to suggested changes. For the domains assessed regarding educational game appearance, percentages were obtained that were between 85.9% and 97.3%.
Conclusion: the assessments triggered adjustments to the game's theoretical-scientific content, making it capable of being used as an educational resource for the mental health discipline in nursing courses.

DESCRIPTORS: Mental health. Validation study. Educational technology. Gamification. Psychiatric nursing.

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VALIDAÇÃO DE TECNOLOGIA EDUCACIONAL COMO RECURSO DIDÁTICO NO ENSINO DE ENFERMAGEM EM SAÚDE MENTAL

RESUMO

Objetivo: Validar uma tecnologia educacional como recurso didático para o ensino de enfermagem em saúde mental.
Método: Estudo metodológico, realizado através da concordância entre os juízes especialistas e do público-alvo, para a validação do conteúdo e avaliação da aparência de um jogo educacional. Participaram do estudo 11 juízes especialistas e 114 alunos de duas universidades. Para a validação, foi utilizado o Índice de Validade de Conteúdo.
Resultados: A avaliação do recurso didático-pedagógico atingiu um Índice de Validade de Conteúdo Global igual a 88,5%. Os itens 7 e 9 obtiveram um Índice de Validade de Conteúdo Individual inferior a 78%. À vista disso, esses itens foram reavaliados e ajustados conforme as alterações sugeridas. Para os domínios avaliados referentes à aparência do jogo educacional, foram obtidos percentuais que estiveram entre 85,9% e 97,3%.
Conclusão: As avaliações desencadearam adequações no conteúdo teórico-científico do jogo, tornando-o apto a ser empregado como recurso educacional da disciplina de saúde mental nos cursos de enfermagem.

DESCRITORES: Saúde mental. Estudo de validação. Tecnologia educacional. Gamificação. Enfermagem psiquiátrica.

VALIDACIÓN DE LA TECNOLOGÍA EDUCATIVA COMO RECURSO DIDÁCTICO EN LA EDUCACIÓN DE ENFERMERÍA EN SALUD MENTAL

RESUMEN

Objetivo: validar una tecnología educativa como recurso didáctico para la enseñanza de enfermería en salud mental.
Método: estudio metodológico, realizado mediante acuerdo entre jueces expertos y el público objetivo, para validar el contenido y evaluar la apariencia de un juego educativo. En el estudio participaron 11 jueces expertos y 114 estudiantes de dos universidades. Para la validación se utilizó el Índice de Validez de Contenido.
Resultados: la evaluación del recurso docente-pedagógico alcanzó un Índice Global de Validez de Contenido igual al 88,5%. Los ítems 7 y 9 obtuvieron un Índice de Validez de Contenido Individual inferior al 78%. Ante lo anterior, dichos ítems fueron reevaluados y ajustados de acuerdo a los cambios sugeridos. Para los dominios evaluados respecto a la apariencia del juego educativo se obtuvieron porcentajes que estuvieron entre 85,9% y 97,3%.
Conclusión: las evaluaciones provocaron ajustes en el contenido teórico-científico del juego, haciéndolo apto para su uso como recurso educativo para la disciplina de salud mental en cursos de enfermería.

DESCRIPTORES: Salud mental. Estudio de validación. Tecnología educacional. Gamificación. Enfermería psiquiátrica.

INTRODUCTION

Historically, mental health care has been marked by a hospital-centric biomedical logic that is reduced to medicalizing and cloistering behaviors, supporting a hegemonic asylum paradigm. The understanding of the subject in mental distress was restricted, and the psychosocial aspects involving psychological illness were disregarded. Thus, individuals who had a mental disorder was separated from the social scene and deprived of their rights as a citizen[1].

However, with the Psychiatric Reform Law, signed in 2001, an attempt was made to adopt a new mode of mental health care, revoking the fragmented perspective, prioritizing individuals' social inclusion and encouraging their autonomy through a therapeutic approach[2]. Likewise, such transformations generated expectations in health training, with a view to contributing to a pedagogical practice transition process, abandoning asylum practice and strengthening teaching based on the psychosocial rehabilitation model[3].

However, although the Psychiatric Reform movement is based on a psychosocial paradigm, it can be seen that modern psychiatric care still has reflections of the historically constructed asylum model, since care in this model still coexists side by side with new devices of mental health care. Considering the above, there is still a reproduction of this praxis in academic spaces, reverberating in a training process that assumes a pathology-centered character[4–5].

At the same time, also in 2001, the Brazilian National Curricular Guidelines for the Undergraduate Nursing Course (DCN/ENF - *Diretrizes Curriculares Nacionais do Curso de Graduação em Enfermagem*) were established, whose purpose was to adopt a critical-reflective and humanized training, conceiving qualified professionals for care[6]. However, even with the DCN requirements, the changes proposed by the Psychiatric Reform in the national scenario and the Brazilian National Mental Health Policy, it is noted that the Pedagogical Political Projects of Higher Education Institutions (HEIs) contribute to maintenance of weaknesses in teaching of mental health discipline[7–8].

Corroborating the aforementioned fact, in a study of a descriptive-exploratory nature of documentary analysis of Political Pedagogical Projects, it was noticed that the institutions had an approach primarily focused on teaching mental disorders and pharmacological therapy, so as not to follow the Brazilian National Mental Health Policy assumptions. Furthermore, this study also evoked the suppressed workload allocated to teaching mental health, compromising the training process[7].

In order to break with the deficient model of mental health teaching, it is therefore urgent to strengthen innovative teaching-learning strategies, such as conversation circles, clinical simulation[9], workshops[8], dramatization[10] and games[4]. These teaching strategies encourage dialogue, teamwork and the development of skills and abilities to act in the reception and individualized care of subjects in mental distress[4,6].

By bibliographical design with a view to understanding the overview of knowledge about the object of study, a scoping review was identified that presented the mapping of the use of serious games for teaching nursing. The study pointed out that the use of this type of technology is not widely defined in the areas of nursing, especially in the area of mental health, as only two studies addressed this topic. Furthermore, the results of this research highlighted the need to validate technologies to legitimize their benefits[11].

This finding encourages the construction of innovative educational technologies that work on content related to mental health, given that they provide an interactive and dynamic approach that assists in decision-making in line with current mental health policies.

Therefore, the present study is justified by the need to break with teaching that maintains a biological perspective, in addition to overcoming the precariousness of mental health teaching in HEIs, in order to use an active approach that favors knowledge acquisition through interactivity, critical

thinking and playfulness, such as games. This type of tool has applicability in different courses and areas of knowledge[12–13], and has proven to be an auspicious methodological tool for innovation in mental health teaching. Therefore, the study aims to validate an educational technology as a teaching resource for teaching mental health nursing.

METHOD

This is methodological research, which was carried out through agreement among expert judges and the target audience for content validity and appearance assessment of an educational game. The study was carried out at two public universities in the state of Pernambuco between April and August 2022. To ensure quality, the EQUATOR network Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) recommendations were respected. Furthermore, it followed the ethical precepts of Resolution 466 of December 12, 2012 of the Brazilian National Health Council (CNS), and was submitted and approved by the Research Ethics Committee of the *Universidade de Pernambuco*.

The study population was made up of expert judges with expertise in mental health and nursing students in the sixth period at the aforementioned universities. Considering Pasquali (1997)[14] precepts, which suggests that the number of judges should be between 6 and 20, this study included a total of 11 expert judges. Regarding the target audience, 114 nursing students from two sixth period classes participated.

To facilitate judge selection to compose the construct validity committee, the inclusion criteria were established based on adapted Fehring[15] criteria: being a nurse expert in mental health; or being a professor in mental health; or having been a mental health nurse for around 10 years; or being a nurse in mental health; and having experience with educational instrument or material validity. The exclusion criteria relating to the sample included the incompleteness of the instrument made available for construct validity.

The inclusion criteria established to compose the sample of students participating in the study were accepting to participate in the game and the study by signing the Informed Consent Form (ICF), being a nursing student at the universities listed for the study and being of age over 18 years old. However, students who were away from on-site activities were excluded from the sample.

Experts were chosen by intentional non-probabilistic snowball sampling. Professionals were contacted via virtual environment via email and were asked to indicate other possible experts to participate in the construct validity committee. The consultation method through the *Lattes* Platform was also used to verify content judge suitability to the criteria established in the study, since the platform provides, in addition to curricula, data and statistics on scientific production in Brazil by region, institution, sex and age.

Assessment with the target audience took place through a convenience sample of undergraduate nursing students from both universities. This type of assessment, aimed at the target audience, is necessary due to the need for students to assess whether the didactic-pedagogical resource applied contributed to the understanding of mental health content. The game was applied to classes in the sixth period of the bachelor's degree in nursing, since, in this period, all mental health content proposed in the discipline is covered.

The game ideation and operationalization were based on David Ausubel's Meaningful Learning Theory (MLT)[16]. This theory endorses that meaningful learning is a learning model that allows students to grasp knowledge through assimilation of new concepts with pre-existing ones. In other words, it is essential that there is interaction between new knowledge and that already existing in

students' cognitive structure. In this way, the game brought by this study is based on the importance of guaranteeing non-arbitrary and substantive learning, encouraging the incorporation of new ideas with existing ones – learned in the course of life or in the classroom – and strengthening students' capacity to explain the information acquired in their own words[16].

After carrying out the bibliographical survey for theoretical foundation, the didactic resource was prototyped. The game is a board game, measuring 120 centimeters wide by 140 centimeters, forming a track with 48 spaces. The creative process took place through Canva®, an online graphic design platform. The game is titled "*A trilha da Saúde Mental*" (The Mental Health Trail), in reference to learning trails as a training trail related to the content of mental health topics covered during the nursing course.

At the beginning of the game, each student chooses a colorful car that is "parked" at the starting point of the trail. The sequence that each player follows on the track is defined by a large, colorful die. At each station on the trail where each car needs to stop, the game seeks to reinforce the importance of assessment as part of the teaching-learning process. The trail is divided between boxes with numbers and action boxes. Among the action boxes, there are boxes with "True or false", "Question" and "Challenge question". If players roll the dice and are directed to an action space, they must perform the action described.

In the case of boxes with "True or false", students must answer whether the statement is correct or not. Depending on their performance in the answer, this student will advance the number of spaces indicated on the card. The same applies to the "Questions" boxes, which consist of open questions in which students will have the freedom to answer them in any way they prefer. Finally, the "Challenge question" boxes are those that players decides whether to answer or not play for a round.

The game's ultimate goal is to reach the stage called "Balance", which represents a harmonious mental health status. It is noteworthy that all material was prototyped with an attractive, colorful look and illustrations, in order to generate greater receptivity by the target audience. Furthermore, it is worth noting that the entire game assumed a playful and educational character, therefore not using a punitive character. This fact is corroborated by encouraging phrases, such as "If you do not know yet, you can learn" and "How about remembering these concepts? There's still time to learn".

Experts received an email with an invitation to participate in the study and the informed consent form to participate in the study. Upon acceptance of the invitation, they had access to the game prototype for viewing through a link provided in the assessment form as well as the ICF and the instrument to be filled out. This instrument was constructed by the authors of this study through the adaptation of two validity instruments from educational materials[17–18].

The judges assessed the game based on the following aspects: 1) objectives; 2) structure and presentation; 3) relevance; and 4) pedagogical potential. The game was assessed using a Likert-type scale, according to the following classification: 1=Totally disagree; 2=Partially agree; 3=Neither agree nor disagree; 4=Agree; and 5=Totally agree. Under such circumstances, potential judges were provided with the assessment instrument.

Assessment with the target audience took place using an instrument based on the Suitability Assessment of Materials (SAM). The translated and validated version proposed by Sousa, Turrini and Poveda (2015) was used[19]. SAM is an instrument used to assess the understanding of educational material, ensuring that the material is suitable for the target audience it is intended for[19]. The teaching resource organization was assessed, including its presentation and content strategy, language, including the understanding of written content, appearance, including illustrations and adopted layout, and motivation. All students had the opportunity to participate in a game match.

To enable content validity, the Content Validity Index (CVI) score was calculated, which measures the proportion of agreement between expert judges regarding the suitability of the aspects analyzed[20]. The Individual Item Content Validity Index (I-CVI) was calculated by adding the agreement of items marked 4 and 5, divided by the number of expert judges.

Expert agreement was analyzed by calculating the CVI, which measures the proportion of experts who agreed on the relevance or not of certain aspects of the content and activities presented on game cards. To this end, the formula was adopted: CVI = number of responses 4 or 5 on Likert-type scale divided by the total number of responses[20]. To attest to the game validity, the CVI was considered equal to or greater than 0.78, a score recommended in a study by Alexandre and Coluci (2011)[20] for studies that have six or more judges.

The calculation of the score of the instrument adapted from the SAM, used for assessment by the target audience, was carried out by adding the scores obtained, divided by the total number of items in the questionnaire and multiplied by 100, in order to find the corresponding percentage. In order to analyze the scores achieved, it was considered that, when the game reaches an average score of 70% to 100%, the pedagogical resource will be considered “Superior”, from 40% to 69%, “Suitable”, and 0 to 39%, “Unsuitable”.

RESULTS

A total pf 11 judges participated in validity, all of whom were female. Regarding professional training, 90.9% are nurses and 9.1% are psychologists. Among the judges, 72.7% work as professors in HEIs. Judges were divided into master’s, doctoral and post-doctoral degree holders, in addition to judges with a master’s degree or doctoral degree in progress. The mean experience in the mental health field was 17 years, with a minimum of three years and a maximum of thirty-three years of experience. All judges had publications in the area of interest.

Experts recorded observations/suggestions in the instrument’s descriptive fields, contributing to game content qualification. Suggested changes were made, generating changes in the content of the teaching-pedagogical resource in question. Among the suggestions, the most striking are shown in Chart 1 as well as their respective adjustments.

Chart 1 – Suggestions from judges regarding the content of the didactic-pedagogical resource for teaching mental health. Recife, Pernambuco, Brazil, 2022.

Suggestions from expert judges	Adjustments in the final version
Insert references to encourage consultation by students.	The references were inserted into the game rules card.
Insert a more objective answer in the card “What does mental health support mean?”	More objective answer inserted.
In the card “What is social stigma?”, mention the interrelationship of elements such as labeling, stereotypes, loss of status, social distance and discrimination.	Mentioned the interrelationship between social stigma and the aforementioned elements.
Cite more concrete examples of delusions of grandeur.	Examples cited, such as “believing that it is God or a very powerful being”.
Detail the number of participants and the average time of each round.	The number of participants and the average time of each round are detailed on the game rules card.

The didactic-pedagogical resource assessment reached an overall CVI of 88.5%, i.e., the game content was validated in its entirety by expert judges. Standard deviation was ±6.8%, which is equivalent to a percentage variation around the mean of 7.7%. It is also noteworthy that items 7 and 9 obtained an I-CVI of less than 78%, both with an I-CVI of 72.7% (Table 1). These items were reassessed and the changes suggested by the committee of judges were implemented. An attempt was made to synthesize the texts present on the game cards, in order to make them clearer and more objective. Furthermore, in order to attribute a logical sequence to the game's content, the cards were numbered and didactically divided by subareas of the mental health discipline.

Table 1 – Result of the Individual Item Content Validity Index. Recife, Pernambuco, Brazil, 2022.

Answers	Sum of responses with:		I-CVI
	Value 4	Value 5	
01. The game is important for teaching mental health at undergraduate level.	1	9	90.9%
02. The information contained in the game contributes to the understanding of mental health content.	1	8	81.8%
03. The game can circulate in scientific circles.	4	7	100.0%
04. The game can help improve mental health teaching.	2	8	90.9%
05. The game meets the proposed objectives.	3	7	90.9%
06. The game is appropriate for teaching mental health at undergraduate level.	3	7	90.9%
07. The texts present in the game are clear and objective.	**4**	**4**	**72.7%**
08. The information present in the game is scientifically correct.	5	5	90.9%
09. There is a logical sequence of the content presented.	**3**	**5**	**72.7%**
10. Information is structured in agreement and spelling.	3	7	90.9%
11. The information contained in the game is coherent.	3	7	90.9%
12. Font size is suitable.	3	7	90.9%
13. Illustrations are expressive and convey information about the topic.	3	6	81.8%
14. The material is appropriate.	4	6	90.9%
15. The topics covered in the game are important for the mental health discipline.	1	8	81.8%
16. The material allows the understanding of mental health content.	4	6	90.9%
17. The game allows knowledge construction.	2	7	81.8%
18. The game addresses important issues.	1	9	90.9%
19. The game is suitable for use in other academic institutions.	3	7	90.9%
20. The game motivates the search for knowledge.	4	6	90.9%
21. The game takes on a playful and innovative character.	2	9	100.0%
22. The game helps to strengthen mental health teaching.	2	8	90.9%
23. The game contributes to reducing deficits in mental health teaching.	2	8	90.9%
		Mean	**88.5%**
Overall		**Standard deviation**	**6.8%**
		Coef. Variation	**7.7%**

The assessment with the target audience included the participation of 114 students from two public universities. Through instrument application based on SAM, regarding the content domain, it was noticed that the game's objective was evident to 93.8% of respondents. For 95.6%, the material

proposal matches the objectives. Likewise, for 95.6%, the game addresses the main information related to the mental health discipline content. In the language domain, 92.1% completely agreed that the game's language is clear. Furthermore, 95.6% completely agreed that the language used favors content understanding and that the level of language is appropriate to the game's objective.

As for illustrations, 91.2% of respondents stated that the game attracts attention and portrays the material's objective, and 85.9% stated that illustrations present important visual messages for understanding the topic. Furthermore, 88.5% of academics completely agreed that illustrations are coherent with the material presented. Finally, 86.8% completely agree that the purpose of illustrations is clear. Regarding layout, 92.1% of participating academics stated that it was consistent and facilitated observation of flow of information, and 89.4% completely agreed that visual devices are used to direct the material content.

In the motivation domain, 96.4% of participants completely agreed that interaction occurs between material and player, in order to favor the understanding of the mental health discipline. Furthermore, 97.3% of students completely agree that they are motivated to learn through the material's dynamic and playful nature. At the end of applying the instrument, students were asked about their opinions about the game. All participants considered this resource very relevant for learning. The final version of the game board for "*A trilha da Saúde Mental*" is represented in Figure 1.

Figure 1 – Graphic representation of the game "*A trilha da Saúde Mental*". Recife, Pernambuco, Brazil, 2022.

DISCUSSION

In a playful way, the proposed development of the learning trail with a focus on formative assessment refers to a reflective process that seeks to encourage the student to understand and articulate meanings based on theoretical content and improve them. Based on the assumptions of meaningful learning, content planning aimed to incorporate knowledge already acquired through connections with new learning. All content displayed on the game cards was created with a view to developing the skills assessed in the specific component relating to mental health and psychiatric nursing in the nursing course.

The priority skills explored in the game aim to help students deal with people in their social contexts, respecting their condition of actively participating in their learning process and, above all, investing in an approach in which learners are the acquirers of new structures of prior knowledge. Meaningful learning is related to the way content is received by students, therefore, it must enable new paths and conditions, because when knowledge is acquired in a meaningful way, it increases the ability to learn other content in a simplified way and with ease in relearning.

The contributions to validity by judges were relevant to improving the game quality. The game's potential allows students to revisit concepts, reflect on situations surrounding the topic of mental health and feel comfortable answering questions calmly and learning from the answer resources, which encourage critical and reflective thinking. The game also favors a light atmosphere of competition as cars move around the board towards reaching "balance", making the experience fun not only for players, but also for the group that participates in this experience.

As limitations, the game rounds allow up to 8 players at a time, and professors must use creativity to involve more students in other rounds or even divide a larger class to expand the experience in participating in the game.

This study made it possible to validate content and assess the appearance of an educational game to be used in mental health classes. Given the analyzes carried out, it is possible to affirm that educational technology is capable of being used as a playful tool to improve the teaching-learning process, making classes more enriching and interactive[21]. In this validity process, the participation of expert judges is crucial, as it guarantees the quality of the material to be validated from different perspectives regarding the topic covered[22].

By using validated technology, professors can have the role of knowledge facilitator, using constructivist pedagogical practices that focus on student empowerment, breaking with the traditional teaching model. In this context, educational technologies, such as games, can be used to encourage learning and the relationship that involves professors, students and knowledge[23].

Considering the nursing training process, the mental health perspective and educational technology construction and validity, the fundamental target is the improvement of nursing practices and care in the area of interest. In the case of the game constructed, it was primarily based on content covered in the mental health curriculum of the Bachelor's Degree in Nursing. Furthermore, the game contents, worked in a dialogic and playful way, sought to contribute to overcoming the gaps that hinder nurses' training process regarding primary knowledge in mental health as well as strengthening the Brazilian National Mental Health Policy.

To achieve satisfactory results in the teaching-learning process with the use of educational technologies, it is essential that professors position themselves as facilitators in this process, offering a space of welcome and empathy for those involved[24].

Regarding educational technologies developed to address topics related to mental health in the context of nursing, two studies were found: one that brought educational software on mental disorders as technology[25] and another that discusses the assessment of a communicative dynamic to work on

drug consumption[26]. From this perspective, it is noted that there are gaps specifically regarding the use of these technologies in teaching mental health in the university environment. This fact is explained by the scarce scientific production available in databases on the application of games in teaching mental health, characterizing it as a topic little explored by the academic community.

In this study, the educational game content was considered valid, obtaining an overall CVI greater than 80%. Only two items presented a CVI-I lower than 78% and, in this case, the suggestions presented by judges were accepted and the game was readjusted and improved. Regarding the educational game appearance assessment, for assessed items, percentage values greater than 80% were obtained. Another study that also sought to validate a board game content and appearance as a pedagogical resource was considered valid, achieving satisfactory CVI and CVI-I values. However, in the assessment process, the study did not consider the target audience. The target audience's involvement is essential to achieve more effective results[27].

Considering, according to educational technology assessment, assessment by the target audience is crucial, as it provides the researcher with a vision of the technology constructed according to the perspective of the sample portion that actually participated in the resource application. Through this type of assessment, it is also possible to assess whether the technology provides changes in behavior in relation to what is proposed to be worked on[18].

A study that aimed to present nursing students' perspectives on the use of educational technologies in the teaching-learning process revealed that these students considered the use of these resources as something capable of strengthening teaching. The game was the most cited educational technology to encourage student learning, bringing to light the perspective of "learning through play" and ensuring learning filled with challenges and motivation[28].

During professional training, the use of playful activities offers a differentiated and more dynamic learning space[28]. Furthermore, these educational technologies can be applied in the professional training process, such as nursing, as they are resources capable of assisting in the acquisition of essential skills and dynamic assessment for work practice[29].

In the meantime, MLT, proposed by David Ausubel, appears as an auspicious strategy to support game planning and operationalization, given that this resource guarantees the interaction of new knowledge with students' prior knowledge and, through this interaction, knowledge acquires new meanings, becoming more robust and refined, which is considered the starting point of Ausubel's theory[16].

The interest in idealizing, prototyping and operationalizing the game in light of MLT emerges given the importance of adopting a teaching-learning model that breaks with the traditional and behaviorist paradigm, whose process is based on mechanical learning based on the memorization of concepts, placing students in the background and encouraging passive and static learning[16].

It is worth highlighting that the game was built with questions that involve the field of nursing, with a view to overcoming gaps in teaching mental health in HEIs, proposing an active approach that favors the collective construction of knowledge, the strengthening of prior knowledge, critical thinking and greater interaction between professors and students. Furthermore, the use of resources, such as games, in the teaching-learning process, awakens creativity and interest, fostering the articulation between theory and practice, bringing considerable pedagogical impact and placing students as co-responsible for their learning.

Regarding the limitations of this study, the lack of opportunity to assess the game with nursing students from other HEIs to assess its effectiveness stands out. There was difficulty in accepting the invitation for judges from other regions of the country, and this limited the regional representation of the final sample, making it impossible to obtain suggestions and comments from other professionals with expertise in the area of interest of the study.

CONCLUSION

Through this study, it was possible to build and validate an educational game content to work on topics related to mental health with students on the Bachelor's Degree in Nursing. The didactic-pedagogical resource assessment reached an overall CVI equal to 88.5%. Only two items presented I-CVI lower than 78%. For these items, some adjustments were made according to expert judges' suggestions. In addition to content validity, the game presented an excellent assessment among the target audience for the categories assessed with regard to the appearance of the technology presented.

Due to the suitability demonstrated in game application, the use of this strategy in other HEIs is encouraged as well as the development of other educational technologies based on dynamism, horizontality, creativity and interactivity between students and professors. Thus, it will be possible to create ways to confront the paradigm of static and mechanical learning restricted to the role of professors in the classroom as the sole person responsible for conveying knowledge.

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There is no conflict of interest.

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