

EVALUATION OF A BOARD GAME TO ANXIETY CONTROL IN STUDENTS ADOLESCENTS

EVALUACIÓN DE UN JUEGO DE MESA PARA EL CONTROL DE LA ANSIEDAD EN ESTUDIANTES ADOLESCENTES

AVALIAÇÃO DE UM JOGO DE TABULEIRO PARA CONTROLE DE ANSIEDADE EM ADOLESCENTES ESCOLARES

¹Andressa Gabrielle Carvalho da Silva²Joseilze Santos de Andrade³Flávia Janólio Costacurta Pinto da Silva⁴Lara Leite de Oliveira¹Instituto Federal do Maranhão - IFMA, Açailândia - MA, Brasil. ORCID<https://orcid.org/0000-0002-2342-9147>.²Universidade Federal de Sergipe –

UFS, Aracaju – SE, Brasil. ORCID:

<https://orcid.org/0000-0003-0488-2840>.³Universidade Federal de Sergipe –

UFS, Aracaju – SE, Brasil. ORCID:

<https://orcid.org/0000-0003-2196-9796>⁴Universidade Federal de Sergipe –

UFS, Aracaju – SE, Brasil. ORCID:

<https://orcid.org/0000-0001-6102-6499>**Corresponding Author****Andressa Gabrielle Carvalho da Silva**

Rua Perimetral, n. 02B, Colina Park,

Açailândia-MA. CEP: 65.930-000.

Telefone: (99)99169-0710. E-mail:

andressa.carvalho@ifma.edu.br

Submission: 12-05-2023**Approved:** 16-05-2023**ABSTRACT:**

Objective: To develop and evaluate a board game as a health education tool for teaching anxiety control techniques in students adolescents. **Methods:** The validation process took place in three stages: literature review; game development and evaluation with expert judges, from July to November 2022. Regarding the quantitative analysis, the items were judged according to a 3-point Likert scale, which validates educational content in health, and the Content Validity Index was calculated by through mathematical equations: I-CVI and global IVC. **Results:** A total of 17 judges evaluated the game, they were professional nurses and psychologists with experience in school health with an adolescent public. The game was evaluated for purpose (CVI>0.95), structure and presentation (CVI>0.98), and relevance (CVI>0.94). **Conclusion:** The educational technology was considered valid and adequate by the judges for implementation during the assistance of health professionals, more specifically nurses and psychologists, to students with anxiety in school environments. In this way, it is expected that the game becomes an aggregative tool for professionals in their care.

Keywords: Anxiety; Adolescent Health; Ludotherapy; Validation Study**RESUMO**

Objetivo: Desenvolver e avaliar um jogo de tabuleiro como ferramenta de educação em saúde para o ensino de técnicas de controle de ansiedade em adolescentes escolares. **Métodos:** O processo de validação ocorreu em três etapas: revisão da literatura; desenvolvimento do jogo e avaliação com juízes especialistas, no período de julho a novembro de 2022. Com relação à análise quantitativa os itens foram julgados conforme uma escala *likert* de 3 pontos, que valida conteúdos educativos em saúde, e calculado Índice de Validade de Conteúdo por meio de equações matemáticas: I-CVI e o IVC global. **Resultados:** Um total de 17 juízes avaliou o jogo, foram profissionais enfermeiros e psicólogos com experiência na saúde escolar com público adolescente. O jogo foi avaliado quanto ao objetivo (IVC>0,95), estrutura e apresentação (IVC>0,98), e relevância (IVC>0,94). **Conclusão:** A tecnologia educacional foi considerada válida e adequada pelos juízes para implementação durante assistência de profissionais de saúde, mais especificamente enfermeiros e psicólogos, aos educandos com ansiedade nos ambientes escolares. Dessa forma, espera-se que o jogo se torne um instrumento agregativo aos profissionais em seus atendimentos.

Palavras-chave: Ansiedade; Saúde do Adolescente; Ludoterapia; Estudo de Validação**RESUMEN:**

Objetivo: Desarrollar y evaluar un juego de mesa como herramienta de educación en salud para la enseñanza de técnicas de control de la ansiedad en escolares adolescentes. **Métodos:** El proceso de validación se llevó a cabo en tres etapas: revisión de la literatura; desarrollo del juego y evaluación con jueces expertos, de julio a noviembre de 2022. En cuanto al análisis cuantitativo, los ítems fueron juzgados según una escala tipo Likert de 3 puntos, que valida contenidos educativos en salud, y se calculó el Índice de Validez de Contenido por medio de ecuaciones matemáticas: I-CVI e IVC global. **Resultados:** Un total de 17 jueces evaluaron el juego, eran enfermeras y psicólogas profesionales con experiencia en salud escolar con público adolescente. El juego se evaluó por propósito (IVC>0,95), estructura y presentación (IVC>0,98) y relevancia (IVC>0,94). **Conclusión:** La tecnología educativa fue considerada válida y adecuada por los jueces para ser implementada durante la asistencia de profesionales de la salud, más específicamente enfermeras y psicólogas, a estudiantes con ansiedad en ambientes escolares. De esta forma, se espera que el juego se convierta en una herramienta agregativa para los profesionales a su cargo.

Palabras clave: Ansiedad; Salud del Adolescente; Ludoterapia; Estudio de Validación

INTRODUCTION

About 14% of adolescents (10 to 19 years old) in the world live with some mental disorder, with anxiety being the most common of them (4.6%), especially among female adolescents (5.5%), who may be associated with bullying victimization ⁽¹⁾.

Anxiety is a means of human defense that enables meticulous behavior in caring for oneself and the world, however, it can become morbid, pathological and excessive. With that, it is necessary to learn to adjust to this insistent feeling, perceived much more frequently in recent years ⁽²⁾.

The symptoms of anxiety are diverse and can be divided into psychic, physical and cognitive, with a purely clinical diagnosis, in which the context, intensity and duration of the symptoms must be analyzed, in addition to the impact on the quality of life and a correct differentiation of other disorders ⁽³⁾.

There are different professional approaches to anxiety and the problems it can cause, these include the use of drugs and psychotherapy, in addition to humanized nursing care that should promote listening, welcoming and teaching relaxation techniques. Therefore, it is important to involve a multidisciplinary team in this context ⁽⁴⁾. However, it appears that the specific performance of nurses in primary health care in relation to care for adolescents is deficient, as they focus on specific services that do not allow for continuity and the establishment of bonds ⁽⁵⁾.

The school has an environment conducive to the development of health

education activities, which can act in the prevention of mental pathologies, as professionals able to offer help to children and adolescents are present in this environment ⁽⁶⁾. Therefore, high levels of anxiety have been observed in school teenagers who have in common the experience of family conflicts with communication difficulties, which results in an increase in self injury practices as a search for “pain relief” ⁽⁷⁾.

Early management of anxiety through dynamic tools can expand knowledge on the subject with rapid detection of symptoms by the user, in addition to serving as a non-pharmacological intervention ⁽⁸⁾. Also, there is a decrease in anxiety levels in approaches that involve gamified resources, with up to four times greater chances of adherence when compared to non-gamified treatments ⁽⁹⁾.

Regarding games to control anxiety in adolescents when compared to other therapies and other resources, these showed the same effectiveness, however, the literature involving this theme is scarce. Even so, such devices are seen as aggregators to professional care with a greater possibility of adherence to treatments, as they are considered ludic means ⁽¹⁰⁾.

Therefore, it becomes necessary to develop educational technologies (ET), based and validated, that address mental health education for adolescents, focusing on anxiety control. The resources can be implemented in the school context, in order to make the teaching-learning process playful.

Given the above, this study aimed to develop and evaluate a board game as a health

education tool for teaching anxiety control techniques in adolescents students. It is important to highlight that the purpose of this intervention does not replace existing treatments, but can be added to them.

METHODS

This is a methodological study carried out between July and October 2022, to the development and evaluation of a board game as an object of health education that raises the teaching of anxiety control techniques in adolescents students. As it is a ET, four adapted steps were adopted regarding the evaluation of the game, namely: technology production; selection of judges with application of the evaluation instrument; analysis and discussion of responses and, finally, production of the final version of the technology ⁽¹¹⁾. Therefore, the research was carried out in three stages: literature review, game development and content evaluation.

Literature Review

Bearing in mind that the scientific basis brings significant contributions to the development of technologies in health education ⁽¹²⁾, and for adequate knowledge about interventions based on games for anxiety, a search was carried out in the databases: LILACS, MEDLINE, BDNF and SCOPUS for games and toys to control anxiety in children and adolescents. For that, full articles available online in Portuguese, English and Spanish were selected, using the descriptors: adolescents, mental health, games and toys, and their

corresponding in English. No board and/or card games were identified for anxiety control in this public either in the national or international literature, only digital games.

A systematic review ⁽¹³⁾ on board games for health revealed that most of the games identified were aimed at changing behavior styles related to health, focusing on increasing knowledge and/or skills, with findings mainly from games aimed at controlling obesity. This study revealed the existence of a single board game aimed at anxiety in preoperative outpatient children. It is a virtual board game, applied in Portugal, which specifically addressed knowledge about the health team, medical instruments, the procedure, anesthesia, recovery room and post-discharge care. The study concluded that providing pre-surgical information reduced children's worry and anxiety ⁽¹⁴⁾.

From there, the search for games to control anxiety aimed at adults was extended, in order to gather more information about the methodologies used in the creation of these devices. In the Virtual Health Library - VHL, by combining the descriptors and connectors “games and toys” AND “anxiety”, 246 studies were identified. In this investigation, only one technology related to the theme was obtained, which described a nursing intervention in the preoperative period of myocardial revascularization, in which an educational board game called “Game of surgical experience: an incentive to self-care” was used. This game was created and applied in Brazil to decrease anxiety levels in preoperative adult patients. Its structure

was based on self-knowledge about the surgical procedure, including the pre, trans and post-surgical stages. The results were promising with regard to the decrease in the anxiety levels of these patients, however, the theme of anxiety was not addressed in the game's formulation ⁽¹⁵⁾.

Game Development

The creation phase of the game was based on a technique widely used for anxiety control, the technique entitled A.C.A.L.M.E.S.E. This is related to the name itself, in which each letter of the word corresponds (in portuguese) to a step to reach a lower level of anxiety: 1 Accept your anxiety; 2. Catch the things around you; 3. Act with your anxiety; 4. Release the air from your lungs; 5. Keep the previous steps; 6. Examine your thoughts; 7. Smile, you did it; 8. Expect the future with acceptance ⁽¹⁶⁾.

The game called "Acalmix" is composed of a rectangular board that contains 44 squares, a

six-sided dice, five pawns of different colors that represent the players, 63 cards containing questions and thematic messages, in addition to a guide for the applicator's orientation. The game allows from one to five participants with the presence of a judge. The cards are divided into eight blocks of different colors in which each block refers to a step of the A.C.A.L.M.E.S.E. technique ⁽¹⁶⁾.

Each group of six squares on the board has a color equal to the block of cards in each step mentioned above. For example: squares one to six will be colored black, corresponding to the block of black cards **A** - "accept your anxiety", and so on with different colors. As the pawn lands on a square of a certain color that contains the face of a card, it must pick up a card of the same color as that square. The letters can contain messages, tips, questions or practical situations related to that step of the anxiety control technique.

Figure 1 - *Acalmix* game board. Aracaju, SE, Brazil, 2023



Source: Prepared by the authors (2023)

The industrial design of the game was granted by the National Institute of Industrial

Property (INPI), under number BR 302022006817-9. The application for

registration of the game's brand at the INPI is under number 929295323.

Evaluation of game content

The content evaluation was carried out by professional nurses and psychologists from the Federal Institutes of Science and Technology in Brazil, ending with the adaptations of the game based on the evaluators' recommendations. This step took place online, sending all the material by email to the expert judges. The e-mails were obtained through contact with the people management directorates (PMD) of the federal institutes, as well as through requests in whatsapp groups.

All professionals on the email and whatsapp list who met the inclusion criteria of being a psychologist or nurse with at least three consecutive years of experience in caring for school adolescents were invited to participate in the survey. Therefore, from the total number of e-mails obtained, the invitation was sent to 91 nurses and 44 psychologists, totaling 135 professionals. Professionals who were on leave or on leave at the time of the survey did not participate.

Together with the letter of invitation, the following were sent: an electronic form prepared in Google Forms containing the Free and Informed Consent Form – FICF and the questions for validation; a guide on the details of the game, in PDF, with guidelines, rules, explanation of the execution dynamics and explanation of the A.C.A.L.M.E.S.E. technique⁽¹⁶⁾; the game cards and the planed figure of the board.

According to Pasquali⁽¹⁷⁾ the recommended number of judges for this process consists of six to twenty professionals. Therefore, within the established period of 15 days for acceptance, a total of 17 professionals evaluated the game.

To represent the numerical items, the form had 28 questions about the content of the game using a three-point Likert -type scale, 0 = disagree (D) - item needs to be deleted or redone, 1 = partially agree (PA) - relevant item, but some adaptation is required and 2 = I totally agree (TA) - correct item without the need for any kind of addition or correction⁽¹⁸⁾. These items were categorized according to their pertinence in relation to the criteria of objectivity, structure/presentation and relevance, adapted from a scale that aims to validate the contents of health materials for different target audiences⁽¹⁹⁾.

For the answers in which the scores 0 and 1 were selected, the evaluation form contained the guidance, that the judges elucidate the justification subjectively, in order to contribute with suggestions for the improvement of the game.

The present study was approved by the Research Ethics Committee of the Faculdade de Ciências e Tecnologia do Maranhão - FACEMA under opinion nº 5.632.302. In accordance with the ethical precepts of Resolution 466/12/CONEP, data collection for the study only started after approval by the ethics committee. As stated in the FICF signed by the participants, their anonymity was guaranteed throughout the process.

For the characterization of the study population, simple descriptive statistics were performed and for the analysis of the game's content, the Content Validity Index was calculated using mathematical equations: I-CVI (Item-Level Content Validity Index) and the global CVI. The I-CVI was obtained by dividing the “two - I totally agree” responses and the total number of responses for each item, and the global CVI was obtained by adding the individual I-CVI divided by the total number of items in the instrument validation content ⁽²⁰⁾. An acceptable CVI was defined as a score equal to or greater than 0.80 ⁽²¹⁾. To ensure the reliability of the instrument used, Cronbach's Alpha Coefficient was calculated.

RESULTS

The content of the game “Acalmix” was evaluated by a group of 17 judges, 15 nurses (88.3%) and two psychologists (11.7%). 16 female (94.1%), aged between 34 and 40 years (52.9%) and seven (41.2%) were between 26 and

33 years old, the majority (52.9%) over ten years of professional training time. Eight (47.1%) of these professionals did not have a degree in mental health, while four (23.5%) had a degree in mental health at specialization level, four (23.5%) at master's level and one with doctorate (5.9%).

Regarding the time of performance in school health with the adolescent public, seven (41.1%) had between three and six years of experience, eight (47.1%) between six and ten years and two (11.8%) had more than ten years of experience with this public.

In the evaluation with the judges in the “Objectives” domain, no professional considered D - Disagree. Four markings were obtained for PA (4.59%) and 83 for TA (95.40%). The PA and TA score totaled 87 marks, totaling 100% of valid responses. The global CVI of the objectives domain was 0.95 (table 1).

Table 1 - Content validation agreement by the judges according to *Acalmix game* objectives. Aracaju, SE, Brazil, 2023

Domain	Validation			
	D 0	PA 1	TA 2	I- VCI
Objectives				
1.1 Game contemplates the proposed theme/purpose (teaching of techniques for anxiety control-A.C.A.L.M.E.S.E?)	0	1	16	0.94
1.2 Is the game content suitable for the teaching/learning process?	0	0	17	1
1.2 Game and guide content clears up doubts about the topic covered?	0	1	16	0.94
1.3 The game content provides reflection on	0	1	16	0.94

the theme?

1.4 The game encourages behavior changes about coping with anxiety?	0	1	16	0.94
score	0	4	81	85
percentage	0%	4.70%	95.29%	100%
global IVC			0.95	
Cronbach's alpha			0.34	

Source: Prepared by the authors (2023)

Caption: 0. D= Disagree; 1. PA= Partially Agree ; 2. TA= totally Agree

In the “Structure and Presentation” domain, 218 marks were obtained for TA (98.64%), three (1.35%) for PA and none for D. The suggestions were: add practical tips on how to perform that step of the technique in practice and replace or remove some expressions such as “died” and “weak” from the letters related to step E - Wait for the future with acceptance, as they deal with sensitive subjects, which could

sound controversial to the public. There was also a suggestion to add the definition of anxiety in the game's guide.

PA and TA scores totaled 221 marks, representing 100% of valid responses. The overall CVI was 0.98, which represented content validation in terms of Structure and Presentation (Table 2).

Table 2 -Content validation agreement by the judges according to the Structure and Presentation of the *Acalmix game*. Aracaju, SE, Brazil, 2023

Domain	Validation			
	D 0	PA 1	TA 2	I- VCI
2.1 Is the language of the game clear and objective?	0	0	17	1
2.2 Is the language of the game appropriate for educational material for teenagers?	0	1	16	0.94
2.3 Is the language of the game interactive, allowing active involvement in the educational process?	0	two	15	0.88
2.4 Is the theme of the game current?	0	0	17	1
2.5 Does the game dynamics present a logical sequence of ideas?	0	0	17	1
2.6 Does the content of the <i>A-Accept Your Anxiety letters</i> present enlightening and necessary information?	0	0	17	1
2.7 Does the content of the <i>C-Contemplate the things around</i>	0	0	17	1

you cards present enlightening and necessary information?

2.8 The content of the <i>Aa-Aja cards with their anxiety</i> does it present clear and necessary information?	0	0	17	1
2.9 Does the content of the <i>L-Release the Air from Your Lungs cards</i> present clear and necessary information?	0	0	17	1
2.10 Does the content of the <i>M-Maintain the previous steps</i> present clear and necessary information?	0	0	17	1
2.11 Does the content of the <i>E-Examine Your Thoughts cards</i> present clear and necessary information?	0	0	17	1
2.12 Does the content of the <i>S-Sorry letters you managed to</i> present clarifying and necessary information?	0	0	17	1
2.13 Does the content of the <i>Ee-Expect the future</i> letters with acceptance present enlightening and necessary information?	0	0	17	1
score	0	3	218	221
percentage	0%	1.35%	98.64%	100%
global IVC	0.98			
Cronbach's alpha	0.43			

Source: Prepared by the authors (2023)

Caption: 0. D= Disagree; 1. PA= Partially Agree; 2. TA= totally Agree

In the “Relevance” domain, 64 marks were obtained for TA (94.11%), four for PA (5.88%) and zero (0%) for Disagree. There were no suggestions in this evaluated domain. According to the judges' assessment, PA and TA

together totaled 68 marks, representing 100% of the valid responses. The global CVI was 0.94, which represented the validation of the content regarding Relevance (Table 3).

Table 3 -Content validation agreement by the judges according to Relevance of the *Acalmix game*. Aracaju, SE, Brazil, 2023

Domain	Validation			
	D	PA	TA	I-VCI
Relevance	0	1	2	VCI
3.1 Does the game encourage the learning of techniques to control anxiety?	0	1	16	0.94
3.2 Does the game arouse interest in the topic?	0	1	16	0.94
3.3 Does the game contribute to knowledge in the area?	0	1	16	0.94
3.4 Would you use the game in your appointments?	0	1	16	0.94
score	0	4	64	68

percentage	0%	5.88%	94.11%	100%
global IVC				0.94
Cronbach's alpha				0.62

Source: Prepared by the authors (2023)

Caption: 0. D= Disagree; 1. PA= Partially Agree ; 2. TA= totally Agree

Considering the three domains, the overall Cronbach's Alpha was 0.71. Even with high percentages of agreement and adequate CVI, greater than 0.90, all suggestions and considerations by expert judges were analyzed and considered for the final version of the game.

There was an increase in the definition of anxiety in the guide, and the suggested modifications focused on the “game cards” as shown in Table 1, with the board remaining unchanged.

Table 1 – Contents of letters that have undergone changes. Aracaju, SE, Brazil, 2023

Letter	Before	After
C9	Situation: After following step A – Accepting your anxiety, what next step should you take according to the A.C.A.L.M.E.S.E. technique?	Tip: You can contemplate the things around you by counting how many objects with the letter C you see at that moment, or how many people in blue clothes you see on the street, or how many different plants you see on your way.
Ee8	Message: Distrust fate and believe in yourself. Spend more hours realizing than dreaming, doing than planning, living than waiting, because although those who die are alive, those who almost live have already died. Sarah Westphal	Message: Distrust fate and believe in yourself. Spend more hours realizing than dreaming, doing than planning, living than waiting. Sarah Westphal
Ee10	Message: The future has many names, for the weak it is the unreachable, for the fearful, the unknown, for the brave it is opportunity. Victor Hugo	Message: The future has many names, for some it is the unattainable, for others the unknown, for the brave it is opportunity. Victor Hugo - Adapted

Source: Prepared by the authors (2023)

DISCUSSION

The construction of the “Acalmix” game can bring positive contributions and innovation

in nursing and psychology care that encompass the adolescent public in the school context. It is an intervention object for health education that

teaches steps to control anxiety in a ludic way. The use of the board game allows the professional to focus not only on the pathology, but on a technology capable of provoking stimuli, developing skills, exchanging knowledge between the educator and the student, in addition to improving the socialization processes ⁽²²⁾.

Because it is an educational product to be used by a health professional, its construction must involve their participation, therefore, the action of these research subjects brings quality and effectiveness to the technologies developed ⁽²³⁾. Therefore, the game was evaluated by expert judges, which demonstrated strong reliability and validity of the game's content. After this process, the game was improved through suggestions expressed by professionals, even with an agreement level greater than 0.90 for all validation items.

The participation of nurses in this process was predominant in relation to psychologists, however, the broad involvement of nurses with professional experience in school health, plus degrees in mental health, enabled the process of analyzing the game's content in the sense of being qualified professionals who use school as a means of promoting health education ^(6,24).

Change recommendations focused on game structure, specifically card content. The judges highlighted the importance of formulating more realistic situations of the students' daily lives, so the addition of letters with tips on how to perform anxiety control techniques in practice was suggested. In view of this and given that studies reveal that teaching associated with

training in relaxation methods such as, for example, diaphragmatic breathing, the fourth step of the A.C.A.L.M.E.S.E. technique, has positive effects in reducing anxiety ⁽²⁵⁻²⁶⁾.

Another change suggestion considered viable was the removal/replacement of some words such as “died” and “weak” that were in the content of message letters, as they are confusing expressions for the age group and because of the possibility of sounding like tones of judgment according to experts. The suggestion to add the definition of anxiety in the game's “guide” was also accepted, as for the judges, understanding anxiety can help the adolescent to assimilate the magnitude of the technique. That said, dialogue with anxiety is important, which consists of understanding it and putting it in its proper place, as well as knowing how to differentiate “normal anxiety” from “pathological anxiety” ⁽²⁾.

From the representation identified in the literature of board games, it is observed that these have been restricted to the hospital environment in which knowledge about the operative steps is addressed, and do not address anxiety itself as the central theme of the content ⁽¹⁴⁻¹⁵⁾. In addition, during the literature review, it was noted that the adolescent public has not been contemplated in the research investigated.

Unlike physical games, it is possible to verify that there is a greater variety in the existence of digital games for the mental health of young people, but the studies are still very incipient with a great methodological variability, and the need for greater evaluation before being introduced in professional care ^(27, 10).

Furthermore, there is a growing association between the use of online games and the increase in anxiety symptoms, with a significant negative correlation between screen time and increased anxiety⁽²⁸⁾.

It is worth noting that the dynamics of board games also favor group assistance for adolescents, which is considered an efficient way to approach anxiety in the school environment, as this interaction brings with it a relevant contribution to learning, and consequent well-being for student's mental health⁽²⁹⁾.

CONCLUSION

The study made it possible to evaluate the content of a board game as an educational technology for teaching anxiety control techniques in adolescents students.

It was observed that the game "Acalmix" presented satisfactory agreement percentages and CVI for all evaluated items, with regard to objectives, structure and presentation, and relevance of the game. Thus, the evaluation of expert judges in the area demonstrated the validity of the game for use by health professionals, especially nurses and psychologists who work in school health.

As a limitation of the study, it is inferred that the investigated literature was restricted in the sense of contributing significantly to the development of the game, which suggests the need for further studies aimed at the use of physical games to control anxiety in the age group.

As a perspective for future studies, it is recommended to evaluate the usability of the

game as an object of intervention in mental health, in order to verify the effectiveness of the technology built regarding the learning of the technique and the reduction of anxiety levels in the adolescent public.

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Scientific Editor: Francisco Mayron Morais Soares. Orcid: <https://orcid.org/0000-0001-7316-2519>