

An antihypertensive move: technology to mediate teaching practices with health students about medications

Uma jogada anti-hipertensiva: tecnologia para mediar práticas de ensino com estudantes da saúde sobre medicamentos

Una jugada antihipertensiva: tecnología para mediar las prácticas de enseñanza con estudiantes de salud sobre medicamentos

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ABSTRACT

Objective: To verify evidence of validity of the board game “An antihypertensive move” produced to mediate teaching practices with students on health courses about diuretic and antihypertensive medications.

Method: this is a methodological and development study in compliance with the SQUIRE-EDU guidelines. 20 experts participated. In data collection, the Health Educational Content Validation Instrument (IVCES) and the Health Educational Technology Appearance Validation Instrument (IVATES) were applied. For the analysis, the Content Validation Index (CVI), the Appearance Validation Index (IVA), descriptive statistics and the Binomial Test were used.

Results: in content validation, a CVI of 0.92 was obtained (first and only round); in appearance validation VAT of 0.83 (in the first round) and 1.00 (in the second round).

Conclusion: the game is adequate in terms of content and appearance and is a valid technological device to mediate teaching practices about medicines.

Descriptors: Educational technology. Validation study. Drug therapy. Hypertension. Antihypertensive Agents. Health Occupations Students.

RESUMO

Objetivo: Verificar evidências de validade do jogo de tabuleiro “Uma jogada anti-hipertensiva” produzido para mediar práticas de ensino com estudantes de cursos da área da saúde sobre medicamentos diuréticos e anti-hipertensivos.

Método: trata-se de um estudo metodológico e de desenvolvimento com adesão às diretrizes SQUIRE-EDU. Participaram 20 especialistas. Na coleta de dados aplicou-se o Instrumento de Validação de Conteúdos Educativos em Saúde (IVCES) e o Instrumento de Validação de Aparência de Tecnologia Educacional em Saúde (IVATES). Para a análise utilizou-se o Índice de Validação de Conteúdo (IVC), o Índice de Validação de Aparência (IVA), pela estatística descritiva e o Teste Binomial.

Resultados: na validação de conteúdo, obteve-se IVC de 0,92 (primeira e única rodada); na validação de aparência IVA de 0,83 (na primeira rodada) e 1,00 (na segunda rodada).

Conclusão: o jogo está adequado quanto ao conteúdo e aparência e é um dispositivo tecnológico válido para mediar práticas de ensino sobre medicamentos.

Descritores: Tecnologia educacional. Estudo de validação. Tratamento farmacológico. Hipertensão. Anti-hipertensivos. Estudantes de ciências da saúde.

RESUMEN

Objetivo: verificar evidencias de validez del juego de mesa “Una jugada antihipertensiva” elaborado para mediar en las prácticas de enseñanza con estudiantes de cursos de salud sobre medicamentos diuréticos y antihipertensivos.

Método: se trata de un estudio metodológico y de desarrollo siguiendo los lineamientos SQUIRE-EDU. Participaron 20 expertos. En la recolección de datos se aplicó el Instrumento de Validación de Contenidos Educativos en Salud (IVCES) y el Instrumento de Validación de Apariencia de Tecnologías Educativas en Salud (IVATES). Para el análisis se utilizó el Índice de Validación de Contenido (IVC), el Índice de Validación de Apariencia (IVA), estadística descriptiva y la Prueba Binomial.

Resultados: en la validación de contenido se obtuvo un CVI de 0,92 (primera y única ronda); en apariencia validación IVA de 0,83 (en la primera vuelta) y 1,00 (en la segunda vuelta).

Conclusión: el juego es adecuado en términos de contenido y apariencia y es un dispositivo tecnológico válido para mediar en las prácticas de enseñanza sobre medicamentos.

Descriptores: Tecnología educacional. Estudio de validación. Quimioterapia. Hipertensión. Antihipertensivos. Estudiantes del Área de la Salud.

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■ INTRODUCTION

Arterial hypertension (AH) is classified as a chronic non-communicable disease, with multifactorial etiology, defined by high blood pressure levels, whether systolic ≥ 140 mmHg – systolic blood pressure and/or diastolic ≥ 90 mmHg – diastolic blood pressure⁽¹⁻²⁾. High blood pressure measurements should be obtained outside the clinical office and are related to the incidence of morbidity and mortality associated with atherosclerosis, which manifests as ischemic heart disease, cerebrovascular accident and vascular, renal and peripheral diseases. Therefore, it should be emphasized that drug and non-drug therapy, as well as a healthy lifestyle, are potential strategies to avoid the risks arising from the disease⁽²⁻³⁾.

Data on the prevalence of hypertension in Brazil tend to vary depending on the model of studies carried out. According to the National Health Survey⁽⁴⁾, 23.9% and the Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey⁽⁵⁾ 27.9% of Brazilian adults over 18 years of age self-reported hypertension. However, considering the BP measurements taken and the use of BP medication, it was found that 32.3% of the adult population has high blood pressure, with a higher prevalence of 71.7% among men. Between 2000 and 2018, there was a small increase in the rate of acute myocardial infarctions (25%) and a significant increase in blood pressure levels (128%). However, regarding morbidity, a trend towards stability in hospitalizations has been observed over the last ten years⁽²⁾.

Strategies aimed at improving the treatment of systemic arterial hypertension, whether through drug or non-drug therapy, impact adherence and can lead to therapeutic success. However, there are several aspects that interfere with adherence, such as the chronicity of the disease and the difficulty in regularly using medication, due to adverse effects, which are often poorly understood⁽³⁾.

Teaching and learning drugs' characteristics begins in the pharmacology discipline. Pharmacology is taught in health courses. These courses teach content related to medications used to treat systemic arterial hypertension. However, there is evidence of a high retention rate, failure, and dropout rate of students in the discipline above, which affects training and may also compromise future professional practice^(3,6). Therefore, it is essential to contribute to improving teaching practices in this subject, through different technological devices.

Among the various technological devices for teaching purposes, we can mention games, a type of educational technology that has gained prominence in health education, as through them, students become protagonists in

the construction of their learning, in a playful and creative way. Creativity is heightened, and students can observe, analyze, hypothesize, and conduct the process reflectively and critically⁽⁷⁾. On the global stage, educational technologies are understood as tools that need to be incorporated into educational systems as a response to a learning demand for which traditional teaching is already insufficient⁽⁶⁻⁷⁾.

Based on this perception, in 2020 the board game "An antihypertensive move" (first version) was created, designed by the authors and made by a design professional with the following elements: a board – containing the target organs for pharmacological action; 13 cards – each containing a definition, drug class, mechanism of action and side/adverse effects; two dice – one numeric die to organize the order of plays and one command die containing a question about the items on the cards; colored pegs for the players and an instruction manual.

Players must roll the numeric die to determine each participant's turn to play. The player with the highest score will be the first to play and so on, and the lowest score will define the mediator of the round – responsible for shuffling the cards and ensuring that the players' response is consistent with the content of the card. When starting the game, participants have the "hypertensive" status on the side of the board. By answering all the items on the command die, completing a card, and thus consolidating the conquest of a pharmacological action site, players can advance to the status of "normotensive". The player who conquers the greatest number of pharmacological sites on the board wins the game.

Thus, board games as a modality of educational technology help build knowledge, cognitive development, skills, and ethical styles, interactively. Evidence in mediation in the teaching-learning process favors the mastery of content by stimulating those who teach and those who learn, connecting three main concepts. These are entertainment, well-defined rules, and the presence of the player. Therefore, it is a prosperous active methodology designed to improve social interactions, perception, cognition, and psychomotor skills, influencing emotional performance through expanding social interaction⁽⁸⁻⁹⁾.

However, content and appearance validation must be achieved, as such processes point out both positive aspects and indicate what needs to be improved to obtain a technological device suitable for mediating teaching practices. Therefore, this study aims to verify the evidence of the validity of the board game "An antihypertensive move", produced to mediate teaching practices with students of health courses on diuretic and antihypertensive medications.

METHOD

Methodological⁽¹⁰⁾ and development⁽¹¹⁾ study that followed the SQUIRE-EDU⁽¹²⁾ guidelines. It was operationalized in two stages: Content Validation (CV) and Appearance Validation (AV)⁽¹³⁻¹⁴⁾. The study was conducted from August 2020 to August 2021, at a university in the North region, in the city of Macapá, State of Amapá, Brazil.

In both validations, sample size was defined by convenience. Twenty-five invitations were sent at a time. If the minimum number of specialists was not reached, another 25 invitations were sent. Thus, the recommendations indicating six to twenty specialists were observed⁽¹⁵⁻¹⁶⁾. The inclusion criteria in CV were a doctorate or master's degree in the health area; teaching experience in the curricular component: pharmacology (minimum of three years); clinical and/or care experience in the care of people with systemic arterial hypertension (minimum of three years); scientific production in the area of pharmacology or health with a focus on systemic arterial hypertension or in the production of educational technology; participation in evaluation boards for thesis, dissertation, monographs in the area of interest of the technology in question. The inclusion criteria for AV were at least two years of experience in the design and marketing field. Experts who did not complete the assessment within 30 days of submission were considered as sample loss.

CV experts were selected on the Lattes Platform, using the "subject" search mode, filling in the field with the terms "hypertension" and "educational technology", separately, and "antihypertensive drugs" and "educational technology" together. AV specialists were selected at the university where the study was conducted, using the "snowball" technique, in which the first person identified indicates the next. After selection, invitations were sent by email. 25 invitations were sent to CV and five to AV. After acceptance, the remaining items were sent via Google Forms, with the insertion of the Free and Informed Consent Form, the file containing the game in PDF format, and the instrument. A period of 30 days was established for the return of the completed instruments. In case of doubts, participants were advised to contact the author for clarification.

The Health Education Content Validation Instrument (IVCES)⁽¹⁷⁾ was used in CV. The instrument contains topics on the sociodemographic and professional data of the specialists with 19 items related to three domains: objectives (seven items), structure and presentation (nine items), and relevance (three items), organized on a 4-point Likert scale: 1. Totally Adequate, 2. Adequate, 3. Partially Adequate, 4. Inadequate. At AV, the Health Educational Technology Appearance Validation Instrument (IVATES)⁽¹⁸⁾ was used. The instrument contains

12 items related to graphics, layout, visual communication, information layouts and expressive language of the material, organized on a 5-point Likert scale: 1. I completely disagree, 2. I disagree, 3. I partially disagree, 4. I agree, 5. I completely agree. Both instruments have already been validated and used in methodological studies.

The game, An antihypertensive move, was sent to experts online with all the necessary information; a video was also made available with a simulation of a match of the game.

Two calculations were used to analyze the CVI: Item Content Validation Index (I-CVI) to determine the degree of adequacy for each item and Total Content Validation Index (T-CVI) to determine the degree of adequacy of the items according to the dimensions of the instrument. I-CVI and T-CVI were calculated by dividing the number of responses 1 or 2 by the total number of responses. A T-CVI equal to or greater than 0.80 was considered for validation⁽¹⁹⁾.

For the analysis of the IVA, the strategy was repeated: Item Appearance Validation Index (I-IVA) and Total Appearance Validation Index (T-IVA). I-IVA and T-IVA were calculated by dividing the number of responses 4 or 5 by the total number of responses. For validation⁽¹⁸⁾ it was established that an item with IVA-I ≥ 0.78 is considered excellent; between 0.60 and 0.77 indicates a need for change; with IVA-I < 0.60 it is poor and the material must be redone from the key point of the item.

Binomial Test was used to verify adequacy and agreement statistically, and the acceptable score was ≥ 0.80 with a significance level of 5%. The analyses were performed using MS Excel and IBM SPSS – version 26 for Windows.

The study was approved by the Research Ethics Committee of Universidade Federal do Amapá (Protocol No. 4,487,512/2020).

RESULTS

Content Validation

Of the 25 healthcare experts selected via the Lattes platform, 16 accepted the invitation and evaluated the technology in question. Regarding the general profile, 68.8% of the specialists were men, 56.3% were aged 30-39 years old, 62.5% had a degree in Pharmaceutical Sciences, 56.3% had graduated 6 to 10 years ago, 56.3% were responsible for the educational process in the pharmacology discipline for higher education, 68.8% had a PhD. Regarding location: North (50.0%), South (18.7%), Southeast (31.3%). Regarding the academic profile, 68.8% have teaching experience in the discipline of the area of interest, 62.5% participated in examining boards for end of course papers, dissertations and/

or doctoral thesis in the area of interest, 62.5% had academic experience in the area of interest, 56.3% had scientific production in the area of interest and 43.8% with dissertation and/or thesis supervision in the area of interest (Table 1).

In the content validation domains, the objectives domain, six items obtained $CVI > 0.80$. Item 1.5 obtained a $CVI-I$ of 0.75 and binomial test revealed that this value is not significantly lower than 0.80 ($p=0.402$); $CVI-T$ was 0.90. In the content validation domains, the objectives domain, six items obtained $IVC > 0.80$. Item 1.5 obtained an $IVC-I$ of 0.75 and binomial test revealed that this value is not significantly lower than 0.80 ($p=0.402$); $CVI-T$ was 0.90. In the structure and presentation domain, seven items obtained $CVI-I > 0.80$, with a $CVI-I$ variation between 0.81 and 1.00. Items 2.2 and 2.8 obtained $CVI-I < 0.80$, and binomial test revealed that these values are not significantly lower than 0.80 ($p=0.082$

and $p=0.402$, respectively); $CVI-T$ was 0.88. In the relevance domain, all items obtained $CVI-I$ values between 0.94 and 1.00 and $CVI-T$ was 0.98 (Table 2).

Of the seven items that make up the objectives in the IVCES^(16,18), item 1.5 and of the nine items that make up the structure and presentation, items 2.2/2.8 had $CVI-I$ ⁽¹⁹⁾ below the cutoff point recommended by the literature and received the following suggestions as recommendations from health experts: improve the clarity of writing, standardize some technical terms, perform spelling review on all components of the game, replace the term peptic with peptide; replace the word drug with pharmaceutical; replace chlorine with chloride, replace collecting duct with papillary collecting duct, which were all met and corrected in the content of the technology in question.

Table 1 – Demographic and academic profile of experts participating in the content validation process. Macapá, AP, Brazil, 2022, n=16

Variables		n	%
Gender	Female	5	31.2
	Male	11	68.8
Age	20-29 years	5	31.2
	30-39 years	9	56.3
	40 years or older	2	12.5
State in which the participant lives	Amapá	6	37.4
	São Paulo	5	31.2
	Santa Catarina	2	12.5
	Pará	1	6.3
	Bahia	1	6.3
	Amazonas	1	6.3
Academic background	Pharmacist	10	62.4
	Nurse	3	18.8

Table 1 – Cont.

Variables	n	%
Biomedicine	2	12.5
Biological sciences	1	6.3
Training (years)		
0-5 years	2	12.5
6-10 years	7	43.6
11-15 years	3	18.8
16-20 years	3	18.8
21 years or more	1	6.3
Professional field		
Higher education teaching (pharmacology)	9	56.1
Postgraduate studies (Pharmacology)	3	18.8
Higher education teaching (nursing)	2	12.5
Higher education teaching (biological sciences)	1	6.3
Pharmacy and outpatient care	1	6.3
Length of employment in the area		
0-5 years	3	18.8
6-10 years	9	56.3
11-15 years	2	12.5
16-20 years	1	6.3
21 years or more	1	6.3
Academic degree		
PhD	11	68.8
Master	4	25.0
Specialist	1	6.3

Source: research data, 2022.

Table 2 – Experts' responses according to Content Validation Index by Items and Total Content Validation Index. Macapá, AP, Brazil, 2022 (n=16)

1. Items of the Objectives	Totally Adequate	Adequate	Partially Adequate	Inadequate	CVI-I	p-value
1.1 The information/content is consistent with the learning process.	10	6	0	0	1.00	1.000
1.2 The information is consistent with the theme	12	2	2	0	0.88	0.859
1.3 The game facilitates the process of learning antihypertensive medications	10	5	1	0	0.94	0.972
1.4 Technology can circulate in the scientific community of the area	9	6	1	0	0.94	0.972
1.5 The game contains appropriate academic language	6	6	4	0	0.75	0.402
1.6 The game can be used in the classroom	10	4	2	0	0.88	0.859
1.7 The game meets the content proposed by the pharmacology discipline, with a focus on antihypertensive drugs CVI-T	13	2	1	0	0.94	0.972
					0.90	0.999
2. Structure and Presentation Items						
2.1 The game is adequately presented	9	7	0	0	1.00	1.000
2.2 Game information is clear and objective	5	5	6	0	0.63	0.082
2.3 Information is scientifically correct.	8	7	1	0	0.94	0.972
2.4 There is a logical sequence of the content	7	9	0	0	1.00	1.000
2.5 Information with correct nominal and verbal agreement, as well as spelling	5	8	3	0	0.81	0.648
2.6 Writing meets academic standards	9	6	0	1	0.94	0.972
2.7 The information on game items is consistent	5	8	3	0	0.81	0.648
2.8 The illustrations are expressive and sufficient	7	5	4	0	0.75	0.402

Table 2 – Cont.

1. Items of the Objectives	Totally Adequate	Adequate	Partially Adequate	Inadequate	CVI-I	p-value
2.9 The material is appropriate and attractive	9	7	0	0	1.00	1.000
CVI-T					0.88	0.993
3. Relevance Items						
3.1 The game covers relevant topics	10	5	1	0	0.94	0.972
3.2 The game proposes the construction of knowledge	13	3	0	0	1.00	1.000
3.3 The Game is suitable for use by scholars	12	4	0	0	1.00	1.000
CVI-T					0.98	1.000

Source: research data, 2022.

Appearance Validation

Of the five design and marketing specialists invited, four accepted the invitations and participated in the evaluation. Regarding the general profile, there are 100% residents of the State of Amapá, 50% female and 50% male, 100% in the age range of 30 to 39 years old. Regarding the professional profile, 100% have degrees in advertising and marketing, 50% have 10-15 years of training, 100% have experience in design, marketing, professional and technological education, 25% have master's degrees and 25% are specialists (Table 3).

IVATES has 12 items for appearance validation. Of the 12 items of the instrument, items 4, 7, 10, and 12 obtained IVA-I below the cutoff point recommended by the literature⁽¹⁶⁾, indicating the need for change (Table 4). Experts from other areas then made recommendations regarding necessary changes so that the technology could be presented in accordance with the technical formatting and visual conditions. These are the recommendations made: change the color palette, change the layout of the images (they said there was “visual pollution” in images and icons), remove symbols and logos from images, avoid repeating images.

After the evaluations with the recommendations were received, considering the completion of the first round of

appearance validation, all the recommended changes were made, both by health experts and experts from other areas. Considering the results of the first round evaluation for appearance validation, a second round was carried out in which the game was sent again to experts from other areas. As for the 12 items of the instrument, all obtained an IVA-I of 1.00 and IVA-T was 1.00 (Table 5).

Educational Product

Specialists in health and other areas received the first version of the educational technology – An antihypertensive move, with images of the game box, board, command die, dolls, and 13 cards (front and back sides), as well as the manual with the instructions and rules of the game (Figure 1). After the validations were completed, the first version was restructured according to the recommendations received (Figure 2). The board game “An antihypertensive move” is available for download in the technology repository on the website of the Educational Technology Studies Network (RETE Brasil)⁽²⁰⁾. This repository offers a variety of educational technologies and enables contact with researchers from all regions of Brazil.

Table 3 – Demographic and academic profile of experts participating in the appearance validation process. Macapá, AP, Brazil, 2022, n=16.

Variables		n	%
Gender	Female	2	50.0
	Male	2	50.0
Age	30-39 years	4	100.0
State in which the participant lives	Amapá	4	100.0
	Master of Arts and Bachelor's degree in Advertising	1	25.0
	Bachelor's Degree in Social Media with Qualification in Advertising and Bachelor's Degree in Pedagogy	1	25.0
	Social Media with qualification in Advertising	1	25.0
	Advertising and Marketing	1	25.0
	0-5 years	1	25.0
	6-10 years	1	25.0
Training (in years)	11-15 years	2	50.0
	Higher Education Teaching, Designer and BRANDING MANAGER	1	25.0
	Management – Federal Government	1	25.0
Professional field	Marketing and Publishing	1	25.0
	Continuing Training, Professional and Technological Education and Pedagogical Supervision	1	25.0
	0-5 years	2	50.0
Length of employment in the area	6-10 years	2	50.0
	None	2	50.0
Degree	Master	1	25.0
	Specialist	1	25.0

Source: research data, 2022.

Table 4 – Expert responses according to Item Appearance Validation Index and Total Appearance Validation Index. Macapá, AP, Brazil, 2022, (n=4)

Appearance items	1. I totally disagree	2. I disagree	3. I partially disagree	4. I agree	5. I totally agree	CVI-I	p-value
1. Illustrations are appropriate for the target audience	0	0	1	3	0	0.75	0.590
2. The illustrations are clear and easy to understand.	0	0	1	2	1	0.75	0.590
3. Illustrations are relevant to understanding the content	0	0	0	2	2	1.00	1.000
4. The colors of the illustrations are suitable for the game	0	2	1	1	0	0.25	0.027
5. The shapes of the illustrations are suitable for the game	0	0	1	3	0	0.75	0.590
6. The illustrations portray the daily life of the target audience	0	0	0	2	2	1.00	1.000
7. The figures are appropriate to the text	0	0	2	2	0	0.50	0.180
8. The figures elucidate the content	0	0	1	2	1	0.75	0.590
9. The illustrations help to explain the theme and are arranged in a logical sequence.	0	0	1	2	1	0.75	0.590
10. Illustrations are in sufficient quantity	0	0	2	2	0	0.50	0.180
11. The illustrations are appropriately sized	0	0	1	3	0	0.75	0.590
12. Illustrations help change behaviors and attitudes	0	1	1	1	1	0.50	0.180
IVA-T				0.83	0.714		

Source: research data, 2022.

Table 5 – Expert responses after modifications made according to the Item Appearance Validation Index and Total Appearance Validation Index. Macapá, AP, Brazil, 2022, (n=4)

Appearance items	1. I totally disagree	2. I disagree	3. I partially disagree	4. I agree	5. I totally agree	CVI-I	p-value
1 The illustrations are appropriate for the target audience	0	0	0	2	2	1.00	1.000
2. The illustrations are clear and convey ease of use	0	0	0	2	2	1.00	1.000
3.The illustrations are relevant to the target audience's understanding of the content	0	0	0	1	3	1.00	1.000
4. The colors of the illustrations are appropriate for the type of material	0	0	0	2	2	1.00	1.000
5. The shapes of the illustrations are appropriate for the type of material	0	0	0	2	2	1.00	1.000
6. The illustrations portray the daily lives of the intervention's target audience.	0	0	0	2	2	1.00	1.000
7. The arrangement of the figures is in harmony with the text	0	0	0	1	3	1.00	1.000
8. The figures used elucidate the content of the educational material	0	0	0	2	2	1.00	1.000
9. The illustrations help to expound the theme and are in a logical sequence	0	0	0	2	2	1.00	1.000
10. There are adequate quantities of illustrations in the educational material	0	0	0	1	3	1.00	1.000
11. Illustrations are in appropriate sizes in the educational material	0	0	0	2	2	1.00	1.000
12. Illustrations help change the behaviors and attitudes of the target audience	0	0	0	1	3	1.00	1.000
					IVA-T	1.00	1.000

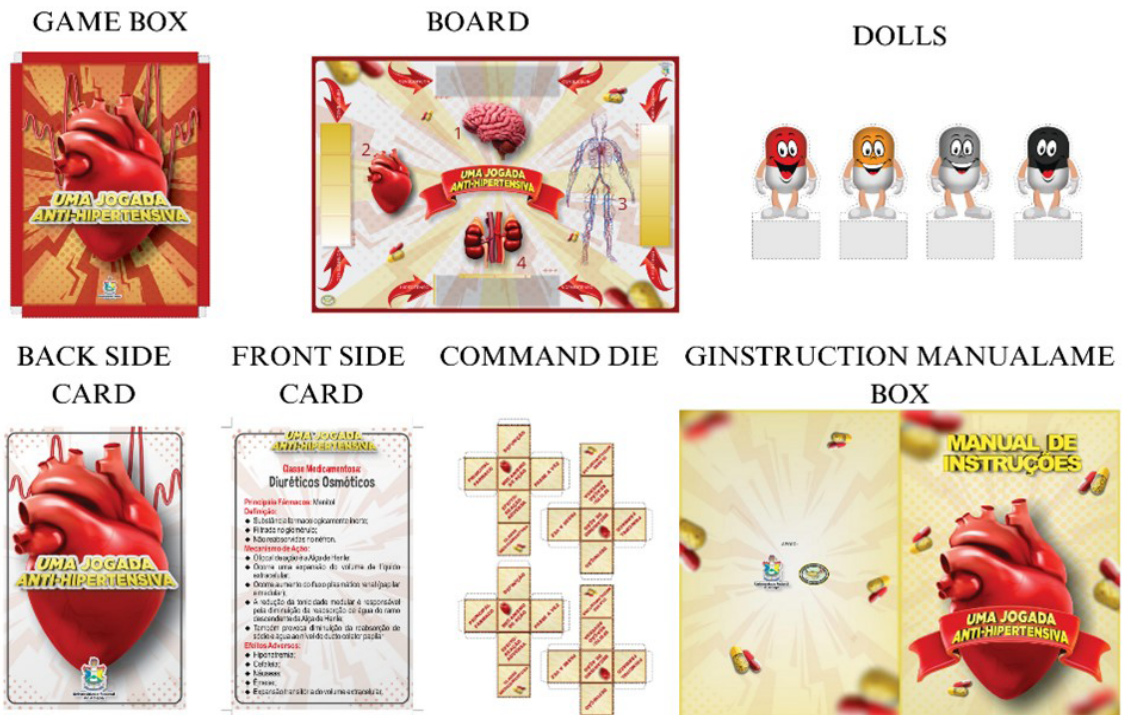
Source: research data, 2022.

Figure 1 – Graphical representation of the first version of the educational technology. Macapá, AP, Brazil, 2022



Source: research data, 2022.

Figure 2 – Graphical representation of the final version of the educational technology. Macapá, AP, Brazil, 2022



Source: research data, 2022.

■ DISCUSSION

Content validation was positive. However, a second round was needed for appearance validation. The currently most acceptable agreement rate for educational technology (ET) validation is 80%. Modifying an ET based on suggestions proposed by experts is essential for its improvement so that the proposed objectives are achieved and the quality of the material is guaranteed⁽²¹⁻²²⁾. Acceptable rates for validating game-type educational technologies are global CVI (CVI-T of the three domains of the instrument) above 0.80%^(22,23-24).

The board game "An antihypertensive move" is a tool that allows players to have fun and learn, and therefore puts them in an active position in learning. The teaching-learning process can take away students' protagonism or enhance it, and by enhancing it, it changes the process from a passive position to an active position⁽²⁵⁾. Thus, board games are potential active methodologies to mediate teaching practices on complex subjects in the health area, providing participation, social interaction, motivation, curiosity, proactivity, attention and attitude^(23, 25, 26-28).

The results of the domain objectives were positive, and, therefore, the content is complete, concise and didactic. With the cards it is possible to master the most important points of each drug. Moreover, each drug class is based on the available literature related to the topic. The theoretical basis for the construction and/or validation of a board game is essential for the content to project changes aimed at providing and promoting learning and knowledge. Thus, it is possible to promote critical reflection for players/students and, consequently, agile thinking to face the various problems to be experienced in professional activity in the future^(24,27).

The results of the structure and presentation domain were positive. Still, they raised suggestions from experts, with emphasis on items 2.2 and 2.8, related to spelling rules, which encouraged rigorous correction of the Portuguese language during the process. Some changes made to board games are essential to improve their understanding, in addition to making them more attractive and playful⁽²⁹⁾.

The results of the relevance domain were positive, showing that the content is relevant to the target audience, with potential for the construction of reflective-critical thinking. Educational technologies are necessary for the dissemination of knowledge in a lighter, more dynamic and fun way. The board game contributes to the teaching-learning process and is effective in significantly expanding theoretical and practical knowledge, increasing the interest of players/students in deepening their studies on the subject. Furthermore, games stimulate competitiveness and act as a motivating element for the construction of knowledge^(23, 30,31).

As for the appearance validation results, which indicated the need for two rounds, after the modifications were made, the game was considered valid. Appearance validation demonstrates that illustrations, organization, structure, and design of the material are essential elements for elucidating and understanding a given theme, which combined with the layout produce the necessary attractiveness to arouse interest in reading and playing the game. These elements are attractive to the target audience, and therefore, understanding and complying with them will provide greater adherence to educational technology by the target audience^(8,32).

The teaching of pharmacology in health courses raises the effects that pharmacological substances have on the biological, biochemical and pathophysiological functions of certain organs or body systems, as well as pharmacokinetics (bioavailability, distribution, absorption, excretion), pharmacodynamics (drug-receptor interactions, dose-dependence relationship). Regarding the content on diuretic and antihypertensive medications, their importance in improving the quality of life of people living with hypertension stands out, in addition to reducing morbidity and mortality resulting from complications of uncontrolled blood pressure. Thus, active teaching strategies, with games, for example, can enhance the teaching-learning process with direct positive implications for professional practice, allowing for quick and coherent clinical reasoning.

A limitation of this study is its non-validation with the target audience, since validation with this audience would help promote adjustments to statements and improve the language and image of the game. Furthermore, validating technologies with the general target audience requires more time and resources to organize tests, analyze feedback, and make improvements. However, the project has a schedule of steps for validation with the target audience, which will seek to ensure that the game "An antihypertensive move" becomes a means of teaching the public for which it was designed.

■ CONCLUSION

The board game – An antihypertensive move has proven to be valid in content and appearance, and is an educational technology with relevant information about diuretic and antihypertensive medications, with accessible technical language, and objective and attractive illustrations for the target audience. Therefore, the game can be considered applicable in different teaching-learning realities, since Brazil is a diverse country with differences enhanced by social determinants that are reflected in economic and regional inequalities, such as structural deficiencies and access to technologies, especially the hard ones: computers, and tablets, among others.

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