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BANFISA and (IN) DICA-SUS in health undergraduate education: playing and learning construction

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ABSTRACT

Facing the challenges to the critical formation of health professionals, this article debates if the games BANFISA and (IN)DICA-SUS increases the creativity, the teamwork and the autonomy in the graduation in health. **Objectives**: to analyze the learning built during the matches of the games by students of the subject Gestão de Políticas Públicas em Saúde at the Universidade de Brasília. **Method:** exploratory, descriptive research, in a qualitative approach, with 26 students from various graduation courses in health, using a questionnaire and participant observation. **Results:** participants reinvented rules, related issues addressed in the games to the reality, interacted with colleagues and had fun throughout the match. Comparing the games in relation to ludicity, the BANFISA was more attractive than the (IN) DICA-SUS, although they are complementary. **Conclusion:** learning constructed by the students goes beyond the content of the subject; involve the active participation in group and creativity.

Key words: Health Education; Games and Toys; Higher Education; Creativity; Personal Autonomy.

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INTRODUCTION

To understand the meaning of teaching and learning in the undergraduate field is essential, both for the student and the professor. First of all, some concepts that are already ingrained in most of these individuals must be rethought and deconstructed so as to establish new ones. Higher education must promote critical thinking and the professor plays a key role in this educational practice, which is supported by topics of knowledge[1].

In addition to the assimilation of content, learning involves skills and experiences that will give support to individuals so they are able to rebuild their reality. The path of educational practices guides the development of these skills and competences so actions can include human subjectivity and comprehensiveness in care[2]. Learning implies in a paradigm shift in the process of construction and deconstruction of knowledge, going beyond legal and prescriptive formalities, through the development of questioning methodologies, which are committed to human beings[3].

Training in health is guided by the National Curricular Guidelines (DCNs as per its acronym in Portuguese) for undergraduate courses, which are in line with principles and guidelines of the Unified Health System (SUS, as per its acronym in Portuguese). The DCNs aim to place students as subjects capable of identifying the gaps in their knowledge, and help them find a balance between theory and professional practice[1,4].

Yet the curricular content has some distortions and it is possible to see that the biological model prevails in health undergraduate education, oriented toward specialties and making use of cognitive evaluation by the accumulation of information. As a result, in practices of SUS professionals, actions are based on the logic of medicalization, verticalization of programs, and fragmented and hierarchical relationships or actions in care[2,5].

The implementation of DCNs requires bringing creative practice to the learning environment. Becoming an active and transforming subject, who questions the social structures of the environment in which they are and provoke changing actions, implies in a creative intellectual practice. Teaching proposed by DCNs is based on a meaningful learning process, in order to encourage creative potential, autonomy and self-management of learning[2,6].

Besides creativity, working as a team and building their own knowledge are key elements for those who seek innovation on their own, in order to change actions within society[2-3,6]. The ability to interact cooperatively with colleagues allows exchanging experiences and information, makes solution of problems easier and enhances creative thinking. Such actions are present in playing, which always requires one to play together, presupposing company rather than loneliness[7-8].

From the playing point of view, it is not just about doing what is determined; it is essential to use imagination and reason, which articulates content and critical thought[8]. Teaching-learning and research, which are inseparable, are strengthened by the idea that the whole educational process is reflected on the hermeneutic process of the game[9], and that all fields of science are forms of playing, since they are isolated in their own fields, limited by the strictness of methodological rules[10].

Playing makes it possible for the professor and students to work, exercise and reflect on the nature of the human being and their incompleteness, which implies in dialogical actions that give way to what is new and to creative reflection. In this sense, the naive perception of reality, or focused vision, may be overcome as the critical consciousness is formed, expanding the vision through reflection and commitment to reality. The subject becomes then a transforming agent[11].

From that point, the agent is autonomous in the process of knowledge building and responsible for their success or failure. Teaching is aroused and those who teach become stimulating agents. The human body becomes conscious, a sensor, a learner, a transformer, a creator of beauty and not an empty space to be filled with content[11-12]. Although the use of active methodologies is indicated for professional training, the search for alternatives that use different strategies enhances the development of students' potential[13].

In the perspective of articulating playing with education in the training of health professionals, the project Recriar-se[14] created two board games, (IN)DICA-SUS and BANFISA, in which it is possible to learn about the operation of SUS. (IN) DICA-SUS is an adaptation of another trivia game and consists of finding the content of cards by means of hints and tips. For every hint given, participants have the chance to find the SUS-thing (concepts and guidelines), the SUS-time (historical facts and regulations), the SUS-place (health services and forums of articulation), and SUS-players (professionals, organizations and associations) that are part of the health public policy in Brazil. BANFISA, which is based on the game Monopoly, discusses the construction and funding of SUS health services. In this game, participants must purchase items that are part of the health care network and complete it to win the game. During the game, players negotiate, respond to commands from the Health Council and the SUS Regulation Unit, increase or reduce the provision of health services, as it happens in the management of the health system.

These two games have been adopted by many courses, such as Medicine, Nursing, Social Services and Collective Health Management, besides being part of the curricular content of Public Health Policies Management at the University of Brasilia (UnB) since the first semester of 2011[14].

In this context, the present study raises the question whether the games BANFISA and (IN)DICA-SUS stimulate creativity, teamwork and autonomy of Life Sciences undergraduate students to reinvent their own knowledge. To answer this question, a few objectives were defined: a) to analyze knowledge built during the games (IN)DICA-SUS and BANFISA by Public Health Policies undergraduate students; b) to identify the potential of the games (IN)DICA-SUS and BANFISA regarding creativity, teamwork and autonomy; and c) to compare playfulness of the games (IN)DICA-SUS and BANFISA in the construction of knowledge in the Life Sciences undergraduate program.

METHOD

This is a study of the Recriar-se Project, which investigates the construction of knowledge through educational technologies based on the integration of entertainment, art and

education[14]. This is an exploratory and descriptive study with a qualitative approach. The exploratory stage was carried out to obtain information concerning teaching methodologies which use playing as a means, and scientific output that addresses the topic, as this kind of research is ideal for getting familiar with relatively unknown events[15].

The descriptive feature of the study is explained by the need to detail knowledge built and the constituent components of learning that are triggered by playing experiences. We aimed to describe the categories that affect the degree of relaxation and pleasure of students during the game[15].

The qualitative nature is explained by the object, which is subjective, since we try to identify and understand how knowledge is built from playing experiences. The qualitative approach is characterized by social phenomena coming together, and it is not worth quantifying and generalizing, as it works with a universe of meanings, reasons, wishes, aspirations, beliefs, values and attitude[16].

The study setting was a classroom of Public Health Policies of the University of Brasilia (UnB). Subjects were students enrolled in the aforementioned course, and 26 played (IN) DICA-SUS and 21 played BANFISA.

Data collection instruments were a script of participant observation and a semi-open questionnaire, previously developed[17], composed of 2 closed-ended and 11 open-ended questions. The variables of this instrument are divided into the following levels: a) Player profile: gender, education, age, profession, affinity with board games and study habits; b) Learning components: perception of learning, self-assessment, assimilation of concepts, learning by association, active participation, theory-practice contextualization, previous knowledge and reconstruction of ways of understanding; c) Emotions and attitudes during the game: motivation to study, tension in the game, desire to win, lack of interest in the game, formal and informal help to colleagues; and d) Game tactics: understanding of rules, quality of hints and cards, understanding of the board and reinvention of the game.

The creation of the participant observation script was based on the aforementioned levels and variables and by the literature review of the exploratory stage. In order to create this instrument, a matrix was built, in which levels, concepts, variables and indicators were found, as suggested by the literature[15]. Afterwards, three pretests were performed in the form of game workshops with students who were not part of the study. After this pilot phase, 15 items were selected to be part of the final version of the script, and they were divided into three levels (Chart 1).

Data were collected during the classes of Public Health Policies Management at UnB, at different moments of discussion of content, which were: health policies, models of care service, funding and management of the care network in the SUS. The group was divided into four groups, each one with 5 or 6 students. The professor was absent during the activity in order to ensure more freedom and spontaneity to participants, who were under the supervision of a monitor, whereas a scholar of scientific initiation carried out participant observation with a script. The average length of each game was between 60 and 90 minutes, whereas the questionnaire response time was 15 to 20 minutes.

The scholar interacted actively with players as if she were a player, so that subjects could feel more comfortable and forget they were being observed. Notes were taken discreetly so as to soften the formal nature of the study. From the exploratory phase

Chart 1 – Levels and items of the participant observation script used during the games of (IN)DICA-SUS and BANFISA, Brasilia, Distrito Federal, Brazil, 2012

Observation script	
LEVELS	ITEMS
Game, creativity and teamwork	Active interaction among participants
	Fierce competition with colleagues to win the game
	Help to colleagues
	Creation and/or change of rules
	Presence of other playing relations
Game and autonomy in knowledge construction	Reports of specific characteristics of SUS based on the game
	Difficulties concerning SUS
	Reports of interest in further studying the topic
	Attention and excitement to get the right answers and/or to build the healthcare network
Game and emotions	Body language and relaxing communication during the game
	Reports of concern and/or expression of nervousness
	Competition as a stimulus for the game
	Positive reports regarding fun
	Negative reports regarding fun
	Attitude and behavior expressing boredom

and the theoretical framework that supported the study, we observed actions, statements and non-verbal expressions that indicated the presence or absence of creative thinking, teamwork and in which moments autonomous knowledge construction took place, based on the hypothesis that playing stimulates it.

The questionnaires were applied immediately after the end of the game, so as not to miss the emotions and thoughts brought up during the game, and students answered in writing and individually. As soon as they answered the questionnaire, with the professor still absent, students were invited by the scholar to discuss openly the playing experience and their communication with content regarding public health policies in Brazil, which complemented the observation notes.

An analysis of content was carried out in order to assess and investigate the communication process in the context of the game, with a codification to delimit relevant features, which are summarized in units that may be developed[15]. Data that supported the analysis include the record of observations in a field diary, answers to questions, group discussion and notes related to the participant observation with a script. A codified table composed of levels and items present in the script was used (Chart 1). After the analysis of this material, the empirical categories were extracted based on statements, and they were put in their respective predefined variables that originated the script[17]. The reports and notes of observations that did not fit into any category gave rise to new empirical categories.

Anonymity and confidentiality were ensured regarding the source of information, as well as personal details of subjects involved, who signed two copies of a Free and Informed Consent Form. One of the copies was kept by each participant and the other was filed with other documents of the study. The study was approved by the Research Ethics Committee of the Faculty of Life Sciences of the University of Brasilia, under number 026/12.

RESULTS

Of the 26 participants of the game (IN)DICA-SUS, one (3.8%) was male and 25 (96.2%) were females, aged up to 30 years old (92.4%). Twenty-two students (84.6%) reported they had a particular affinity with board games, for different reasons: a) relaxing and interaction; b) its stimulating dynamics; c) contact with it in their childhood and d) learning provided. Of the 21 participants who played BANFISA, two (9.1%) were male and 19 (90.9%) were female. Eighteen were aged up to 30 years old (85.7%) and 17 (80.9%) had an affinity with board games. All of them were undergraduate students of UnB.

From the level "Game, creativity and teamwork", the frequency observed was greater for "Reinvention of rules" for BANFISA (29%) than for (IN)DICA-SUS (11.1%), whereas the categories "Help to colleagues" and "Interaction/group discussion" were more frequent for (IN)DICA-SUS (Chart 1).

Through participant observation with a script, reports described in the questionnaires were confirmed. It was observed that students changed rules and helped their colleagues in games of (IN)DICA-SUS, in order to make it more simple. As for BANFISA, the reinvention of rules occurred mainly to organize negotiations during the game (Chart 2).

Regarding the level "Game and emotions", the categories with the highest frequency were "Relaxation and informality" for (IN)DICA-SUS and "Will to win" for BANFISA (Table 1). Unexpectedly, the first game had several reports of "Boredom" whereas the second did not have any report related to this category.

It is possible to explain these results with the help of participant observation. Both games began heated and students were excited. However, in view of difficulties encountered during the solution of cards of (IN)DICA-SUS, which requires some knowledge of the topic, it became a little boring and slow. In that sense, students showed a "Lack of interest in the game/will to quit" (15.9%) (Chart 2). In the case of BANFISA, which does not require previous experience, the feeling of relaxation and informality was permanent throughout the game, with only one report of lack of interest or will to quit the game.

For the level "Game and autonomy", the assessment of "Game tactics" by players of (IN)DICA-SUS was ambiguous regarding difficulty (26%) or ease (27.7%) of cards, although dynamics (22.7%) and rules (16.8%) made learning easier. As

Chart 2 – Comparison between answers from students to the questionnaire and records of participant observation of games, by empirical category and game played, Brasilia, Distrito Federal, Brazil, 2012

Categories	Statements and records of participant observation	
	BANFISA	(IN)DICA-SUS
Reinvention of rules	*"We decided we had to complete the network with 'services' of the same color, in order to increase the number of negotiations, interaction and difficulty of the game."* GB.8 Participant observation: A group decided that the network could only be of one color, corresponding to the color of the pawn. The justification was that the game would be more difficult and would have more negotiations.	*"Everybody helped and we gave easier hints, then the game went on better and more people made moves."* GI.22 Participant observation: Participants of a group chose the easiest cards and disposed of the difficult ones. One of the groups decided that everybody should try to get the answers right together.

To be continued

Chart 2 (cont.)

Categories	Statements and records of participant observation	
	BANFISA	(IN)DICA-SUS
To learn while playing	*"Some questions were complex, but they gave me the opportunity to learn about some topics that were unknown to me until then.* GB.17 Participant Observation: A participant read a card and the other did not understand what it was about. *"Never heard about that..."* As soon as reading was done, participants asked to see the card to learn/ understand the topic.	*"I ended up learning many things I didn't know."* GI.20 Participant observation: Students came closer to each other after they got the answers right in order to read all the hints. Many of them showed interest in learning during the game and some of them took notes.
Lack of interest in the game/will to quit	*"I wanted to quit, because I found BANFISA very confusing"* GB.21 Participant observation: Two students were not interested. One sat near the group and the other was using the computer.	*"I wanted to quit because, despite being relaxing, it is too lengthy."* GI.6 *"I wanted to quit because I couldn't get any answer right."* GI.7 Participant observation: When it took them long to get a right answer, players asked whether they should play until the end or the class was finished.
Motivation to study	*"The game provides a light learning that encourages students to learn more, by the way questions are raised."* GB.3	*"I felt that it is necessary to deepen knowledge of certain areas of the SUS, for instance, specific regulations for the SUS".* GI.4
Assimilation of content	*"Games allow to learn content in a fun and relaxing way. In a simple and creative way we can better assimilate content."* GB.6	*"By means of a simple method, you can learn everything, its history, its role and its functions through hints."* GI.22
Self-assessment	*"Winning, as the game addresses topics discussed in the classroom. Winning means that we learned the content."* GB.12	*"They did favor learning, because you play and learn in a funny and relaxing way. And you even test your knowledge".* GI.24

Table 1 – Comparison of frequency of BANFISA and (IN) DICASUS answers by variables, Brasília, Distrito Federal, Brazil, 2012

Variables	(IN)DICA-SUS No. (%)	BANFISA No. (%)
Reinvention of rules	3 (11.1)	11 (29)
Help to colleagues	12 (44.4)	9 (23.7)
Will to win	10 (27.7)	17 (43.6)
Boredom	5 (11.7)	0 (0)
Connecting and understanding topics	4 (11.1)	13 (36.1)
Interaction/group discussion	9(33.3)	8 (21.1)

for the participants of BANFISA, the game dynamics had better results (32.9%) for immersion in the game.

Among the "learning strategies", "assimilation of content" (36.1%) and "recalling topics" (22.2%) were the categories that stood out in (IN)DICA-SUS, which is explained by the game format itself, based on questions and answers. In BANFISA, "connecting and understanding topics" (Table 1) was the most frequent answer, as recorded on the field diary, since students managed to extrapolate the care network found on the board, and associated it with the actual organization of care services at SUS. The "motivation to study" was not frequently reported, only seven participants of both games felt the need to deepen their knowledge after the game.

Reports concerning "competitiveness and success as a learning stimulus" did not stand out in any of the games. This can be explained by the attitude of students in the face of difficulties encountered during the game: instead of competitive and individual actions, many of them made use of interactive actions as a strategy to better learn and, consequently, make progress in the game. However, natural competition encouraged by the game was frequently observed as a stimulus of relaxation and informality, highlighted by the creation of new entertaining relations in parallel with the game. Students played games with each other, using their own codes and expressions.

It was also possible to observe that, besides reviewing contents, helping to assimilate and associating the topic of the game with reality, more BANFISA players stated they learned

while they played (16.7%) when compared to (IN)DICA-SUS players (8.3%). This feature was evident throughout the games and recorded on the observation script. When interacting in a more dynamic and warm way, students were more stimulated by learning brought by BANFISA. This was clear in statements made during the games, when students reported they could better understand the operation of the SUS healthcare network, relating it to the content of the course.

DISCUSSION

The profile of players and the atmosphere in which the games took place are particularities that affect the assessment of joyfulness, learning components, emotions felt during the game and tactics, as seen in previous studies[17]. We can analyze a greater interest in those who had a pleasant experience with games, whether in the present or in childhood, as a psychic factor that is particular to the experience of playing for human development[18]. The reinvention of rules is an important variable to assess game joyfulness in many contexts[19], and it indicates a certain superiority of BANFISA compared to (IN)DICA-SUS regarding this point. Based on that, the playing potential is identified as a stimulating factor of teamwork and cooperative actions, due to the fact that the game is communicative, regardless of who is playing and the distance between players[8-12,14,17-19].

The results of the category "Game and emotions" make reference to the challenging feature of games. However, if players feel they are not ready, the game becomes uninteresting and monotonous. Playing is also a demonstration of superiority that combines opposed feelings like pleasure and tension during the game. The uncertainty of victory results in excitement, since one does not play when they are sure to win. In other words, satisfaction and the risk of losing are inseparable. These experiences are specific to the immersion offered by the game, which is characterized by the duality between pleasure and tension, as found in the literature[14,17-20].

Based on the results of the category "Game and autonomy", the different forms of learning experienced by subjects during the games were observed, and these new ways do not always fit in the methodologies chosen by professors. Learning components aroused by playing prevail, and they are more based on creativity, autonomy and interaction of participants, rather than on discipline of formal education[9-14].

The incentive to learn concomitant to the game illustrates how playing incites exploration and the search for information about the environment, besides contributing to learning[17-18] The mix of fantasy and reality and the change resulting from playing are essential characteristics of the game. In BANFISA for instance, players are attracted both by getting closer to others and by the escape from reality. The game, which is culturally essential to people's lives, introduces the individual to life and to their completeness, increasing the capacity of overcoming barriers and facing difficulties[6-10].

CONCLUSIONS

During the games of BANFISA and (IN)DICA-SUS, we can conclude that learning constructed by students goes beyond the content proposed by the course. Participants put into practice essential skills, such as teamwork, active interaction and creativity highlighted in the reinvention of rules and the creation of contexts for situations originated by the games.

When comparing joyfulness between games, it was evident that BANFISA was more attractive than (IN)DICA-SUS, since it offers more possibilities to learn as the game progresses and it presents situations that are easier to put into context with reality. As (IN)DICA-SUS requires more background knowledge to keep its dynamics, it ended up being a boring experience for those who were not prepared or who did not master the topic addressed.

However, we can conclude that these two games complement each other, and each one has its particularities to provide a playful experience of learning, relaxation and cooperation. Depending on the moment the game is included in the learning process, the perception of it can be changed. As a limitation of this study, we can mention the need for further research in different contexts of teaching-learning, in order to analyze the playing potential found in the study.

REFERENCES

1. Keiser DE, Serbim AK. Diretrizes curriculares nacionais: percepções de acadêmicos sobre a sua formação em enfermagem. Rev Gaúch Enferm. 2009;30(4):633-40.
2. Lucchese R, Vera I, Pereira WR. As políticas públicas de saúde - SUS: como referência para o processo ensino-aprendizagem do enfermeiro. Rev Eletrônica Enferm [Internet]. 2010 [acesso em 19 de dezembro de 2014];12(3):562-6. Disponível em: http://www.fen.ufg.br/fen_revista/v12/n3/v12n3a21.htm
3. Backes DS, Erdmann AL. Formação do enfermeiro pelo olhar do empreendedorismo social. Rev Gaúch Enferm. 2009;30(2):242-8.
4. Ministério da Educação (BR). Lei nº. 9394, de 20 de dezembro de 1996. Estabelece as diretrizes e bases da educação nacional. Diário Oficial da União 23 dez 1996;Seção 1.
5. Moraes JT, Lopes EMT. A formação de profissionais de saúde em instituições de ensino superior de Divinópolis, Minas Gerais. Trab Educ Saúde [Internet]. 2009 [acesso em 19 de dezembro de 2014];7(3):435-44. Disponível em: http://www.revista.epsjv.fiocruz.br/upload/revistas/r264.pdf
6. De Masi D. O ócio criativo. 3.ed. Rio de Janeiro: Sextante; 2000.
7. Callois R. Os homens e os jogos: a máscara e a vertigem. Lisboa (PT): Cotovia; 1990

8. Gadamer HG. A atualidade do belo: a arte como jogo, símbolo e festa. Rio de Janeiro: Tempo Brasileiro; 1985.

9. Alves MA. O modelo estrutural do jogo hermenêutico como fundamento filosófico da educação. Ciênc Educ (Baudu). 2011;17(1):235-48.

10. Huizinga J. Homo Ludens: o jogo como elemento da cultura. 6. ed. São Paulo: Perspectiva; 2010.

11. Freire P. Pedagogia da autonomia: saberes necessários à prática educativa. 36. ed. São Paulo: Paz e Terra; 1996.

12. Niemeyer FSKS, Silva KS, Kruse MHL. Diretrizes curriculares de enfermagem: governando corpos de enfermeiras. Texto & Contexto Enferm [Internet]. 2010 [acesso em 19 de dezembro de 2014];19(4):767-73. Disponível em: http://www.scielo.br/pdf/tce/v19n4/21.pdf

13. Sobral FR, Campos CJG. Utilização de metodologia ativa no ensino e na assistência de enfermagem na produção nacional: REVIEW integrativa. Rev Esc Enferm USP [Internet]. 2012 [acesso em 19 de dezembro de 2014];46(1):208-18. Disponível em: http://www.scielo.br/pdf/reeusp/v46n1/v46n1a28.pdf

14. Pires MRGM, Matos DG, Göttems LBD. Jogo (IN) DICA-SUS e Banfisa: formação de profissionais de saúde pelo recriar-se do lúdico. In: Anais do V Congresso Ibero-Americano de Research Qualitativa em Saúde; 2012 out 11-13; Lisboa, Portugal. [acesso em 09 de fevereiro de 2014]. Disponível em: http://www.eventgest.com/CLIENTES/leading/c_aap.php?gc=Abstracts%202.0-%209680108976%20-%20Results%20AAP&id_evento=9680108976

15. Sampieri RH, Collado CF, LúcioPB. Metodologia de Research. 3. ed. São Paulo: McGraw-Hill; 2006.

16. Minayo MCS. O desafio do conhecimento: research qualitativa em saúde. 9. ed.Rio de Janeiro: ABRASCO; 2006.

17. Pires MRGM, Guilhem D, Gottems LBD. Jogo (IN)DICA-SUS: estratégia lúdica na aprendizagem sobre o Sistema Único de Saúde. Texto & Contexto Enferm [Internet]. 2013 [acesso em 19 de dezembro de 2014];22(2):379-88. Disponível em: http://www.scielo.br/pdf/tce/v22n2/v22n2a14

18. Pimentel AA. Ludicidade na educação infantil: uma abordagem histórico-cultural. Psicol Educ. 2008;26(1):109-33.

19. Savi R, Wangenheim VGC, Ulbricht V, Vanzin T. Proposta de modelo de avaliação de jogos educacionais. Novas Tecnologias Educação [Internet]. 2010 [acesso em 19 de dezembro de 2014]. Disponível em: http://seer.ufrgs.br/renote/article/view/18043

20. Jennet C, Cox AL, Cairns P, Epps A, Tijs T, Walton A. Measuring and defining the experience of immersion in games. Int J Hum-Comput Stud [Internet]. 2008 [cited 2014 December 19];66(9):641-61. Available from: http://www.sciencedirect.com/science/article/pii/S107158190800049