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ORIGINAL ARTICLE

QUALITATIVE ANALYSES OF AN EDUCATIVE INSTRUMENT ABOUT DENGUE USED BY SCHOOLCHILDREN

ANÁLISE QUALITATIVA DO ALCANCE DE UM INSTRUMENTO EDUCATIVO SOBRE DENGUE PARA ESCOLARES

ANÁLISIS CUALITATIVO DEL ALCANCE DE UNA HERRAMIENTA EDUCATIVA PARA LOS NIÑOS EN EDAD ESCOLAR SOBRE DENGUE

Mark Anthony Beinner¹, Évelin Angélica Herculano de Morais², Suelen Rosa de Oliveira³

ABSTRACT

Objectives: to examine the perceptions of students after use of educational game Combating Dengue (JSD) and verify the effectiveness of play by schoolchildren in learning about this public health disease. Method: This study assessed the acceptability of an educational model based on the use of a board game about dengue, using a feedback methodology. The study subjects were 74 students enrolled in the 5th and 6th grades. A questionnaire was administered to students at a public school in Belo Horizonte, MG, after contact with the JSD. Data were analyzed using descriptive statistics. The project was approved by the Human Ethics Committee (Process: 0106.0.203,000-09). **Results:** Students demonstrated increased knowledge about dengue and reported the development of activities to prevent dengue. Conclusion: feedback allowed the students to express their opinions about the game, in addition to voicing their interest in preventing dengue at home and in the community. **Descriptors:** Health Education; Dengue; Feedback; Students.

RESUMO

Objetivos: analisar percepções de alunos após uso do jogo educativo Jogando em Saúde - Dengue (JSD) e verificar a eficácia do jogo no aprendizado e diversão. **Método:** trata-se de estudo de avaliação da aceitação de um modelo educativo baseado no uso de um jogo de tabuleiro sobre dengue, usando a metodologia de retroalimentação psicológica ou *feedback*. Participaram 74 escolares da 5ª e 6ª séries do ensino fundamental. Um questionário foi aplicado aos alunos de uma escola pública de Belo Horizonte, MG, após contato com o JSD. Os dados foram analisados por estatística descritiva. O projeto foi aprovado pelo Comitê de Ética em Pesquisa (Parecer 0106.0.203,000-09). **Resultados:** os alunos apontaram novos conhecimentos adquiridos e relataram o desenvolvimento de atividades para prevenir a dengue. **Conclusão:** o *feedback* permitiu a expressão de opiniões dos alunos sobre a atividade, a manifestação do interesse em combater a dengue e o desejo de expandir conhecimentos e responsabilidades. **Descritores:** Educação em saúde; Dengue; Retroalimentação Psicológica; Estudantes.

RESUMEN

Objetivos: analizar las percepciones de los estudiantes después de su uso del juego Jugando en Salud - Dengue (JSD) y verificar la efectividad de juego en el aprendizaje y la diversión. **Método:** Este fue un estudio para evaluar la aceptabilidad de un modelo educativo basado en un juego sobre el dengue, utilizando la metodología del retroalimentación psicológica o *feedback*. El estudio contó con 74 estudiantes de los grados quinto y sexto. Se aplicó un cuestionario a los alumnos de una escuela pública en Belo Horizonte, MG, después del contacto con el JSD. Los datos fueron analizados utilizando estadística descriptiva. El proyecto fue aprobado por el Comité de Ética en Investigación (Protocolo 0106.0.203,000-09). **Resultados:** los estudiantes mostraron nuevos conocimientos y reportaron el desarrollo de actividades de prevención de dengue. **Conclusión:** el *feedback* permite la expresión de las opiniones de los estudiantes sobre la actividad y el deseo de ampliar los conocimientos. **Descriptores:** Educación para la Salud; Dengue; Retroalimentación Psicológica; Estudiantes.

¹Professor, Departamento de Enfermagem Materno Infantil, Universidade Federal de Minas Gerais e Saúde Pública/UFMG. Belo Horizonte (MG), Brazil. mbeinner@yahoo.com; ²Nurse, Escola de Enfermagem, Universidade Federal de Minas Gerais/UFMG. Belo Horizonte, (MG), Brasil. E-mail: evangelica@yahoo.com.br; ³Nurse, Ph.D student, Programa de Saúde da Criança e do Adolescente, Faculdade de Medicina, Universidade Federal de Minas Gerais/POSCA/UFMG. Belo Horizonte, (MG), Brasil. E-mail: sufmg@yahoo.com.br

INTRODUCTION

Dengue is becoming a worldwide public health problem affecting, especially school children.¹ This disease constitutes the most important arboviral disease transmitted by insects in relation to morbidity and mortality and affects about 100 tropical and subtropical countries.² However, there is a gap between what is known about the disease and developed practices for the elimination of dengue vector breeding. The lack of a national health policy, as well as an insufficient control of the primary dengue vector, *Aedes aegypti*, are aggravating factors that contribute to the high incidence of the disease.

Control and prevention activities against dengue, such as educational campaigns in schools, are an important tool to stimulate young schoolchild communities about the severity of the disease, while emphasizing the need to engage in prevention, whereas behavior change and active community participation are critical to combat dengue fever and other epidemics.² Health education, when promoted regularly, is essential aspect to promoting health, autonomy, and can motivate an individual to build upon his/her health knowledge. Furthermore, development of educational activities outside health service facilities has proven essential for their promotion, since it favors transformation by way of "doing" in health, empowering participants to take charge of their own process of change. Therefore, involvement of different segments of society is fundamental with school-aged children as it relates to their health and reality, favoring the construction of a critical, reflexive thought and promotion of social responsibility.³ It is clear that technical knowledge, supported by scientific knowledge, plays an important role in health education issues, but there is the need to exchange experiences and knowledge of the stakeholders involved, since technical and scientific knowledge is not null and experience is not underestimated. According to this logic, health education must give priority to centers of learning, starting from critical thinking of all social actors (professionals and subjects), thus allowing for collective growth.⁴

Under these considerations, as part of a strategy for health education, targeting school-aged children, a board game called "The Dengue Health Game (DHG)," was developed as an additional educational aid for the control and prevention against this disease. Following the application of this

board game in public schools in Belo Horizonte, Minas Gerais, Brazil, the overall learning process was evaluated using a technique known as feedback, which is characterized as a post-activity learning experience, which allows for clarifying participant's possible perceptions that may have been misleading or confusing during the gaming process, and finally, provide educators the chance to conduct improvements of this learning aid (DHG) in subsequent applications.⁵ Therefore, the objective of this paper was to analyze the perceptions of school aged children regarding the board game DHG and verify the effectiveness of the game as an educational aid aimed at the prevention and control of dengue.

METHOD

This study evaluation of an educational game model was based on the use of a board game about dengue (DHG), applied in a municipal public elementary school in the city of Belo Horizonte, MG.

The study subjects were 74 schoolchildren between 9 and 13 years of age enrolled in the 5th and 6th grades, divided into 13 groups. This age group was chosen because young children at this age are able to engage in abstract cognitive thinking, in addition to their ability to formulate hypotheses. Thus, their reasoning is transformed and the young child is able to establish systematic solutions based on lógica.⁶ At this age level, perception of environmental awareness extends beyond familiar boundaries. Furthermore, it is also expected that young children at this age level share their knowledge and experiences with parents or guardians at home and together with other members of the community while serving as young educators. Criterion for school selection was based on a region with the highest incidence of confirmed dengue fever cases prior to the educational intervention, according to epidemiological data from the City's Health Department.

According to the City's Department of Health, 8,490 cases of dengue fever (DC), 33 cases of dengue complications, 8 cases of dengue hemorrhagic fever (DHF) and one death were reported in 2010, in the northern region of Belo Horizonte. In the Northwest regional of the city, reported dengue epidemic outbreaks were even higher: 8,500 cases of DC, 75 cases of severe dengue complications, 10 cases of DHF and 4 deaths.⁷ the personal findings by participating schoolchildren were recorded and analyzed by means of a questionnaire, also called feedback or as a debriefing tool. According to

Crookall (1992), "Feedback is perhaps the most important part of a simulation or gaming process." ^{8:141} The common elements to the feedback process included a review of the previous game play experience (DHG), what participants liked or disliked about the gaming process, lessons learned and how children may improve their skills at the game and or improve their responses to the discussed, dengue topics.

The questionnaire was composed exclusively of open- and closed-ended questions that allowed the schoolchildren to freely express their ideas about dengue fever. The structure of the feedback questionnaire was based on six phases according to Kriz (2010) for the most appropriate steps to an effective feedback process.⁹ These phases involved recording participant's emotions post dengue game play, insights and observations that arise during the process, aspects about the activity, which may be applied and compared with the participant's real world situation; acquisition of new knowledge: hypothetical simulations suggest behavior change; and actions that can be undertaken after the game intervention by the schoolchildren to control dengue.

In addition to many, pre-existing options to design a feedback questionnaire form, it was important to take into consideration the age group that responded to this tool. Schoolchildren in this study received guidance from a teacher or monitor who was responsible for each group. The children's oral responses were transcribed exactly as stated. Ambiguous responses were further explored for accuracy in order to try to better understand a child's response. The pupils in each classroom were divided into groups of 5 to 6 members. The group participants responded to the same feedback questionnaire.

The data analysis process included reading the pupil's feedback responses, followed by tabulating the data using Microsoft Excel, in which the responses were grouped according to their similarity. For each word or phrase, a keyword was assigned and expressed by a number or code, which was be tabulated together with the other similar responses. Each number or coded word or phrase of the children's responses was summed. The number or coded word or phrases were then sub classified according to specific topics: for example, classification of dengue fever, signs and symptoms, dengue serum types, just to name a few. Therefore, results were based on a descriptive, qualitative and quantitative statistical analysis, observing the categories of

the nominal variables according to their occurrence in absolute numbers.

Like the board game experience, feedback was conducted in the classroom, which guaranteed a familiar environment. The study participants were informed about the study objectives and then were asked to give consent. The schoolchildren's parents or guardians were also asked to give consent to participate their children in the study. The Human Ethics Committee (COEP) of the Federal University of Minas Gerais approved the execution of this study (ETIC 0106.0.203,000-09). This study adhered to the guidelines of Brazilian resolution 196/96 of the Ministry of Health, which includes reference to anonymity of a subject's participation and limited data access by the principle investigators. Other aspects of the game results, such as (pre and post test), the semi-structured questionnaire used to evaluate the experimental and control groups are reported elsewhere.

RESULTS AND DISCUSSION

The feedback process lasted approximately 30 minutes and was done in one of two schools that had contact with the DHG, selected randomly. Of a total of 74 students, 54% were male. The age of the schoolchildren ranged from 9 to 13 years (mean 10.6 years with a standard deviation of 0.7 years).

The objective of the first question of the questionnaire was to evaluate the child's initial thoughts and impressions after playing the DHG. Almost all children, except one, reported enjoying the game. Most of the responses (69 or 24.8%) were with respect to learning about dengue via playing the board game and the possibility of them transmitting newly acquired knowledge to others. The most commonly given responses to the categories (52 or 18.7%) were those relating to the gaming and entertainment experience used to teach control and prevention of standing water sources, in addition to learning how to care for existing water sources, such as swimming pools and potable water tanks.

Responses from Question 1 permitted a participant to infer that the gaming activity was considered a fun and efficient way to learning, which was expected of an educational aid that deviates from the traditional in-class learning approach. According to Table 1, the majority (73 or 98.6%) of the participants indicated that they enjoyed the game board experience, which is consistent with a previous Venezuela study by Vivas & Guevara (2003).¹⁰ Vivas & Guevara (2003) ¹⁰ also evaluated the use of a board

game about dengue as a teaching and learning tool about this disease. In their study, at post game study, 86.7% of the young children who participated in the experience felt very positive about the way they learned about measures to control and prevent dengue fever. In a more recent study,¹ an educational game about dengue, involving schoolchildren aged 11 to 14 years, was evaluated in the Philippines. In that study, the level of satisfaction by the children was measured using a Likert scale varying 1 to 5. The level of satisfaction by the subjects was 4.25, a level considered high.

The pupil who expressed dissatisfaction about the game justified his or her feeling by the fact he or she answered many of game card questions incorrectly and therefore was unable to win the game. However, answering

incorrectly meant that the correct answers were read, an important process that allowed for learning and reinforcement of dengue knowledge skills not only for that specific individual, but also for the rest of the participants.

Table 1. Number of responses according to each category in Question 1: “Did you enjoy the game? Why?”, Belo Horizonte, MG, 2011.

Response categories		
1. Yes		
2. No		
Total		
1. Why did you enjoy the game?		
1a. We could discuss the topic		
1b. It was fun to play		
1c. It taught me how to avoid dengue	30	10.8
1d. It was interesting		
1e. I learned about the disease and the game teaches others as well	69	24.8
1f. It taught me ways to avoid standing water sources		52
1g. Signs, systems and death by dengue	6	2.1
1h. It's cool		
1i. Excellent		
1j. It resolved my doubts about dengue		
1k. Knowledge about the dengue mosquito		6
2. Why you did not like the game?		
2a. My answers were incorrect		
Total		

**All pupils, except one gave multiple responses. N = absolute number of participants.

Question 2 explored the children’s feelings post DHG play, expanding on the findings from Question 1. Only 6 pupils in one group responded that they were tired of playing, which was regarded as a negative response to the game activity. However, under this same question, other participants indicated that they wanted more time to play or the opportunity to play again. Besides the positive responses, which explored participant’s level

of satisfaction, a group of participants (67) described themselves as having come away “educated” after the gaming experience (Table 2). These same schoolchildren responded that they had learned more about dengue and the mosquito cycle and had agreed that they were able and willing to educate others (friends and neighbors) about dengue fever.

Table 2. Number of responses to each category in Question 2: “How did you feel after the game?”, Belo Horizonte, MG, 2011.

<i>Response categories</i>	<i>n</i>	<i>%</i>
1. Positive feelings	191	88,9
1a. Informed	12	5,6
1b. Better	6	2,8
1c. Educated	67	31,2
1d. Happy	88	40,9
1e. Smart	6	2,8
1f. Attentive	6	2,8
1g. Motivated	6	2,8
2. Negative feelings	6	2,8
2a. Tired	6	2,8
3. Other responses about the game	18	8,4
3a. I wanted to play the game again	12	5,6
3b. Satisfied, because I already knew a lot about dengue	6	2,8
Total	215*	100

*All pupils gave multiple responses. N = absolute number of participants

When examining the DHG pre- and post-test questionnaire, most schoolchildren demonstrated a positive validation of the game. This semi-structured questionnaire contained the similar questions and information explored in the dengue board game cards. Therefore, to evaluate learned knowledge skills about dengue, the questionnaire was applied before and seven days post game play. Approximately 14% (23) of the feedback responses by the game participants were negative about the DHG pre e post questionnaire, which included, among other comments, the level of difficulty of the questions about dengue, in addition to the number of questions. At the other extreme, there were pupils who thought that the questionnaire was good indicating that they were curious and aroused by answering the questions. Finally, the instrument was cited as means to test prior knowledge. Not one response acknowledged the questionnaire as being fun to answer.

Developing a fun evaluation instrument for use by youngsters can be a strategic way to complement a learning process, and therefore, deserves to be studied and tested jointly with gaming.¹¹ As a result, it will be possible to extend the expected range of learning from the game, arousing greater attention when responding to the questions, while at the same time, maintaining the participant’s interest during the activity.

In looking at the responses to Question 4, which examined pupil learning at play using the DHG game (Table 3), more than a third of

the responses (158 or 35.5%) were related to learning ways to prevent the disease, care of standing water sources, the function of Zoonosis health teams, and individual prevention against mosquito bites. Almost an additional third of the responses, approximately 29.8%, were knowledge regarding the dengue mosquito reproduction cycle, characteristics for identifying the dengue mosquito, mosquito behavior, and the gender that feeds on blood, among others. It is important to mention that several responses also emerged in relation to self-medication and the risks that this attitude may pose. Just one group of six pupils incorrectly answered that manifestation of the disease in pregnant women is rare. In contrast, we identified a weakness in the instrument that may have favored an incomplete understanding of a game card that states that vertical transmission of dengue is rare. This is a point that will be revised and corrected by the authors as a way to improve the game card questions.

Of all the feedback questions, Question 4 resulted in the most responses from nine categories. This may suggest real learning by the schoolchildren using this different pedagogical aid approach.

Tabela 3. Número de respostas pertencentes a cada categoria da Questão 4: “Você aprendeu algumas coisas novas sobre a dengue? Caso sim, quais são elas?”, Belo Horizonte, MG, 2011.

Response categories	n	%
1. About the dengue disease	59	13,1
1a. It's possible to die from it	6	1,3
1b. Signs and systems	42	9,4
1c. Types of disease (DF e DH)*	6	1,3
1d. You can get dengue 4 times	5	1,1
2. Mosquito characteristics	133	29,2
3. Treatment forms	26	5,8
4. Prevention methods	158	35,5
4a. Avoid standing water sources	40	9
4b. Care with standing water sources	40	9
4c. Preventing mosquito bites	6	1,3
4d. Zoonosis health team	12	2,7
4e. Insecticide/larvacide	24	5,4
4f. Avoid the accumulation of garbage	36	8,1
5. Dangers using aspirin	29	6,5
6. Yellow fever transmission	6	1,3
7. No vaccine currently available	12	2,7
8. Transmission	17	3,8
9. Incorrect information	6	1,3
Total	100	100

**DF: Dengue Fever, DH: dengue hemorrhagic fever.
**All pupils gave multiple responses. N = absolute number of participants.

In Question 5, pupil overwhelming stated that the board game presented important aspects about dengue fever (Table 4). Most participant’s responses (139 or approximately 52%), involved preventive care terms, especially those centering on dengue prevention at home. However, dengue fever control and prevention measures, conducted inside the pupil’s homes, did not include such measures as covering water floor drains, which are important standing water sources for proliferation of the dengue mosquito. In-home standing water sources were also

discussed by Lennon & Coombs (2005), who cite the lack of references to address in-home standing water sources. Studies focusing on dengue fever reduction measures emphasize control and prevention outside the residence as a priority. ¹ The issue of in-home dengue control measures may be better explored in future revisions of the DHG to investigate if schoolchildren are sufficiently informed regarding the chance of *A. aegypti* outbreaks inside homes.

Table 4. Number of responses according to each category in Question 5: “Did the game show you something about dengue that is important to you? If so, please explain”, Belo Horizonte, MG, 2011.

Response categories	n	%
1. Aspects about the dengue disease	30	11,2
1a. Types of dengue	18	6,7
1b. Signs and systems	6	2,2
1c. You can be infected with dengue 4 times	6	2,2
2. Prevention forms	139	52
2a. Care in and around the home	55	20,6
2b. Basic prevention	18	6,7
2c. Avoid standing water sources	37	13,8
2d. Care with standing water sources	18	6,7
2e. Avoid the accumulation of garbage	5	1,9
2f. Taking care of one’s health	6	2,2
3. Virus	24	9
4. Dangers using aspirin	21	7,9
5. Transmitting to other animals	11	4,1
6. Aspects about the dengue mosquito	12	4,5
7. Treatment methods	18	6,7
8. Other responses	12	4,5
8a. Everything about dengue is important	6	2,2
8b. Learning about new information	6	2,2
Total	267*	100

*All pupils gave multiple responses. N = absolute number of participants

As expected, most of the answers cited in the question concerning dengue prevention dealt with direct actions to prevent and control the disease, representing 59.3% of the responses. These activities include basically

avoiding standing water sources and the accumulation of trash and debris (Table 5). These activities were also expressed, in greater numbers, by responses from schoolchildren in a similar study on feedback

by Lennon & Coombs (2005).¹ The second largest group of responses from Table 5, involved control and prevention in a broader sense: for example, the pupils indicated that they would be willing and capable to guide and encourage family members, neighbors and the general community on measures to prevent the spread of the dengue fever vector. This is perhaps one of the most important points of feedback, because it demonstrates that one of the main objectives

of the educational intervention, done through play, positively influenced participant’s awareness of their responsibility to prevent dengue fever, which would include working jointly as a community action. In addition, 12 pupils admitted habits that contributed to the occurrence of *Aedes aegypti* cases and pledged to change their behavior by promoting actions to prevent future outbreaks.

Tabela 5. Número de respostas pertencentes a cada categoria da questão 6: “Agora, há alguma coisa que gostaria de fazer para prevenir melhor a dengue?”, Belo Horizonte, MG, 2011

Response categories	n	%
1. Direct prevention actions	184	59,2
1a. Avoid standing water sources	72	23,2
1b. Avoid accumulation of garbage	86	27,7
1c. Insecticide/larvacide use	6	1,9
1d. Maintain water sources covered	20	6,4
2. Behavior modification	12	3,9
3. Share dengue prevention with neighbors	87	28,1
4. Other responses	27	8,7
4a. Risks that dengue may result in death	21	6,8
4b. Practice dengue prevention actions	6	1,9
Total	310*	100

*All pupils gave multiple responses. N = absolute number of participants.

The feedback questionnaire also included a question about uncertainties participants may have had concerning information they received during the game, the goal being to evaluate and improve the educational instrument, and also to review and assess the impact of inaccuracies for prevention and control of dengue. Question 5 of Table 4 had the second lowest number of recorded responses compared to other feedback questions (1, 2, 4, 6) which demonstrates that the schoolchildren had a prior understanding of the various aspects of the disease. It was observed that, contrary to question 4, which demonstrated increased knowledge with respect to the mosquito *A. aegypti*, most of the answers were related to specific aspects of the mosquito, such as the mosquito life cycle, behavior, and type of climate that favors the onset of mosquito egg survival without water contact, among others. It is interesting to note that the pupil’s uncertainties were described as new and surprising in and of themselves. For example, one group of children was uncertain about the fact that “the egg can survive a year without water.” This statement is correct and included in numerous information sources about the mosquito *A. aegypti*. Some information about dengue resulted in surprise or even amazement by the young participants.

Other questions were seen as curiosities, like the question: “What does the male mosquito eat?” The game card explains that

only the female mosquito feeds on human blood in order to reproduce. But comments about the eating habits of the male mosquito were not included. As it so happens, the male mosquito feeds on carbohydrates extracted from vegetables, and the females also feed on sap of plantas.¹² This demonstrated that the DHG increased the participant’s curiosity, attention and interest during play. These findings may be cause for discussion and planning to improve the use of this pedagogical tool.

According to the results of the feedback questionnaire, there was no doubt in the minds of the schoolchildren about the structure of the dengue knowledge pre- and post- test DHG questionnaire or the dengue board game, indicating that both educational devices were adequate, when considering the pupil’s age and school grade. A small number of responses from the feedback questionnaire by the schoolchildren were regarding suggestions about the size and number of the game card questions and similarly repeated game card questions. These suggestions will be considered, however, it is important to note that questions that appear to be repeated may involve importance dengue health issues, and therefore, should be repeatedly reinforced during game play. Furthermore, the reflected upon experiences by the participants in relation to the game card question responses during the feedback discussion is an important aspect of the

acquisition and reinforcement process of knowledge and change of attitude of the individual or group indivíduos.⁹

Finally, the last feedback question asked the DHG participants to suggest improvements to the game or the pre- and post-test dengue board game questionnaire. We evaluated the responses of each participant in order to make improvements in the game or questionnaire according to the needs and interests of the targeted audience. There was no dominant or specific aspect, only suggestions ranging from the game rules that explain player game piece movement on the board game, types of awards for first place winners, and the possibility of increasing the number of players per group, among other suggestions. We feel that increasing the number of board game participants may result in a greater distraction to the group as a whole. Furthermore, each participant would have a lesser number of opportunities to advance on the board and choose and read game card questions to the group. These two factors could result in lower game play concentration and less dengue knowledge acquisition. However, depending on the classroom setting and the number of board games, the number of players could be evaluated by the class monitor or teacher. Another suggestion was to "increase the number of game cards." This may be interpreted as a real enthusiasm on the part of pupils to continue playing and discovering new information. This finding may also be asserted by the suggestions to "Improving the number of board game square spaces,"

"Increase the board game size," "Redesign the game to last longer during play," in addition to other responses. Some suggestions were considered very constructive, although few, deserve citing such as "Create shorter questions and responses," "Create less, repetitive questions." As previously mentioned, we believe that these repetitive questions are important to learning about measures to control and prevent dengue fever. Other groups gave no comments, suggesting that both the game and the pre- and post-test dengue board game questionnaire were satisfactory.

CONCLUSION

The use of feedback was considered an efficient and quick way to understand the findings related to the application of a board game and questionnaire to measure knowledge about dengue fever. Constructed and applied to allow for open responses by participants, the questions were formed in a

non-threatening, non-formal or without restrictions manner, thus allowing the participants to respond with both positive and negative opinions about the gaming process. Participating schoolchildren responded to the measurement tool in an informal, relaxed atmosphere, giving them the opportunity to answer about what they had learned from the DHG, as well as their opinions about the game. In general, acceptance to the gaming experience was good, with several exceptions of acquiring new knowledge and the enjoyment of learning. This finding is crucial for the continuation of the project, since it facilitates the acquisition of valuable information for the control and prevention of dengue and reflection of the schoolchildren's daily activities that culminate in the reports of outbreaks by the dengue mosquito. Furthermore, several suggestions were given regarding the dengue board game and pre- and post-test dengue questionnaire to improve the learning process, in addition to greater satisfaction for players.

Behavioral change can be perceived in some responses regarding the recognition of habits that contribute to the appearance of dengue fever cases, and interruption, thereof, after reflection. It was observed from the experience that there was interest in combating dengue not only at the individual level, but also to expand such knowledge and responsibilities to encourage others in the community to commit to control and prevent the spread of the disease. This may be by championing the role of each community member in the fight against dengue. Finally, the study suggests the use of feedback can serve as an alternate approach to enhance learning after a teaching intervention, such as dengue, considered a major challenge in public health.

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Correspondence Address

Mark Anthony Beinner
Avenida Alfredo Balena, 190 / sala 422
Bairro Santa Efigênia
CEP: 30130-100 – Belo Horizonte (MG), Brazil