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ORIGINAL ARTICLE

LEADING ROLE OF ADOLESCENTS IN THE CREATION OF A STORYBOARD FOR A DIGITAL GAME ON LEPROSY

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ABSTRACT

Objective: to describe the leading role of school adolescents in the creation of a storyboard for a digital educational game on leprosy.

Method: qualitative research-action study. Carried out in a public school in the state of Pernambuco (Brazil) in 2019. There were eight pedagogical workshops with students, for the understanding and creation of the educational digital game, using Scratch software version 2.0. The production process followed the development model of digital educational material, created by Falkembach.

Results: the educational action enabled the potentialities and stimulated the creativity of the adolescents to take on a leadership attitude in the creation of the storyboard for a digital game on leprosy.

Conclusion: teenagers had a leading role in creating the storyboard of a digital game on leprosy. The concern in using the virtual environment contributed to the adolescents' resourcefulness and creativity when they were encouraged and have access to benefit conditions for the elaboration of the storyboard.

DESCRIPTORS: Leprosy; Play and Playthings; Educational technology; Health education; Adolescent.

PROTAGONISMO DE ADOLESCENTES EN LA CREACIÓN DE STORYBOARD PARA UN JUEGO DIGITAL SOBRE LEPRA

RESUMEN:

Objetivo: Describir el protagonismo de escolares adolescentes en la elaboración de un storyboard para un juego digital educativo sobre lepra. Método: Estudio cualitativo, tipo investigación-acción, realizado en una escuela pública de Pernambuco (Brasil) en 2019. Se organizaron ocho talleres pedagógicos con escolares, impartiéndose conocimiento y construcción del juego digital educativo, utilizando el software Scratch versión 2.0. El proceso de producción siguió el modelo de desarrollo de material educativo digital creado por Falkembach. Resultados: La acción educativa instrumentalizó las potencialidades y estimuló la creatividad de los adolescentes, para que asumieran una actitud de protagonismo en la elaboración del storyboard para el juego digital sobre lepra. Conclusión: Los adolescentes asumieron un rol protagónico en la creación del storyboard para un juego digital sobre lepra. El interés en utilizar el ambiente virtual coadyuvó a la desenvoltura y creatividad de los adolescentes estimulados por tener acceso a condiciones propicias para elaborar el storyboard.

DESCRIPTORES: Lepra; Juegos e Implementos de Juego; Tecnología Educacional; Educación en Salud; Adolescentes.

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INTRODUCTION

Leprosy persists as an important public health problem in Brazil, ranking second as the most endemic country worldwide, with cases reported in all units of the federation, but with greater prevalence in the North, Northeast, and Midwest regions[1-2]. The State of Pernambuco ranks ninth with the highest leprosy detection coefficient and third in the Northeast[3].

The disease mostly affects the skin and nerves of the body's limbs, with high disabling power, contributing to increased absenteeism, restrictions in social life, and psychological troubles triggered by the persistence of prejudices and stigmas of the disease[4]. From the new cases in adults, 24% already have some type of disability as a consequence of the disease[5].

Leprosy is considered an adult disease, however, there is a high number of cases in children under 15 years old, which suggests the early exposure and the persistence of disease transmission[6]. In the year 2015, 18,230 cases were reported in children under 15 years old worldwide, from these, 281 had a degree of disability classified as type 2 at the time of diagnosis[5].

The State of Pernambuco ranks sixth place for the coefficient of detection of new cases in children under 15 years old (12.14/100,000 inhabitants), being classified as hyper-endemic[5], because according to the Ministério da Saúde (MS) (Ministry of Health) it is above 10/100,000 inhabitants, thus showing the current transmission power of the endemic and its trend[7].

The event of the disease in adolescents is harmful not only due to physical damage resulting from late diagnosis or non-adherence to treatment but also due to psychological harm, triggered by stigma and social isolation[8], at a stage of life marked mainly by rapid growth, personality structuring and social integration[9].

Due to the repercussions that leprosy can cause to the health of patients, the World Health Organization (WHO) launched, in the year 2000 with a five-year update Global Strategy to approach the challenges faced in the control of the disease. The 2016-2020 Strategy warns that investment in modern communication strategies is essential to raise awareness of leprosy in the community[5].

Educational Technologies (EdTech) have brought a positive impact and have been increasingly used to withstand the teaching-learning process, as they can offer dialogue and strengthen the patient-professional relationship. On health-related topics, the technologies approach to culture and socio-historical context components, enriching the participants' view of the world, involving properties to assist the adolescents' autonomy to make decisions that improve their health[10].

The acknowledgment of leprosy among neglected diseases and its high incidence in children under 15 years old highlights the importance of providing EdTech widely available as tools capable of being used in public policies aimed at health promotion, disease control and prevention, with emphasis on the school environment.

In this context, the Programa Saúde na Escola (PSE) (School Health Program) represents an intersectoral proposal, which proposes a partnership between education professionals and the Equipe de Saúde da Família (ESF) (Family Health Team), emphasizing the role of nurses as an articulator in health promotion actions[11], mobilizing health education strategies and community access to primary care services[12].

As adding Freire's assumptions to the educational practice in health, it has to be considered the educational process as a progressive instrument, which proposes to enable

the individuals' emancipation processes, through the development of aware thinking about health issues specific to each social reality[13-14], for leprosy control. Health education actions with a group of students using ET[15] highlighted that digital games showed more significant results concerning attention and cognitive flexibility, which can contribute to the improvement of executive functions[16]. The proposal for the elaboration of the ET, in this study, points out as an innovative criterion the fact that it does not limit the basis of its construction in a survey of the relevant literature.

The theoretical-methodological assumptions of Freire's critical social education[13-14] concerned the authors in identifying and believing in the potentialities and providing opportunities for the adolescents' active participation in the construction of knowledge, stimulating creativity and leadership. It was proposed to prepare the adolescents to develop a storyboard, aimed at featuring in a simple, objective, and easy way a diversity of relevant information for the elaboration of an educational digital game[17] for the control and prevention of leprosy. Given the above, the study aims to describe the school adolescents' leadership role in the elaboration of a storyboard for an educational digital game about leprosy.

METHOD

This is a qualitative study of the research-action type , which is capable of associating several forms of collective action[18]. The methodological path's choice reveals the researcher's intention facing a specific phenomenon[19], which in this study aims to ensure the achievement of an educational strategy centered on the participation of school adolescents.

The educational strategy was carried out along with the starting of classes from February to April 2019, in a state public school in Pernambuco, Brazil. The development of technology was adapted from the development model of digital educational material created by Falkembach, which proposes constructionist learning, in which the learner is the center of the learning process. The procedures for developing a digital educational material must pursue the following phases: analysis and planning, design, implementation and maintenance (carried out in the first phase of the project), evaluation and distribution (developed in a second stage) to validation with specialists and target public, consisting requirements for making the digital game available[10,20-21].

In the first phase, eight pedagogical workshops were held with six students, for knowledge and construction of the educational digital game, using Scratch version 2.0, a software that uses logic blocks, sound, and image items to develop interactive stories, games, and animations. It was chosen because it is free and has been specially designed for game development by 8 to 16 years old individuals, besides being used in the main operating systems (Windows, Linux, and Mac).

The educational strategy was carried out in the library, previously scheduled, to ensure an air-conditioned and peaceful environment, with three computers being made available, one for each pair to explore the virtual environment. Each workshop lasted one hour at most, scheduled so as not to compromise the student's curricular activities at school.

The adolescents' selection took place by intentional sampling[22], according to the following inclusion criteria: adolescents regularly enrolled in school, who participated in an educational health strategy, conducted by culture circles about leprosy, carried out as an extension activity with the participation of the researcher together with nursing students from the research group, in the previous semester. It consisted of exclusion criteria: more than one absence in the workshops, a fact not observed, proving their interaction and concern in the activities of developing the digital game.

To support the dialogue on how the content should be explored in the game, the Ministry of Health instruction booklet was used[23] which approaches leprosy and human rights. The adolescents' speeches were recorded and transcribed, to register the data, supporting the analysis and planning of Educational Technology. In this stage, the storyboard was built by the teenagers, which provides a graphic visualization of the scenes' images, in a sequence[17], establishing the game step by step. The development of these steps is a requirement to continue with the implementation, which corresponds to the programming of the digital game. It was done by a professional in the programming area.

The study was approved by the Research Ethics Committee of the Health Sciences Center of the Universidade Federal de Pernambuco with opinion no. 3,060,866.

RESULTS

The workshops were carried out with a group of six teenagers, aged from13 and 18 years old, single, four of them self-declared to be mixed race and two of them self-declared to be white, most with high school and elementary school, two of them had a computer course certification, 50% of them had a computer and used it regularly.

The first workshop was developed based on the following generating question: what is the group's knowledge about leprosy? The previous knowledge that the adolescents had for participating in cultural circles about the disease contributed for them to express clearly and safely the main contents that should be in the digital game so that the Ministry of Health's instruction booklet was only a backing because they had already built critical and reflective thinking on the theme.

In the second workshop, the generating question was: what are the requirements for the creation of digital and playful educational technology about leprosy for adolescents? The development of the third workshop shown as a generating question: what knowledge about the Scratch platform is necessary to carry out simple programming of a digital game? This initial knowledge of programming was essential for school adolescents to understand the step by step to build the digital game and supported the requirements for the creation of the storyboard.

The fourth workshop had the generating question: what type of digital game does the group choose? Given the impossibility of joining three games with different schedules, available on the platform, most teenagers opted for a game based on Super Mario®, claiming to be more attractive gameplay and arouse greater curiosity in the public. From the fifth to the seventh workshops, the following generating question was considered: what are the requirements for the creation of the storyboard to develop the digital game about leprosy? The adolescents were encouraged to explore their creativity to outline how the theme in the digital game would be approached and its sequence, as well as its composition and form of presentation of relevant knowledge.

In previous meetings of pair research, it was proposed by the adolescents, collectively, that the game should show questions, which would allow the player to carry out self-assessment of knowledge, with the recording of correct answers by scoring. They also highlighted the use of characters and interactive environments, using visual and sound resources, with challenges to be overcome and opportunities to earn extra scores, to ensure the game's dynamism. The creation process conducted by the storyboard (Figure 1) was carried out based on the exploration of the creativity of the digital game, considering the adolescents' expectations and desires. Chart 1 represents the requirements, objectives and specifications used by the adolescents in creating the storyboard.

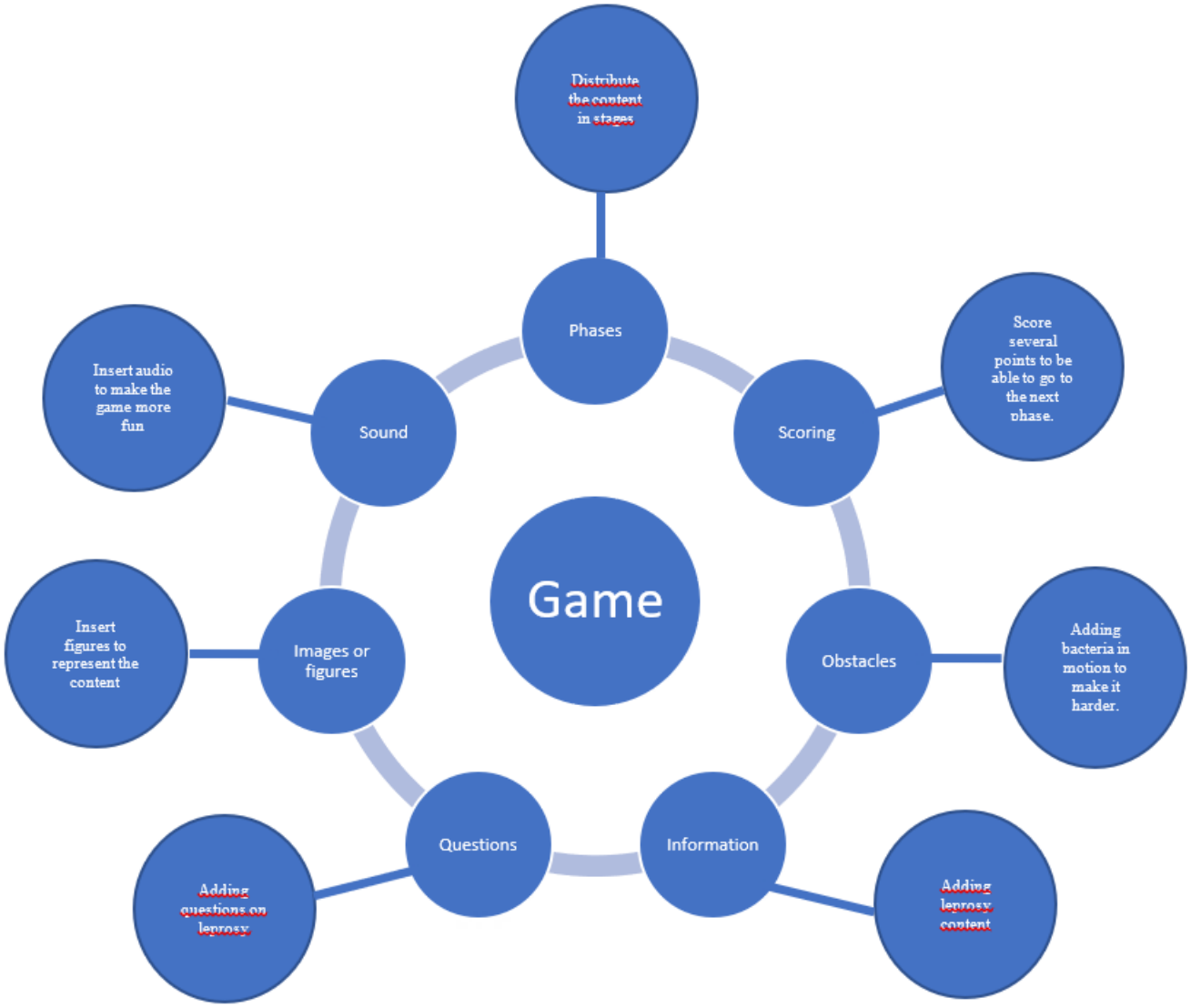

Figura 1 – Storyboard desenvolvido pelos adolescentes. Recife, PE, Brasil, 2019
Fonte: Autores, 2019.

Table 1- Leading role of adolescents in the creation of the storyboard for the digital game "Game Hanse". Recife, Pernambuco, Brazil, 2019 (continues)

REQUIREMENTS	OBJECTIVES	SPECIFICATIONS
Distribution of content in stages	To show an increasing order of the contents covered	The adolescents developed four stages: 1. concept and epidemiology; 2. transmission; 3. signs and symptoms; 4. treatment and stigma
Information and questions	To investigate if the player is attentive and can learn the content covered in the game	The adolescents created nine questions about the theme to contribute to its problematization in the game
Settings, Images or Figures	To illustrate the content to contribute to the clarity and understanding of the message	The adolescents described which images or figures would be more appropriate for learning the content
Audio	Make the game more fun	The teenagers chose to use the sound of the Super Mario game, considering making it more attractive

Obstacles	To establish obstacles to challenge the player	The adolescents highlighted their concern in the challenge of a game, proposing the presence of a moving bacteria to challenge the player, associating it with the challenges required to control the disease.
Scoring and change of stage	To encourage the player to increase his/her score by finding correct answers to questions	The adolescents established five points for each correct answer and two points less for the wrong answer

Source: Authors, 2019.

In the eighth workshop, with the digital game already programmed, the generating question was: how did the adolescents evaluate the stages proposed in the storyboard? In the final workshop, the adolescents were encouraged to make an appreciation of the collective production proposed for the digital game, also to suggest changes that they considered important. The name chosen by teenagers for Educational Technology was "Game Hanse".

The objective of the educational digital game is to provide access to learning on leprosy, for adolescents, in a playful, interactive, and participatory way. The contents were: concept, epidemiology, transmission, signs and symptoms, treatment, and stigma. The avatar, the central character of the game, was represented and proposed by the adolescent, completing the first version of the "Game Hanse", to be submitted to the validation process.

DISCUSSION

The epidemiological profile of leprosy in the Brazilian context and the event of hyper endemicity among children under 15 years old require studies to help public policies for coping and promoting health, in this age group, in controlling the disease. Studies show that investing in the health of adolescents creates an important intervention not only for this stage of the life cycle, but also for future generations[24-25].

The nurse, as an articulating member of the team in health promotion actions, highlights the role of health educator, at all levels of assistance, but mainly in primary care[12,15]. The involvement of the adolescent population requires mobilization and negotiation strategies from this professional to establish a partnership with managers, coordinators, and teachers, in the development of interdisciplinary actions in health education in the school setting.

This study follows a proposal that opposes the traditional teaching approach, based on verticalized educational relationships, called banking education. Critical social teaching, proposed by Freire, justified the need to establish student participation strategies in the construction of knowledge[13-14], besides stimulating the development of social responsibility, by contributing to the production of a technological tool capable of assisting professionals in the development of health education actions about leprosy.

The creation of the storyboard for the "Game Hanse" was developed with the participation of public-school adolescents, to share knowledge on leprosy playfully and enjoyably. The elaboration of the educational digital game encouraged the adolescents' role of leadership, based on the recognition and valuing of their knowledge on leprosy, through previous participation in an extension project with the development of culture circles[26] on the theme. Thus, the participants presented previous knowledge and identification with active teaching approaches.

The initial stage, called analysis and planning[20] for the elaboration of the digital game, in this study, constituted the creation of the storyboard by the teenagers, chosen for its didactic character, systematically delineating the activities to be performed in each phase.

The digital game as educational technology is a playful resource, which provides leisure, interactivity and possible educational action, considering its acceptance and use increasingly present in the daily lives of adolescents[10]. The study explores and highlights the potential of adolescents to act as leaders in the development of educational technology to improve the efficiency in the dissemination of health knowledge to the population, with an emphasis on the adolescence period.

However, it is necessary to overcome fragmented and specific health education practices and models, characterized by a posture of obedience and passivity by individuals and social groups[13-14]. Health systems must provide conditions for social responsibility, ensuring that adolescents act in the development and use of digital resources[24].

The critical social teaching approach[13-14] promoted the teaching-learning process for carrying out workshops for the elaboration of digital games (educational games) that would provide a dialogic atmosphere between students and educators, promoting the exchange of knowledge, stimulating concerns and the development of creative processes by the participants[10].

The workshops ensured respect for the autonomy, knowledge and experiences of adolescents in the teaching-learning process, contributing to a cooperative perspective with the educator and other colleagues, in the link between popular and scientific knowledge for the development of the digital game[10].

The workshops were dialectical arenas of teaching, out of concerns, searches, attempts, errors and successes, to a new propositional conception of the collective[13-14]. The researcher was challenged to take an innovative educational action and committed to respecting the participants' autonomy, recognizing a context of public education that is out of the context of technological advances and proposing access to the virtual environment as a proposal for the construction of knowledge.

Throughout the workshops, the group found gaps in knowledge among peers about leprosy, listing the main points to be approached and the characteristics typical to the digital game that would provoke the greatest interest of the players. In the development of the workshops about games, it was observed the concern and motivation of adolescents in the process of creation and programming in a virtual environment.

The development of an educational digital health game has been developed in scientific studies, aimed at disseminating knowledge through playful activities, which make adolescents explore the virtual environment for their self-care. However, some studies are centered on the researcher or at most, centered on knowledge learned from the population group for which educational technology is intended[10,15]. It is necessary to highlight the positive effect of the educational digital game that explored health care for adolescent cancer patients, as a tool to learn about the disease and self-care during treatment[27].

Game-based learning programs make simpler conscious and creative learning experiences. The games provide some additional enhancement mechanisms: sharing ideas, questions and tasks, design components, immediate feedback and rewards for high-quality performance[27].

The study matches with the Global Leprosy Strategy (2016-2020), which recommends a rushing towards the world without leprosy, aiming to reduce the global and local leprosy burden, reinforcing community awareness, encouraging early detection and ensuring the immediate beginning of treatment[3], measures that require the population's access to knowledge about the disease.

The planning of the digital educational game explored in its content relevant issues such as: identification of the etiological agent, a form of transmission, signs and symptoms, diagnosis, treatment, prevention, cure and coping with stigma, considering the suggestions of the adolescents, paying attention to avoiding the use of technical terms and use easy language[3].

The adolescents' participation improved the definition of the main and other characters and interactive structures of the digital game, the choice of the type of game and its type of presentation. Thus, during the creative process, expectations were solid and generated new concerns and expectations all together, involving and motivating the exercise of leadership.

In the development of the storyboard for a digital game, it is highlighted the compound of written communication in association with visual communication, with the figures of the characters and images that portray the settings in the virtual environment[17]. The use of visual resources contributes to the communication of scientific ideas relevant to health care, considering that the image highlights being self-explanatory, allowing to overcome the language barrier and add information to the proposed texts[21].

It is the responsibility of the school nurse (active in some countries) to show skills in the various methods of communication with adolescents, to establish an effective school health program[28], but also to develop an improvement in the use of digital technology for communication with the adolescent population[29].

The content approach about prevention, adherence to treatment and coping with the stigma of leprosy has been changed in terms of language, making the text clearer. The digital game proposed by adolescents exhibits an association between texts and images, expanding the exploration of different senses, due to the strength and diversity of communication that they represent in the development and enhancement of the educational process[21].

When thinking about the current context, marked by constant changes caused by technological innovations, using an educational digital game valid in the classroom environment or health services supports adding this technology in educational health strategies, favoring pleasant and beneficial learning situations[14-15].

Technology is an extension of our brain, a different way of thinking, an instrument to deal with in different contexts[28]. Study of a randomized controlled clinical trial, of a mixed-method, developed in the United States of America, with the use of a digital game among high school students to explore the potential of the virtual game in social, emotional and cognitive development in the promotion of ethical and moral considerations for decision making, found that those who participated in the discussions after playing, showed more complex responses[29].

New technologies need to be included in pedagogy, stimulating intelligence with the growth of knowledge, considering the potentialities made available by the virtual learning environment. The school makes a valuable setting in the establishment of shared actions in health and citizen education of the adolescent population.

Elementary school teachers in Spain observed an increase in the frequency of using apps in the classroom, highlighting the importance of this resource for immediate access to meaningful information on the impact of learning[30]. In this scenario, the importance of the nurse's role in cooperation with other health and education professionals comes out, in the development of health-promoting strategies for this population group with an emphasis on leprosy control and prevention.

As for the limitations, during the workshops, there were difficulties in providing technological equipment and inflexibility of the participants' schedules.

FINAL CONSIDERATIONS

The development of the creation stage of "Game Hanse" by the adolescents was the difference of this study, by providing the exercise of leadership in the systematic and creative development of articulated and procedural stages. The role of the group in the development of the storyboard for a digital game enhanced the characteristics of the target audience, building a virtual game with its own identity.

The researcher's experience with holding training workshops for adolescents in the development of digital games, provided an expansion in the construction of knowledge about the use of active methodologies, with a critical social teaching approach in the participatory development of the storyboard, fostering the recognition of the potential of the adolescents as transformation agents in the reality of health, when considering and stimulating its leadership and the advances in educational proposals with technological development as a tool in the construction of knowledge about leprosy and citizenship rights.

The "Game Hanse" establishes a perspective of adding the involvement and participation of the target audience in producing studies of educational technology. The role of health educator results, as the responsibility of nurses and other professionals, who need access to educational technologies for the inclusion of public in actions for the adolescent to encourage health and cope with leprosy as a public health problem.

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