Case Study

DEVELOPMENT AND VALIDATION OF A MENTAL HEALTH EDUCATIONAL SOFTWARE*

DESENVOLVIMENTO E VALIDAÇÃO DE SOFTWARE EDUCATIVO DE SAÚDE MENTAL

DESARROLLO Y VALIDACIÓN DE SOFTWARE DE EDUCACIÓN DE LA SALUD MENTAL

Nadja Cristiane Lappann Botti[1]
Isabela Rodrigues Mesquita [2]
Camila Corrêa Matias Pereira [2]
Francielli Aparecida Araújo [3]

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[1] RN, Psychologist. PhD in Psychiatric Nursing. Adjunct Professor at the Nursing School from the Federal University of São João Del Rei-UFSJ, Campus Centro-Oeste Dona Lindu. Divinópolis, MG – Brazil.
[2] Nursing School student at UFSJ, Scientific Initiation scholarship grantee. Divinópolis, MG – Brazil.
[3] Nursing School student at UFSJ. Divinópolis-MG – Brazil.

Corresponding Author: Nadja Cristiane Lappann Botti. E-mail: nadjaclb@terra.com.br
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ABSTRACT

Teaching mediated through technologies is a growing trend nowadays. This study aims to describe the process of development and validation of the Quiz Madness educational software designed to be used as a teaching resource in mental health education. The objectives of the software were defined based on the importance of the teaching-learning process of specific and general contents for training nursing students in the mental health field. The software was developed using tools from Microsoft Visual Studio 2010 and the ASP.NET MVC and Silverlight programming languages and validated according to the Method of Reeves. The educational software can be used as an innovative technology to support the teaching-learning process of general and specific content for training in the mental health field.

Keywords: Technology; Software Validation; Nursing; Mental Health.

RESUMO

O ensino mediado por tecnologias é tendência crescente na atualidade. Este trabalho tem como objetivo descrever o processo de desenvolvimento e validação do software educativo Quiz Loucura, desenvolvido para ser utilizado como recurso didático no ensino de saúde mental. Os objetivos do software foram definidos em função da importância do ensino-aprendizagem de conteúdos específicos e de formação geral na área da saúde mental para alunos de enfermagem e validado de acordo com o Método de Reeves. Para desenvolvimento do software foram utilizadas ferramentas do Microsoft Visual Studio 2010 e linguagens de programação ASP.NET MVC e Silverlight. O software educativo pode ser utilizado como tecnologia inovadora de apoio no ensino-aprendizagem de conteúdo de formação geral e específica da área da saúde mental.

Palavras-chave: *Tecnologia; Validação de Programas de Computador; Enfermagem; Saúde Mental.*

RESUMEN

La enseñanza mediada por tecnologías es una tendencia creciente en la actualidad. Este trabajo tiene como objetivo describir el desarrollo y validación del software educativo Quiz Locura desarrollado para ser utilizado como recurso didáctico en la enseñanza de salud mental. Los objetivos del programa fueron definidos de acuerdo a la importancia de la enseñanza y el aprendizaje de contenidos específicos y de formación general en el área de salud mental para los estudiantes de enfermería y validado de acuerdo con el método de Reeves. Para desarrollar el software se utilizaron las herramientas del Microsoft Visual Studio 2010 y lenguajes de programación ASP.NET MVC y Silverlight. El software educativo puede ser utilizado como una tecnología innovadora de apoyo para la enseñanza y el aprendizaje de contenidos de formación general y específica en el área de salud mental.

Palabras clave*: Tecnología; Validación de Programas de Computación; Enfermería; Salud Mental.*

INTRODUCTION

An educational software is a computer program developed specifically for learning certain content, competence, or ability. Its use facilitates the learning based on interaction, motivation, and discovery.[1] It is known that educational interfaces serve as the means to negotiate meaning and construction of specific knowledge in specific contexts.[2] Thus, the educational software can promote learning, which is the cognitive demand for the acquisition of knowledge and the building of relationships and concepts.[3]

The educational software is characterized by the presence of a pedagogical basis, didactic purpose, and easiness of use and interaction.[4] Therefore, the definition of pedagogical principles and requirements for the presentation of content and interaction becomes necessary for the development of educational softwares. Software developed on a constructivist basis contemplates the development of autonomy and treatment of errors in a motivating way. An attractive interface with elements of interaction is considered positive, facilitating use and promoting learning.[5]

Educational softwares are classified into tutorial, simulation, and educational games.[6] Educational games are softwares that influence the social-affective and cognitive development from the playful, motivational, and intense interactivity standpoint.[4] The development of educational softwares can be understood in line with the curricular reforms proposed by Nursing schools that advise for the use of active, participatory, and meaningful learning methodologies.[7]

In Brazilian Nursing, the development of educational programs mediated by technologies is a growing trend nowadays. In general, it is linked to universities and projects directed to professional training and health education.[8] The production of the software as an instrument of teaching and learning in the area of mental health can be an alternative teaching tool in the area[9] associated with the fact that the use of technological resources in Nursing education can favor the development of the profession, stimulate research, and promote changes.[10]

On the assumption of the possibilities of using technology in education and the shortage of educational materials and innovation in the teaching-learning process, in the mental health field, this article aims to describe the process of development and validation of an educational software on mental health, built for nursing students.

METHOD

The Quiz Madness educational software was developed according to the stages of software engineering: theme definition, identification of educational objectives and target audience (step 1), definition of the learning environment and application modeling (step 2), interface planning (step 3), technologies used and implementation (step 4), and evaluation and validation (step 5).[11]

Definition of the topic, educational objectives, and target audience

The experience over a decade in teaching mental health and Psychiatry in the undergraduate Nursing program has shown, among other things, that conventional methods are not efficient for teaching in this area. The Quiz Madness educational software was developed in association with the recognition that innovative educational strategies contribute to the improvement of the teaching-learning process and can be used as a didactic teaching resource to review and/or update mental health issues.

The objectives of the Quiz Madness were defined in relation to the importance of knowledge of specific and general contents for training Nursing students in the mental health field. Due to its objectives and contents, the educational software can be extended to students of other courses in the area of health, and health professionals in situations of training/improvement in the mental health field.

Definition of the learning environment and application modeling

The learning environment was defined according to the assumptions of quality in an educational game. Therefore, the Quiz Madness presents features of technical performance (degree of response to commands from the player and regularity in the execution and number of frames per second), interactivity (description of the player mechanical process while running the software), control (describes the easiness in running the game); history (responsible for the player's emotion and motivation); meta (highlights the challenges and rewards of the software), and repetition (the software motivates the user to play several times).[12]

Therefore, the planning and development of the Quiz Madness was based on the criteria of student interaction with the educational software, pedagogical grounds, content, and programming.[4] The student-educational software interaction covers the easiness of use, motivational resources, adequacy of pedagogical activities, and adequacy of media and interactivity resources. The pedagogical rationale involves the epistemological clarity of a pedagogical basis that supports the development of the software. The content covers relevance, correctness, state of the art, adequacy to the learning situation, variety of approaches, and previous knowledge. As for the programming, the conceptual reliability and easiness of use should be preserved.[4]

The content of general and specific training was structured into thematic categories. The thematic categories of general training include visual arts, scenic arts, music, literature, and curiosities, whereas those of specific training include history of madness, asylum paradigm, psychosocial paradigm, legislation, and personalities (Table 1).

Table 1 - Description of the thematic categories and general and specific training content of the *Quiz Madness* educational software

General Training	
Thematic category	Content
Visual Arts and Madness	Sculptors, painters, collectors, museums, Iconographies, personalities, artistic exhibitions related to the theme of madness
Performing arts and Madness	Plays, movies, children's drawings, documentaries, television programs, and actors related to the theme of madness
Music and Madness	Singers, composers, bands, operas, essays, songs, and musical performances related to the theme of madness
Literature and Madness	Writers, poets, story tellers, literature, and phrases related to the theme of madness
Curiosities and Madness	Expressions, translations, popular culture, popular myths, phrases related to the theme of madness
Specific Training	
Thematic category	Content
History of Madness	Conceptions of madness in the Ancient, Median, Modern, and Contemporary ages
Asylum Paradigm	Asylums in Brazil and the world, treatments performed in mental institutions, personalities, and conceptions of the asylum model
Psychosocial Paradigm	Personalities and conceptions of the psychiatric reform, substitutive services of attention "to mental health, personalities, and conceptions of the psychosocial model
Legislation and Madness	Declarations, ordinances, laws, resolutions, and recommendations related to the theme of madness
Personalities and Madness	Biographies of the main characters and theorists in the history of Psychiatry and mental health

Source: prepared by the authors.

Interface Planning

The interface planning was done concurrently to the application modeling step to contemplate constructivist characteristics in the development of the software such as autonomy, treatment of error in a motivating way, and creation of an attractive interface.[5] The characteristics of educational games were considered for the presentation of contents to provide interactivity, expansion of teaching environments, and engagement of students' interests.[4]

The Quiz Madness educational software was developed to be played online and free of charge, and is hosted in the website http://www.quizloucura.com.br. The homepage shows information about the Quiz Madness project, game rules, authors, and contact e-mail address (Figure 1).

To start the game, the player must create an account/register on the first access by filling out a form with personal data; on consecutive accesses, the player performs the login with the name and password created earlier. The game's goal is to correctly answer questions of general and specific training in mental health and reach the end of the board with the highest score possible.

Because it is a board game, it begins by the activation of a dice; the drawn number will be, respectively, the number of advancing spots on the board (Figure 2). Each specific spot on the board refers to the question of the respective category to be answered. The questions are divided into four levels of difficulty: easy, medium, difficult, and very difficult. The score of right answers will follow the degree of difficulty of questions and will be worth 1, 2, 3, and 4 points, respectively.

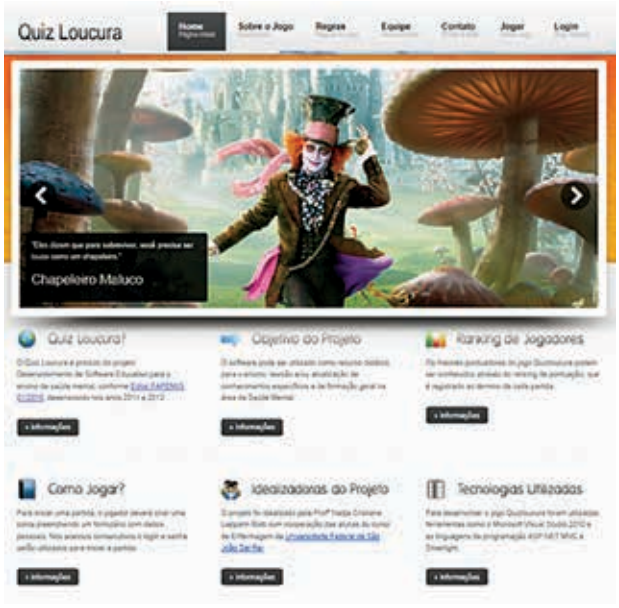

Figure 1 - Homepage of the *Quiz Madness* educational game. Source: prepared by the authors.

The player has three response options for each question; the chosen answer must be checked to confirm the choice and, in the event of a hit, it is scored. If the option chosen was wrong, the player loses the question's points. The right answer is presented to the player if he chose the wrong answer. If the player chose the right answer, the process continues advancing on the board by throwing the dice again. Besides the spots of thematic categories, the board also shows spots that refer to wildcards with functions of winning or losing points randomly drawn. The game ends when the player completes the route

on the board. At the end, the player has access to his score and position in the ranking of Quiz Madness players.

Figure 2 - Board of the *Quiz Madness* educational game.

Technologies used and implementation

The Quiz Madness game was developed using tools from Microsoft Visual Studio 2010 and the ASP.NET MVC and Silverlight programming languages. In the implementation step, the following were established: creation of registers of categories of questions and answers and administrators and system users (external users), design of access rules, creation of the ranking score and pages (initial system configuration, display of game rules, and information about the authors) of the educational software. Still in this step, in board construction, the display of questions and validation of answers with the respective rules for the correct and wrong answers were created.

Evaluation and validation of the *Quiz Madness* educational software

The evaluation of the Quiz Madness educational software was performed continuously during the development, by the responsible team, ensuring the goals and targets originally proposed. The team was composed of one nurse, one psychologist, one Mental Health and Psychiatry professor, and one PhD in Psychiatric Nursing, three undergraduate nursing research fellow students, and two systems analysts.

The software was validated using the scale of Reeves, which uses criteria regarding the interface with the user (14 criteria) and in relation to pedagogical aspects in the software (10 criteria). The validation counted with the participation of 27 evaluators consisting of 6 members of the Academic League of Mental Health and Psychiatry from the Federal University of São João Del Rei (medical school and nursing students), 14 students in the 7th and 9th undergraduate nursing school periods from the Federal University of São João Del Rei, and 7 professors of Psychiatry and Mental Health in Nursing undergraduate courses from public universities (with masters' or PhD degrees in Psychiatric Nursing or Mental Health). The evaluators, directly or indirectly, feature representative groups of the target population for the Quiz Madness software. The game validation was approved by the Research Ethics Committee from the FUNEDI under protocol 23/2010.

The Reeves Method evaluates the software based on a scoring scale of antagonistic concepts considered negative to the left and positive to the right.[13] The average of 92.36 ± 6.54 was observed for the criteria related to the interface with the user (easiness of navigation, screen design, spatial compatibility of knowledge, presentation of information, aesthetics, and functionality) and of 86.08 ± 9.18 for the pedagogical criteria (epistemology, instructional sequencing, experimental validity, error valuation, structuring, student control, and cooperative learning).

Final considerations

Education has undergone constant reforms through the improvement of technologies aiming at progressively developing a motivating and interactive pedagogical relationship. Currently, teachers and students use educational *softwares* as helpful resources in teaching-learning activities. Considering the objectives of developing an educational game, we concluded that the *Quiz Madness* project reached its goal of producing innovative technology to support teaching-learning processes. Furthermore, it proved to be an alternative for general and specific training of Nursing students in the area of mental health, other health area students, and health-care professionals in situations of training/improvement, in a motivating and adequate way.

References

1. Prieto LM, Trevisan MCB, Danesi MI, Falkembach GAM. Uso das tecnologias digitais em atividades didáticas nas séries iniciais. Renote. 2005; 3(1):1-11.
2. Gomes AS, Wanderley EG. Elicitando requisitos em projetos de Software Educativo. In: Workshop Brasileiro de Informática Educativa; 2003; 14 a 20 de julho. Anais do XXIII Congresso da Sociedade Brasileira de Computação. Campinas: SBC; 2003p. 227-38.
3. Bassani PS, Passerino LM, Pasqualotti PR, Ritzel MI. Em busca de uma proposta metodológica para o desenvolvimento de software educativo colaborativo. Renote. 2006; 4(1):1-10.
4. Oliveira CC, Costa JW, Moreira M. Ambientes Informatizados de Aprendizagem: Produção e Avaliação de Software Educativo. Campinas: Papirus; 2001. p.144.
5. Reategui E. Interfaces para softwares educativos. Renote. 2007; 5(1):1-10.
6. Tajra SF. Informática na Educação: novas ferramentas pedagógicas para o professor da atualidade. 3ª ed. São Paulo: Érica; 2001. p.143.
7. Fonseca LMM, Góes FSN, Ferecini GM, Leite AM, Mello DF, Scochi CGS. Inovação tecnológica no ensino da semiotécnica e semiologia em

enfermagem neonatal: do desenvolvimento à utilização de um software educacional. Texto Contexto Enferm. 2009; 18(3):549-58.

8. Padalino Y, Peres HHC. E-Learning: estudo comparativo da apreensão do conhecimento entre enfermeiros. Rev Latinoam Enferm. 2007; 15(3):397-403.
9. Botti NCL, Carneiro ALM, Almeida CS, Pereira CBS. Construção de um software educativo sobre transtornos da personalidade. Rev Bras Enferm. 2011; 64(6):1161-6.
10. Oliveira SRC. Desenvolvimento e validação de um software educacional sobre administração de imunobiológicos injetáveis para o ensino da enfermagem [dissertação]. Rio de Janeiro: Universidade Federal do Rio de Janeiro; 2006.
11. Santos N. Design de interfaces de software educacional. [Cited 2012 Jan. 15]. Available from: http://www.uemgfrutal.org.br/~portari/ei09/Aula05%20-%20Design-de-Interfaces-de-Software-Educacional.pdf
12. Rhodes G. Desenvolvimento de games com Macromedia Fhash Professional 8. São Paulo: Cengage Learning; 2008.
13. Lucena MWFP. O uso das tecnologias da informática para o desenvolvimento da educação. Rio de Janeiro: Universidade Federal do Rio de Janeiro; 1994.