

Designing a health literacy game for epilepsy education

Rodrigo Gustavo Silvestre Júnia Coutinho Anacleto Karina Piccin Zanni*

UFSCar - Federal University of São Carlos. Computer Science Department, Brazil

*UFSCar - Federal University of São Carlos. Center for Biological and Health Sciences, Brazil

Abstract

Games are changing and improving the traditional education methods. They are interactive and, usually, providing more engagement and fun than other education methods. In the last decade, video games have been used as a tool to educate people about health-related topics, reaching out even children. In this paper we propose a under developing health literacy game for epilepsy education with the primary goal of educate the players about epilepsy, decreasing the prejudice that people have about this condition. We describe some aspects of the game and how we need to proceed in the next steps.

Keywords: Health Literacy; Games for Health; Epilepsy; Serious Games.

1. Introduction

The traditional ways of education are changing, new medias are being adopted to improve learning. One of these new medias are the video games, which are a more interactive and, possible, fun way of educate. Specific for health education, games can be a tool to reach the young people and teach them notions of health cares and self-efficacy [Baldwin and Dandeneau 2009; Street Jr. et al. 1997; Papastergiou 2009].

With this scenario, we propose designing a health educational game about epilepsy which main goal is to help the player to be conscious about this condition and prepare to deal with situations when somebody has seizures.

In this work in progress paper we will show the importance of health literacy and health education in Section 2; the use of games in education in general and especially in health education in Section 3; information about epilepsy and it's symptoms are provided in Section 4; in Section 5 we give the first steps in designing a game to educate the players about epilepsy and how to deal with people with this condition when they present seizures. In the end of the paper we show our first conclusion in Section 6 and our next steps in Section 7.

2. The Importance of Health Literacy

Health literacy can be described as a set of skills that allow a person to understand basic health information. This is a very important and wide ability, influencing in the way that a person seek for health information, how a person can use this information for their benefit and how it will influence in one person health decisions [Nielsen-Bohlman et al. 2004; Selden et al. 2000].

In Brazil, a lot of people cannot read well or even cannot read at all, it certainly difficult the access of these people of health information, because the major part of health literacy materials provided by health agencies are written (like pamphlets and websites) [Instituto Paulo Montenegro 2009; Osborne 2005]. Because of this situation, many people have problems in communicating, sharing, and taking better decisions about their own health care, limiting their self-efficacy and self-management [Glanz et al. 2008].

Colbert [2007] brings us a classification for situations when health literacy skills can help us getting a better treatment:

- Clinical: skills need to filling medical forms, understand medication dosages, providing accurate medical history.
- Preventive: skills for follow preventive health recommendations, change lifestyle for a better health and diseases prevention.
- Navigational: skills for understand how the health care system works

3. Games In Health Education

Many initiatives to design games for education in general have been made in the last 10 years. Video games offer a different experience of learning for it's players, they are intended to be more interactive and fun than other educational medias, attracting and engaging especially children and adolescents [Edgerton 2009; Street Jr. et al. 1997].

Some authors argue that the penetration of video games as an educational media is happening now and tends to grow in many areas of traditional education [Squire 2008]. The difference between educational games (serious games) and entertainment games are the fact that they focus on problem solving situation,

trying to teach something to the player through some designed experience or simulation, while the entertainment games tends to just focus on delivery a fun experience to the player [Susi et al. 2007]. Some advantages of using games to educate, including about health topics, are [Baldwin and Dandeneau 2009; Papastergiou 2009]:

- games allow repetitive trials for solving a specific problem;
- provide individual feedback for the player's actions;
- through games is possible to provide an specific experience and stimulate specific feelings in the players according to the game goals;
- offer social interaction among the players;
- provide experiential learning, which can improve the player's health-related behaviors

There are some different categories within the games for health, such as the educational games and the recently growing in popularity, exergames (a.k.a. cybertherapy) [Sawyer and Smith 2008]. In this paper we are focus on the designing of a health educational game, basing on some positives experiences in general educational games [Kam et al. 2009; McCabe and Wise 2009] and specific health educational games [Steinman and Blastos 2002; Pempek and Calvert 2009].

4. Epilepsy

Epilepsy is a brain disorder that provokes recurrent seizures in a person. It happens because the neurones, responsible for carry messages in different parts of the brain, send these messages in a different order or too strongly. A person with epilepsy can live many months and even years without having a seizure, although seizures can reappear at any time, this is a limitation that those people have to deal with [Devinsky 2002; Parkinson and Johnson 2006; Leppik 2006].

People with epilepsy may have some restrictions such as driving, swimming, the ability of work in certain jobs and so on. Also, the use of anti-epileptic medication may have side effects, especially in the cognitive functions and memory. In the other hand, about half of patients may control their seizures with the first medication that they try [Wilner 2008; Schmidt and Schachter 1999].

According to Wyllie [Wyllie 2007] there are 60 million people with epilepsy in the world, and every year about 30 to 50 new cases per 100,000 people. Epilepsy is more likely to happen in kids and in people with more than 55 years. Wyllie also points some famous and historic people who had or may have had epilepsy, such as Socrates (the Greek philosopher), Alexander the Great, Napoleon Bonaparte, Lord Byron, Vincent Van Gogh, and others.

5. Towards an Educational Game About Epilepsy

The central idea of this paper is to design a educational game for teach the players about epilepsy. In this section we are describing some gameplay elements that can be applied to reach out the game goals.

5.1 Seizure Simulation

Many games educate through simulation of real life situations. In this game we can teach how people should react when somebody is presenting symptoms of having a convulsion.

In a epileptic seizure, the person, usually, loses consciousness, fall to the ground and have jerking movements [Epilepsy Action 2011]. This event takes just a few minutes, but the people around can help the person with convulsion by doing these actions:

- protect the person from injury, especially the in the head
- place the person in the recovering position (see Figure 1)
- stay with the person until their fully recover



Figure 1 - Recovery position [Epilepsy Action 2011]

In other type of seizure, the person may have a partial seizure, losing the awareness of their surroundings. In this case the correct procedure is to protect the person from any danger until their fully recover, explain everything that happened and the person may have missed [Epilepsy Action 2011].

Our idea is provide a simulation of these situation in the game, rewarding the player for doing the correct actions to help the character until the seizure is over.

5.2 Trivia Game

Trivia games are one of the simplest kinds of games. They consist of quiz questions with multiple options, but just one correct.

In the epilepsy context, we can use some important and historic people who, allegedly, had epilepsy and put them in this trivia game asking the players if they can figure out who had epilepsy (see Figure 2). The intention is to show to the player that it is possible for people with epilepsy to achieve important things and live an almost normal life.

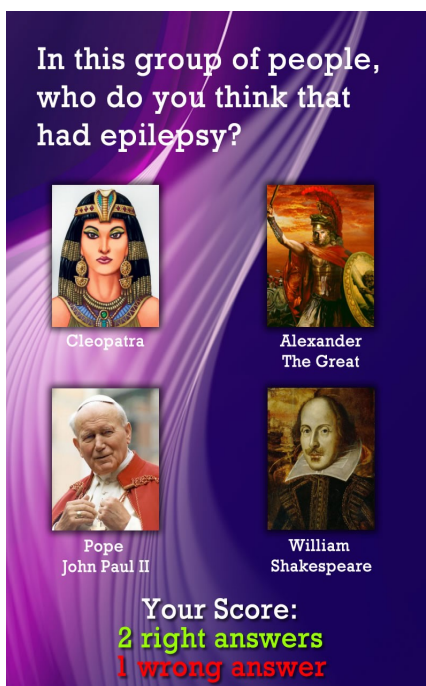


Figure 2: Example of the Trivia Game

5.2 Sports and Epilepsy

There are a lot of sports that people with epilepsy can practice taken the correct cares and protective equipments [Epilepsy Action 2010]. In this kind of game our intention is show to the player that a person with epilepsy can practice some sports with other people, but everybody involved in the activity need to know about the person condition in order to provide the correct help in case of seizures.

The idea is to present some sport situation and provide some equipments that may or may not be used in the activity to provide security to the person with epilepsy. The player need to think carefully and choose all correct equipments of protection needed by the person with epilepsy, Figure 3 illustrate how it could work out.



Figure 3: Example of sports-related epilepsy mini-game

Conclusion

The traditional education is evolving and adopting many media resources to improve the teaching process. Video games are maturing as a media that can be used to provide fun experiences and to educate players about one specific topic. The use of games to improve learning is happening now for many different purposes, such professional training, foreign languages lessons, flying simulations for pilots, games designed for military training, games to instruct how to do yoga and others physical exercises, and so on.

Games for health education is one of these many purposes. The primary goal in design such games is to teach the player about a health topic: the prevention of some disease, how to take the correct medication, simulating how a microorganism can affect our body, how to proceed in a specific health-related situation, etc.

Our main focus on this paper is to contribute with a initial design and insights about a game which goal is to teach the player about epilepsy and how to deal with people who present the symptoms. Also, to demystify some wrong beliefs about this condition and decrease the prejudice and segregation that often happen with people with epilepsy.

Future Works

As next steps, we need to continue the designing and implementation of the game, observing the correct software engineer practices and methodologies. In earlier stages of development, heuristic evaluation can help in identifying design flows and usability errors in the game user interface. After finishing the final product, we need to assess the overall usability of the game and how much the players can learn about epilepsy after playing it.

Acknowledgements

The authors would like to thank the support of São Paulo Research Foundation (FAPESP) and Federal Agency of Support and Evaluation of Postgraduate Education (CAPES).

References

- BALDWIN, M.W., DANDENEAU, S.D., 2009. PUTTING SOCIAL PSYCHOLOGY INTO SERIOUS GAMES, SOCIAL AND PERSONALITY PSYCHOLOGY COMPASS 3 (4), pp. 547–565.
- COLBERT, A.M., 2007. FUNCTIONAL HEALTH LITERACY, MEDICATION-TAKING SELF-EFFICACY AND HIV MEDICATION ADHERENCE. DOCTORAL DISSERTATION, UNIVERSITY OF PITTSBURGH.
- DEVINSKY, O., 2002. EPILEPSY: PATIENT AND FAMILY GUIDE., F.A. DAVIS, PHILADELPHIA.
- EDGERTON, E., 2009. CHANGING HEALTH BEHAVIOR THROUGH GAMES. HANDBOOK OF RESEARCH ON EFFECTIVE ELECTRONIC GAMING IN EDUCATION. IGI GLOBAL SNIPPET, pp. 370-387.
- EPILEPSY ACTION, 2011. FIRST AID FOR SEIZURES. AVAILABLE FROM: [HTTP://WWW.EPILEPSY.ORG.UK/INFO/SEIZURES/FIRST-AID](http://www.epilepsy.org.uk/info/seizures/first-aid) [ACCESSED 23 AUGUST 2011]
- EPILEPSY ACTION, 2010. SPORTS AND LEISURE. AVAILABLE FROM: [HTTP://WWW.EPILEPSY.ORG.UK/INFO/SPORTS-LEISURE](http://www.epilepsy.org.uk/info/sports-leisure) [ACCESSED 23 AUGUST 2011]
- GLANZ, K., LEWIS, F.M. AND RIMER, B.K., 2008. EDITORS, HEALTH BEHAVIOR AND HEALTH EDUCATION: THEORY, RESEARCH AND PRACTICE. JOHN WILEY AND SONS.
- INSTITUTO PAULO MONTENEGRO, 2009. BOAS NOTÍCIAS E UM FORTE ALERTA SÃO AS PRINCIPAIS REVELAÇÕES DE INAF 2009. AVAILABLE FROM [HTTP://WWW.IPM.ORG.BR/IPMB_PAGINA.PHP?MPG=4.02.02.00.00&VER=POR](http://www.ipm.org.br/ipmb_pagina.php?mpg=4.02.02.00.00&ver=por) [ACCESSED 17 AUGUST 2011]
- KAM, M., KUMAR, A., JAIN, S., MATHUR, A., AND CANNY, J., 2009. IMPROVING LITERACY IN RURAL INDIA: CELLPHONE GAMES IN AN AFTER-SCHOOL PROGRAM. IN PROC. ICTD 2009, APRIL 17--19, 2009.
- LEPPIK, I.E., 2006. EPILEPSY: A GUIDE TO BALANCING YOUR LIFE. DEMOS MEDICAL PUBLISHING.
- MCCABE, J., WISE, S., 2009. IT'S ALL FUN AND GAMES UNTIL SOMEONE LEARNS SOMETHING: ASSESSING THE LEARNING OUTCOMES OF TWO EDUCATIONAL GAMES, EVIDENCE BASED LIBRARY AND INFORMATION PRACTICE, VOL. 4 No.4, pp.6-23.
- NIELSEN-BOHLMAN, L., PANZER, A.M. AND KINDIG, D.A., 2004. HEALTH LITERACY: A PRESCRIPTION TO END CONFUSION. INSTITUTE OF MEDICINE, THE NATIONAL ACADEMIES PRESS, WASHINGTON, DC.
- OSBORNE, H., 2005. HEALTH LITERACY FROM A TO Z: PRACTICAL WAYS TO COMMUNICATE YOUR HEALTH MESSAGE. JONES AND BARTLETT PUBLISHERS, SUDBURY, MA.
- PAPASTERGIOU, M., 2009. EXPLORING THE POTENTIAL OF COMPUTER AND VIDEO GAMES FOR HEALTH AND PHYSICAL EDUCATION: A LITERATURE REVIEW, COMPUTERS & EDUCATION, v.53 n.3, p.603-622, NOVEMBER.
- PARKINSON, G., JOHNSON M., 2006. EPILEPSY. CONTINUUM INTERNATIONAL PUBLISHING GROUP
- PEMPEK, T.A., AND CALVERT S.L., 2009. TIPPING THE BALANCE: USE OF ADVERGAMES TO PROMOTE CONSUMPTION OF NUTRITIOUS FOODS AND BEVERAGES BY LOW-INCOME AFRICAN AMERICAN CHILDREN. ARCHIVES OF PEDIATRICS AND ADOLESCENT MEDICINE, 163 (JULY):633–637.
- SAWYER, B. AND SMITH, P., 2008. SERIOUS GAMES TAXONOMY. PRESENTED AT THE GAME DEVELOPERS CONFERENCE 2008. AVAILABLE FROM: [HTTP://WWW.DMILL.COM/PRESENTATIONS/SERIOUS-GAMES-TAXONOMY-2008.PDF](http://www.dmill.com/presentations/serious-games-taxonomy-2008.pdf) [ACCESSED 15 AUGUST 2011]
- SCHMIDT, D., SCHACHTER, S.C., 1999. EPILEPSY: PROBLEM SOLVING IN CLINICAL PRACTICE. MARTIN DUNITZ LTD.
- SELDEN C.R., ZORN M., RATZAN S. AND PARKER R.M., 2000. CURRENT BIBLIOGRAPHIES IN MEDICINE: HEALTH LITERACY, NATIONAL LIBRARY OF MEDICINE, BETHESDA, MD.
- SQUIRE, K. 2008. VIDEO GAMES AND EDUCATION: DESIGNING LEARNING SYSTEMS FOR AN INTERACTIVE AGE. EDUCATIONAL TECHNOLOGY MAGAZINE (MAR.-APR. 2008) 17--26.
- STEINMAN R.A. AND BLASTOS M.T., 2002. A TRADING-CARD GAME TEACHING ABOUT HOST DEFENSE, MED EDUC 36, pp. 1201–1208.
- STREET JR., R.L., GOLD, W.R. AND MANNING, T.E., 1997. HEALTH PROMOTION AND INTERACTIVE TECHNOLOGY: THEORETICAL APPLICATIONS AND FUTURE DIRECTIONS. LONDON: LAWRENCE ERLBAUM ASSOCIATES.
- SUSI T., JOHANNESON M., AND BACKLUND. P., 2007. SERIOUS GAMES - AN OVERVIEW. TECHNICAL REPORT HS-IKI-TR-07-001, SCHOOL OF HUMANITIES AND INFORMATICS, UNIVERSITY OF SKOVDE, SWEDEN.
- WILNER, A.N., 2008. EPILEPSY: 199 ANSWERS: A DOCTOR RESPONDS TO HIS PATIENTS' QUESTIONS. DEMOS VERMANDE.
- WYLLIE, E., 2007. EPILEPSY: INFORMATION FOR YOU AND THOSE WHO CARE ABOUT YOU. CLEVELAND CLINIC PRESS.