If you build it would they play? Challenges and Solutions in Adopting Health Games for Children

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ABSTRACT

This article discusses the challenges encountered with the adoption of games for children created as part of the e-bug/edugames4all project. One of the aims of this project is/was to design health games for 9 to 15 year old children. This paper presents one of the challenges we encountered with games adoption: how to teach children that were not familiar with the Interactive Digital Storytelling (IDS) game mechanics how to play the games. We solved this issue by using a training mission teaching children the basic concepts, navigation, and methods for "investigation" required to understand before playing the game. This paper presents the evaluation of *the* training missions and the lessons drawn.

Author Keywords

Serious games; games for health; games for children; interactive digital storytelling.

ACM Classification Keywords

K.3.1. Computer Usages in – computer assisted instruction (CAI), computer-managed instruction (CMI), distance learning.

General Terms

Human Factors; Design; Measurement.

INTRODUCTION

There are various campaigns used to promote awareness about responsible antibiotic use and improve hygiene [5, 12], however few of them are aimed at children [13]. The aim of the e-bug/edugames4all project as part of the DG SANCO funded E-Bug project was to address this gap, by creating educational resources for children. Among these resources, several educational games have been developed with the aim of improving, in an enjoyable manner, children knowledge about microbes, hygiene and appropriate antibiotic use. The games target children between 9 to 15 years old. Two types of games were created: platform games [15], and interactive digital storytelling games [14]. In this research we will focus on the last category, Interactive Digital Storytelling (IDS) games.

IDS games are narrative-centered games, in which the game changes its path based on the user interaction with the system. Various narrative-centered learning environments have been proposed and some successfully used when working with children [6, 16]. However, the e-bug/edugames4all games, although successfully used for teaching purposes, with over 60 000 players just between January 2009 and March 2010 [21], was confronted with players dropping-out before finishing the game. Although a tutorial was provided as part of the game, it just showed that more effort was needed towards teaching children how to play the game. For example, an evaluation of the games performed with 129 students from four UK schools reveal that 50%, 54%, 42%, and 29% of the students from the visited schools found the game frustrating and too hard to play [13].

This paper presents how we addressed this challenge by the introduction of a new game mission, called the training mission that helps children that were not so savvy game players, or did not play this kind of game, to acquire the basic skills for playing the game. The rest of this paper is organised as follows. The next section presents a short background on the previously reported game drop out problems and providing players with help in the game. The following section introduces the games, followed by an introduction of the designed training mission. The training mission evaluation is presented afterwards. The following section presents a discussion of the results and the paper ends with our conclusions.

BACKGROUND

Game drop-out is reported not only for other serious games [13, 8], but also in industry projects [18]. Often, when the games are introduced in a classroom setting, they seem too complicated for students [16], or from an educational point of view, students are not performing as well as their peers, get discouraged and give up the game on the long run [9]. In this paper, we focus on the first problem, games that are found too complicated by children.

Teaching players how to play is considered a "key challenge in video game design" [1]. Although there are successful games that did not provide any help for players,

such as Super Mario Brothers [19], tutorials are a frequent method of teaching new players the game mechanics [1]. The usefulness of a tutorial is not always guaranteed, research showing that tutorials are not always a reliable method for increasing the game play, their performance depending on the game complexity [1]. Although having a tutorial integrated in the game was the first method of choice in this project it has not been successful and we opted for a tutorial presented as a training mission in the game. A similar approach is done in TimeWarp [4], a mobile augmented reality game, in whom part of the introduction to the gamy play is done in-game by the virtual characters.

E-BUG/EDUGAMES4ALL INTERACTIVE DIGITAL STORYTELLING GAMES

E-bug/edugames4all IDS games consist of four games/missions. During these missions, the players need to solve a mystery. The games are created following problem based learning principles [7], and a series of red herrings and puzzles as described in the STAR framework [17]. During the missions, the player takes the role of an investigator who has to solve the mystery/case. Each of the missions follows different learning objectives and they are focused on:

- Bad Bacteria at BBQ [3] and the GHD Game [11] focus on the importance of hygiene in general and hand washing in particular.

- When Bugs go Wild [22] and Gambling Never Pays [9] focuses on responsible antibiotic use.

The player must resolve the puzzles presented in the game that lead to solving the main mystery. During this process, the player learns about microbiology. To solve the puzzles, the player has to interrogate possible suspects, collect data and analyze it, draw and re-evaluate conclusions. To help the player, s/he has a partner, can make use of so called *microvision* – which is a special tool in the game that allows her/him to see the microbes, can analyze the collected evidence in the lab that in the game is called, the e-Cooper.

ADOPTION CHALLENGES

Although various challenges were encountered from the game design stage until it was created (i.e. children preferring a certain type of game not considered suitable by the other involved partners; balancing between a scientific microbe name seen as important from the point of view of the involved microbiologists, and a children friendly name for a microbe), due to lack of space in this paper we will focus only on the adoption challenges.

The game was designed and iteratively evaluated with the aim of having a game that children will enjoy playing. Among the issues that appeared when the game was evaluated in experimental settings and later on when the game was up online and free for children to play was that many children found the game frustrating and difficult to play without a formal instruction [12]. Typically in a game, a tutorial is inserted to help players when they get stuck [1], but although we already had a tutorial as a part of the game, the feedback was showing that more effort was needed to help children that previously did not play this kind of game before. As the tutorial was not successful and the main aim of this game is to teach microbiology and not to teach the game mechanics, we decided to create a shorter mission to help alleviate this problem. This mission was called the training mission and it was aimed at teaching the basic game mechanics to children that were non-savvy players. This may reduce the cognitive load that children need while playing the game and focus on the game's main activity [2]. As the children who already master this type of game would not usually appreciate a short and easy mission [10] the players can play the other missions without having to play the training mission first.

TRAINING MISSION

The training mission [20] was introduced after the first three games (Bad Bacteria at BBQ, When Bugs go Wild and Gambling Never Pays) were already developed, mainly because of the difficulties players encountered while playing. Therefore, we aimed to introduce in a fun way the concepts some non-game savvy children were missing by having the game characters explicitly describe how certain features of the games have to be used (see Figure 1). To keep players engaged, a case/mystery that was easy to solve was also presented. The player is first introduced to his game partner who explains the game mechanics and explicitly guides the player through the game. The player is shown how to travel between different locations, how to collect and analyze evidence, and the usage of the *microvision*, elements pertinent to solving the mystery in the rest of the missions.
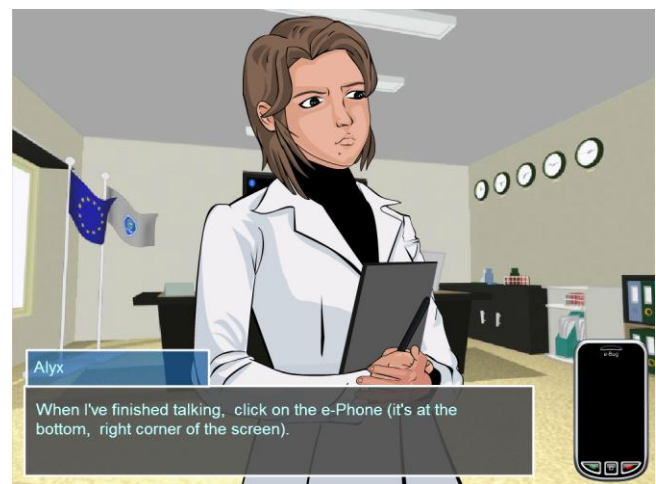
Figure 1. The player's partner explaining how to use the e-Phone.

TRAINING EVALUATION

The purpose of this evaluation was to qualitatively assess the training. The evaluation took place with 49 10 to 13 year old students (average age was 11.8) attending "Technology Camp," a summer school held at Elstree School, near Reading, Berkshire in 2010. The students were asked to play the training mission and fill the questionnaire. This took approximately 10 minutes.

The students had to answer five open questions regarding the training graphics, easiness to follow the training, willingness to continue playing, and improvements to be made.

Graphics

When asked about the graphics (*Did you like the graphics or the 'look and feel' of the game style?*), most of the participants reported that they like the game graphics: "*The graphics were very good*". Some of the participants provided suggestions for improvement, focusing on the game movement: "*Yes, although I think the movement could be smoother.*" and the characteristics of the characters: "*The people should have more realistic poses.*" Four participants reported not liking the training graphics, but they did not comment on what they did not like to them.

Easiness to Follow the Training

The participants were initially asked whether or not they find it easy to follow the instructions given during the training (*Was it easy to follow the training instructions?*). Most of the participants find it easy: "*Yes, it's a nice simple, effective game.*", "*yes, very easy*". Two of the participants found it sometimes confusing: "*Mostly yes, a bit confusing sometimes.*" and two of them reported not finding it easy to follow the training without commenting.

Then the participants were asked if they were stuck during the training (*Did you get stuck at some point during the mission?*). Half of the participants reported not having any problems and the other half reported getting stuck during the mission. They reported being stuck at two different points in the game: towards the end of the game: "right at the end!" and when they have to go to the e-Copter "Yes, when I had to go to the e-Copter.". e-Copter is the place where the player has to go analyze the results of the probe obtained.

Willingness to Continue Playing

The students were asked whether or not they were excited to continue playing or not (*After the tutorial, were you excited to continue playing?*). Most of the participants reported being excited to continue playing. Four participants had a moderate answer: "medium (yes and no)". Eight participants reported not being excited to continue playing: "*I was really excited, but I did not want to carry on.*"

Improvements to the Training

When asked what they would change (*What would you change about this training? Anything?*), a bit more than half of the participants said anything. Eight of them mentioned that they would like to have less talk: "*Maybe cut down on the talk.*" Two mentioned problems with the e-Copter: "*More simple use of the e-Copter.*" and another two mentioned difficulties with the ending part of the game: "*Make what you have to do at the end clearer.*" problems which appeared also when the participants were asked whether they got stuck. An equal number of participants (two) mentioned the need of extra help: "*With just 'that doesn't prove anything,' Alyx should give you a tip.*" and the fact that the training is too simple: "*It was a bit boring and simple.*". Other issues mentioned were with regards to the text: "*Yes, stop calling it a game using the character, it's unrealistic.*" and the possibility to be able to see the discussions again "*When people talk a lot, have arrows at the top and bottom of the text box so you can go back to what the people were saying before.*".

DISCUSSION

The qualitative evaluation shows that overall the training was well designed. The evaluation does not count for the usefulness of the training in helping students with the game. Although we have no comparable quantitative data for how many students initially managed to play the game with and without the training, since the training was introduced we performed several experimental studies in which students played the game with and without having to play the training mission before. The researcher who observed the students during these studies mentioned that the introduction of the training mission has helped students.

Our observations during the project were that although a tutorial was provided it was often not enough, more effort was needed towards having children play the game. This is not sustainable if the student plays the game by itself, and not necessarily good when it leads to frustration and students giving up on playing the game.

CONCLUSION

This paper presented the issue that encountered with adoption of educational games for health created as part of the Edugames4all project. Students who were familiar with the IDS-concept enjoyed the game but students who were not game savvy did not find the game intuitive. We therefore explored the introduction of a tutorial in the form of another mission, called training mission, to be played before the actual game missions to help the not so game savvy students learn the basics of the game in a more explicit form through game play. Players familiar with the IDS game mechanics can skip this mission. A qualitative evaluation of the training mission through open questions was presented addressing the training mission graphics, easiness to follow, participant willingness to continue playing when the mission was over and suggested

improvements to the current training mission. The results showed that most of the participants provided positive feedback.

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