Simulation Game for Training New Teachers in Class Management

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ABSTRACT
Games are used in education at all levels for quite long time. Most educational games intend to introduce trainees to a new subject and present them with new knowledge when others allow them to acquire and improve certain skills. This paper presents the "Teaching Game", an implementation that explores the possibility to create a simulation of a classroom event in the format of a game. It is offered as a training tool for new teachers who want to get prepared for the class. The educational aim of the game is to put players in the place of a teacher who comes across some unforeseen circumstances and to allow them to test and improve their skills in class management.

The 'teaching game' has been implemented in Game Maker 7 and it is a tool developed for the needs of the "Virtual Training Environment (VTE) for Teachers" at the University of Westminster.

Categories and Subject Descriptors
H.2.2 [Design Tools and Techniques]: User Interfaces; I.2.1 [Applications and Expert Systems]: Games

General Terms

1. INTRODUCTION
How should teachers respond when they come across unforeseen situations in the classroom? Any person involved with education could tell that there are no recipes or ready-made solutions that a teacher could follow in order to handle a new or difficult situation in a classroom. There are so many unpredictable factors such as teacher’s and students’ goals, reactions, specific cognitive and emotional conditions as well as conditions related to a particular, most of the times unique, event that it is not possible to provide useful instructions to a new teacher.

It is only after many years of experience when teachers start to realise the best ways to handle unforeseen situations and they start becoming proactive in order to prevent an unpleasant situation or incite a specific reaction from students. By facing and asking to handle different, new, unexpected and mostly difficult situations, new teachers could improve their skills to understand students’ reactions, manage the classroom better and avoid disturbing factors.

A training environment that will help new teachers to get prepare for the class, should offer trainees the chance to face real life situations and allow then to experiment with them. Both are essential features of any training environment [6]. The "Teaching Game" is an implementation that explores the possibility to create a simulation of a classroom event in the format of a game. The educational aim of this game is to put players in the place of a teacher who comes across some unforeseen circumstances and to allow them to test and improve their skills in class management. It is a tool developed for the needs of the "Virtual Training Environment (VTE) for Teachers" - a platform created at the School of Electronics and Computer Science (ECS), University of Westminster, London.

2. OBJECTIVES OF TEACHING GAME
The main objective for the ‘teaching game’ was to introduce players to ‘real-life’ situations. It was absolutely essential to use genuine situations instead of ‘made scenarios.’ There are some good reasons for that. On one hand ‘made scenarios’ have been criticized for being disconnected from their real-world context [2]. As a result, knowledge conveyed through ‘made scenarios’ tends to be situated in the context of the theoretical framework within these scenarios have been constructed rather than the context in which actual events took place. On the other hand learning situated in real-world contexts has been shown to have positive impacts on learning and learner motivation (Duffy Cunningham, 1996) [1].

In order to collect authentic data, we interviewed lecturers at the School of Electronics and Computer Science (ECS), University of Westminster. The "teaching game" we present in this paper reproduces, in game format, an event that took place during an exam at ECS. The event was described to...
us by the lecturer who took part in it and had to handle this specific situation.

3. THEORETICAL BACKGROUND

There are two main questions we had to answer before we started the design of the game. The first one is 'what exactly we try to simulate in this game'. Apparently, the initial approach to this question is that it is the 'teaching environment' and the 'teaching process' that we have to simulate. The 'teaching environment' is a self-explanatory concept and it consists of all those persons, machines (e.g. computers) or other tools (e.g. projector, boards or software) that are present or used in the classroom.

The 'teaching process' is not such straightforward to define term. "Teaching" has been described in many different ways: as "the art of explaining", "a profession", "the result of experience", a "skill", a "charisma" etc. All these definitions try to capture different aspects of 'teaching'. For this particular application we started with the main remark that whatever teaching is, it is mainly achieved through linguistic communication between the teacher and the students. Apparently there are more ways for a teacher to pass a message to students (e.g. body language, intonation) but language is the most common and ultimate tool, teachers use.

As it is common in any discourse students try to decode the message given by the teacher and then they code their own linguistic messages. After that, it is the teacher who has to decode students' messages in order to continue the communication. All the other non-verbal actions and signals are used in order to underline and clarify the linguistic message. The linguistics messages that teachers and students exchange do not convey only information or knowledge related to a specific subject. They also pass information about understanding, emotions and intentions. The linguistic choices teachers make indicate intentions and trigger reactions from students. For example a lecturer who tells student during the very first day of a class "my module is very difficult with a very difficult exam" and a lecturer who tells them "only half of you will manage to pass my module" try to pass the same message (that students have to work hard to pass the module) but the choices they make cause different impressions, feeling and reactions from students.

The second question we had to answer was what kind of actions will be available to players. Having defined teaching as (mainly) a linguistic communication the actions we provide players with are linguistic actions. For the needs of the game we created alternative ways for the teacher to react to specific problems by generating different linguistic actions. Such alternatives were constructed after discussions with teachers and students. These actions are presented to players as different sentences. The player has to choose the "correct" sentence that corresponds to a certain attitude towards the students and a certain way to communicate with them. Apparently, no answer could be considered as a 100% "correct" or assumed that it will work will all students. From experience we could say that a certain attitude might lead to a "quicker" solution and definitely - because this is a real life story- we could say which one worked in the given situation. There is no assurance that the same choices will work with a different class.

It goes without saying that the view that 'teaching is a linguistic action' is a relative narrow approach and it limits the number of actions players are allowed to take in order to play the game. The development of this principle along with the "characters" of the students must be considered in the future, in order to create a more sophisticated game that will be much closer to the "real environment".

4. SOFTWARE CHOICES

Two pieces of software currently used for computer games graphics and implementation were studied, namely "Game Maker" and "True Space 7".

"Game Maker" (download from the address: http://www.yoyogames.com/make) is an easy-to-learn Windows and Mac IDE originally developed by Mark Overmars[3] as a teaching aid for his students. It is gaining recognition as a useful teaching tool in primary and secondary schools because of its easy entry and sophisticated scripting language.

"True Space 7" offered by Caligari Corporation (http://www.caligari.com/products/trueSpace/ts75/Brochure/intro.asp) is a fully-featured 3D authoring package. It is a more sophisticated package with more advanced graphics but it requires more learning time. True Story is used for...
modeling, apply texture and light, animate and rendering 3D content.

Both packages produce executables. We decided to use 'Game Maker' taking into consideration its full functionality and the less learning time it requires.

4.1 Design

4.1.1 Instructions and Help

Students get the following instructions at the beginning of the game: "You are the lecturer of the first year computer science module 'Programming 1' and you organise a lab exam. Students are already in the lab waiting for your instructions - they have no previous experience of University lab exams and they might be a bit anxious... They expect to work in an undisturbed and 'peaceful' environment." The user plays the role of the teacher.

During the game players can get help from a "wizard" who appears at the right bottom corner of the screen. The wizard provides feedback to players after each action and explains why they gain or lose points.

4.1.2 Aim, Actions and Health Bars

The aim of the game, as it is set in the instructions, is for the teacher to make sure that the exam goes smoothly whatever unexpected problems occur. Time plays a crucial role. The teacher has to resolve any problem that comes up as soon as possible and - in an ideal world - to foresee and avoid it.

The user has to select among three sentences and decide which action and which phrasing will lead to a quick solution. At the bottom of the screen there are also two health bars: "students' acceptance" and "teacher's confidence". At the beginning of the game both health bars are in the middle (50). Every action that helps to resolve problems which arise add to "students' acceptance" and "teacher's confidence" when wrong decisions that cause further unnecessary delay reduce the score.

Figure 2 shows the screen of the "Teaching Game". According to the real event we simulate a late student enters the room and a serious of disturbing events start. Each time the player clicks on the teacher he is provided with three linguistic actions to choose from as it is shown in the following figure (Fig 3). In order to create the options offered to players, several studies on how to be more productive in classroom and how to deal with difficult students were used [5, 4].

5. IMPLEMENTATION

The case study was built using GameMaker (GM) 7 engine. We selected to represent avatars from interactive representation of a human figure in a games-based two-dimensional interactive graphical environment. The term was made popular by Neal Stephenson in his novel 'Snow Crash'. For example a person in a virtual meeting or the tutor in a distance learning context may be represented by their avatar dealing with students. Usually an avatar will have human characteristics, including speech and facial expressions.

For this game there are three main avatars. The lecturer, the students initial in the class (all with the same avatar representation) and the student that appear delayed after a certain time (fig 3). The game has been designed to use the common WASD keyboard entry with the help of the mouse to select options over dialogues, or to initiate time events using the left click. The game general FSM (Finite State Machine) can be seen in Figure 3.

6. PILOT TESTING

The "Teaching Game" has been pilot tested several times over the course of two days by one expert. It has been very well delivered and it is easy to use. The dialogues are very informative, easy to read and easy to select. Only very few minor problems were identified, which are presented below in two sections along with some suggestions.

6.1 Apparatus

Computers were used to display the hypertext. Pentium IV 2.0 GHz custom computer with 1024MB memory were used. The monitor was a Dell Professional 1909W 19 inches colour monitors. The monitors' resolution was 1360 x 768 / 60 Hz.

6.2 Usability aspects

Since the game is educational a welcome message would be more appropriate at the start of the game instead of the three choices of how to proceed with the game. Then, only the "Start" option should be displayed in the middle of the game. It was suggested that for reasons of consistency with the rest of the game's screens (the health bars appear at the bottom), the other two (Help and Save and Exit) option should be moved to the bottom space. It is unlikely that the user will use these choices again and again, and therefore could easily be moved at the bottom of the screen. In addition, these two functions should be available to the user throughout the game, in order to give to the user the opportunity to again read the guidelines, if needed, or to leave the game at any time he/she wishes to do so. Furthermore, the opportunity to go back to the main/start screen should be given to the user without having to quit the game altogether.

In the "Help" file, where the functions of the different keys are explained, an explanation about the "Esc" key is needed, since it is a key used in the game and an explanation is not provided. Also, it need to be said that the Esc key has a
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Besides, when the user clicks on the Help (F1) button and moves to the help screen it is not clear how he/she can get back to the main screen, therefore, a message like "press esc to return to the main screen" needs to be displayed in the screen, and it needs to be clearly visible. This is only happening at the beginning of the game and it might take a while until the user will realise that he/she needs to click again on the lecturer in order to continue. A message like "click on the lecturer to continue" from the wizard could be very useful and it could improve the pace of the game. The user might not remember what he/she needs to do to proceed, and an instruction will help him/her to proceed with the rest of the game.

Finally, in some of the responds/explanations from the wizard, when the respond is less informative and the user loses points, it is not clear if those points refer to the confidence levels or not, since the health bars display percentages. However, if it is, this is inconsistent with the health bars and a change it should be made, so both use the same metric scheme and therefore the relationship between the two is transparent.

6.3 Technical aspects

A technical problem was identified when the teacher is moved at the end of the classroom, after the second row of desks. When the teacher stands there and the new student enters the room, he/she turns back immediately and moves around, outside the class/wall, presumably trying to find another entrance. After he/she finishes moving around the classroom, enters the room, goes towards the lecturer, the interaction starts and the game continues.

7. FUTURE WORK

The "Teaching Game" (as a tool offered through the "Virtual Training Environment (VTE) for teachers") is an ongoing project. We continue to expand and develop it. We also work on more complicated real-life scenarios that could be re-created in the form of a game. Further developments will include additional student avatars with different AI for each one. That could lead to import additional features for each student such as psychological profiles and confidence, which the teacher should take into account with time constraints. Also, all the usability and technical issues revealed by the pilot testing will be resolved. Expand the GUI of the game to include face avatars and information selection for all students within the class. Create a database to keep reference of user’s actions in order the game AI to update itself to increasing level of difficulty.

8. REFERENCES


