Conectado: A Serious Game to Raise Awareness of Bullying and Cyberbullying in High Schools

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Abstract. Video games are becoming increasingly popular, even in educational settings. Games are not only built for entertainment: for example, so-called *serious games* are designed to teach or change behaviours, such as raising awareness. Serious games provide several advantages, most notably player engagement, making them a powerful tool for teachers. In this article we describe Conectado, a serious game designed and developed to raise awareness of bullying and cyberbullying. The game has been designed to provide a common experience to students, placing them in the role of victims. The game it is intended to be used in class as a tool for teachers, allowing them to motivate a controlled discussion and make students reflect on the problems of bullying and cyberbullying.

Keywords: e-learning, bullying, cyberbullying, serious games, empathy, awareness

1. Introduction

Although it is now common to hear about bullying and the importance of preventing new cases from appearing, bullying has historically been frequent and even wrongly considered as a '*normal* rite of passage' for children and adolescents [1]. It was not until two decades ago that it began to be seen as a serious risk to the mental and physical health of young people. Now bullying is globally recognised as a serious problem due to its high impact and long-term effects on the life of the bullied. Among the most common effects include problems associated with attention, behaviour and emotional regulation, which usually interfere with their ability to learn and adapt in schools [2]‑[5]. But significant psychological disorders and even suicides have also been documented [6].

With the generalization of the new technologies, the pervasive use of mobile devices and social networks, and the early age at which young people begin to use these technologies, another new form of harassment has emerged, called *cyberbullying* [7], [8]. This phenomenon is more complex because it makes young people vulnerable both at school and at home, especially because they are not fully aware of the effects of their actions and of the dangers hidden in the Internet [8], [9]. Cyberbullying can occur at any time and the consequences for victims are just as serious and important as for victims of more traditional bullying. It should not be forgotten that both bullying and cyberbullying are universal problems and affect all countries to a greater or lesser extent, being phenomena independent of the culture and country of origin of victims and aggressors.

As in other countries around the world, bullying and cyberbullying are one of the greatest problems in schools in Spain [10], [11]. A problem that many schools do not know how to address effectively. But due to perceived importance and relevance of the problem, there is an increasing number of campaigns and projects that focus on this area both in terms of prevention and action (e.g. the police has created a program where policemen visit schools to inform the students on the risks of the Internet in general, and about bullying and cyberbullying in particular). However, this is still more of an exception than the norm, and there continue to be very few resources that are free, accessible and easy to apply at school. Many of the current approaches are also difficult to scale, as they require experts to train teachers or to travel to the centre to carry out evaluations, talks and workshops. Neither can we forget parents, who also need to be given resources to enable them to educate their children at home and to deal with the problem of bullying if their children are involved in any way (either as aggressors or as victims).

On the other hand, video games are now an important part of our young people's leisure time. But video games can also be used in the classroom [12], [13] to teach in what has been called serious games (a.k.a, educational games). Serious games have been effectively used in different domains such as medicine [12], [14] or business education [15]; and for different purposes, such as increasing knowledge or changing user attitudes [16], [17]. Serious games provide authentic learning environments that break the student 10-minute limit of attention to traditional lectures [18], while providing immersion and a free and safe exploration of simulated domains where they need to apply their knowledge and can experience the results of their action with very short feedback cycles [19]‑[22]. All these characteristics make serious games a very useful tool that can be used for raising awareness about social problems [23].

We describe *Conectado*, a serious videogame designed and developed to raise awareness about bullying and cyberbullying among young people, from 12 to 17 years old. This video game has been conceived as a tool to motivate a teacher-led classroom discussion once students have a common experience of cyberbullying acquired after playing the game.

The rest of the paper is structured as follows. In section 2 we detail the objectives and characteristics of the videogame, in section 3 we describe its design. Section 4 presents experiments carried out so far to validate the effectiveness of the

game and its use in class. Summarized results are described in section 5. Finally, section 6 discusses the conclusions reached and future work.

2. *Conectado*, The Videogame

Conectado is a videogame developed within the e-UCM research group of the Complutense University of Madrid (Spain), specialized in eLearning, eLearning standards and serious games (educational games). The videogame has been designed and developed with the goal of raising awareness against bullying and cyberbullying through emotions; and more specifically, through identification with what a victim of this kind of harassment feels. It is intended to be an educational tool used in class by education professionals to help them present this subject in a more interactive way and with a greater emotional involvement of the prospective participants, youths between the ages of 12 and 17.

The game provides a common experience for all students in a class, hence a subsequent discussion can be initiated under the supervision of an educator (e.g. teacher, counsellor). The aim of this subsequent reflection session is to make players reflect based on their common experience and better understand the ultimate consequences of their actions, thus increasing the effect that the game itself achieves. The educator may also raise discussions about if any of these situations occur in the school and how their students live it. In this way, it is possible to highlight aspects of the game such as the importance of asking for help in cases of (cyber)bullying (and presenting it as an act of bravery and not of "being a snitch") or to highlight how important communication with parents is and to avoid being a neutral observer or even a passive collaborator who looks the other way (and who are involuntary but necessary participants in these harassment processes). It has been studied that one of the most effective long-term solution is that peer students withhold approval and actively or passively condemn the bully [24], [25].

The videogame is designed as an adventure-style game, where the player is put in the situation of a student who suffers from bullying and cyberbullying in a daily basis after arriving in a new school. The story occurs in 5 days during which the protagonist of the story must go from home to school and from school back home, interacting with the characters that appear in the different scenarios. The storyline advances as the schoolmates in the game turn their backs on the protagonist and start actively or passively collaborating with the ongoing harassment, both on social networks and in person when you interact with them.

Figure 1. Start screen

Figure 2. Configuration screen. Players must choose a "real" name, username, password and gender for the protagonist in the game and its eponymous social network , "Conectado".

The player can experience first-hand, but within the safety of a short game session, different types of harassment arising from bullying and cyberbullying, including social exclusion, insults, aggressive nicknames, publication of images retouched to humiliate and mock the protagonist, offensive messages, password theft, theft of physical objects, blackmail, etc. All these actions are intended to increase the empathy of the players towards victims, as well as to make them reflect on the unexpected consequences of certain actions. The goal is to increase awareness of cyberbullying, to better understand it and reflecting also on the social aspect of the problem. Cyberbullying not only directly affects the bullied person but also their environment both at school and at home. However, this is a complex message to convey to students, and we think that an interactive videogame is an effective way to present it in a language and medium that young people understand as their own.

To increase the empathy for the protagonist, after each day in the gameplay, one minigame in the form of a nightmare appears. Player cannot, by design, defeat this minigame, therefore increasing feelings of impotence, inferiority, frustration and loneliness. This is also achieved with the numerous dialogues that appear in the game with the different characters, where players can choose responses among several options, none of which allows them to end harassment until the end of the game. Within dialogues, options never include resorting to violence, because a violent response

would only lead to an escalation in the aggressions. In this way, the player learns that the only way to combat harassment and cyberbullying is to ask for help. Indeed, reaching a satisfactory game ending is only possible if the player-protagonist discusses the ongoing bullying with parents and/or teachers. This reflects that bullying is a serious and social problem that the player cannot solve alone.

3. Design and Characteristics

In this section we will present the different design decisions and features of the videogame. The development of *Conectado* takes into account the most relevant aspects highlighted by the design of serious games literature [26]:

- The conditions of use: how, when, where and by whom the video game will be used.
- The aesthetic has to make attractive the video game to the intended players.
- The players interactions, that is to define how the player will be able to interact with the game scenario or simulation of the environment.
- The simulation of the domain that provide an adequate representation of the environment and context in which it is developed and on which it is intended to teach and raise awareness.
- The detailed educational design of progression and problems the player will encounter.
- The pedagogical objectives should also have clear instructional objectives.

The videogame has been designed and developed considering its use in class supervised by a teacher. To simplify deployment in schools and decrease teacher resistance the game has low technical requirements and avoid complex game interactions or mechanics. This way the game can be deployed in a PC and played only using the mouse to interact with the characters and objects in the game.

Its gameplay time is intended to be a maximum of about 40 minutes so that it is perfectly possible to incorporate it in a one-hour class leaving time for a short discussion guided by the tutor or teacher about the common experience that the players live through the videogame. However, the optimal situation would be to have two hours to first complete the game and then maintain an active discussion with students where they can raise their concerns and points of view.

Figure 3. In-game social net. Friends screen. The user can accept or reject the requests.
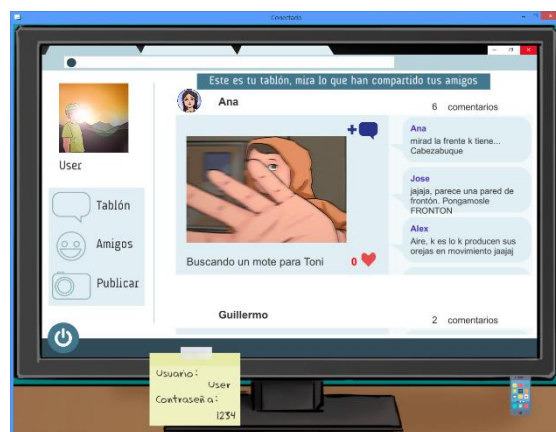

Figure 4. In-game social network. The user can comment on photos and read comments from other characters.
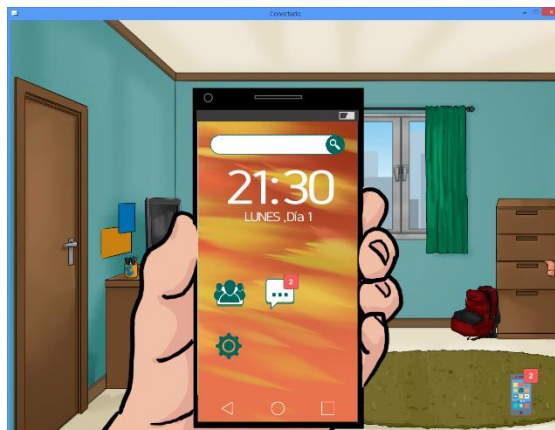
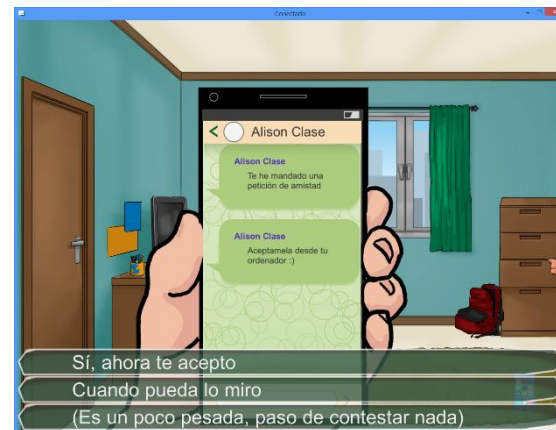

Figure 5. Player's smartphone: menu.

Figure 6. Smartphone displaying chat with a character. The player can choose between several responses.

To reduce the time needed for completing the game, some interactions within the social network (see Figure 3 and Figure 4) and the mobile phone (see Figure 5 and Figure 6) that appear in the game have been simplified. For example, not all the functionalities of a social network have been captured, such as likes or uploading publications, and it is not possible to comment on all the news uploaded by colleagues, only on some. Comments are also limited to choosing between several pre-generated responses. This is also the case for mobile conversations, as players cannot reply to all messages as they arrive; instead, responses are limited to certain moments, and require choosing from predefined sets of options (see Figure 6).

To design the story and the scenarios, the current literature on harassment and cyberbullying has been studied, identifying the main characteristics and their consequences to faithfully represent the most relevant aspects of the problem within the videogame. Studies indicate that the places where most bullying occurs in high schools are: the classroom, during breaks, in bathrooms, at exit time, and during lunch [27], [28]. Theft, insults, nicknames and fights are common. Also marginalizing peers and mocking them [29], [30]. The video game displays these common places and events, as it switches between its two main locations: the protagonists' house (see Figure 7 and Figure 8) and school; and within each, the places where bullying occurs: classrooms (see Figure 9), corridors (see Figure 10), bathrooms, and so on. Since bullying is a occurs over relatively large time-spans [25], [31], the game has been divided into 5 days, to better capture this characteristic.
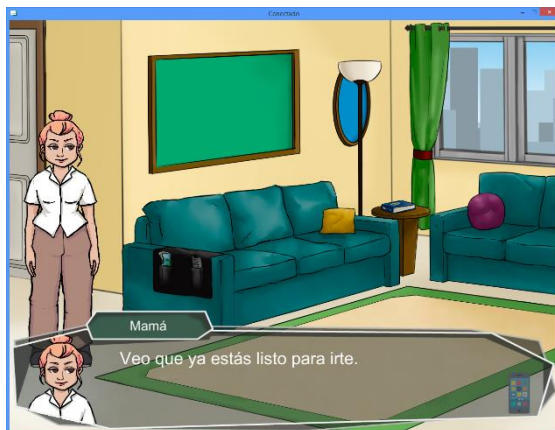

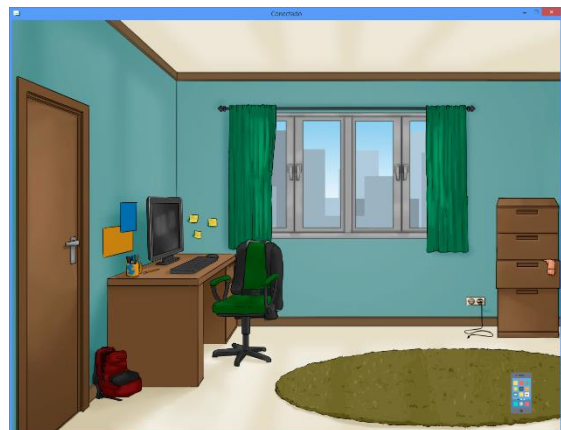*Figure 7. Dining room of the protagonist's house. A dialogue with the protagonist's mother is visible.*

Figure 8. Protagonist's room, PC (used to access the social network), smartphone and school backpack.
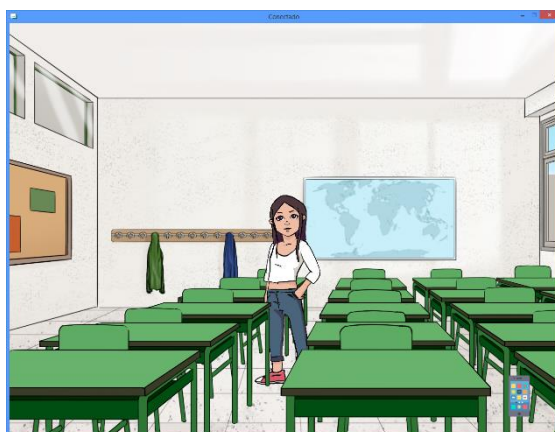

Figure 9. Classroom of the main character. Here it is Ana, an active follower of the bully.
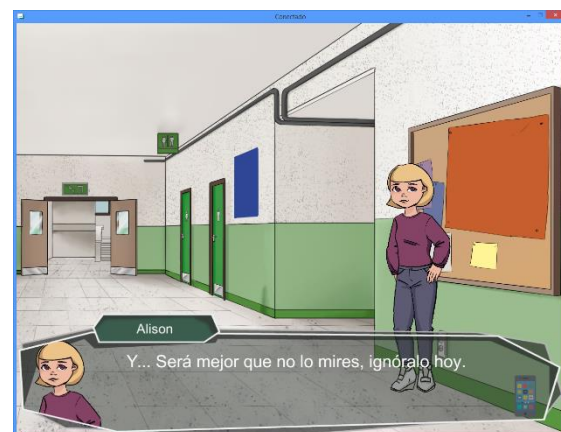

Figure 10. High school corridor, displaying an ongoing dialogue with Alison, a classmate.

Actions that are considered harassment and cyberbullying are transformed into different events that happen during the videogame, going from minor to major severity as the days go by. On the first day, the player begins to get to know his teammates and the main antagonist of the game appears: a stalker who will make life impossible for the player-protagonist. On the second day, the harassment itself begins, as the antagonist sticks a piece of gum on the player's chair which ends up on the player's behind, unleashing mockery of the player by several characters. At home, social exclusion begins through the mobile chat channel used by the class. On the third day, other characters ignore the player, and the stalker is shown blackmailing these characters into harassing the main character. Additionally, the protagonist is insulted on the social network, and has photos uploaded without permission. On the fourth day, the protagonist's mobile phone and password are stolen, supplanting their identity on social networks. Finally, on the fifth day, the characters mock the protagonist; which is then locked in the dark in the bathroom until found by the teacher.

In bullying and cyberbullying there are different profiles that are common to both problems depending on the role they play. The three main profiles are [6]:

- The bully, the person who carries out the bullying and/or cyberbullying actions.
- The victim, the person who is the target of the bullying and/or cyberbullying actions.
- The observers, of which there are usually several (especially in cases of cyberbullying, where they can be thousands). Observers can take a number of roles, such as defending the victim, or taking a passive spectator role where they apparently do not get involved but somehow consent to the ongoing harassment, or even as active followers that encourage and support the bully.
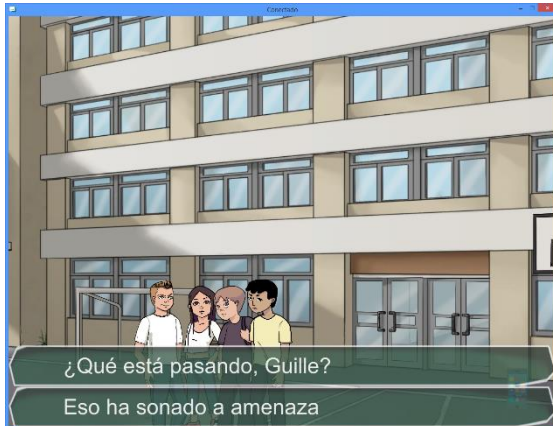

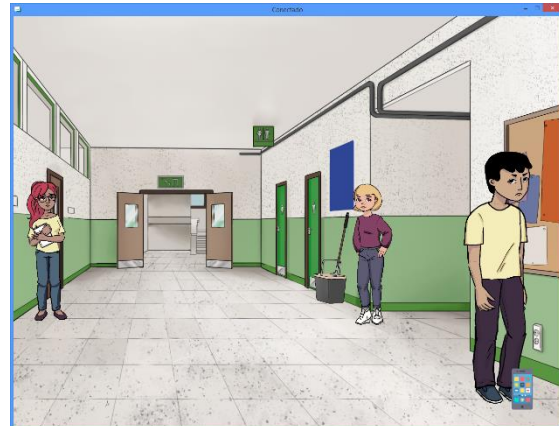Figure 11. From left to right: Alex (Bully), Ana, Jose and Guille.

Figure 12. From left to right: María, Alison, Guille.

These roles are represented through the 6 classmates with whom the protagonist can interact within the videogame. There is one main stalker, one active follower and one passive follower. There is also the figure of the observer and two characters who begin as passive defenders but who, as the story unfolds, become spectators and passive followers.

The story help to all possible roles of bullying, as it makes victims be aware of the problem and ask for help, observers understand the problem and help them and perpetrators become aware of the consequences of their actions and stop harassing. To do this, the game not only shows the reality through the situations described and the dialogues, throughout each of the first 4 days there is a nightmare in the form of a mini-game that the player has to complete, but this mini-game is impossible to win and there is no way to complete it satisfactorily. Each of the nightmares is related to the different events of each day. In this way, the player experiences impotence, anger, overwhelm and anxiety, feelings that bring the player closer to the victim's predicament.

In the first nightmare, the player must sit in a chair, but when the user is going to click on each of them, the chairs disappear, leaving the player with no place to sit (see Figure 13). In the second nightmare the player must protect several chairs from gum that falls from the top of the screen; and as time goes by inside the mini-game, gum starts to fall both more often and much faster; the mini-game does not end until the player has lost (see Figure 14). In the third nightmare the player must talk to 5 of the characters to try and win back their friendship, but all of them, no matter what dialogue options are chosen, ignore the player (see Figure 15). Finally, in the fourth nightmare, there is a retouched photo that the player must report, but when the photo is reported it is multiplied, taking up the entire screen and without allowing the player to delete it (see Figure 16).
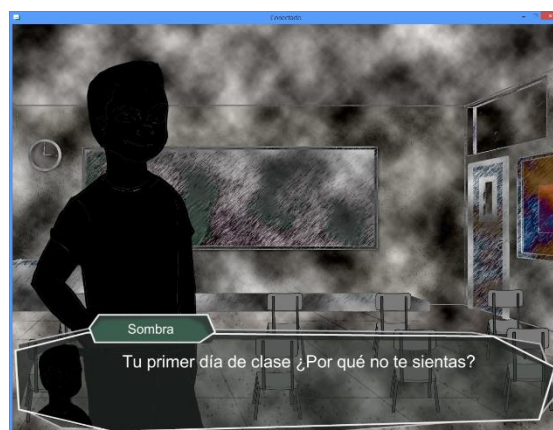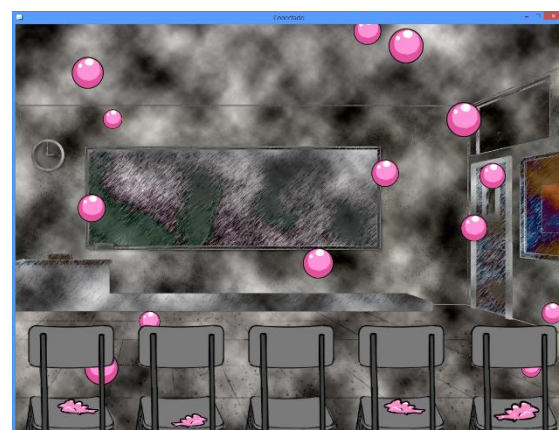

Figure 13. First nightmare
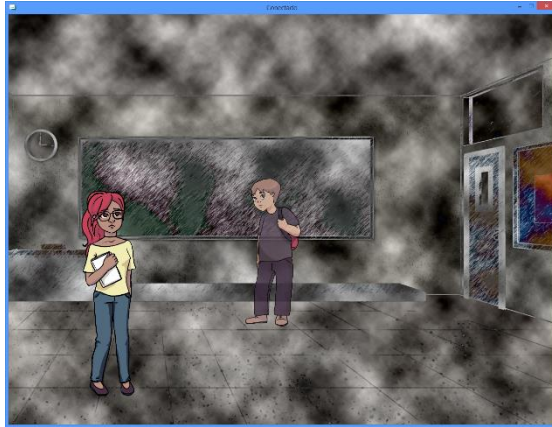

Figure 14. Second nightmare.
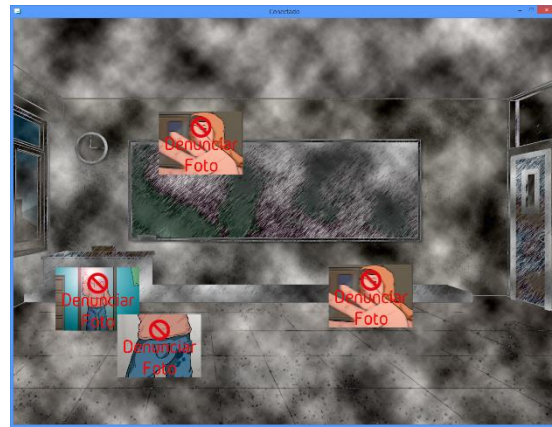
Figure 15. Third nightmare.

Figure 16. Fourth nightmare.

While there are in-game dialogs that allow the user to choose between multiple responses and change small parts of the story, none of these options allow for aggressive behaviour or will result in improving the ongoing bullying (see Figure 17 and Figure 18). It is only at the very end that the user has the opportunity of asking for help to actually end the problem. The dialogue options allow players to feel a sense of freedom that makes them think that in-game actions can allow them to solve the problem and get along with their in-game peers. This is by design: the game is intended for users to experience the 5 days of harassment within the videogame, and make them reflect on the fact that one cannot always address such a serious problem as bullying and cyberbullying without outside help. Another feature of the game is the importance of communication with parents [9]: players can choose to explain what happened during the day to their in-game parents at the end of the day, affecting the end of the game. Also, at the end, players can choose whether to tell the teacher what has happened, if parents had not already contacted the teacher.

All the features described help to represent the problem of bullying and cyberbullying, as well as their characteristics and consequences, in a quite realistic way; and, most importantly, with a high level of engagement. This is useful also for teachers, who can later carry out the final reflection and discussion with the students on what they have experienced during the play session.
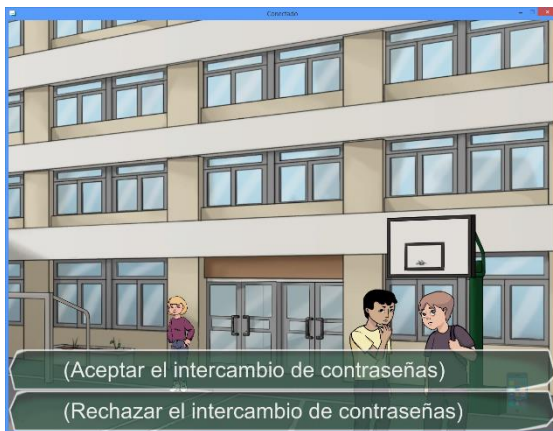

Figure 17. Example of a choice that affects the history. The player can share their passwords voluntarily or not.

Figure 18. Example of a choice that does not affect the history of the game. Alison asks the player if he can help her find her earring.

4. Experiments

The effectiveness of the video game *Conectado* has been experimentally validated in three different schools, where a total of 257 secondary and first year high school students have participated. In addition to completing the game, they took a previous and a subsequent test on harassment and cyberbullying to measure the impact of the game on their perception of these issues. This pre-test, gameplay, post-test experiment is a common experimental design when validating the effectiveness of serious games [32]. All the information for each player was collected using pseudo-anonymous tokens so no personal information was stored and data cannot be traced back to specific students. All the data of the player's interactions with the game are collected using eXperience API (xAPI) format, in order to analyse how each player plays, how long it takes to complete the games and to check if they get stuck in any scene [33]. The collection of these data together with the questionnaires is important as it allows the video game and its effect on the players to be validated. In this way we can apply Learning Analytics on the data [34], [35].

Both the initial and subsequent questionnaires have 18 common Likert 1-7 questions on harassment and cyberbullying based on several questionnaires to measure bullying and cyberbullying in schools. These questions are the ones used

to measure the effect of the game on the students, the players must say if they are more or less in agreement with the statements of the form:

- X action is bullying.
- Y action is cyberbullying.

In addition to this, the initial questionnaire enquires about the age and gender of the players. The final questionnaire has a separate Cyberbullying Test to assess the level of cyberbullying within each class and it consists of 45 items: 15 to assess the level of witness, 15 to assess the level of bully and 15 to assess the level of victimization. It also includes 10 additional questions about the use of social networks and 3 free text questions to find out what they think about the game, what they think they have learned and if they feel identified with any of the characters that appear in the game.

5. Results

The results obtained in the experiments with 257 students using the videogame have been very positive, proving its effectiveness as with promising results as a tool to be used by teachers. As mentioned in the previous section, their perception of harassment and cyberbullying was evaluated through 18 questions evaluated from 1 (low perception) to 7 (high perception) before and after the students played the game.

The results show an increase of 0.66 points over 7, where 5.72 points were obtained in the initial questionnaire and 6.38 points in the final questionnaire, after having applied the video game (see Figure 19). This increase is statistically significant, as measured with a paired Wilcoxon test ($p < 0.001$). This increase is particularly noteworthy since the three centres had previously carried out one or more awareness-raising actions on bullying (e.g. with the collaboration of the police). The effect is also significant for each gender, and considering each school separately [36].

Through the free text questions in the post-test, it was identified that several players felt identified with some of the characters that appear in the game. This indicates that the characters and situations that appear in the game are realistic enough for players to feel identified with them. A few players stated that they felt identified with the main character of the game which could be a symptom that these players may be suffering from bullying.
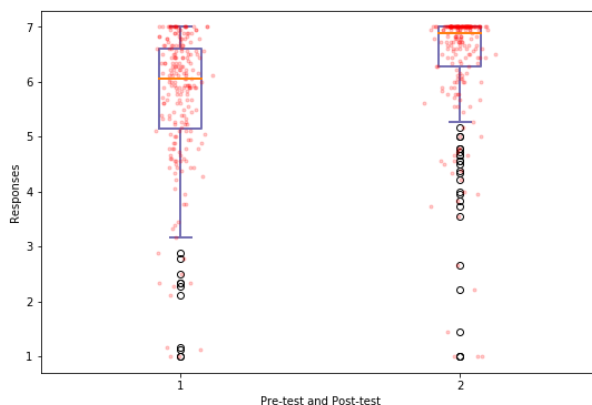

Figure 19. Result of the pretest vs. the postest

From the free questions we also have obtained that most of the players liked the game (65.6%) while only 2.2% answered that they did not like it. In addition, many of them feel that it has helped them to learn things (63.2%) such as the importance of asking for help, to put themselves in the victim's shoes and that some acts such as ignoring someone or insulting them can have more consequences than they think if they are not isolated events. Only 10.3% answered that they had not learnt anything. From those that left non-empty answers, 9.2% mentioned already knowing about the problem and how to approach [37].

6. Conclusions and future work

The serious game *Conectado* has been designed and developed aiming to contribute in the fight against one of the most common and difficult social problems for young people nowadays: cyberbullying. With the analysis of the data gathered in experiments in schools, the game has proven to be an effective tool to raise awareness against bullying and cyberbullying for its target players (12-17 years old). The use of the game in class was also well-received by players who are familiar with these tools and embrace having more engaging learning materials in class.

The project is currently in the second stage of validation in which validation with teachers is sought as a tool to be used in the classroom. We are conducting an experiment in schools that want to participate in a two-hour session with teachers. In this session, a researcher from the e-UCM group will train teachers in the use of video games. He will explain the game and the questionnaires that the students must do, he will explain the video game and its characteristics and will have the assistants play it and make several questionnaires so that they have the vision of the student. It will

also pass a questionnaire focused on teachers to obtain their views and how they see the use of the video game as a tool as well as the possible improvements they see. With these experiments, the aim is to improve the video game, add new features and create a teaching guide for its use with the help of professionals who test the game. This validation phase is expected to be completed with 100 teachers from different schools of different types and in different regions. In addition, we are also considering the evaluation with Education Science students to see if the future teachers' perception of the use of the games differs to some extent from that of the current teachers.

Finally, and in parallel with this validation phase with teachers, a final evaluation is being carried out with students in which the play sessions and the subsequent discussion will already be led by teachers (and not by researchers) and in which at least 1000 students are being reached. We are now on the process of formally analyse the results of this second validation phase.

Acknowledgment

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