



ONLINE DIGITAL GAMES AND EDUCATION FOR SUSTAINABLE DEVELOPMENT: A CONTROVERSIAL RELATIONSHIP?

Antonia Boniati, Georgia Liarakou, University of the Aegean, Costas Gavrilakis, University of Ioannina, Costas Tsolakidis, University of the Aegean, Greece

Introduction

Education for Sustainable Development (ESD) is linked not only to institutionalized form of education but also to informal settings, offering students the opportunity to come into contact with various sustainability issues and develop relevant knowledge, attitudes and values. It is worth mentioning that informal learning arises from the activities and interests of a person, namely not only through the use of printed material, the Internet and a computer, but also through every-day practices such as games (Sefton-Green, 2013). Since the early stages of ESD, games have been proposed as an alternative instructional method (Taylor, 1983). Computer and video games attract increasing interest among ESD educators due to their potential to support learning, especially among adolescents. Knol and de Vries (2011) argue that this particular age group is proficient at multitasking, prefers visual information over textual, is cross-media oriented, and is highly active on social network sites.

The success of digital games is an open research field in literature (Boyle, Connolly, Hailey & Boyle, 2012). Dowell (2007) argues that digital games are compelling because they reflect essential aspects of our cognition and culture (i.e. the ability to respond rapidly to uncertain visual stimuli, use of stories). The effects that digital games may have on users and especially on children have been largely explored. Most research on online web-based games concerns serious games rather than entertainment games. Serious games are video games with an educational nature, for use in formal educational settings as well as at home (Annetta, Minogue, Holmes & Cheng, 2009).

In the last years the number of ESD serious games has grown exponentially (Liarakou, Sakka, Gavrilakis & Tsolakidis, 2011). Several studies provide evidence that serious games can effectively contribute to awareness rising, concept construction and the development of positive attitudes towards sustainability issues (Liarakou, Daskolia & Papanikolaou, 2012; Knol & de Vries, 2011). However entertainment games have larger audiences than serious games because they offer the opportunity to the player to move freely, to work with others and develop his/her creativity of (Boyle et al., 2012). Despite the fact that these games are entertaining, this does not preclude the fact that they offer effective learning experiences

(Boyle et al., 2012). As Dowell (2007) argues learning cannot be not delimited by the bracketing of games into those designed for pleasure and those designed for education.

So, despite the previous negative review regarding the use of digital games and their impact on children, research today argues that these games may constitute useful pedagogical tools (Durkin & Barber, 2002). In fact the perspective taken on non-serious games has been invariably of negative learning while the possibility that positive learning may be acquired has received negligible attention (Dowell, 2007). Research has shown that users believe that these games broadcast nonviolent messages and give way to eliminate their negative emotions (Dyck, Pinelle, Brown & Gutwin, 2003). In addition they learn to interact with other players (Dyck, Pinelle et al., 2003); they develop analytical and spatial competences and strategic skills (Mitchell & Savill-Smith, 2004); they have robust links with their families and they are also involved, more than other children, in free activities (Connolly, Boyle, MacArthur, Hainey & Boyle, 2012). It is worth mentioning that entertainment games broadcast social messages and health messages to players, such as those against adolescent obesity (Altamimi & Skinner, 2012).

Therefore, since the engagement of children with online entertainment games is one of their most popular activities, it is important to explore what children learn with these games and especially what do they learn concerning sustainability. In this study we investigated what kind of messages children of high school perceive when playing three of the most popular online games and whether these messages facilitate or prevent sustainability. In particular, how do they perceive and interpret such messages? Which kind of knowledge, attitudes and values related to sustainability children develop through these messages and to what extent they influence their real lives?

Methodology

A qualitative research approach was used to explore the messages perceived by the respondents. The selection of a qualitative approach is based on: (a) the shortage of relevant studies and data that indicates a rather unexplored research field and (b) the need to dig in depth the perceptions of a rather small number of users (Cohen, Manion & Morisson, 2007). Although this choice prevent the generalization of the findings, it allows the emergence of every possible perception and interpretation made by participants and later on the preliminary formation of basic categories which would guide future research.

The study was developed into three phases. At the beginning 54 high school students (13-15 years old) of the island of Rhodes in Greece were provided with a brief questionnaire in order to report which online games they prefer. In the second phase among the most popular games, we chose the three most complex strategy games, namely the Call of Duty, the Minecraft and the League of Legends, to be further investigated. These games were carefully explored, through a long empirical study, to clarify possible messages concerning ESD, and to prepare an interview guide. The main questions of the interview guide were related to the three dimensions of sustainability (i.e. environment, economy and society). In the third phase

15 high school students were selected. A purposive sampling approach was used (Cohen et al, 2007) so as all of them to be experienced on the three games. The sample consisted of 3 children of the 1st class, 5 of the 2nd and 7 of the 3rd class of high school. Individual interviews were conducted and qualitative content analysis was applied to interpret the data.

Results

In the next sections the results of the analysis of the three games are presented.

Call of Duty (CoD)

The game has many different versions, with different scenarios; all of them constitute representations of a war between the US and the Russian army. Often players are also confronted with terrorists who kill civilians. The player aims at killing the opponents and simultaneously avoiding death. Usually the game consists of 5-member teams. It is very important that players use weapons of the latest technology. The game's graphics are of high resolution and full of realistic elements (people's representations, cities, mountains, camps etc.).

The messages emerged from the analysis of this game were classified into two categories: social and environmental. Furthermore the emotions experienced by the researchers were compared to those experienced by the respondents.

With regard to social messages, it seems that although children obey to the rules of the game, they don't lose their ability to recognize whether the elements projected are realistic and socially acceptable or not. For example, occasionally the game requires players not to kill civilians, a rule that is acceptable from every child both in the game and real life:

"A: ...you should kill enemies rather than people who do not blame you for nothing."

The main purpose of this game is that players should kill as many opponents as possible. Although children enjoy taking other players' characters life in order to win, they also realize that this is unacceptable in real life. Furthermore, only one of them would be willing to go to war, and this is because of patriotism. In addition, the game presents the Americans as heroes and the Russians as evildoers. Considering that most respondents understand that this is not true in reality, the game cannot predispose them positively or negatively:

"A: I do not know who the good guys are and who the baddies are. Nobody is good or bad. They are just rivals."

It is also important that the game encourages teamwork. In this study it was reported that the most players collaborate with their teammates. The reasons vary, but almost all are designed to win the game:

"A: I prefer to win and this is done with teamwork."

On the other hand, in some cases the children come in contact with concepts which they are not familiar, so they cannot judge whether the game presents them in a right way or not. More specifically, although the concept of terrorism is used within the game, it isn't associated with its proper meaning. As a result several respondents cannot describe with certainty what a terrorist is and if terrorists are realistically presented in the game:

“Q: What do you think of terrorists in real life? Do they have any relation with those in the game?”

“A: I'm not sure. However I think there is a difference. It is not the same in reality.”

Sometimes the player is confronted with situations in the game which pose some kind of ethical dilemmas. When they are faced with such questions, most of the children decide according to the interest of the group, and in particular the salvation of friends in the game.

Although the scenery of the game is very realistic, the environmental processes seem to be unrealistic. For example, although players use high tech weapons, the game's environment is not affected or damaged. Most of the respondents were able to perceive that this doesn't happen in reality:

“A: The nuclear bombs for example, destroy the environment and infect people.”

Finally feelings experienced by researchers in comparison to those of children are quite different. While the researchers felt mostly negative emotions, children were more positive. It is noteworthy that when children were asked whether they agree that the game (rated by the ESRB) should be played by youths over 18 years, all of them disagreed:

“...no one needs to be 18 years old to see some things that can be seen when living in an ugly area or in the street ...”

League of Legends (LoL)

Players in this game are called Summoners and fight within the Fields of Justice, organized into five-member groups. Their aim is to destroy the opposing team's nexus (energy source). At the beginning, each player has to select its champion (appearance and features) among 116 different ones. Players are provided with or have to find and acquire several tools (Runes, Masteries and Spells) that offer different advantages and support. In the battle, summoners can buy various items being at the shop near the summoner platform with the gold gathered during the battle. The game's graphics are of high quality but they don't depict human figures or real locations (a fantastic world consisted of forests, enchanted cities, lakes, jungle etc.).

The messages emerged from the analysis of this game were classified into two categories, social and economic messages and, once again, emotions were also reported.

The respondents show a particular interest for social messages put forward by the game. First of all, children reported collaboration once again, with more emphasis than in the CoD. However, collaboration is not considered only as a way to win. The children also prefer to play with their friends, rather than with strangers, for safety and socialization reasons:

“A: If you have a team to play, the game is not just a game; it becomes a game of collaboration. You win only through collaboration.”

“A: Due to this game I have met some children from the 1st, the 2nd and the 3rd Lyceum class of my school. They talked to me when they saw that I was playing well.”

In parallel, the concept of solidarity is also promoted. Often in five-member groups, there are beginners. Although not playing very well, the other players do not leave them alone and do not insult them for their mistakes:

“A: Anyway, I will support him unless he purposely doing bad. And I say to him ‘never mind, do that, try not to play so aggressively’ and so on. The game’s rules also stress this tip, i.e. if you help your partner he will probably play 20% better, so I try to do so.”

Players regard the helping of weaker players as very important; so they argue that they would do so in real life.

There are also some servants programmed by the system to move forward from the player in order to protect and actually to be sacrificed for him. In terms of real life, most respondents believe that there are some people with fewer rights than others, something that they are totally opposed:

“Q: How do you feel about this?”

A: Shame for mankind! Something should be done about this. Now I do not know exactly where it occurs but...”

As in the CoD, players must end the lives of other players in order to win. Although in this way they progress in the game, some children would prefer to imprison their opponents rather than kill them. Others believe that in this way the game would not have fun, but certainly in real life all would prefer a guilty person to be imprisoned rather than executed. Additionally, the players develop a sense of responsibility as they cannot leave their teammates in the middle of a battle without a good reason because they will be penalized with exclusion from the game for a few days:

The economic messages disseminating through this game relate to purchases that children can make using either gold, gathered during a battle, or real money. It was observed that some children consume more items than needed, since the game prompts them to spend their gold. The children stated that they also have consumer trends in real life:

“A: I seek more to spend my gold. In this way you try to get better.”

“A: You buy what you want, but always you want something more; this is in human’s nature; and you say okay, I have the financial ability so let’s get this and I’ll find something to do with it!”

Players can buy costumes with real money to change their appearance. At this point, respondents also showed signs of consumerism since they gave real money to buy such costumes:

“A: You like it and you show around what you got; but it’s also nice because you see that your champion has a visual difference.”

In the same manner, in their real life children believe that the appearance also plays an important role:

“A: Yes, in real life I think it’s important because dressing somehow shows to the others what your character is. I think it is nice to be dressed in a beautiful way!”

What is striking here is that none of the respondents would like spend real money to buy items that would help them to win the game. According to them, it would be unfair for children with limited economic power, and it would be boring for someone to win because of money and not due to his/her competence:

The feelings generated in children, are close to those experienced by the researchers. There are feelings of anger, anxiety, and excitement. For instance, a child said that it takes pleasure because through this game it can help his friends, an opportunity not given in real life:

Minecraft

In this game players have to place and break blocks. For this reason it is called ‘the electronic Lego’. Players can work together to create wonderful and imaginative things. The game has two modes. In the first (Creative), the player has the ability to create things while in the second (Survival) faces monsters and uses what he/she has constructed during the fight. Instead of different levels this game switches between day and night. The graphics of the game are quite low but its environment is very peaceful (forests, a green valley with flowers and many animals, the ocean etc.), at least during the day.

The data gathered from the third game were divided into three categories; social, economic and environmental messages. Knowledge acquired concerning natural resources and the feelings of players were also examined.

Concerning social messages, collaboration aiming at winning the game and communication with other players emerged once again. However, in this game collaboration is also associated with creation:

“A: I prefer to work collectively because together with others we can create more beautiful and bigger things.”

Players create a community based on their own imagination. This is the reason why players develop creative thinking and autonomy during playing. All players stated that their constructions were based on improvisations. However, sometimes children are likely to see something in real life or on YouTube that catches their attention:

“A: Sometimes I make something that I saw on the Internet and want to see if I can manage to make it by myself.”

Q: Do you try to construct exactly the same?

A: Not the same but similar. The main frame can be the same.”

On the other hand, during the nights in the game (the daylight lasts 20 minutes in total) there are some monsters that attack the players and try to kill them. In these cases, the players have to kill for self-defense. This process makes the players even more creative as they try to protect themselves. Among all these creative and constructive procedures, there are also some which are likely to positively influence children in real life. For example, players can create their own farm and cultivate plants, fish, breed animals etc. It seems, however, that most children understand that such procedures are not as simple in real life as they are presented in the game:

“Q: Would you like to get involved in some of these economic sectors?

A: No. Because in real life the time needed isn't the same and sometimes you may not harvest the crop, while in the game you always manage to.”

Furthermore, the critical issue of consumerism has also been emerged. In order for the players to create their constructs they have to gather raw materials found in the game environment. Whenever most of the players find a potentially useful material, gather it without a second thought, even if it isn't needed. Some children realized that players show an improvident consumerist behaviour in the game, while all of them believe that consumerism should not exist in real life:

“A: Yes we should not over consume without a reason. In Rhodes, let's say, we have many unfinished houses. People have made the plan, the columns, the frame but the buildings have never been finished and they remain incomplete for many years ... It's a shame; these constructs spoil the image of Rhodes and many raw materials have been consumed for nothing.”

However consumerism doesn't affect the game's environment. No player observes any particular environmental damage, despite the profligate use of natural resources. Nevertheless most respondents stated that such damages are evident in the real environment. They believe that natural resources are actually limited:

“A: In reality there are limitations. We cannot draw raw materials continuously. For example, considering the quantities we draw, the oil can be exhausted. However in Minecraft the world is so large that there is an infinite amount of things.”

This game also provides a lot of information on various topics that children may not acquire during their formal education. This information, however, may not correspond exactly to reality, in terms of time frames, representations etc. No child was able to describe precisely, for example, the extraction process of diamond, the glass production process or what exactly a sheep can provide. They learned however that diamonds, in comparison to other minerals, have the most difficult mining process, glass is produced by sand, a sheep provides wool, meat and milk.

The emotions reported by the researchers and those expressed by the children were quite similar. Both positive and negative emotions have been emerged. While the construction caused satisfaction, the battle against monsters provoked stress, anger but also pride for the victory.

Discussion

Considering that sustainable development consists of three interrelated dimensions, namely environmental protection, economic efficiency and social justice, every kind of educational process that promotes or deals with messages and values consistent with these dimensions potentially contributes to the vision of ESD. Online entertainment games constitute a noteworthy kind of informal education since their pedagogical role has been increasingly recognized (Durkin & Barber, 2002). The present study demonstrated that three of the most popular such games involve indeed social, environmental and economic messages. Even if the perception and the interpretation of such messages differ among children, they should not be underestimated for their role on ESD.

It is obvious that the majority of the messages reported are associated more with the social rather than with the environmental and economic dimensions, even if some of them encompass more than one dimension. Teamwork, collaboration and solidarity are among the most evident messages/values promoted through different ways. Within this context, interaction, as a basic feature of online edutainment games (Prensky, 2001), is evident across the three games, since the majority of players prefer to play with friends. These games promote socialization as well as mutual support, even with beginners, aiming at achieving a common goal. Such features and values are expected to guide children's attitudes also in real life. The values of life and equity also emerge implicitly or explicitly throughout these games. Children seem to be able to distinguish some negative perceptions, tasks and behaviours required to win a game from what is moral and acceptable in real life (e.g. racist perceptions, killing people, having servants). At the same time players seem to become creative, imaginative, autonomous and able to deal with complex situations themselves.

The unreal representations of these games might confuse users with regard to environmental conditions and potential degradation. In two out of three games (CoD and Minecraft) the environmental dimension is quite clear. However, although the behaviour of players in the game would cause serious damages on the natural or human environment, in the unreal setting of the game everything seems to be unharmed and unlimited. As with many games providing players with many “lives”, here the environment seems to be regenerated. Fortunately in this study users realize that the real environment is more fragile.

Moreover, such games, and especially the Minecraft, help children to come in contact with economic sectors which are essential for sustainable development such as farming, agriculture and extraction of natural resources. Although the knowledge provided is shallow, some basic aspects are useful, especially for children living in urban areas.

However, the dominant message emerging from LoL and Minecraft, that corresponds both to economic and environmental dimensions, relates to consumerism. Both of these games do not prevent players from acquiring a wealth of resources, materials and tools even if they are not needed. Without setting limits (e.g. economic, natural, moral), these games indirectly promote consumerism. In terms of appearance, children seem to adopt consumerist attitudes and accept that dressing is important in real life although they consider that giving real money to buy costumes is unfair in the game (LoL). Additionally, it is very interesting to note that children seem to be sensitive with regard to over consuming of some materials, a practice that degrades environmental aesthetics and exploits natural resources (Minecraft). However, this is due to personal experiences of their town. We could assume that both games and real life experiences influence in conjunction children’s perceptions, values and attitudes. It seems that both real and virtual experiences influence their decisions, and sometimes probably in a contradictory way.

In conclusion, we consider that, in the light of a constructivist approach, online entertainment games constitute a significant link of an informal education chain which should be taken into consideration. The games examined through this preliminary study have various messages – positive or negative – linked with all dimensions of sustainable development. That is why the exploration of such games in the context of ESD should be further promoted. The present study focused on some basic ESD aspects, namely the content and messages promoted, of three popular games. A more detailed study, focusing both on pedagogical approaches and the interaction of game’s and real experiences of users would reveal further useful aspects of the pedagogical role of these games in relation to ESD. Research should also involve quantitative approaches, by examining more games and involving a broad sample of children so that findings can be generalized. The participants of this study were children from middle class families. Future research should also involve children from families having a wide range of social features so that useful comparisons can emerge.

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