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Serious games in education

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Abstract

This paper describes some of the tensions around serious games in education by considering how serious games might be designed for learners who may not be especially motivated to play them. Beginning with a narrative that sets out where serious games position within educational settings, with a focus on high school and college, the paper describes two elements that are considered essential for serious games for this demographic – fun and cool.

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1. Introduction

Education has had many changes thrust upon it over the years. Historically, education has been considered in formal and informal environments with the school being the formal setting for the education of children. In the main, schools were initially funded by religious institutions and the teachers were learned scholars who sought to instill into children some moral values, some 'learning' (of writing and numbers), and some life skills including discipline and cleanliness. Influenced by the philosophies of their times, schools adopted practices that were considered beneficial to their main task which was to instruct the next generation to ensure they would be worthy upstanding citizens. Certain aspects of school life were deeply seated in the beliefs around children that proposed dominant images of children as being the innocent child, 'tabula rasa' (a blank slate waiting to be tutored), the evil child needing correction, and the child as a miniature adult who is essentially just a small adult rather than a different being [1], [2], [3]. The school system built up around these aspects with timetables and timed activities being used to 'correct', a focus on adult values of quiet working and a focus 'to train for adulthood' with a 'push' system of teaching where there was an emphasis on rote instruction.

Playfulness came into education at a later date. There are two main theoretical paradigms around play and both are relevant to a discussion around serious games for education. Modern theories aim to mainly describe the benefits of play, and classical theories tend to focus on the reasons for play. The classical theories include explanations for children needing play like 'surplus energy', [4] and 'restoration' [4]. Play as one preparation for adulthood [5, 6] is also considered important for children to develop.

Within education, there was something of a revolution when computers came into the classroom and when playfulness could then be associated with gaming, and specifically 'videogaming'. Playfulness could then be designed in such a way that playing could be packaged as learning. In his explanation of how digital gaming has pervaded classrooms, Egenfeldt-Nelson [7] describes the transition from 'edutainment,' which was where computers were mainly used in game like instances to provide drill and repetition, through 'learner-centred' products where the emphasis was on personalisation and individually adapting systems, to the most recent 'socially constructed' games where learning is situated in a context. Play has always had a close relationship with learning and is certainly essential to learning as far as young children are concerned, but the association of play with learning as learners become older is much less understood and is relatively understudied. In particular, the design of game based and play based

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environments for older teenagers, either in school or college, is seldom critiqued.

This article, therefore, presents a glimpse into this current design space: the space where serious games are being considered as useful products for older teenagers, and considers how these games might be designed. Two aspects are considered as essential, cool and fun, and these are each considered within the context of designing them into serious game products.

2. The formal educational context for older teenagers

For this discussion, the older teenager (hitherto called the teenager), is considered to be the teenager who is post-puberty but still under the care of, and manly needing to be supported by, his or her parents. He or she is still in formal education which would typically be the later years of compulsory 11 – 18 year old education or the early years of University/ College. He or she would most probably be aged between 15 and 20, would be engaging in several 'adult' activities around smoking, drinking, sexual experimentation, drug experimentation, driving and some occasional anti-social behaviour. As a child in terms of his/her autonomy and as an adult in terms of his/her mind set and physical body – this older teenager is an especially interesting person to design for.

Teenagers are huge adopters of video games. They are prime targets for games designers who seek to develop products especially for this age group. Very popular games include sports games (Fifa), simulation worlds (Sims), exploration worlds (WoW) and building games (Minecraft). This population is known to spend a significant amount of time playing video games alone or with friends both co-located and across the Internet. They play games on different consoles and using different platforms with most teenagers reporting game playing on phones, PCs and games consoles (http://www.isfe.eu/).

In school or college, teenagers are typically expected to merge their online and real worlds around learning management systems that have become prevalent across most educational institutions throughout Europe. Here the teenager will access the learning management system (or content management system – CMS) on a smartphone, PC or tablet and will find homework tasks and learning materials available as digital products with homework being sometimes submitted through a digital portal and sometimes marked in that same way. In class, despite initiatives around computers and laptops in schools, the teenager is unlikely to spend a lot of time doing active learning on an electronic device – there may be times when he or she is at a computer, maybe searching for information or, less commonly, using an interactive product, but much of the teenagers formal educational space is still quite technology lean [8].

In bringing serious games into the formal educational system, indeed in bringing any video games or their ilk, into the educational system there is a consequence, which is that these two quite different worlds (playfulness and learning) come together to some extent. The designers of education have used this coming together as a reason to bring games technology into classrooms citing that as children can already play so this is a beneficial and sensible move. This simplifies the relationship as it is the case that just because a child, and in our case a teenager, wants to play at home and can play at home, does not dictate that the child or teenager will want to play at school in the same way [9]. The context is quite different.

With older teenagers there is documented evidence to suggest that they do not want their schools to be like their homes, neither do they want their homes to be like their 'hang out' places [10]. The teenager is an adaptive creature who recreates himself/ herself to fit in with the social context at hand. The assumption that activities can be and should be carried from one context to another is dangerous. Teenagers are known to need boundaries to help them make sense of their selves. Their risk taking behaviour especially needs boundaries and rules as they develop adult capabilities. If these boundaries become elastic, it can bring uncertainty, confusion and conflict [11].

So, what is the way forward for educators seeking to bring something of the game world into the classroom? Can this be done in an effective way so that teenagers may see this as a reasonable and sensible addition to the learning space, and so that they don't simply see serious games in the classroom as half hopeless attempts by educators to 'muscle in badly' on their attraction to game worlds and games. The remainder of this paper provokes two concepts for consideration as requirements for the design of serious games for education for this candidate group. These concepts are Fun and Cool.

3. Fun with serious games

The definition of a serious game can be attributed to several sources but is generally thought to have been introduced some time before games were digital. In his book 'Serious Games,' Clark Abt wrote as follows: "*we are concerned with serious games in the sense that these games have an explicit and carefully thought out educational purpose and are not intended to be played solely for amusement*" [12, p.9]. This definition, and the claim that games are not meant 'solely' for amusement delineates serious games as being 'not all that fun'. Indeed, one can ask the question 'how can a game about something that is inherently serious be inherently fun?'. Later, the term 'serious games' was applied to digital games with Ben Sawyer in 2003, being considered as the first who made this connection [13]. In 2006, the definition of serious games was extended to include education, training and informing [14]. Whilst education is included here, it is generally considered that only education in the wider sense is really a serious games composite. Initially serious games, both digital and non-digital, were used to train people for tasks associated with certain jobs. Examples included the training of service personnel and the training of people in marketing. In these cases there was often no need to make the games especially engaging as the would-be players were

expected to play, as these were job requirements. Where the would-be players are teenagers in education, the motivation for play is reduced and the designers have to work hard to make the games attractive. For the teenage audience, serious games tend to have big aims as, for example, in serious games for health – they are often trying to change teenagers' behaviour and prepare them for the adult world. This push to change is not lost on the teenage players.

In our own work we engaged in the design of a serious game for teenagers who had been removed from mainstream schooling due to their difficulties in interacting with their peers and their teachers in appropriate ways [15]. Put simply, these were students who had been asked to leave at least two schools for having been found to be too disruptive. The aim of the game being designed was to change these teenagers' behaviours in order to enable them to co-exist with other teenagers and adults without conflict. The game was designed to assist them in understanding their emotional behaviour and it used psychological methods associated with emotional intelligence. A screen shot from the resulting game is shown in Figure 1.

Figure 1. The game interface

In designing this game, it was considered that for the game to be successful it had to be fun to play. Fun was not something especially associated with serious game design, in most cases it was the design of the game play and the game mechanisms that took centre stage. For teenagers, the game experience (GX) [16] was mainly associated with fun constructed from emotional and cognitive player responses. To gather ideas for the fun design of the game the developers took the unusual step of directly working with the teenagers who would eventually play the game. This was a risky approach to take as the game was intended to 'change' the players and thus was coming from the standpoint of considering that the player was in need of change viz. was broken in some way.

The challenge was to engage with these teenagers in the design of their own serious game. A participatory design approach was taken [17], with teenagers being invited to join in a series of design activities with the research team. Each activity engaged with six to eight teenagers and took place in the school hall. Activities were designed to tease out playful ideas from the teenagers whilst not placing too much attention to the core 'requirement' of the game. One activity was to gather content for the dialogue around conflict. For this activity several high profile 'pairs' – Charles and Diana, Miss Piggy and Kermit, Posh Spice and David – were brought to the table, and arguments in their relationships were talked about. By placing themselves into these roles the teenagers were able to playfully and expressively contribute dialogue to the game that was relevant to them. A second activity brought conflict a bit closer to the teenagers' lives by encouraging them to model, using plasticine, conflict situations that they had encountered or could imagine encountering. In creating simple models and using repeated single frame shots on cameras to animate the sequences of events, the teenagers were able to express how a conflict situation would typically begin and end, and used speech bubbles to add conversation which was again, in their own voice (see Figure 2). A third activity was designed to capture some fun images for mood faces. Teenagers were given biscuits and icing pens and asked to draw faces representing different feelings. These were later incorporated in the game.

Figure 2. Design ideas crafted in plasticine.

The aim, in this design activity, was to design fun into a game that was inherently serious. The serious aspect of the game was incorporated through the narrative and the activities and the fun aspects were added on with the imagery and the designed features. The teenagers played the game later and were seen to remark that they recognised some of the elements as items they had earlier contributed.

This example shows how a game could be made more appealing for a group of players by having them contribute elements to the design. However, this is seldom sensible and is often not possible, therefore, it is not enough on its own. Extracting from this one case, however, some of the fun in the end game was the edgy elements included (like the teenagers buying gin from the local shop), and the extreme representations of certain moods and conversations. It is possible that these would not have been included had the design only been done by adults as they would have typically been less close to the boundaries where these teenagers belong. In designing fun into games for teenagers

it seems reasonable to allow some risky edgy input, and some exaggeration. The fun in a serious game for a group of teenagers may only be there when they can put themselves squarely into it, adding their voices, their characterizations and their own socially constructed humour.

4. Cool game design

A second serious game design activity required the design of an energy game for teenagers that would change the way they used domestic energy in the home. Whilst not situated in education, this application was to be used by this same demographic of teenagers and is included here as it explores the need for teenage products to meet the 'cool' requirement. In contrast to the emotional intelligence game, this game was intended for a very large audience and so designing only with those who might use it was not considered feasible. In this case it was necessary to design something that would be acceptable and played by a large number of teenagers. The approach taken here was to consider 'How to design for teenagers?,' and specifically, 'How to design a serious game for teenagers that they will actually play'."

Studying literature on how to design for teenagers revealed very few studies. Guidelines for design tended to be very general, e.g.[18], and did not consider teenagers as a group worthy of a different set of heuristics. In designing in this space we took on designing for 'cool' which is, in their own words, something that is 'owned' by the teenage community [19]. Cool is described as being both socially ascribed [20], but also product centred, where aspects of a product's nature, such as 'authenticity' [21], are necessary components. Within 'cool' communities such as a teenager's peer group, it was assumed that certain things and certain people could be described as 'cool'.

In studying cool with teenagers using surveys, design sessions, user studies and the literature, six categories of cool were defined, and a model for cool was developed. The six categories of cool were listed [22]:

- REB Rebellious and/or illicit (probably has some socially or morally unacceptable line to it) [23].
- AS Anti-social (encourages anti-social behaviours – maybe avoiding the need to mix with others or encouraging anti-social behaviours like bullying and violence) [23].
- RET Retro (clearly from a previous era) [21].
- AUTH Authentic – the real thing (more about items that are 'the must have' brands – and maybe are 'hip' or trendy at the moment) [21].
- RICH Many desire – affordability issues – big money (probably less about brands and more about features – where having this item would mainly signify you have a lot of money to spend) [24].
- INN Innovative – original (something that is really a bit of a surprise, where – on encountering this thing – people would be impressed by it for its unusualness rather than for any of the above explanations) [24].

In applying this breakdown of cool to serious game design for education it is apparent that certain characteristics can take on significant importance. The characteristics associated with the product – innovative, rich, authentic and retro suggest quite unusual but also quite feasible design decisions. As an example:

- Making the game as slick as the big videogames (Rich)
- Having game characters in the game that are in other games as well (Auth)
- Using a game genre or game characters from the teenagers' childhood (Retro)
- Having something new in the game not in other games (Innovative)

These would all, we consider, provide a good game experience for this player group and it could be argued that only one of these might be needed to give a product a 'cool' edge over competing products.

The two characteristics associated more with cool behaviour; however, these being anti-social and rebellious are more difficult to transfer into design guidelines in the context of serious games for education. As soon as something is packaged as education the rebellious teenager will choose not to play it, or will play it without engagement or without interest. He or she will resist the message simply because this is 'meant' to be played. One design idea might be to hide the main m=message of the serious game in a second message that the teenager will rebel from and inadvertently fall into the learning of the hidden tale. This is slightly in line with the approach taken in designing the emotional experience game and is in fact what many serious game designers try to do when hiding the learning inside game play. Anti-social behaviour is associated with the use of behaviours that shock and also with being pro-social with their own peer group. Designing serious games that take advantage of that tribal behavior, using online collaborative activity for instance, is one solution.

5. Conclusion

Designing serious games for older teenagers is complex. The social environment where they learn, the products and technologies they use, and the value systems they apply to things they use all need to be considered. Their natural playfulness and their attention to selves can be designed into serious games by allowing them opportunities to input elements of themselves into the game play. Their value systems can be taken into games with the use of retro gameplay, games embedded in non-educational game genres and games that use their favourite game characters. New and innovative methods for gameplay still need to be developed to keep this genre fresh.

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