THE GAMIFICATION OF LEARNING AND RESEARCH: TECHNOLOGY, AUTISM AND SOCIAL SKILLS
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With the rapid uptake of digital technologies among young learners, it is no wonder that we see an increase in the use of technology and more specifically, gamification, in education. Gamification is the “process of using game thinking and mechanics to engage audience and solve problems”. Within the field of education, interactive online applications are often built for the sole purpose of enhancing learning. However, there are vast amount of readily available technologies and we need to begin to identify how learning is affected by day-to-day online interactions and gaming. In this paper, I will be discussing an integral part of my PhD research – understanding how gaming enables young people with autism to learn social skills. Using participant observation and online participatory ethnography, the research showed the potential for using gaming as both a tool for learning and researching in the field of education.

Introduction

As an impatient and hyperactive child, my mother often sat me down to play with jigsaw puzzles. Years later, I learnt that her motive was to keep me silent by focusing my energy on a single task that was challenging yet fun at the same time. Looking back, this anecdote now suggests an important aspect to learning: gameplay. Not only did I enjoy the task at hand – albeit the frustration that came with the challenge – but over time I learnt a few intangible skills such as patience, focus, strategic thinking, and the list goes on. While these skills are nonacademic and not formally taught at schools, research suggests that social and emotional learning, which occur largely at schools since they are likely to be the first major social institution individuals are enrolled into, are crucial to promoting and sustaining lifelong and academic education (Zins et al., 2004). Gaming, traditionally juxtaposed to structured learning, can enhance both academic and nonacademic education particularly with the advent of new media technologies.

In this paper, I will discuss how gamification can help young people with autism learn social skills while enriching research. Through examining The Lab, a network of technology clubs for young people with high functioning autism between ages 10 and 16, this paper will demonstrate how the use of technology and gaming within a physical social setting reveal the need for the reconceptualisation of sociality for individuals on the spectrum as they perform beyond the perceived limitations of their disability. I will begin by defining the concept of gamification.

What is a Game? Defining Gamification

Since the sixties, Bernard Suits (1967) has been exploring the concept of the “game”. In one of his earliest papers aptly titled “What is a game?”, he explored elements which make up a game and what it means to be involved in one. One of his most consistently used definitions of a game can be found


“To play a game is to engage in activity directed towards bringing about a specific state of affairs, using only means permitted by rules, where the rules prohibit more efficient in favour of less efficient means, and where such rules are accepted… [a] voluntary effort to overcome unnecessary obstacles” (Suits, 2005, p. 48-49)

In his definition, we can identify key elements to a game. First and foremost, it is an activity, suggesting active participation by person(s) involved. Secondly, he describes it as a “specific state of affairs”, suggesting that a game has goal(s). Next, he talks about a game being governed by rules which set the perimeter of what can or cannot be done – this poses the idea of a challenge, or even competition. Finally, a game or being in a game is voluntary and the rules are therefore accepted prior or during the engagement of the activity. While there may be many other elements such as “uncertainty” or “involving decision-making” as pointed out by Salen and Zimmerman (2004), Suits’ definition forms the basic crux of understanding a game.

It should be noted that in Suits’ definition, he refers to it as an action (i.e. “to play a game”) rather than an object. However, gaming in itself does not necessarily refer to playing, or playfulness (Deterding et al., 2011; Salen & Zimmerman, 2004). While gaming is constituted by a set of rules, goals and challenges, play denotes a “more freeform, expressive, improvisational, even “tumultuous” recombination of behaviors and meanings” (Deterding et al., 2011, p. 11). In some cases, play has been described to be unproductive, not serious and distinct from ordinary life, projecting a sense of fun (Caillois & Barash, 1961; Huizinga, 1955). While both gaming and playing are very complex concepts that are not the identical, they are certainly interrelated (Salen & Zimmermen, 2004). Playing is an integral aspect to gaming as it involves an individual making specific choices that are often unrelated to life outside the game – it involves a level of creative, free and expressive thinking. While playing is not necessarily contained within a game, games are in no doubt a large subset playing (Salen & Zimmermen, 2004). Therefore, for the purpose of this paper, I will not further distinguish the differences between playing and gaming.

Gamification is therefore the “process of using game thinking and mechanics to engage audience and solve problems” (Kapp, 2012, p. 10), using “game-design elements” within traditionally “non-gaming contexts” (Deterding et al., 2011). In other words, gamification is trying to use rules, actions and challenges to achieve traditionally non-gaming goals. I will further illustrate this in the context of education and research in the next section.

**Gamification in Education and Research**

Within education, games are often used as instructional tools. In a meta-analysis conducted by Randel...
et al. (1992, p. 261-276), 68 studies on games and simulations for learning were conducted and analysed. The games and simulations covered instructions for topics such as mathematics, biology, social sciences, physics and languages. The team found that of the 68 studies, 38 (or 56 percent) found no difference between traditional instruction and gamified instruction on student performance, 22 (or 32 percent) favoured gamified instruction, five studies preferred gamified instruction with reservations on the user-interface of the game/simulation while the final three were in favour of traditional instruction. The study concluded that games and simulations used for instructional learning were beneficial, particularly when specific content was targeted and objectives were well-defined. More importantly, participants rated gamified instruction as more interesting than conventional instruction.

The research findings from Randel et al. (1992) were further echoed for other studies. In Vogel et al.’s (2006) meta-analysis on 248 studies comparing traditional classroom teaching to gamified teaching, it concluded that gamified instructional teaching yielded higher cognitive gains and better attitudes toward learning. In Ke’s (2009) qualitative meta-analysis, she found that of the 65 studies she analysed, only one concluded that traditional instruction was more effective than computer-based/gamified instruction. More than half of the studies found computer-based instruction more effective, a quarter had a mixed response while 18 percent found no difference between gamified instruction and traditional instruction.

These studies show that games and simulations, while not without their flaws, are mostly effective in enhancing learning. More importantly, it constantly outperforms conventional instruction. While I am not suggesting that gamified learning should replace traditional teaching, it is evident that partial gamification is beneficial in encouraging and motivating learning (Kapp, 2012). According to Kapp (2012, p. 52-53), the success of gamified instruction can be attributed to both its intrinsic and extrinsic motivations. Intrinsic motivation is when a learner yearns do something for the purpose of self-fulfillment while extrinsic motivation is guided by external rewards (eg. Praise). Gameplay, as previously mentioned, projects a sense of fun and enjoyment. Through a series of challenges, goals and fantasised contexts, games invoke curiosity and intrinsic motivation (Malone & Lepper, 1987). Individuals play games because it takes them into desirable spaces which Malone and Lepper categorise as fantasies. When milestones of the game are completed, the player is rewarded with points, badges, etc., gaining a sense of satisfaction which is then translated into a form of extrinsic motivation (Kapp, 2012, p. 59-60).

Gamification has been used across the field of education extensively – from instructional coursework, problem solving to learning physical and cognitive skills and even more. However, the gamification of learning is often premised on the creation of specialised games for learning. Do noneducational games affect the way we learn?
Research has shown that games, particularly video games, have a great impact on the social behaviour of young children. A common rhetoric around video games is its perpetuation of violence, addiction and aggression (Griffiths, 1999; Anderson, 2004). As Anderson (2004, p. 407) summarises “exposure to violent video games is significantly linked to increases in aggressive behaviour, aggressive cognition, aggressive affect, and cardiovascular arousal, and to decreases in helping behaviour”. It should be noted that he, and many others, often refer to these video games as violent games (eg. Grand Theft Auto series) – they do not represent all video games. Returning our focus to Anderson’s definition, he points out the impact video games have on individuals: they can alter behaviour, cognition, affect and even the physical body. While he positions video games in a relatively negative light, other research have shown that video games can contribute positively to an individual’s development in these areas. In Durkin and Barber’s (2002, p. 373) study, for example, they found that game players scored better than non-game players in several measures including “family closeness, activity involvement, positive school engagement, positive mental health, substance use, self-concept, friendship network, and disobedience to parents”. A study by Braun et al. (2016) showed that online games had an impact on an individual’s personality, with regular gamers having lower neuroticism than game addicts and more importantly, non-gamers. Other studies conducted by Lenhart et al. (2008) and Jancsz & Martens (2005) concluded that gaming is a social activity that encourages civic engagement, interaction and the building of positive relationships. Therefore, both simulated gamification and organic gaming can yield positive outcomes in learning – this may even be amplified for young people with autism which I will discuss in my case study next.

While more pronounced in the field of education, gamification is less utilised in other areas such as academic research. Within research, most gamification occurs in the form of a real-world market research (Cechanowicz et al., 2013; Huotari & Hamari, 2012). These may include competitions (eg. “Create a video to enter a draw to win”) aimed at marketing a product or service or creating customer loyalty through engagement and excitement. They use similar game-design elements: setting goals, imposing rules, providing a challenge and rewarding the best player. However, from an academic perspective, gamification is rarely used within its methodology. As one of my ethics reviewer questioned: Is it ethical to present a research method in the form of a game? Are we deceiving participants to engage in research using “click baits”?

In this paper, I explore how gamification through the use of technology can be beneficial to research – particularly with difficult to reach segments – while remaining ethical.

**Case Study: The Lab**

The Lab is a technology club for autistic young people between ages 10 and 16. It is an unstructured learning environment for these children who have a common interest in technology. Each session lasts
for two hours and is facilitated by two young tech-savvy mentors. Once a week, members of The Lab bring their laptops into a spacious room, set them up where they feel comfortable and begin playing games or learning computing skills from the mentors at their own pace. Unlike a classroom, the physical space is unstructured whereby tables and chairs are set up based on weekly negotiations between the young people and the mentors. When I first walked into The Lab, I was surprised at the vibrancy of the young people and the space. It seemed as if academic and lay assumptions of autism, widely defined as “persistent deficits in social communication and social interaction”, were unjust: individuals with autism can socialise on their own terms if given the right environment, people and tools (APA 31).

An evaluation of The Lab by Donahoo and Steele (2013) showed that the setting of this technology club has made a documented difference to the lives of these young people with autism where they begin to learn social skills and develop meaningful relationships while acquiring technical skills. A large part of its success is attributed to the interactions between and within the unstructured physical, online and psychosocial spaces which my research conceptualises under the term ‘differentiated spaces’ (Ng et al., 2015). ‘Differentiated spaces’ refers to a number of physical and abstract spaces, distinctly different from each other yet working in combination to make meaning of an environment (Ng et al., 2015). I will specifically be looking into how the online space – in the context of gaming – enables young people with autism to learn social skills at their own pace, in their own space.

Using Game-Design Elements in Research
In Donahoo and Steele’s (2013) evaluation, it was found that traditional research methods such as semi-structured interviews or focus groups caused anxiety and stress to some of the autistic participants. My initial observations of The Lab also revealed that these young people did not feel comfortable within a formal research setting: my presence as a researcher and “outsider” made them nervous and weary. In more than one instance, I have been told to leave with hand gestures (eg. Hand signaling stop sign raised to my face) or short sentences (eg. “I don’t know who you are. Can you please leave me alone?”) without ever making eye contact. Stone and Priestly (1996) highlight that structures of traditional methodology invoke unequal power relations between the researchers and their participants, particularly in the case of disability studies. This is because traditional methods of research often detach the researcher from the researched subjects and material to maintain control and objectivity. While it is not within the means of this paper to discuss the issues of power, objectivity and subjectivity within research, it is important to point out that a researcher’s involvement, active participation and insights are equally valid and even advantageous to the collection of quality data for analysis as they are inadvertently part of and responsible for the framing of the project (Johnson et al., 2006). Stone and Priestly (1996) hence propose that a participatory paradigm may redress some of these power dynamics and enable researchers to engage in meaningful research with participants on
In addition, I also observed that while young people at The Lab enjoyed the unstructured programme and setting, they often engaged in relatively repetitive and complex work (eg. Coding a game or drawing an animation) guided by mentors and set-tasks. In many ways, activities at The Lab are goal-oriented. Informed by Donahoo and Steele’s (2013) research and my own observations, I decided to alter my methods to suit the needs of the situation. Thus, taking Stone and Priestly’s (1996) recommendation, I chose to conduct online participatory ethonography.

Online, “virtual” or “digital ethnography” is not a new concept. It is an adaptive form of ethnography using digital tools within an online community (Williams, 2012, p. 294). Online ethnography works particularly well with young people with autism as individuals are able to interact without the nuances of non-verbal communication such as body language, eye contact and emotional cues (Davidson and Parr, 2010, p. 72). However, the emphasis here is in its participatory nature. According to MacLeod et al. (2014), participatory methods “sought to overcome barriers to [research] participation”. This is especially relevant to this research as autistic individuals are often deemed as “problematic” to communicate with (Lewis, 2009; Bagatell, 2007; MacLeod et al., 2014). “Participatory” refers to two different aspects of participation in this case. Firstly, it is conducted in a consultative process through weekly feedback sessions. Secondly, instead of studying an established environment which is often the case in virtual ethnography (Williams, 2012, p. 294), participants were requested to build an online environment. In most cases relating digital ethnography, the online environment has to be specially programmed for research (Underberg & Zorn, 2013). However, this may not always be effective for a few reasons:

1) There are a wide variety of digital tools that already exist. Within the field of education, teachers are already re-using and re-appropriating technology for the purpose of teaching. Hence, from an education perspective, I believe research in this area can stand to benefit from adapting to and understanding the use of existing digital technologies.

2) Familiarity – participants may already be familiarised with existing tools which aid the understanding of ongoing learning (i.e. what they may be experiencing and learning online now) instead of new learning.

Therefore, to incorporate research and self-directed learning as well as fit into the culture of The Lab as an interest-driven space, I am conducting the online participatory ethnography on a 3D multiplayer sandbox simulation game, Minecraft. This game was particularly chosen because the young people at The Lab are familiar with and love the game. In fact, frequent competitions are held at The Lab where members use Minecraft to showcase their work. In addition, research done by Ringland et al. (2016) as well as testimonies from parents and children (Cheng, 2016; Rutkin, 2016) reveal the potential Minecraft has as a space for creative and social learning, including the building of virtual support
networks and friendships, for children with autism.

To encourage participation, I set-up a competition within a dedicated Minecraft server for participants. The goal of the competition is to build the most creative landscape that illustrates the theme ‘My Learning and Education’. The rules are as follows:

1) Participants may work individually or as a team of up to four persons
2) Participants can only work on the competition during their Lab sessions
3) No sabotaging or destroying of other people’s work
4) No bullying and use of abrasive language
5) No cheats - this is fairly common in other servers but is not penalised because players are meant to build creative worlds that they enjoy

If the rules are broken, the individual or the team is immediately disqualified. Apart from the final tangible reward (e.g. Chocolates) for building the most creative landscapes, participants are also given optional bonus tasks every fortnight which earn them points if they complete these tasks.

To receive feedback about the gameplay and their experience with other players, I spoke to different players each week as a form of consultation. Optional tasks and landscapes were then modified to improve the gaming experience for participants. All feedback and modifications to the game were noted and I was personally involved in monitoring the server – both as a moderator (to ensure no bullying) as well as an ethnographer.

Results and Discussion
As this is part of a broader on-going research to understand how the differentiated spaces of The Lab enable young people with autism to socialise and build meaningful relationships, only initial findings from the online participatory ethnography will be discussed.

Ethics
From an ethical perspective, the project was designed so that the “respect for the participants is not compromised by the aims of the research” (NHMRC, 2007). As previously mentioned, traditional research methods often caused autistic individual distress and anxiety. By aligning my research method to the aims of The Lab while injecting elements of gameplay, participants and parents responded with enthusiasm as they were both intrinsically and extrinsically motivated to participate. They were not anxious about the research method because it was a common activity at The Lab. Moreover, it projected itself as mutually beneficial: Participants gain both tangible (i.e. prizes) and intangible (e.g. Self-fulfillment) benefits while I was able to conduct my research.

Gamified Learning of Social Skills
The preliminary results showed that young persons with autism do communicate and socialise for the purpose of achieving the goal of the game. This communication takes place both online through private group chats as well as in the physical space of The Lab. In some teams, roles were assigned by the most senior/experienced Minecraft member and hand-written lists or hand-drawn layouts were used for planning. However, eye contact is kept to the minimum for most children at The Lab as they converse to each other while focusing their eyes on the screen. These findings are consistent with a number theories about the way people interact online as well as how autistic individuals may communicate. According to Janzen et al. (2006, p. 340), eye contact, a form of non-verbal communication, may cause undue stress or anxiety for autistic individuals due to sensory perceptual differences. Therefore, as Davidson and Parr (2010, p. 72) argued, the use of technology and gaming form a distraction that enables individuals with autism to interact without the influx of certain sensory stimulation. In addition, Wittel’s (2001) conception of ‘network sociality’ - enabled by technology which requires lower commitment in comparison to traditional notions of communities and is largely interest-based – is brought to the physical space of The Lab where young people with autism interact to ways similar to their interaction online. In many ways, through the use of technology and gaming, young people with autism has learnt and adapted their online social skills to the physical world, helping them socialise beyond the perceived limitations of their disability.

Gamification and Research

One of the difficulties faced in the early stages of the research involved communication. Apart from being rejected from discussions, I was unable to speak about the research to some participants due to anxiety issues. However, with gamification, I was personally involved and able to establish common grounds with participants, discussing about the game in detail. In addition, participation rates improved because the game gave the child a reason to participate. It should be noted that members of The Lab who did not want to be involved in the research but wanted to play the game were permitted into the server – however, they had to sign a form indicating they do not wish to be analysed or recognised by them game handles/names within the research. Participants were also permitted to participate one part of the research but not be involved in the rest. Most importantly, the gamification of the research method enabled me to build long-term rapport with members of The Lab, enabling feedback about the game as well as the research – which autism researchers such Lewis (2009), Bagatell (2007) and MacLeod et al. (2014) indicated as one of the main challenges and barriers to conducting social research on individuals with autism.

Case Study: The Lab

Insofar, I have discussed the benefits of gamification in learning and research. In both instances, gamification produced positive outcomes including higher participation rates, enthusiasm, display of
positive attitudes and higher cognitive engagement. My research also highlighted the importance of evaluating the impact of games, particularly video games, on an individual’s learning – particularly with a nonacademic focus (e.g., Social skills). However, more research needs to be done in the area to recognise how gaming can affect a child’s learning and development positively, beyond the rhetoric of violence, addiction and aggression.

From a research perspective, new media technology has changed the way we socialise, communicate and understand society. As digital natives, physical and outdoor games, while still an important aspect to development, have become sidelined by online and digital games for young children (Palfrey & Gasser, 2013). Therefore, there is an imperative need for academic research to adapt to these new technologies so that research methods within new paradigms are not lost in translation. For all we know, learning and research may occur in augmented realities through VR (virtual reality) headsets in the near future.

References


