

Gaming and Students with Asperger's Syndrome: A Literature Review

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Introduction

As a teacher in the field of middle years education, I have observed a continual rising interest in video and online gaming by many of my students, regardless of gender and academic ability. In the past few years, I encountered students playing an online game set in a virtual environment (VE) called *Runescape*. My interest was especially piqued when I noticed students with special needs, especially those with Asperger's Syndrome(AS) playing the game and exhibiting positive social and cognitive skills that he would rarely demonstrate in a traditional classroom environment. Students with AS were discussing the game with other classmates (and myself) in and outside the classroom. They were asking how to spell words and utilize a calculator in order to achieve objectives within the game. They were problem solving and surfing the web for online discussion groups associated with the game.

In this literature review, I will seek to answer the following questions: What educational learning principles and concepts are associated with online gaming? How do these aspects of gaming benefit students with AS? In turn, I will present a review of the latest research on the issues related to education and gaming, present an overall framework of the game *Runescape*, discuss some of the defining characteristics of AS, then explore how certain aspects of gaming benefit students with AS.

Education and Gaming

Although the considerable amount scope of research on the topic of student disinterest in traditional education could not be considered fully in this paper researchers in gaming have certainly made significant comparisons of student motivation in traditional classrooms and gaming environments. Jayakanthan (2002) stated that in comparison to gaming, traditional education- learning as it is imposed upon students in traditional atmospheres — is simply not a “fun” activity. Papert (1998) also commented that if we asked the students why they do not like school, they would respond that it is not that the work is too hard, but that it is boring. Simpson (2005) argued further that our teachers and schools are not prepared to assess the skills or meet the needs of a "new" generation of learners entering their classrooms. Gee (2003a) in an article in *Wired Magazine*, also argued that in response to lack of overall academic performance, schools in the U.S. are moving to skill and drill instruction, scripting for teachers and multiple choice testing that results in students learning simply how to memorize.

So what are students interested in, and where are they spending most of their time? Kids are actively involved in gaming, and are spend more time per week blowing up online aliens than watching television or (no surprise) doing homework (Shreve, 2005). They invest as good video games can take up to 50 to 100 hours to win, even for good players (Gee, 2003b). Certainly, the most compelling argument is economic. The video game industry currently generates more than seven billion dollars per year (Shreve, 2005).

When I began to research this paper, I questioned whether gaming held any educational importance. For many, it would seem logical that gaming is largely a waste of time and energy at the expense of education. For example Provenzo (1991), in *Video Kids: making Sense of Nintendo* states, “To begin with, most video games are not educational, only goal oriented: Mario rescues the Princess, and Pac Man gobbles the dots...they are not necessarily goals that are consciously admired or pursued by any particular group in the culture.”(p.33) From this perspective gaming is a mindless pastime with little educational benefit. However, other writers consider gaming more than an entertaining activity without educational value. Simpson (2005) argued that children today spend more time outside the classroom — exploring, questioning and problem solving — than they do learning in school. Squire, Giovanetto, Devane, and Durga,(2005) were even more pointed stating that that the widespread use of games could require some rethinking and restructuring of the basic “grammar” of schooling. They also argued that a challenge for educators pursuing game-based learning pedagogies is that students' knowledge may not match with traditional school based practices. Instead, a student's ability to participate in complex social practices, learn new knowledge, and perform well in novel, changing situations needs to be considered valuable learning (Squire & Jenkins, 2003).

Most notable in condemning traditional education practices in light of the benefits of gaming is James Paul Gee (2003b), the author of *What Video Games Have to Teach Us about Learning and Literacy*. He stated that when kids play video games they can experience a much more powerful form of learning than when they are in the classroom. Gee developed 36 learning principles that can be found in good video games (a few which I will discuss in this paper).

Papert (1998) went so far as to compare game designers to curriculum designers on the nature of learning:

The crux of what I want to say is that game designers have a better take on the nature of learning than curriculum designers. They have to. Their livelihoods depend on millions of people being prepared to undertake the serious amount of learning needed to master a complex game. If their public failed to learn, they would go out of business. In the case of

curriculum designers, the situation is reversed: their business is boosted whenever students fail to learn and schools clamor for a new curriculum!(p.88)

Although many would question the validity of such a claim, he does make an important point about the motivation of game designers. Gaming is a business and well designed games are often challenging. Students are very interested in this type of learning, probably due to the challenges presented in the gaming environment.

Runescape

In order to illustrate many of the ideas in this paper, I will use the popular online game *Runescape*.

Runescape, set in the magic and mystery of the Middle Ages, is an online game in which players create characters and interact with other players, game characters and objects in a virtual world. What is a virtual world? In a simulation a virtual world is created and displayed on a computer screen. Students assume a role and make choices that involve solving a problem or moving through an experience (Smedley & Higgins, 2005).

The characteristics of this VE were articulated by Steinkuehler (2004) in which she quotes:

Massively multiplayer online games (MMOGs) are highly graphical 2- or 3-D video games played online, allowing individuals, through their self-created digital characters or “avatars” to interact not only with the gaming software (the designed environment of the game and the computer-controlled characters within it) but with other players’ avatars as well.(p.1)

There are approximately 80 different peer servers (maximum 2000 players per server) that host the game in different locations in Canada, U.S and Europe. Players can choose from

a “free environment” or pay an additional monthly fee to explore “member environments”.

Players select their character's appearance that includes hair, clothes, skin colour and gender. These characters interact with one another and other computer characters. Players then learn the basic skills of the game like movement and use of maps, cutting wood, making fire and cooking, hunting and gathering food, and mining/smithing ores. Players must demonstrate that they can perform these tasks before they can enter an actual VE.

Use of the maps in *Runescape* is crucial to game play. Players learn some orienteering skills when locating areas in their virtual world. As they move around in the environment, they can click on and “pick up” items which they can store in their backpacks for later use.

Runescape is a free enterprise forum. You can barter goods or work for money(coins). Math skills are incredibly important, especially when interacting with other players in trading or purchasing expensive items.

Chatting is very important in the game. Proper social skills and chatting etiquette will gain you friends or enemies. Chatting options include “On” (everyone), “Friends” (only chat with players on your friends list) and “Off”. Players cannot use profanity when chatting since the program will block potentially offensive combinations of letters.

As the characters develop certain skills their levels and experience increases. There is status associated with being an experienced player. Players may wish to go on quests where they need to accumulate different items and accomplish tasks that yield rewards or increase skills. Problem solving, literacy skills and help from friends are often needed to be successful.

MMOGs like *Runescape* are popular and they are the choice of young gamers as Steinkuehler (2004) explained:

Many examples of MMOGs are not only found in the gaming arena, but they are by far are the most important entertainment media in the lives of the millennial generation — those who have grown up on the PlayStation rather than Atari 2600 (or to go back even further, your basic pinball).(p.6)

Asperger's Syndrome

This paper considers the influence of gaming specifically on players who have Asperger's Syndrome. In order to situate the discussion, I will outline relevant characteristics that identify person with Asperger's Syndrome(AS) and review some research strategies that have been suggested to aid students with these cognitive and social challenges.

Frith as cited in Cobb et al.(2002) stated:

Asperger's Syndrome falls at the high functioning end of the autistic spectrum and is characterized by average or above average intelligence, obsessive interests in specific topics and adherence to routines. There may be marked deficiencies in social skills, non-verbal communication, abstract thought processes, theory of mind, executive functioning abilities and imaginative play. Individuals with AS experience inherent difficulties in interaction with their peers, despite an often strong desire to do so. Due to poor abilities in recognizing and interpreting social cues such as turn taking and difficulties in non-verbal communication, they often display behaviour that is generally considered to be socially and/or emotionally inappropriate.(p.11)

Moore, Cheng, McGrath, & Powell (2005) also stated that persons with autism find it hard to relate to, and empathize with, other people. They argued that there is a communication impairment: the person with autism finds it hard to understand and use verbal and non-verbal communication. Finally, there is a tendency towards rigidity and inflexibility in thinking, language and behaviour. Cobb et al. (2002) added, "As a result, individuals with AS may experience social exclusion from their peers due to difficulties in making and sustaining friendships and social skills."(p.12) Cobb et al. gave specific examples of social difficulties such as difficulties with interviews, social interactions within teams, group work and interacting with others during unstructured, social time such as breaks and lunchtimes.

Griffin, Fitch, Albera, Gingras (2006) explained that students with AS have academic problems that arise because of literal thinking styles, inflexibility, poor problem-solving skills, poor organizational skills, and difficulty discriminating important information. This has some interesting implications for teachers of students with AS. In the area of academics, research suggests that children with Asperger's syndrome frequently need assignments broken into small amounts of information, less total assigned work, and nonverbal signals to help them refocus (Griffin et al.). They also have suggestions for teachers to address the social difficulties associated with AS protecting the child from bullying and teasing, teaching peers about AS and creating cooperative learning groups.

This paper next focuses on certain gaming principles that may be directly attributed to aiding students with AS reach specific learning objectives through discussion of the following concepts: gaming culture, avatars, affinity groups and active learning.

Gaming Culture

Students with AS have difficulty with social interactions so one of the suggestions to aid students with AS is to develop cooperative learning groups. However, computer usage, to a novice observer who believes computers are isolated workstations, would certainly contradict participation in these groups since the user is isolated from social interaction. Gaming, in these conditions, would be a solitary experience. However, Mangis (2003) stated that, "Gaming is becoming an increasingly social activity...nearly 60 percent of gamers playing with friends, 33 percent playing with siblings, and about 25 percent playing with spouses or parents. LAN parties and massive multiplayer online games are on the upswing." (p.113)

Computers are in fact interconnected in LANs (local area networks) and around the globe. *Runescape* players number in the tens of thousands connected through a complex network of servers located around the world. Chat and messaging allow for friends to interact from large distances. Games are not simply problems or puzzles: they are microworlds, and in such environments students develop a much firmer sense of how specific social processes and practices are interwoven, and how different bodies of knowledge relate to each other (Squire & Jenkins, 2003).

Smith (2004) also argued that the person-to-person connectivity of the Internet is helping people rediscover the sociability of gaming. Jayakanthan, 2002 commented on the social aspects of gaming: "With the large amount of social interaction and shared gaming experience, there also develops a gaming culture."(p.98) What are the features of this culture? "Game cultures feature participation in a collective intelligence, blur the

distinction between the production and consumption of information, emphasize expertise rather than status, and promote international and cross-cultural media and communities.” (Squire & Steinkuehler, 2005, p.1) Even though social interaction, especially person-to-person interaction, is a challenge for persons with AS, the “culture” in gaming becomes appealing to those very persons. Gee (2003) stated: “Video games---like many other games---are inherently social, though, in video games, sometimes the other players are fantasy creatures endowed, by the computer with artificial intelligence and sometimes they are real people playing out fantasy roles.”(p.7) It is these fantasy creatures, real or computer generated, that provide students with AS opportunities for exploring social interaction in this VE?

Over and above the general benefits of being computer-based, VEs offer great potential for people with autism. Perhaps the most important advantage is that users can role-play in an environment designed to mimic specific social situations. The growing sophistication of VEs means that tasks and skills can be practiced in increasingly realistic settings.(Parsons, Mitchell and Leonard, 2004, p.450)

In *Runescape*, the more quests a user completes, the more challenges he or she overcomes, the more experienced the user's character becomes, and with that experience, the player's character gains status. In what way is the player's character, or avatar, an important element of learning in gaming for students with AS?

Avatars, Game play interactions and persons with ASD

Benford et al.(1997) referred to such virtual bodies as *embodiments*, although a number of other terms are in general use including *clones* and *avatars*. Avatars can be found in a number of different online environments and they are a powerful aspect of the gaming experience. For example, Hoover and Nicholas (2005) described how avatars are being used in business simulations for training purposes:

SimuLearn Inc.'s Virtual Leader software takes standardized business-leadership situations and translates them into a 3-D world similar to those experienced in computer-generated, role-playing computer games like

"The Sims." Only here, students guide avatars through a series of meetings and make them delegate tasks to employees. If the manager doesn't direct people in the right way, game characters may nod off, get up from meetings, or develop a dislike for their superior. It works in real time, and it's supplemented with online reading and interactive lessons to teach leadership styles to senior cadets. (p.50)

In an online gaming community called *Second Life*, Foster (2005) illustrated a more dramatic example of how powerfully users associate with their avatars.

Over the summer, Mr. Maggio followed a blog about goings-on in Second Life and was intrigued by what he read: Participants in the community strive for social acceptance, hire private investigators to spy on virtual spouses, hurl harassment charges at each other, and debate whether a virtual marriage ceremony performed by a minister's avatar is — well, real. In one scandalous case, two virtual characters reportedly developed such a strong connection that their human operators ditched their respective spouses and moved in together.(p.3)

In *Runescape*, the avatar is an embodiment created by the user. This is important, for a two reasons. First, the creation of an avatar develops a strong association between the user and the game, and becomes a form of identification with the virtual character's world, story and perspectives that become a strong learning device at a number of different levels (Gee 2003b). The gamer becomes concerned with the avatar as an extension of him/herself in the game. In fact, Gee, (2003b) not only tied avatars to strong learning opportunities, but also remarked that the use of a projective identity helps speak to, and possibly transform, the player's hopes, values and fears.

The second reason lies within the area of communication. As mentioned earlier, communication is difficult because for people with AS because communication is literal and non-verbal cues are difficult to understand. Within an MMOG environment like

Runescape students with AS are not challenged with non-verbal cues because the interactions are confined to the chat component. Also avatars provide a means to approach others that students with AS may not normally initiate. Moore et al.(2005) stated that communication may be impossible in the absence of the technology, either because the participants are geographically remote or because of the possible reluctance of the person with autism to engage in face-to-face interaction.

In fact, face-to face interactions are more difficult for people with AS than just the aspect of social awkwardness implies. It has implications for game play that I argue are beneficial. Parsons & Mitchell (2001) argued that interactions via computer virtual environment technology (CVE) tend to be slower than face-to-face interactions, and that slowing down the rate of interactions may provide users with autism with time to think of alternative ways of dealing with a particular situation. Cobb et al.(2002) drew similar conclusions in their research with persons with AS and their interactions in a virtual Cafe.

Also, CVE interactions give opportunity for students, regardless of ability, to take risks in game play. Gee (2003) referred to this as a "...psycho-social moratorium - that is, a learning space where the learner can take risks where real-world consequences are lowered."(p.62) This appears to be a significant power of gaming; the ability to save previous levels in a game allows players to take those risks. In this environment one can examine and experiment with a number of different variables to complete a level. If a player fails, he/she simply begins over again. Here the gamer can, contrary to traditional education, feel free to fail and without time constraints to pursue alternate strategies to see what went wrong (Squire & Jenkins, (2003).

Constantly re-evaluating one's actions in order to achieve a goal is certainly a critical aspect of learning as illustrated by Squire and Jenkins (2003):

Game theorists use the term meta-gaming to refer to conversations about the strategy that occur around the actual game play itself as players share what they know, ask questions of more expert players, and put their heads together to resolve vexing challenges. This kind of critical engagement with the game can resemble what educational psychologists call meta-cognition, the process of reflecting upon learning itself.(p.29)

Driscoll, (2005) commented, "Teaching learners to assume an active and purposeful role in their own learning has been a growing concern among instructors and researchers

alike” (p.107-108). Interestingly enough, meta-cognition, or meta-gaming is already an important critical engagement for all gamers in order to accomplish the goals in each level of a game.

Affinity groups

I stated earlier that meta-gaming (or meta-cognition) involves conversing with other players, questioning more expert players, and working together to resolve vexing challenges (Squire & Jenkins, 2003). Certainly a player may choose to interact with a game as a solitary participant. This, however is hardly ever the choice in practice. Gaming is as much about community as it is about competition (Smith, 2004). Mangis (2003) made the following point: “Gaming will continue to evolve from a lonely, you-against-the-machine activity to a more social and community driven pastime.”(p.113) What is confined to the game environment at first soon spills over into the virtual world beyond it (e.g., websites, chat rooms, email) and even life off-screen (e.g., telephone calls, face-to-face meetings)(Steinkuehler, 2004). Players interact with each other in a variety of meaningful ways to share knowledge and skills. Gee (2003) referred to these communities of players as *affinity groups*.

People in an affinity group can recognize others as more or less 'insiders to the group'. They may may not see people face-to-face, but when they interact with someone on the internet or read something about the domain, they can recognize certain ways of thinking, acting, interacting valuing and believing as well as the typical sorts of social practices associated with a given semiotic domain.(p.27).

Affinity groups ,or virtual learning communities(VLC) (Schwier, 2001) are formed from relationships among players through game play. Games encourage collaboration among players and provide a context for teaching and for the emergence of learning communities. Steinkuehler (2004) stated: “During collaboration, the focus is on the *activity*, with information (e.g., manuals, guidebooks, websites) playing only a secondary and supporting role (unlike most classrooms).”(p.7) Popular digital games do this already. Look up most any popular game on the Internet and you find robust communities of game players debating games, sharing game tips, or offering critiques to designers(Squire & Jenkins, 2003).

One example of the effectiveness of affinity groups is found in the research in which the researchers worked in a classroom with students with a multiplayer version of *Civilization 3*, a popular video game that allows players to actively develop their own civilization over a period of time (Squire et al., 2005). One of their findings was that the program was running more or less like a learning community, with all the participants engaged in joint activity. Different participants had different expertise, and learning occurred as the participants interacted in the common game space, sharing ideas and strategies and testing them with one another.

How does this then apply to students with AS? I've observed that students with AS discuss *Runescape* with other students (and myself) and access the web for online discussion groups associated with the game. I argue that just as the avatar provides anonymity from face-to-face interaction, the use of affinity groups/VLCs give opportunities for all persons regardless of ability and location to become part of that group. Schwier (2001) adds: "Virtual learning communities are learning communities based on shared purpose rather than geography. Technology can potentially help people with autism who cannot or do not wish to come together physically, but who wish to discuss common interests join a community of practice (Moore et al., 2005).

What I witnessed were students with AS, who would usually avoid social interaction, actively involved in such interactions with affinity groups/VLCs and meta-gaming.

Active learning

The final principle, active learning, is one of the most important facets of learning and gaming. Gee (2003) argued, "...active learning involves three perspectives; experiencing the world in new ways, forming new affiliations, and preparation for future learning"(p.23). Is there active learning in game environments? MMOGs and avatars that interact actively in virtual environments, giving all users, especially those with AS, opportunities to explore VEs in different ways than, for example, a physical environment. Our section on affinity groups certainly encompasses the new affiliations that users, regardless of ability, can participate.

But what about preparation for future learning? The preparation for future learning is related to meta-cognition, or the process of reflecting upon learning itself, which was referred to earlier as critical learning.

Another factor is that games are designed so that the learner can take charge of the process of learning, thus making it very different than school learning, where the teacher (or the curriculum designer) has made the important decisions and the "learners" are expected to do what they are told— which is no way to learn to be a good learner.(p.88)

Taking part in the process of learning is no small task for active gamers. As Papert stated at the beginning of the paper, games, especially good games, are not easy. They are designed to be hard. Gee (2003a) stated:

Each level dances around the outer limit of player's abilities, seeking at every point to be hard enough to be just doable. In cognitive science, this is referred to as the regime of competence principle, which results in a feeling of simultaneous pleasure and frustration — a sensation familiar to gamers as sore thumbs.(p.2)

The gamer must be completely aware of what is going on in the game to be successful. Squire et al.(2005) stated, “In short, game play when viewed as an activity system, demands navigation of multiple information spaces and negotiation of multiple discourses.”(p.35) .

However, the gamer must be aware of the information outside of the game.. This paper discussed how affinity groups/VLCs are sources of information for gamers to exchange knowledge and expertise on games. Many of today's games are developed with guides. For many games, the detailed strategy guides are included with the game (Gee, 2003b). The content can often be a large amount of reading for the gamer. Walkthroughs, Gee (2003b) argued, “...these documents run seventy or more single spaced pages and are written according to a tight set of rules of what they should contain and look like (including a list of each date the walkthrough was revised).”(p.101)

Active learning also involve other types of participation in an affinity group. Gamers are often more than just readers: “At the same time, game cultures promote various types of information literacy, develop information seeking habits and production practices (like writing) and require good old-fashioned research skills, albeit using a wide spectrum of

content” (Squire & Steinkuehler, 2005, p.2)

I've observed that when students of all abilities attempt to complete a “quest”, access walkthroughs as they move through *Runescape*, or post information to bulletin boards for their local affinity groups, they are exhibiting the characteristics of active learners engaging in social discourse and taking ownership of their own learning. Gee (2003b) concluded this discussion on gaming and active learning with the following statement:

“The content of video games, when played actively and critically, is something like this: they situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world.” (p.48)

Conclusion

In this literature review, I asked the following questions: What educational learning principles and concepts are associated with online gaming? How do these aspects of gaming benefit students with AS? The literature supports that that students find traditional schooling boring compared to gaming. Researchers are warning that gaming is a more effective form of learning than in the classroom. Students with AS also benefit from the role-playing opportunities available in the principle of gaming culture designed to copy social situations. Avatars , or user embodiments allow the gamer to associate deeper meaning with the gaming experience, and assist students with AS overcome difficulties communicating due to the absence of verbal cues and a reduction in the speed of those interactions. The gaming environment encourages players to take risks and engage in the critical learning principle of meta-cognition. Affinity groups/virtual learning communities allow gamers, including persons with AS, to become part of a learning community and engage in meaningful social interaction. The final principle, active learning, is not only a integral part of gaming, but also involves different types of literacy which benefit students of all ability levels. Far from mindless entertainment, the gaming environment holds not only educational value but also the interest of our students.

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