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## On The Educational Value of MMORPGs

### 1. Introduction

While the advent of video games is something we have witnessed only in the past 30 years, the environment in which they are played is rapidly changing. Although it was not long before the idea of multiplayer games became a reality, the alacrity with which the Internet and other cyber tools became integrated with such leisure time activities is astonishing. By 1988, so called MUDs, or Multiuser Dimensions, were on the rise, despite their humble text-based beginnings. With the advancement of computer hardware, online video games began to grow, in number, in scope and in difficulty. Today, massively multiplayer online games represent not only some of the most complicated and advanced video games on the market, but also one of the largest niches of the video game market. How is it that the most frustrating, complicated and difficult games can attract so many users? Gee and others have made the claim that there is a link between learning and pleasure, and video games can often be seen as a vessel that stimulates learning. Moreover, educational methods and paradigms are more frequently being seen in video games in which you learn how to play, rather than games in which you just play.

Furthermore, the MMO genre is the most extreme example of this, with games of enormous scope that often have users playing them for months and even years before reaching the end of the game. This playtime is centered on developing an avatar, the character that the player controls, learning its abilities, strengths and weaknesses and playing the character in the most successful way. It is no surprise that some of the educational

methods described by others appear in these MMO games to facilitate not only the game play, but also the player's ability to learn to play the game. It is my intention throughout this paper to examine the methods proposed by Gee and others in the context of the massively multiplayer online game genre and analyze the success of these methods in educating players on how to play the game.

## 2. Disambiguation of MMO Games vs. Single Player Games

While the games in the MMO genre fall under the canon of video games, there are a number of distinctions between and clarifications about MMO games and single player games which must be made. First and foremost, in nearly every MMO game, there does not exist a linear method of play. In most single player games, there is a arbitrary starting point, and a single, or sometimes a few, linear path which a player travels to complete the game. The play experience of one player will mirror that of any other player who plays the game. Conversely, the MMO gaming genre often employs the idea of a sand box world in which the player is free to play how he chooses. This can be attributed to the fact that the worlds created in single player games are non-static, non-dynamic worlds, existing only for the the player, and only until he quits playing. On the other hand, MMO worlds are static, in that they exist after the player quits playing, and dynamic in the sense that the players which inhabit the world mold the world themselves.

Moreover, MMO games rarely have an ending in which the player beats the game and the credits roll. For example, in Bungie's *Halo*, each player who plays the game starts in the same location, plays the same set of missions, and plays the same last level, with the same ending. The game experience is modified only by the way the player plays the game, rather than through facilities given by the game designers. In the case of *Halo*, this is simply a choice of which weapons to use throughout the game. However, in MMO games the player

is free to adopt a number of different roles or goals. For example, a player may be interested in exploring the world, becoming a business mogul, playing competitively or cooperatively with other players, or perhaps just socializing. In fact, Richard Bartle, co-author of *MUD*, created a test to classify players into these archetypes through his “Bartle Test,” which rates people by percentage in 4 categories (achiever, explorer, killer and socializer) based on questions answered by the test taker [2].

Furthermore, many non-MMO games have a multiplayer component, though it is important to distinguish the differences between this multiplayer component and the MMO genre. While the connotation of multiplayer brings the idea of playing with other people to mind, it's important to note that the steep difference in magnitude of the number of players. While *Halo* supports play for up to 32 people in a single game, a single server in a MMO might house ten thousand unique players with several thousand players playing at one time. Furthermore, the method of online or multiplayer play in a non-MMO game is determined completely by the type of game. In a first person shooter like *Halo*, the online or multiplayer component is simply a mirror of the single player game: play cooperatively with a friend against the story or campaign the developers have designed, or play against a friend or team of friends, in a competitive mode. However, if a player is not interested in these types of games as a mode of play, then *Halo* offers no additional options. In the MMO game, a player might feel like killing monsters, alone or in a group, in any number of different places. Or perhaps like sitting in a city, socializing or selling goods. Or perhaps competitively against other players in any number of situations. Or maybe they want to explore the sprawling world.

### 3. Overview of the History of MMO Gaming

### 3.1 History of First Generation MMO Gaming

While video games have only recently come into circulation with the invention of the pinball game in the 1960s, the Internet has revolutionized the way we play games. Starting in the 1970s, people began developing games known as MUDs, or Multi User Dimensions. You may recall that graphical computing was not yet a realized goal back then, and thus the games were composed entirely of text. The first games of this genre are generally credited to Will Crother and Don Woods of Stanford with *Adventure*, Dave Lebling, Marc Blank, Tim Anderson and Bruce Daniels of MIT with *Zork*, and Roy Trubshaw of Essex University with *MUD*. The genre of these games was completely based on the problem-solving and hack-and-slash role-playing game environment first pioneered by Gary Gygax with the *Dungeons & Dragons* tabletop role-playing game [1]. The games engine was very similar to the terminal computing at large in the 1970s and 1980s, with most of the early MUDs developed on DEC-shared computing systems and such early internets as ARPANET. The game was comprised of a screen in which all text output would go to an input bar in which commands were typed and entered, and, depending on the MUD, a series of small graphical representations of certain statistics of your character (life and power bars, a paper doll with wounds to represent your current health status, etc) appeared. Your location was described via a paragraph of often verbose and descriptive text, and interaction with the world was performed through a set of key words used to interact with IT the world. This usually included basic movements (north, south, east, west, etc), and basic actions (look, look at something, get something, put something in/on something). The more sophisticated the MUD (and the parser used to accept input), the more sophisticated the allowed input. Some games might accept only two-word commands (go east, get sword, drop dagger), while other games accept more sophisticated commands (put my sword in third green backpack).

Although the development of MUDs began in the mid 1970s, I will focus on the development ten years later, when the Internet brought MUDs to the mainstream. While previously these MUDs were played by a single player or perhaps by multiple players over a LAN (Local Area Network) or a timesharing system, the wave of MUDs that hit the Internet in the late 1980s redefined the game by linking together players from all over the globe. Among the most popular games was *Gemstone 3*, by Simutronics, currently the premiere pay-per-month MUD. In 1989, it initially launched via a pay-per-hour service hosted by GENIE, General Electric's internet service. Later *Gemstone 3* moved to Prodigy and AOL and became a free game, finally becoming privately hosted and pay-per-month in 1993.

MUDs provide an interesting outlet into the retro system of massive multiplayer online games. Because MUDs ranged so widely in the composition as game, I am going to focus this discussion mostly on *Gemstone 3*. Still actively played (2000 paying users), it is the longest continuously existing static online environment in the world, and the paradigm example of the MUD and the early role-playing game. *Gemstone* originally started out as using a Java text-only client. As it grew in popularity, eventually more sophisticated interfaces were designed, with individual windows for managing different strings of text (one for room descriptions, one for a particular channel of communication, one for current interactions), along with images representing user statistics (health bar, power bar, injuries paper doll, compass representing directional movements, etc). It boasts a complicated game play while employing the general role-playing game scheme. Kill monsters to gain experience, so as to gain the next level, and collect gold to buy more equipment so that you can kill more difficult monsters in order to gain more experience, and acquire more gold. In the early stages of the game, monsters are often trivial and death is a non-issue, but as the game progresses, both characters and monsters become more intricate, with additional

attacks, passive abilities and tactical requirements. At the highest echelon of the game, playing in a combative manner is often challenging and difficult from the perspective of not only what you fight but also of how you play. Decisions are made in a split second, and a wrong decision could easily end your killing spree in a matter of seconds. Team play is often encouraged in these situations as a way of protecting yourself when in combat and employing advanced tactics to quickly dispatch the ever-intelligent AI.

### 3.2 History of the Second Generation of MMO Gaming

By the mid to late 1990s, much of the craze over MUD gaming had subsided. While MUD gaming was originally based on the now defunct style of terminal computing, graphical computing had since come into the spotlight and personal computers were ubiquitous. Graphical single-player games were now the norm, and it would be only a short time before the next wave of MMO games came to be. The first of these were small experiments in limited-capacity games like Blizzard's *Diablo*, which had static characters in a non-static world, allowing play with up to three other people. However, it was not long before people expanded graphical online games into the realm of massively multiplayer. The first of such games was *Meridian 59*, released in 1995 by 3DO. It was a quasi-3D world based off of a graphics engine similar to ID Software's *Doom*. However, due to the very limited success of *Meridian 59*, I turn my attention to the second and third children of the second generation of MMO gaming, Origin System's *Ultima Online* and Sony Online Entertainment's *Everquest*.

Origin System's *Ultima Online* went live in 1997. It was a three-dimensional world that employed two-dimensional sprites. Its style of play mirrored that of *Meridian 59* and the MUDs, in which a player kills monsters to improve his skills and earn money so that he can kill harder monsters to get more experience and more money. It was also one of the first games to provide more than one server for players to play on, with the servers often tied to

North American regional location and time zone (Atlantic, Pacific, Great Lakes, Baja, etc). However, *Ultima Online* can also be seen as a social experiment of sorts. It was a sprawling world in which player interaction was the medium of play. Unlike the MUDs which imposed numerous rules to keep a modicum of play and decency intact, *Ultima Online* was more of a social experiment, letting players run free. There were no restrictions on player vs. player combat, and the economic system was fueled by player-owned vendors who sold the loot they acquired from adventuring. Players formed tight cliques known as Guilds, often headquartering them at player-owned castles, houses and boats.

Another such heavyweight title in the second generation of MMOs is Sony Online Entertainment's *Everquest*. Released in 1999, it was the first fully three-dimensional world. It boasted a high level of character customization with twelve races and sixteen classes from which to choose. While previous games had cooperative modes of play, none were intricate and complementary until *Everquest*. *Everquest* was the first game to coin the so called "mage-priest-warrior" archetype. One set of classes was specifically good at taking damage, one set good at healing damage, one set good at dealing damage. Players benefited by banding together in such archetypal configurations, and this type of game play was encouraged. *Everquest* was also the first title to cater to the massive style of cooperative play. While previous titles encouraged cooperative play and gave benefits to players that participated in it, *Everquest* was the first game to require massive cooperative play to experience every level of the game. At the end of the game, large groups of players (40 to 90 in number) would band together to kill a dragon, each of their abilities complementing those of their teammates. This massive style of cooperative play would quickly be termed "raiding" and would become the example for the endgame play of the MMO genre.

### 3.3 History of the Third Generation of MMO Games

While *Everquest* made history topping out with 500,000 subscribers, that was only a taste of what would come. By 2004, Blizzard was ready to unveil its long awaited title *World of Warcraft*, a fantasy MMORPG based off their acclaimed *Warcraft* real-time strategy series. Graphically an improvement over *Everquest*, *World of Warcraft* added advanced texturing, lighting effects, and more sophisticated particle graphics. Graphics were not the only aspect of MMO gaming significantly improved in this step to the next generation. While *Everquest*'s combat and spell systems were linear with little branching from the start of the game to the end of the game, *World of Warcraft* introduced a complex and complicated style of play that centered on learning and mastering the abilities of one's character over the course of the whole game play. The mechanical aspect of gaming advanced beyond staple abilities and prescribed interactions in an encounter. These advances included abilities, counter-abilities, situationally useful abilities and staple abilities, constructing a Yomi-3<sup>1</sup> sort of play style. Additionally, the free-form rules experienced in *Ultima Online*, but notably absent in *Everquest*, came back into the forefront. On many servers, *World of Warcraft* depicted the endless struggle between the factions of the Orc Horde and the Human Alliance. Player versus player interaction depicted this struggle, letting players from opposite sides enter combat on a non-consensual basis. Furthermore, the economic interaction of *Ultima Online* continued in *World of Warcraft* through a faction-based auction house which allowed the sale of items for in-game money. And like *Everquest*, *World of Warcraft* exhibited the massively cooperative method of game play raiding, improving on their predecessors with intricate encounter design and exceedingly complicated player interaction.

#### 4. Analysis

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1 Yomi-3 is the Japanese idea of play which follows the action, counter-action, counter-counter-action style of competitive play.

#### 4.1 Educational Synthesis in MMOs

Since the beginning of MMOs, there has been an archetypal mode of play present in every MMO game. The idea is that one's character begins weak and unequipped, with a limited set of abilities. The player uses these abilities to kill monsters and complete quests, netting the character experience which allows the character to level up. Leveling up increases the power of the character in virtually every aspect, from how much life it has, to what abilities it can use, to the caliber of monster it can kill. As they level up, the character kills harder monsters, which drop better equipment, increasing the power of the player further. This allows the character to kill even harder monsters, which net more experience, and allow the character to level up, ad infinitum, until the maximum level.

Because the player receives only a limited subset of all the abilities and skills he will eventually be able to use, the player is forced to learn at each iteration of the game which combinations of abilities work well for given the characters current standing. This can range from simple (Use B before A, because B improves the effectiveness of A), to complex (B improves the effectiveness of A, but decreases the effectiveness of C). Often the abilities open to a player work well with each other for improved usage. This ground up synthesis mirrors the way nearly any academic subject is taught. Lets look at mathematics in particular. When math is taught, we do not give students a list of all the arithmetic expressions, all the geometric formulas, all the rules of calculus and expect students to memorize and learn them all from day one. Rather, we introduce students to these ideas in increments. Addition and subtraction are taught in the first and second grades, multiplication and division are taught in third and fourth grades, fractions and geometry in the fifth and sixth grades, and so on. In calculus, when learning derivatives, students first learn the

formulaic method to do it,  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ , before learning the “tricks” to do it.

In the same vein, we don't give the students an exceedingly difficult challenge from the start. Instead, we build confidence first through easy problems before offering problems that require more thought or complex solutions. The same is true in monster design in MMOs. The first monster one encounters in the game, in any given area, will not be difficult. As the player progresses through an area or levels up, the monsters will get incrementally harder, gaining more life, inflicting more damage, using more abilities.

Additionally, the game offers many different ways to accomplish the same task, and it is up to the player to best decide which method he prefers. For example, there are numerous ways of solving for the determinant of a matrix, most concerning themselves with arithmetic complexity; in the same vein, a player might have several different chains of abilities to employ. One might net greater damage, or greater defense, or more efficient resource management, or simply be better for the situation. And in the same way as using Gauss-Jordan Row Elimination or LU decomposition to find a determinant, how to perform these methods is just as important as when to use them. This is the objective of the early part of the game, to teach the player to play his character well in hopes that at the end of the game, the player might attempt the games hardest challenges, the same motivation of education in any subject.

#### 4.2 Analysis of 1<sup>st</sup> Generation of MMO Gaming

While MUDs have the most implicit of educational content, due to their crude implementation, they are devoid of educational methods. That is not to say, however, that there aren't outlets for educational experiences within MUDs. The most notable of these educational experiences lies in the mode of play. As I mentioned previously, MUDs

are *World of Warcraft* almost entirely composed of text, where the only images present often represent the current of the character. Because of this, every bit of information concerning what the character can do, who is around the character, where the character is, and more, is communicated through text. Never has there been a video game where the player's success at playing the video game has hinged upon reading comprehension. Moreover, the game does not wait for you to read everything that is happening in a room, process what you've read, and act. The game requires you to read scrolling text quickly and make decisions and react very quickly. Not only is this reading comprehension, but more so speed reading comprehension. To make matters more difficult, the limitations of what can be expressed in text are directly proportional to the size of the vocabulary used in the game. If only maces were available as blunt weapons, then every blunt weapon using character would be exactly the same. Instead, games often include many synonymous names for everything from weapons to armor to clothing. Instead of just maces, we have maces, morning stars, flails, cudgels, blackjacks and more. Instead of swords, we have short swords, long swords, falchion, scimitars, rapiers, claymores, flamberges. The longest running MUDs have vocabularies so expansive that a novice player (or someone with just a limited vocabulary) will often be running to their dictionary. Even I still keep dictionary beside me when I play MUDs. I can say with full confidence that playing a sophisticated MUD will inevitably increase your vocabulary and reading comprehension skills.

Of course, being able to quickly read and comprehend the game environment is only half the equation. The other half is effectively communicating what the character will do in the game. This requires not only the ability to type quickly, but also the ability to type accurately, something which every serious MUD player learns to do. Often issuing commands can require complicated syntax in order to unambiguously tell the game what

one's character wishes to do. When retrieving an item, a simple “get item” might suffice, but if there are multiple items in different locations within the character or the room, the character may end up picking up the wrong item. In Gemstone, most commands follow the syntax “<verb> <numeric modifier> <item modifier> <item> from <numeric modifier> <container modifier> <container>.” The actual command might look something like “get other red falchion from third blue backpack.” While the syntax from MUD engine to MUD engine might differ, the need to effectively and unambiguously communicate what the character should do is present in every MUD, and as a result, at least a working understanding of the syntax and semantics behind the language used for input is required.

While these two ideas are the most effective methods of education inherent to MUDs, that is not the full range of educational prospects. In his article, Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs, Bartle references “[...]people who might play MUDs to learn object-oriented programming[...].” In many cases, MUDs can be a playground to learn various concepts that are important to the design of MUDs. Because the method of playing the game is solely through a command prompt, within every MUD is some sort of lexical analyzer, syntactic parser and semantics analyzer, whether it be some ad hoc parsing scheme or something more well defined. As such, this is often an area of interest to the more technically focused MUD players. Moreover, since MUDs were designed to mirror terminal computing, often there are scripting languages implemented within each MUD. These languages span from fairly powerful Turing-complete languages complete with string matching, arithmetic expressions and more, to very weak languages devoid of basic programming control structures, functions, arithmetic operators and, in some cases, even numbers<sup>2</sup>. Because of the crude nature of these languages, writing scripts in them can often

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<sup>2</sup> Gemstone IV's scripting language is one of the weaker languages, with no iterative loops, no block structure, no arithmetic operators, limited saved variables. However, it is believed (though not proven) to be a Turing-complete language.

be a difficult challenge. In some games, this has prompted players to create their own front ends for playing the game including new, more powerful scripting languages with added functionality, and in some cases, even script concurrency. From my own personal experience, my frustration with non-standardized coding practices in scripts for a specific facet of Gemstone IV prompted me to create a script generator for a certain aspect of the game<sup>3</sup>. Anecdotally speaking, Gemstone IV has a trade skill mechanic called alchemy in the game. It's used for brewing potions, and often has a long and tedious process involving addition of multiple ingredients (sometimes multiple counts of multiple ingredients), issuing brewing commands which incur wait time (boil, simmer, etc). The tedious process could take several minutes for each potion, and any mistake at any point would ruin the potion, wasting time and ingredients. The script generator I developed to help solve this problem creates standardized scripts from a recipe with capacities for error detection and error recovery. While these last few examples are anecdotal at best and never intended by the developers of Gemstone IV (or any MUD in general), a motivated player can find educational outlets in any gaming environment.

As we have seen with the first generation of MMO gaming, the games created are steeped of educational methods both by design and by coincidence. This can be contributed in part to the environments (the world that the character inhabits) and interfaces (the methods which the player plays the game) which define the game. The environment and interface of a MUD are synonymous with the environment and interface of computer programming during the period in which the MUDs were made. It is no surprise that MUDs could be used a pedagogical tool for teaching programming.

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<sup>3</sup> For more information on this script generator, it can be found at <http://www.twilighthall.com/akaylas/generator.html>

### 4.3 Analysis of 2<sup>nd</sup> Generation MMO Gaming

As I continue, we will see that this trend continues during the second generation of MMO games. While graphical games overtook MUDs (REWORD THIS), graphical games were generally divided into two categories. Those which retained MUD elements, and those which did not. Everquest, the most popular game during this period, had very primitive graphics. Because of this, most of the information conveyed to the player (Besides spatial orientation and animation) was done through a chat box, essentially a MUD. However, with free movement, the majority of the game was played through arrow keys and the mouse with “hot keyed” buttons for abilities. The text command was no longer a mode of play, but simply a means of communication. Because so much of the game play was taken care of “under the hood,” an understanding of the technical mechanics of the game (as opposed to mechanics of game play) was no longer a requisite to play and succeed at the game. And since many of the actions the player could take were replaced with single keystrokes, many of the more complicated aspects of user-interaction no longer exist, including knowledge of a game interaction language and the grammar surrounding that language.

While the synthesis of education in playing the game is still present in this era of MMO gaming, it was largely toned down in comparison to MUDs. Because so much of the development in these games was geared towards the infant graphics in them, often sophisticated game play took a backseat.

However, second generation MMO games did introduce a new concept to MMO gaming: raiding. Raiding was a style of play in which large groups of players banded together to kill a substantial monsters within the game (typically a dragon, giant or god from the games lore). While in the beginning these fights were crude and tactics for fighting them were crude and unorganized, they eventually became the central aspect of the endgame of

MMO gaming. As fights became more and more complicated, aspects of problem based learning started to arise in the tactics and strategies devised to kill said monsters. For instance, a monster may have the ability to hit their target and knock them back several hundred feet, causing the raid to have to reposition the monster. While this may seem an unsurmountable problem to a novice raid, eventually the raid will come to the conclusion that positioning the person whom the monster is attacking against a wall, preventing the knock back effect. Such strategies were devised to try to eliminate as many unknowns and as much of the luck factor as possible. As fights became more and more sophisticated and complicated, this phase of planning grew in importance, with lengthy discussions often carried out in order to discern a solution to the complications presented by a certain ability.

While each game in this generation handled the idea of raiding differently, catered to their specific game mechanics, this adaptive strategy play style was present in all games which contained a raiding elements in them.

#### 4.4 Analysis of the 3<sup>rd</sup> Generation of MMO Games

By 2004, companies had to begun perfect the idea of the MMO game. With Blizzard's *World of Warcraft* a new era was about to dawn on MMO gaming. Today, nearly 12 million people play *World of Warcraft* [3]. In my section in which I outlined educational qualities of all MMO games, *World of Warcraft* is the game which embodies this idea of learning to master the most. While *Everquest* paved the way for the idea of endgame raiding, *World of Warcraft* took it to a new level. With the change in the way dungeons were made, and the switch to instanced from static dungeons (multiple copies of each dungeon existing for every group that enters the dungeon), even mundane grouping became a non-trivial task. While in *Everquest*, groups typically went to a dungeon, found an area within it and set up camp, this was no longer the case in *World of Warcraft*. Each dungeon was an encounter

unique from the others with a (usually) linear path through the dungeon. At times there were time constraints or other restrictions put on the group to provide additional challenge.

It became the case that if as few as one person could not play their class and role within the group effectively, the group would not be able to complete the dungeon. Furthermore, unlike in *Everquest*, where encounters could be beaten by simply throwing more people at the encounter, *World of Warcraft* imposed limits to the number of people that could do content. At first, any “raid” level zone could be done by no more than forty people. As the game progressed, this number was eventually lowered to twenty five people, and later ten player options were added. With this limit on the number of players that could participate in one encounter as a group, it became the understanding that everyone participating in the encounter not only needed to know their class, their role and their abilities but also the intricacies of the encounter itself. Many encounters could be won or lost by the error of a single person.

Moreover, their raid level game became the paragon model of sophistication in game encounters. In addition to the adaptive and, in some ways, problem-based learning aspects of raid encounters, many of these encounters had extreme mechanics requiring the coordination of every member within the raid group. Whether it be the coordinated movements of every member of the raid, or positioning of groups in the area of the encounter, the need for planning and structure in tactics was required more so than in any previous MMO game. This eventually led to “raid leader” roles, a tactician of sort whose primary objective was to observe the battle during learning phases and modify the tactics of the raid.

### 5. A Taxonomy of MMO Games

In his article “Learning By Design: Good Video Games as Learning Machines,” James Gee describes a taxonomy of learning principles existing in video games. In this

section of the paper I will extend his taxonomy to the MMO genre of games, investigating what learning concepts are inherent to MMOs.

Gee begins his taxonomy by laying out a set of thirteen categories which exist in single player games and how they facilitate the learner's education within the game. These categories are empowered learners, customize, identity, manipulation and distributed knowledge, well-ordered problems, pleasantly frustrating problems, cycle of expertise, information 'on demand' and 'just in time,' fish tanks, sand boxes, skills as strategies, and system thinking.

The principle behind Gee's idea of empowered learners is, "Good learning requires that learners feel like active agents (producers) and not just passive recipients (consumers)." While Gee cites largely dynamic games such as *Elder Scrolls III: Morrowind*, this property exists within MMO games as well. While the game world is not completely contingent on the actions of a particular player, any player's experience and story is advanced and motivated by their actions in game. A legendary dragon doesn't get slain by single group of players, but many, in fact. From the player's perspective, this does not happen until the player joins a group of other players and actually kills the dragon. In the same vein, a storyline advanced via quests might have been completed by thousands, or (in the case of *World of Warcraft*) millions of players, but the storyline is incomplete in the eyes of a particular player until they play the quests and advance the storyline. As such, the player does not learn to play the game well unless the player actually plays the game. The player's education is based off of their motivation.

The next of Gee's principles is that of *customize*. He states:

Different styles of learning work better for different people. People cannot be agents of their own learning if they cannot make decisions

about how their learning will work. At the same time, they should be able (an encouraged) to try new styles [4].

This is patently true in the genre of MMO games. Earlier, I described the healer-damage dealer-tanker archetype that is inherent to nearly every MMO. Each of these different roles in the game requires a different style of play, different tactics and has a much different experience throughout the play of the game. Moreover, even within each of the roles, and the classes which define the roles, different styles of play emerge. Two people playing the same healer class might play it differently, one opting for reactive play, and one opting for preventative play. In the MMO game genre, there is enough freedom to allow the players to choose not only what role to play, but even tailor their class role to their own style of play.

In the same vein, Gee proposes an idea of *identity*. He states:

Deep learning requires an extended commitment and such a commitment is powerfully recruited when people take on a new identity they value and in which they become heavily invested-- whether this be a child "being a scientist doing science" in a classroom or an adult taking on a new role at work" [4].

In the genre of the MMO Games, customization is one of the metric by which a game is measured. In games where up to fifty-thousand people could be playing together on a single server, simply being able to differentiate between different characters is important. Most games offer a host of different races (species) which the player can pick from, and even then, customize the appearance of the character. Beyond that, the player chooses which archetypal role they wish to play. While these are all conventions and mechanics put into the game by the designers, there is also the inherent social interaction which defines a player. Through their social interactions with others and mechanical interactions with the game, they develop

a personality, exactly what Bartle was trying to clarify in his work [2]. This is also a clear example of the player (learner) being an *active agent* in his acquisition of an *identity*.

The next topic which Gee introduces is *Well-ordered problems*. He describes this as follows:

Given human creativity, if learners face problems on that are too free-form or too complex, they often form creative hypotheses about how to solve these problems, but hypotheses that don't work well for later problems (even for simpler ones, let alone harder ones). They have been sent down a 'garden path.' The problems learners face early on are crucial and should be well designed to lead them to hypotheses that work well, not just on these problems, but as aspects of the solutions of later, harder problems, as well [4].

The idea of well-ordered problems is in complete agreement with the design philosophy I outlined in my section Synthesis of Education. The player is initially weak and unfamiliar with the abilities given to them. The player builds up their character, learning their character's abilities, figuring out which abilities work best with each other and which abilities work best in each situation. Generally speaking, the whole process of playing and learning an MMO game is a giant well-ordered problem.

Coupled with the idea of *well-ordered problems* is that of a *pleasantly frustrating problem*. Gee describes this as such:

Learning works best when new challenges are pleasantly frustrating in the sense of being felt by learners to be at the outer edge of, but within, their 'regime of competence.' That is these challenges feel hard, but 'doable.' Furthermore, they feel-- and get

evidence-- that their effort is paying off in the sense that they can see, even when they fail, how and if they are making progress [4].

The idea of pleasantly frustrating problems exists within the MMO genre, particularly in the idea of 'raiding.' When raiding a monster, the group of players receives feedback on their success based on, say, the health of the monster left when the raid fails. However, this is a tenuous comparison, as in any given MMO, there are encounters which will be easy for the average player, pleasantly frustrating for the average player, and impossible for the average player. That's not to say that the player does not receive feedback from their attempts at killing a monster, but rather there exist some encounters within an MMO game which some players at a certain time will not be able to do. Whether it is from a lack of experience, gear or levels is immaterial, but the player will receive feedback in the form of a hasty death.

Gee's next principle, entitled *cycles of expertise*, is a prominent idea in the MMO game genre. As stated earlier in this paper, players typically play an MMO game for period of weeks, months or even years. With such a long time spent playing a single game, players become aware of what abilities are best to use, when is best to use them, and in what order to use them. Dubbed 'rotations' by the community, this is a method of optimizing the role of the player's character through minimizing the use of the worst abilities and maximizing the use of the best abilities. Furthermore, the players ability to discern which abilities are best to use when is another example of cycles of expertise. Mentioned in the section 3.3 History of the Third Generation of MMO Games, many MMO games now sport a Yomi-3 style of play, in which the active character executes an ability, the opponent executes a counter, and the original player counters the counter, restarting the sequence of events. When to use which counter is an integral part of playing, inherent to cycles of expertise.

Next in his paper, Gee described two similar educational principles: *fishtanks* and *sandboxes*. *Fishtanks* are simplified examples of an otherwise complex environment. Many MMO games start the player in a fish tank environment. At first, monsters do not attack the player on sight, as to minimize difficulty in the player orienting the character in regard to the characters surroundings, in order to prevent the player from being overwhelmed by numerous monsters at the beginning of the game. Obviously, as the player masters the game, the *fishtank* qualities of the starting area diminish. *Sandboxes* are similar to *fishtanks*, but serve a different purpose. Sand boxes provide a secure area to begin to experience the world, while still accurately representing the 'real' world. In many MMO games, sand boxes exist in the beginning of the game. Many games penalized players for dying, but these effects are not experienced before a certain milestone is achieved. This is to ensure that players don't get discouraged from a game that is difficult to master in the beginning stages, much like any modern single player game.

Additionally, Gee introduces the idea of *skills as strategies*. Rather than practice a set of skills in a vacuum, skills are used as a means to an end, i.e. accomplishing a goal. This especially true in video games, not to mention MMO games. Players don't practice their abilities and skills in a vacuum, say, outside the game, but rather use the goals they wish to accomplish as a testing ground for what abilities work well in a given encounter. In addition to skills as strategies, Gee gives an example of *system thinking*, explaining it as follows:

People learn skills, strategies and ideas best when they see how they fit into an overall larger system to which they give meaning. In fact, any experience is enhanced when we understand how it fits into a larger meaningful whole. Players can not view games as 'eye candy,' but must learn to see each game (actually each genre of game) as a

distinctive semiotic system affording and discouraging certain sorts of actions and interactions [4].

*System thinking* plays a large role in cooperative play in MMO games. While there are three main archetype roles that I described in section 3.2 History of the Second Generation of MMO Gaming these roles can be fulfilled in many different ways, through many different methods. Part of optimizing cooperative play is realizing the importance of what any given player brings to a group, and what benefits exist from the contribution of a particular players set of abilities, and what consequences and repercussions occur from a player not fulfilling the duties of the characters role.

## 5. Conclusion

Gee and others have made the claim that video games that while the content of video games is somewhat debatable, the games themselves incorporate educational principles and methods into rich game play. This is in hopes of creating a game that is not only challenging, but also pleasing to play and learn. While little has been done to extend this analysis to the genre of MMO games, it is clear from from the research and analysis in this paper that this rich educational experience exists in single player and MMO games alike.

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