University of Arkansas – CSCE Department

CSCE 4013 Virtual Worlds – Final Report – Fall 2010

An Analysis of Games in Second Life

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Abstract

The virtual world of Second Life has grown by leaps and bounds since its commercial introduction in 2003 and is now also a significant platform for research. In its growth, Second Life has found itself host to an ever increasing library of games. This paper categorizes these games into a taxonomy and analyzes Second Life as a platform for game development. This analysis is a step towards understanding that features should be in virtual world platforms to make the design of high-end games easier and to unify virtual worlds and gaming environments.

1. The Definition of a Game

What is a game? The Merriam-Webster dictionary defines the word *game* as an "activity engaged in for diversion or amusement." While this may have been applicable many years ago, over time games have evolved into a medium that expands well beyond mere diversion or amusement and into the realm of compelling artistic expression on the one hand and serious simulations like war games on the other. Certainly, there are a great many games that have been or are much more than a simple diversion, and a number of games that are played for deeper reasons than just amusement.
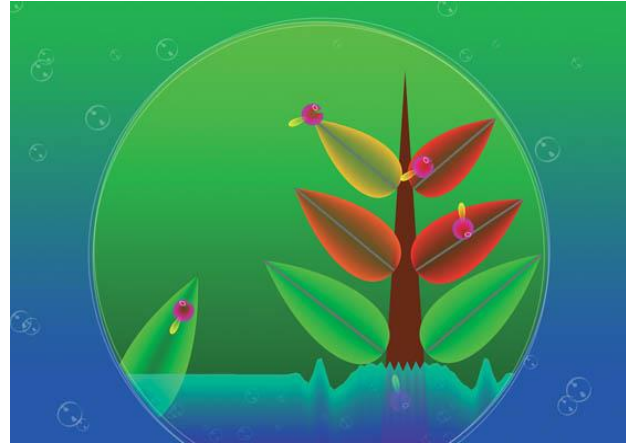

Figure 1: Passage

Developers, critics, and enthusiasts have regularly made attempts to define and categorize games over the years, but seemingly nearly new idea or technological advancement requires extensions of these definitions. Every time an assumption is made as to what a game should be, a new game is released that expands our definition. For example, we often take for granted that a game must contain some sort of element of *fun*, but titles like Jason Rohrer's *Passage* have demonstrated that a game can be compelling and meaningful without necessarily being described as *fun*, in the same manner that one would not normally describe *Schindler's List* as being a *fun* film.

Nevertheless, many prominent gaming figures have defined games in their own terms. Noteworthy and vocal game designer Chris Crawford [2] has emphasized that a game *must* include some sort of conflict in addition to being interactive. The idea of a conflict being

integral to the definition of a game is a common one, but games such as *Animal Crossing* and *Electroplankton* have achieved compelling gameplay without the need of direct conflict.

Figure 2: Animal Crossing   Figure 3: Electroplankton

Designer and writer Raph Koster [4] describes games in terms of interesting and boring patterns, ultimately defining a good game as being "one that teaches everything it has to offer before the player stops playing". Designer Sid Meier is often quoted as claiming, "A game is a series of interesting choices" [6], suggesting that a pure distillation of a game will result in a collection of player-game interactions. However, my favorite definition of a game comes from Nintendo president and CEO Satoru Iwata:

> "I would define a video game as something to which a human being makes an input and from which the human being receives something more valuable than the labor needed to make the input." [3]

This definition seems fairly broad and open, but such a definition might be necessary in the face of such a changing and dynamic environment as the game industry. Not only does Iwata define what he believes a game to be, but he also manages to tie it into what makes the medium so great and unique – the idea of direct human interaction. Games are meaningful and worthwhile because they allow for dynamic responses to a range of inputs, whether they be for aesthetic, thematic, or practical purposes. No other artistic medium seems capable of such a feat.

As is evident, there is yet to be a consensus on the exact definition of a video game. Developers and players alike have devised their own views and opinions regarding what is or isn't a game, and most devolve into a simple matter of "I'll know it when I see it". However, for the purposes of this paper, I will attempt to construct my own rough definition of a game based on my own experiences and the ideas presented by notable figures such as the ones I have quoted above. As such, I will define a game to be any work that satisfies the following conditions:

1.1 Contains an Element of Interactivity

If a work had no interactive elements, then it would be irrelevant and arbitrary who was playing the work, thus making any responses meaningless. As such, the work would be entirely passive and more suited to being defined as being one of a number of other arts, if any art at all.

1.2 Provides a Meaningful Response to an Interaction

If a work did not provide a meaningful (by which I mean, a creator-defined) response to an interaction, then it would again make all interactions irrelevant and arbitrary. Note that this implies some sort of rule structure or gameplay system. Also note that this does not exclude random or non-existent responses, so long as those responses are meaningful and not arbitrary within the context of the game.

I realize that this definition is very general and could be applied to a number of works or items not traditionally considered games, but such a definition is necessary with the expanding scope of video game content – it was not long ago that concepts such as fitness and breathing would have been excluded from the definition, and now titles such as *Wii Fit* and *Wii Relax* are either on the market or in development. The definition is also generic enough to not presume constraints such as "points" or "winning and losing", mechanics taken for granted that are slowly losing their relevance in the context of our most current understanding of games as a medium.

1.3 Getting Another Life

As the game medium has progressed, numerous noteworthy and significant projects have come to fruition over the years. Releasing in 2003, *Second Life* represented a significant step forward for the virtual world community and mainstream exposure to virtual worlds in general. However, the scope of this paper is limited to *Second Life* only as it relates to video games and the game medium. Regardless of *Second Life*'s impact and potential in the field of virtual worlds, I will only be considering game content within the platform during my analysis.

That said, the subject of "gaming" as it relates to *Second Life* is an interesting one, considering how *Second Life* fulfills my definition of a game. And, in a sense, *Second Life* is a sort of game, allowing for players to provide inputs via their avatars and witness responses related to those actions (for example, being stopped when walking into a wall, or not going through the floor after taking a nasty fall onto the ground). However, it is only a game in the most basic sense, like relating a school textbook to literature. What's more interesting are the games developed within *Second Life*, using the virtual world as a sort of platform or medium to create what might be considered more typical or traditional games. In an effort to explore and evaluate these games-within-a-game, I have composed a taxonomy of the types of games I have encountered in the virtual world of *Second Life*, along with genre descriptions and examples.

2. Finding Games in Second Life

As a side note, I will briefly explain the means by which I found and played the games within *Second Life*. An inefficient way to locate games in Second Life is to wander around and run across games. But I was able to use search results from Josh Eno's 3D virtual world search engine: http://csce.uark.edu/~jeno/vwsearch searching for "games" which gives results as shown below where the links are SLURLs (Second Life URLs) that take the user to a Second Life region or parcel. In addition, I also scoured several websites, message boards, and blogs to find the most recommended, popular, or high-quality games in *Second Life*. In total, I played and documented a little over forty individual games (see Appendix A), and observed a great many more.

Results:

Showing results 1-10 of about 10191

The Game, Island Dreams
Description: Currently taking a new game theme, under construction...
ID: cbf3ee41-93e9-1a08-3379-9e48f73c0dc9
dwell: 14798.0

!!GAMES CUPIDUS!! GAMES GAMES GAMES GAMES GAMES GAMES GAMES, Cupidus
Description: GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAME
ID: 8e7a4355-fac9-fb90-73c8-661b299bb0f8
dwell: 3243.0

Moo Town Games - Zyngo and Games, Ariantica
Description: Zyngo Wyld, No Devil, King Bing, Deal Extreme, Solitaire, King Bing Slideout, Bricks, Shrooms, 7GO, Pyramid, Thirteenz, Quince, MooLoTo, Big Bang, ScratchIT, Dizzy, Gemds, Cookies, Ocean Hunt sticker kicker, kickers and Pay For Play
ID: 8adff59d-5bfa-4dad-4654-6aec75e1cf70
dwell: 22737.0

* GAMES SHACK * GAMES Games Games Games Games Games Games Games, Kaunis
Description: GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES GAMES
ID: 2e0da6f6-be32-37a8-3720-ac1882c837c4
dwell: 0.0

next

Figure 4: Results from Eno's Virtual World Search Engine

3. A Taxonomy of Games in Second Life

As I found through my research, the games within *Second Life* can be categorized in a number of ways. I have thus provided a three taxonomies (called dimensions) for categorizing games: dimensions of gameplay, technical construction, and social interaction.

3.1 Dimensions of Gameplay

This dimension attempts to categorize *Second Life* games by their gameplay attributes. This is the means by which games are traditionally organized and separated into distinct genres. It is important to note that the context in which a gameplay is presented is irrelevant in game genres –

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just as we do not sort movies by "movies that take place during the 1800s" or "movies that are set in Europe", games are not typically sorted by "games that are comedies" or "games that are dramas".

3.1.1 ACTION

A game that is characterized by action mechanics involving elements of hand-eye coordination, timing, accuracy, and reflex.

Outside Examples	Second Life Examples
Space Invaders	Virtual Hockey League
Super Mario Galaxy	The Vorago
Resident Evil 4	Amber Raceway
VVVVVV	

Action games are probably the most prominent video game genre, and probably the one type of game most associated with games as a whole. As such, I expected to see a healthy representation of action games within *Second Life* but was instead surprised to find that there are not a great deal of them, and fewer (if any) that succeed with any sort of grace.

The problem, it seems, has mostly to do with the platform of *Second Life* itself. I will go into detail regarding this issue later in the paper, but suffice to say that the nature of *Second Life* itself doesn't allow for a lot of real-time action elements due to lag issues. It's difficult to design and play a game that depends upon hand-eye coordination and reflexes when, say, a player's avatar doesn't reach to block a hockey shot until it's already in the net, even though he provided the appropriate input just a second before.

Figure 5: Virtual Hockey League

The action genre has probably the most sub-genres of any other game genre, so I will discuss the few action games I found in *Second Life* under their respective sub-headings:

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3.1.1.1 ACTION - SHOOTER

An action game that emphasizes its hand-eye coordination and accuracy elements through extensive use of projectile or hit-scan mechanics. Most often associated with the *First-Person Shooter* (or *FPS*) variety.

Outside Examples	Second Life Examples
Galaga	The Vorago
Star Fox	
Halo	
Call of Duty	

The Vorago was the only shooter I could find in *Second Life* via Dr. Eno's search data, and is thus by extension the only FPS that I am aware of in all of *Second Life*.

Figure 6: The Vorago

The Vorago achieves its gameplay through the use of a custom mobile HUD (Heads-Up Display) object. The object is not actually integrated into the player's HUD, but is instead rendered in the actual game world and hovers just in front of its avatar's face. The first-person effect is accomplished by manually setting *Second Life*'s camera to first-person – there is no actual in-game requirement or restraint to play the game from any particular point-of-view.

Player health and resources are managed through a database that the game manages. Likewise, scattered items and pickups are tied to the database – after "picking up" a health pack, it is not your avatar that is informed, but *The Vorago*'s database, which will then update your HUD with the new health value.

Enemies and targets are scripted objects with simple behavior, often made to path around a particular area or just simply stand in place. "Shooting" is accomplished by simply clicking – there are no projectiles or physics in *The Vorago*. When a target is clicked on, it knows that it has been "hit", updating itself and the player in the database. Since *Second Life* ties your point-of-view to your mouse when in first-person, this roughly emulates typical FPS gameplay on other platforms. However, since there is no built-in constraint on a player's point-of-view, there is nothing to stop a player from playing from a third-person view, thus allowing him or her to click on objects anywhere around the player, destroying any semblance of FPS gameplay.

Despite being *Second Life*'s only existing FPS (as far as I am aware), I think *The Vorago* executes the gameplay in the best means possible as allowed by the *Second Life* engine. While an interesting experiment, *The Vorago* highlights some of the obstacles that will need to be overcome for the FPS genre to be viable within *Second Life*.

3.1.1.2 ACTION - SPORTS

An action game that draws its rules, gameplay mechanics, and action elements from real world sports. A sports game typically relies on physics and in-game ball objects to accomplish its gameplay.

Outside Examples	Second Life Examples
Madden NFL	Virtual Hockey League
NBA Jam	Cheeky Cow Golf Club
Wii Sports	Holly Kai Golf Club

Sports games in *Second Life* all seem to involve some sort of scripted object that obeys certain physics mechanics appropriate to the sport. A golf ball will be spawned and land according to pre-defined variables, such as wind direction and swing strength. A hockey puck will shoot in a particular direction at a particular speed and will ricochet off walls at particular angles.

Figure 7: Cheeky Cow Golf Club

However, I have noticed that "ball" objects are often not directly manipulated in the virtual world. While a puck object may bounce around the rink, a player must click on it to "acquire" it, at which point the puck may be spawned again into the virtual world. Similarly, a golf ball is not putt from where it lands – the player merely stands where it lands and a new golf ball object will be generated after swinging. From my experience, it does not appear possible (or, at least, attempted) to have an avatar execute some sort of physics-based action and have that action directly interact with existing world objects in a physics-based manner.

Also interesting is that none of the sports games are completely governed by in-game rules or mechanics. Certain scripts are used to determine when, say, a goal is cored, or when a ball is out-of-bounds. However, it was necessary for a human referee to observe a match of virtual hockey and to call out when certain player-designed rules were broken. There is no script

penalizing a player for stepping over a line – rather, the referee must observe this and make the appropriate call. This is a huge contrast to any major sports video game outside of a virtual world. In fact, I have personally never seen rule governing done by anything other than a computer in a game.

For the most part, sports games seem to work decently in *Second Life* given a few limitations. However, the issue of lag manages to rear its head again – while it was not a major concern in a slow-paced round of golf, frequent pauses were made in a *Virtual Hockey League* match I observed due to network issues. In a game that requires instant action, delayed blocks and shots are unacceptable.

3.1.1.3 ACTION - RACING

An action game that involves a spatial goal and typically emphasizes movement, speed, and spatial progress. The goal is typically made independent of other players if any are present.

Outside Examples	Second Life Examples
Super Mario Kart	Amber Motocross
Gran Turismo	Amber Skyline Raceway
F-Zero	KJ Racing Island

Take note, the exact categorization of the racing genre may be somewhat disputed. Racing games are often described as a type of simulation game by many, but I think an important distinction should be made between the simulation of real-world racing vehicles and the actual gameplay mechanics of a racing game. (That said, there is certainly a bit of overlap between the two genres.)

Figure 8: Amber Dragstrip

Figure 9: Amber Motocross

With regard to *Second Life*'s implementation of racing games, it actually appeared to be a rather popular genre, by far the most popular type of action game from my observations. Typically in-game scripted vehicle objects are generated that a player can sit in, granting the player a new control scheme. Some control schemes are fairly simple (such as a standard arrow key remapping), and others require a bit more finesse (such as pressing various key combinations to execute a motocross trick). Each vehicle provides its own set of physics attributes as well.

Racing tracks and environments usually consist of a simple terrain built using in-game geometry. I typically found that each track utilized a series of invisible scripted "gates" to determine if a player was following the rules and layout of the track. (For example, if a player passes from Gate 3 to Gate 5 without first crossing Gate 4, the game will know that particular player skipped a portion of the track.) Despite this, the gate system isn't entirely effective since not every portion of the track is covered in gates, and there are often easily exploitable holes between most gates. Even beyond skipping gates, there's no recognition of or punishment for going out-of-bounds.

3.1.2 ADVENTURE

A game that is characterized by elements of exploration and puzzle-solving, often involving intricate worlds or environments.

Outside Examples	Second Life Examples
Myst	The Kaaos Effect
Legend of Zelda	The Pot Healer Adventure:
Okami	Numbakulla

Adventure games in *Second Life* are very similar to many of their outside brethren. Players guide their avatars through complex environments built within *Second Life*, clicking on in-game objects and items to acquire or manipulate them. Woven into the environments are subtle stories and puzzles. Certain objects or environments can have scripts that are tied to particular gameplay mechanics, such as a broken pump that needs to be repaired, or a telegraph that can be manipulated via text chat to send a message in MorseCode.

Figure 10: The Kaaos Effect

Figure 11: The Pot Healer Adventure: Numbakulla

Of all the types of games in *Second Life*, adventure games seem to have had the best execution. This isn't particularly surprising considering just how ideal *Second Life* is for the genre given the nature of the platform:

Adventure games don't need to be overly fast-paced, and can be designed to be slow and methodical. This allows the issue of lag to be overcome for the most part.

Since *Second Life* does not depend on client-side game assets to render an environment, designers are free to create large and varied environments knowing that players will always be capable of experiencing them.

The point-and-click nature of a mouse and *Second Life*'s mouse-based interaction and manipulation of in-game objects is well-suited for adventure games – in fact, most PC adventure games do exactly this.

Scripts allow for interesting puzzles and in-game objects or events to be seamlessly and easily integrated into environments.

While the adventure games I played in *Second Life* have still yet to match the richness of adventure games found elsewhere, this is definitely a good start and would be an excellent avenue for future developers to explore.

3.1.3 ROLE-PLAYING

A game that is characterized by measured character growth, often tying gameplay mechanics and systems directly to in-game characters.

Outside Examples	Second Life Examples
Final Fantasy	DarkLife
Mass Effect	Tombstone
World of Warcraft	The Devil's Labyrinth

The role-playing category is another genre that is particularly well-suited to *Second Life*. Being avatar-based, *Second Life* already has an enormous emphasis on character-driven attributes and development. *Second Life* role-playing games (or RPGs) usually incorporate a backend database that tracks players' attributes and character progression. By wearing or equipping some sort of HUD or avatar object that is tied to the database, any relevant actions will update the database with the avatar's current status.

Figure 12: DarkLife

Figure 13: Combat in DarkLife

Figure 14: Tombstone

What constitutes actual "measured character growth" is dependent on the game. RPGs like *DarkLife* and *The Devil's Labyrinth* employ wandering enemy objects with basic behavior scripts attached. Players can engage in battle with these enemies wherein the player's and target's "Health Point" (or HP) values will decrease at regular time intervals as each entity takes a "turn". Calculated damage is increased or decreased depending on certain attributes stored in the database – for example, a player's "Strength" attribute will increase the damage dealt, and an equipped piece of chest armor with a high "Defense" attribute will decrease damage received. Defeating a foe will usually result in a gain of "Experience Points" (or EXP). Once a particular threshold of EXP is reached, a player's "level" will increase, boosting character attributes and

possibly offering other benefits (such as the ability to equip a new, stronger weapon, or the opportunity to learn a new spell).

Player death is also handled by the game. When a player's HP value reaches zero, the game will tag the player as "Dead" in the database, preventing any sort of character advancement. However, since an avatar cannot actually "die" in the *Second Life* engine, a player is still fully capable of moving around within the game world – he or she will just simply be incapable of engaging with enemies, interacting with the environment, accruing EXP, etc. The means by which a player can return to life depend on the RPG, but it may involve returning to some sort of "sanctuary" or using some sort of restorative item. The idea of tying unique avatar statuses to a player's entry in a database is an interesting one, and one that could have multiple applications in other *Second Life* games.

Some RPGs also involve true role-playing mechanics. There are few in-game rules or constraints – rather, players adopt a character persona and act accordingly within a fictionalized virtual world. Any "rules" are created and enforced by the players themselves. These games seem to blur the line between *Second Life* the virtual world and *Second Life* the game platform.

One last interesting phenomenon I've noticed is the use of paid services. It's somewhat common in the MMORPG (Massively Multiplayer Online RPG) and social game markets for some developers to reward players who pay more money. For example, a player may be able to buy a +15 Strength axe for $5.00 while a similar player may only be able to acquire a +10 Strength axe in-game, or a player's farm may be able to outperform a friend's farm because he paid for $10 worth of extra seeds. It's a somewhat unscrupulous means of making money, but the practice seems to have made its way into *Second Life*. This practice goes beyond just Linden Dollars, and games such as *The Devil's Labyrinth* offer incredible advantages for those willing to pay for them. In the case of *The Devil's Labyrinth*, the game almost seems designed and balanced around the use of paid items, encouraging their purchase to make the game even somewhat playable. This might soon become a common means of supporting "free" games in *Second Life*, for better or worse.

3.1.4 STRATEGY
A game that is characterized by elements of planning and skillful thinking.

Outside Examples	Second Life Examples
Civilization	Tiny Empires
StarCraft	En Garde!

Strategy games embody the polar opposite of action games in that they require no elements of hand-eye coordination, accuracy, reflexive action, etc. As such, this is another genre that would be an excellent fit for *Second Life*. However, I was surprised to not find a great deal of strategy games in my searches, if they could be considered true strategy games at all. This might perhaps be due to the amount of effort and attention that needs to go towards developing a truly great strategy game, one rife with depth and detail. *Second Life* might not have quite the audience or population to support that kind of endeavor.

Like the RPG and adventure game, a strategy game would be best implemented with some sort of backend database to track player or faction attributes, settings, etc. *Tiny Empires* appears to do just this to track and measure its large number of players as well as determine when an in-game "turn" has passed. However, not all strategy games would require a database – certain types of strategy games should be more than capable of supporting themselves with nothing more than a set of objects and scripts. This brings us to one of strategy's most well-known sub-genres:

3.1.5 BOARD GAME

A turn-based strategy game that is typically self-contained and emphasizes a small ruleset and game space in order to maximize depth and accessibility.

Outside Examples	Second Life Examples
Chess	Chess
Go	En Garde!

While *Second Life* may not be home to many general strategy games, scripted conversions of popular board games were very plentiful and easy to find. It's not hard to see why – LSL is fairly easy to learn, board game logic is simple and relatively easy to code, most people are familiar with the rules of games like Chess or Checkers, board games in general are very accessible, and the genre's turn-based nature grants it immunity to *Second Life*'s lag issues.

Figure 15: Chess

Figure 16: En Garde!

Games like Chess are also very obviously enjoyable and compelling in their own right, so they make "good" games by default. However, because these games are easy to build regardless of platform, it's not saying terribly much to point out how compelling they are in *Second Life*. The platform is capable of being more than a glorified board game simulator, and so while it's good to see such games being produced within the virtual world, games that more push the boundaries of engine will be necessary for *Second Life* to grow as a platform for game content.

3.1.6 GAMBLING

A game that requires little to no player involvement or skill and is characterized by elements of extreme luck or chance. These games are often tied to monetary admissions and rewards.

Outside Examples	Second Life Examples
Roulette	Zyngo
Slot Machines	Pirate's Treasure

I would normally not find it necessary to explicitly label and categorize this genre, but I deemed it appropriate to do so given the sheer presence gambling games have in *Second Life*. What I found even more interesting was the irony of Linden Lab's stance on gambling in *Second Life* – they have purportedly banned any games of chance, and any games with a monetary risk must have a level of demonstrable skill involved in winning. Despite this claim, there is an incredible number of games that, while having an illusion of choice and skill, are ultimately built on pure luck.

Figure 17: A virtual casino in Second Life

Figure 18: Gambling games Zyngo (above) and Fruit Fiesta (below)

For example, according to Dr. Eno's search data the most popular game by far is *Zyngo*, a sort of slot machine in disguise. One entry fee typically grants a number of rounds, each round beginning with four randomly chosen numbers arranged in a horizontal row. Above the horizontal row is a static grid of sixteen squares, arranged so that a column of four squares is situated above each square of the horizontal row. The idea is to click on numbers in the grid columns that match with their respective randomly generated numbers in the bottom horizontal row. After the series of rounds are over, the player is rewarded a cash prize based on how much of the grid was matched.

Obviously, the action of clicking on the grid squares involves no human thought processes or decision-making, and no amount of skill is going to change which numbers are randomly generated. This scam is made even more transparent by the inclusion of an "Auto-Play" button that will match and click the grid squares for the player, no different than pulling a slot machine lever and letting the machine tell the player whether or not he has "won". How such a mechanic can be included and still pass Linden Lab's inspection is maddening and beyond my comprehension. And beyond *Zyngo*, nearly every one of these devices (some less transparent than others) incorporates some sort of similar veil of "skill" to fulfill Linden Lab's requirement.

In terms of technical construction, most gambling games seem to be designed to fit in small, self-contained "booths" with appropriate scripts. They are seemingly easy to copy, sell, and use, and

are very prominent (and apparently profitable) in *Second Life*. As of now, they the best represented "gaming" in *Second Life* due to their popularity and will probably see the most growth and advancement of any category of games in the virtual world.

Gameplay Genres that are not represented in Second Life

The following is a brief examination of gameplay genres that I did *not* encounter in *Second Life*. In the interest of expanding *Second Life*'s presence in the field of gaming, I would think it worthwhile to analyze exactly which types of games are not represented, including possible reasons as to their exclusion and how they might be realized in the future.

3.1.7 FIGHTING

An action game with extremely competitive gameplay, often involving avatars or other playable entities that embody certain gameplay themes or ideas. They typically involve direct competition between multiple players and emphasize elements of timing and player psychology.

Outside Examples
Virtua Fighter
Super Street Fighter IV
Super Smash Bros Brawl

Fighting games are a very popular multiplayer genre. Given *Second Life*'s nature as a social virtual world, fighting games would make a great addition to its array of supported game types. However, I believe there to be two major obstacles to its mainstream acceptance in *Second Life*.
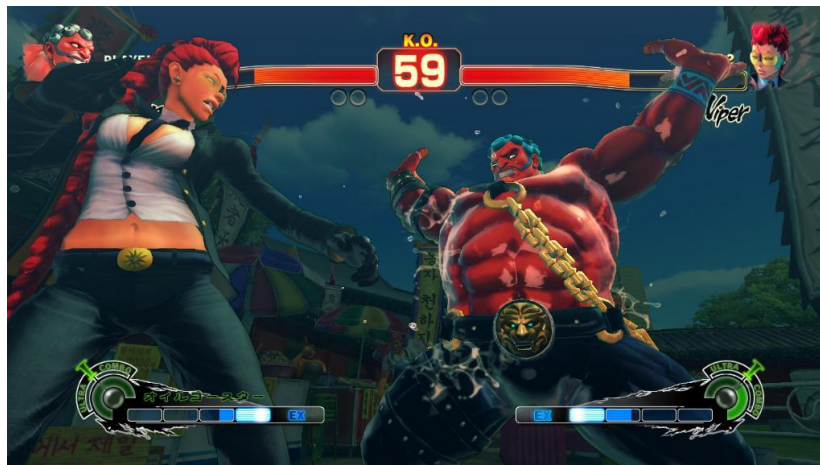
Figure 19: Super Steet Fighter IV

 More so than possibly any other video game genre, fighting games are extremely susceptible to issues of lag. In a genre where it is not uncommon for developers to balance a character's moves around a 0.2 second difference, the sorts of lag problems found in *Second Life* are nigh unacceptable.

The majority of fighting games are played on a 2D plane and I have yet to see any game, regardless of genre, played in 2D within *Second Life*. If there were a means of explicitly limiting an avatar's range of movement to only a horizontal and vertical axis, it might be more attractive

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for developers to bring their fighting games to the platform. (This may indeed be possible, as I am ignorant to the specific limitations of *Second Life*'s engine.)

3.1.8 PLATFORMER

An action game that emphasizes spatial movement and hand-eye coordination. Often involves so-called "platforms" and jumping mechanics.

Outside Examples
Super Mario Bros.
Sonic the Hedgehog
Donkey Kong Country Returns

This is another popular genre for anyone who played *Donkey Kong* or *Mario Bros.* in arcades. Platformers are simple and accessible and would make excellent games in *Second Life*. The reasons for their exclusion are most likely the same as for fighting games – lag problems and a lack of support for 2D content.

Figure 20: Super Smash Bros. Brawl

3.1.9 PUZZLE

A game that encapsulates a particularly novel or unique gameplay mechanic, often requiring thoughtful action from the player.

Outside Examples
Tetris
Katamari Damacy

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There were a number of *Second Life* games that I encountered that could be considered borderline puzzle games, but unfortunately they were all blatantly designed as gambling games – their gameplay mechanics incorporated far too many elements of chance in addition to their admission fees and payouts.

Figure 21: Tetris

Figure 22: Katamari Damacy

Surprisingly, beyond said gambling games, I found no true puzzle games. However, it would not be difficult to imagine enjoyable puzzle games being implemented within *Second Life*. In fact, from my observations, there are no technical limitations preventing any compelling puzzle games from being developed (beyond any temptations to convert such games into potential gambling prospects). To be honest, I would not be surprised if such puzzle games already existed (despite my best efforts to find them).

3.1.10 REAL-TIME STRATEGY

A type of strategy game that occurs in real-time. Often emphasizes tactics and resource management.

Outside Examples
StarCraft II
Age of Empires

Figure 23: StarCraft II

With so few strategy games in *Second Life*, it's not a surprise to find that there are no real-time strategy (RTS) games. RTS gameplay would require a number of additions or enhancements to the *Second Life* engine to function properly:

- A large number of game units and structures are required for RTS gameplay in addition to some sort of interface to manage them. Not only would *Second Life* need to track and manage all of these game objects (many with their own AI), but it would need to provide a means of selecting and deselecting various combinations of units and a way to intuitively direct them.

- RTS games often take place within large game spaces, so a large amount of virtual land would need to be allocated.

- Different players can have different views of the same RTS game. For example, fog-of-war effects might hide the position of a player's units from his opponent, but that player would still be able to see his own units. I am not aware of the *Second Life* engine being capable of changing the appearance of an environment depending on which avatar is viewing it – this might be an interesting technical addition to look into, even beyond gaming applications.

All that said, one possible alternative to avoiding the above issues would be some sort of dynamic HUD-based RTS. The only limiting space would be the size of one's screen display, and games like *Tiny Empires* have demonstrated to me that a HUD can display different views of the same world or data to different players. However, such an RTS would have to be designed from a 2D point-of-view, and I also do not know if *Second Life* has any technical limitations on what a HUD is allowed to do.

3.1.11 SIMULATION

A game that attempts to simulate a particular idea, whether fictional or non-fictional.

Outside Examples
SimCity 3000
Roller Coaster Tycoon
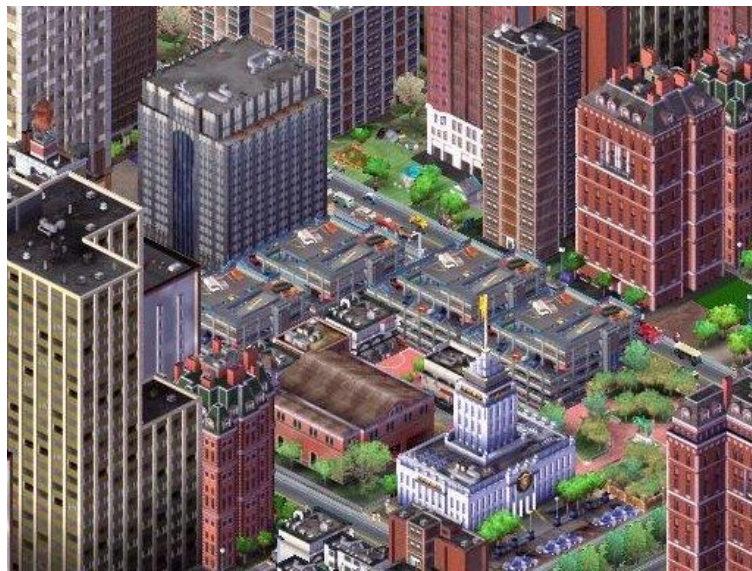
Figure 24: SimCity 3000

By far the most surprising omission, I could not find a single simulation game despite numerous searches. The closest I ever came to a simulation game was the University of Arkansas hospital catheter operation simulation, which automates bots but is not interactive.

Of course, this brings into question where we can draw the line between game and application. There's nothing that really separates the hospital simulation from a game except one's preconceptions and personal definitions. Like the *Second Life* platform itself, the hospital simulation could be considered a type of game, a type of "serious" game, a game with a purpose beyond entertainment or aesthetic value. But then, "serious" works in other media are often deemed so *because* of their artistic qualities – *Mona Lisa* is a "serious" painting, Beethoven is "serious" music, and *Citizen Kane* is a "serious" film. Semantics aside, this should highlight that a distinction might need to be made between a "serious" game in the artistic sense and a "serious" game in the application sense, and that this distinction might be the line in the sand (however blurry and subjective it might be) that separates games as an artistic medium and games as a tool to serve humanity.

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So, while the University of Arkansas hospital simulation is certainly a type of game and a type of simulation, it's not the same type of simulation game as it pertains to this genre. For example, most good simulation games would not sacrifice compelling gameplay mechanics for the sake of realism or maintaining a better "simulation" (which is why I'm not a fan of the term in the first place, given its inaccuracy), while simulations in the practical sense would strive to perfectly emulate their source regardless of whether or not it's considered more compelling in an artistic or aesthetic sense.

As to why there are no simulation games in *Second Life*, I haven't a clue. Obviously, the platform can support the gameplay given *Second Life* is practically a simulation itself. Perhaps that is precisely the reason – players might not feel the need to play a simulation game inside an already simulated world. Perhaps the costs associated with building a true simulation game simply aren't worth the investment. (Or, perhaps any existent simulation games simply escaped my scrutiny.)

3.2 Dimension of Technical Construction

This dimension explores the ways in which games can be technically constructed within *Second Life*.

3.2.1 SCRIPTS AND CODE

A game that is constructed using scripted objects and objective, coded rules and gameplay mechanics.

Outside Examples
Zyngo
Numbakulla
The Kaaos Effect

Most games in *Second Life* are built in this fashion. They have the rules of the game hard-coded and are completely objective and computer-controlled. For example, a referee would not be needed to determine when a king is placed in checkmate during chess – the game would be programmed to automatically grant victory to the appropriate player.

3.2.2 SELF-CONSTRAINTS AND REFEREES

A game that does not solely utilize objective code or built-in rules and mostly relies on players willingly obeying a set of human-constructed terms and rules. Rule and game violations are determined by other humans or players.

Only a few games in *Second Life* use this rule construct, often in conjunction with objective scripts and rules. For example, while a game of virtual hockey will use scripts to determine when a goal has been made, a "No Flying" rule must be enforced by a human referee – there is no code to prevent a player from flying during a hockey match. This rule construct is best used by games of a social nature that already have subjective "rules" (such as in a role-playing game like *Tombstone*).

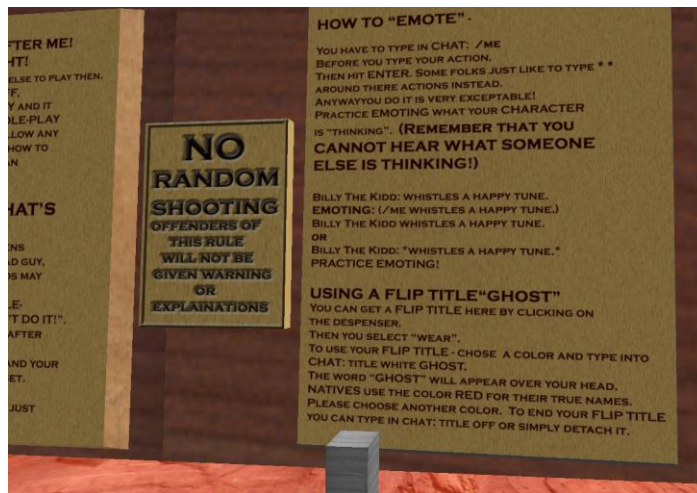| Outside Examples |
|---|
| Tombstone |
| Virtual Hockey League |

Figure 25: List of rules and guidelines in *Tombstone*

3.2.3 REAL-TIME

A game that takes place in real-time. Actions will execute at the time of input and occur independently of other actions or events.

Outside Examples
Virtual Hockey League
Amber Motocross

For the most part, these games aren't very prominent nor successfully executed in *Second Life*, mostly due to lag problems. They are constructed and designed around the assumption that actions will occur immediately upon input, such as turning a vehicle during a race. However, when these actions are delayed due to lag, the games can quickly become unbalanced as various player actions occur only after unpredictable delays.

3.2.4 TURN-BASED

A game that utilizes a turn-based timing structure. Actions do not immediately occur at the time of input and are instead delayed or simply not accepted until a pre-determined, synchronized time.

Outside Examples
En Garde!
DarkLife
Tiny Empires

Turn-based games seem to have made the best transition into *Second Life*. By circumventing the lag issue via synchronized turns, it doesn't matter if a player's action is delayed by a second if his opponent can't perform an action until the player's turn is over. In terms of technical execution, games like *DarkLife* and *Tiny Empires* seem to synchronize turns to a server clock or

timer. However, many board games in *Second Life* simply define a turn to be over when a player has selected an action.

3.2.5 ENCAPSULATION

A game that is constructed in tight, efficient "capsules" of gameplay and geometry. These capsules are far removed from other interfering elements (such as other players and objects) in order to facilitate smoother gameplay and performance.

Outside Examples
The Kaaos Effect

The only game I could find that extensively utilized this construct was *The Kaaos Effect*, but I found it significant enough as to warrant its own category. By encapsulating certain parts of a game and isolating it from its environment, performance was improved considerably during my play tests. This could be a major breakthrough for *Second Life* as a gaming platform as a means of circumventing certain lag issues. Similar techniques have been used in other games like *World of Warcraft* with great success.
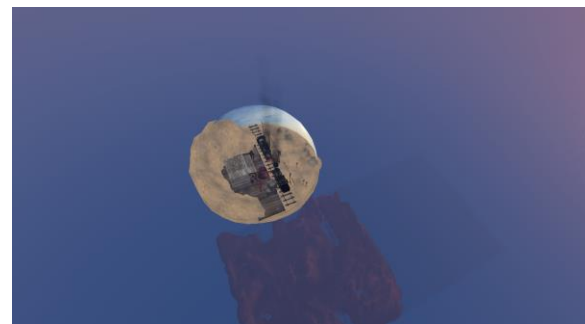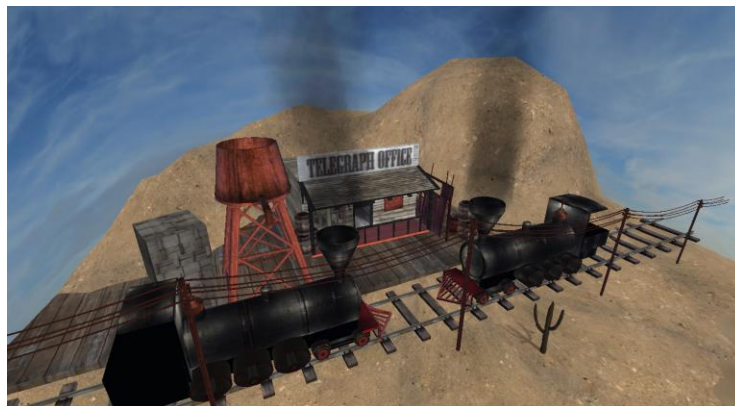
Figure 26: Encapsulation in *The Kaaos Effect*

A game that utilizes or is fully contained within a 2D HUD device.

Outside Examples
The Kaaos Effect
Devil's Labrynth
Tiny Empires
DarkLife

When equipped, HUD objects provide a 2D overlay that can display useful information, provide a button-based UI, or act as its own self-contained game. They appear to be lightweight, efficient, and extremely effective. It would be interesting to see if HUD objects could developed further to include additional functionality, such as virtual screens that could be used to play 2D games.
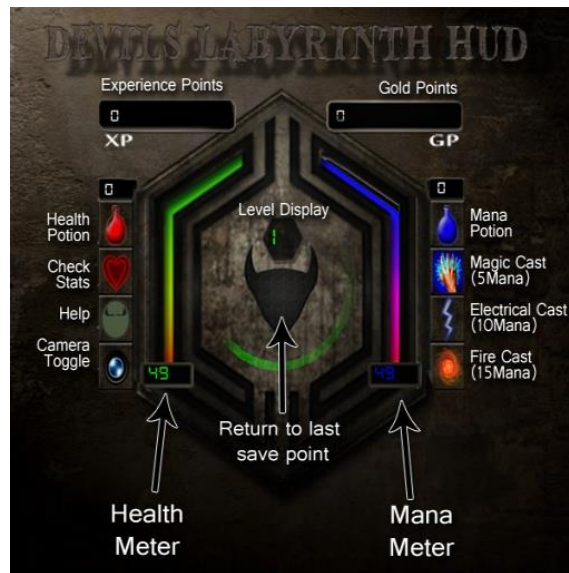
Figure 27: HUD display in *Devil's Labrynth*

3..3 Dimension of Social Interaction

This dimension explores a number of ways *Second Life* games facilitate social interaction and what these social elements add to their respective games.

3.3.1 MULTIPLAYER COMPETITIVE

A game that involves multiple players that are in direct conflict with one another for success.

Outside Examples	Second Life Examples
Chess	Virtual Hockey League
GoldenEye007	KJ racing Island
Marvel vs. Capcom	The Vorago

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These games are incredibly popular and plentiful outside of *Second Life*, but there are surprisingly not very many within the virtual world. This might be because *Second Life* is not the most ideal platform for competitive gameplay due to lag and a lack of games with any real depth. There also don't seem to be very many competitive players within *Second Life*, and without anyone to play, competitive players have little reason to play *Second Life*. (It's sort of a "chicken and the egg" effect.)

3.3.2 MULTIPLAYER COOPERATIVE

A game that involves multiple players that are encouraged to cooperate towards a common goal.

Outside Examples	Second Life Examples
Team Fortress 2	DarkLife
Castle Crashers	Tiny Empires
ToeJam & Earl	

More popular than their competitive brethren, these games encourage players to socialize and work together. As what is marketed as a primarily social platform, *Second Life* seems particularly suited for these sorts of games where players can be "friendly" and interact with one another as they play the game. One might even consider these interactions to be the main attraction of the game, rather than the gameplay itself.

3.3.3 MULTIPLAYER SOCIAL

A game that involves multiple players and is primarily played for communication and social interaction. Goals can be varied and/or nonessential, the emphasis being on *what happens* rather than a particular victory condition.

Outside Examples	Second Life Examples
Animal Crossing	Tombstone
Minecraft	

Figure 28: A social gathering during a racing event at *Amber Dragstrip*

While I listed only one explicitly multiplayer social game, it could be argued that all of *Second Life* is one enormous social game. There is no "winning" *Second Life*, nor are there any specific goals to accomplish. Players join *Second Life* primarily to interact with others, and this purpose often extends to many games within *Second Life* itself. *Amber Dragstrip* is a barren wasteland until one of its "race nights", a social event where few players come to race and most come to socialize. As a game, *Second Life* is mostly aimless with "goals" such as *Amber Dragstrip* that exist almost solely for the ulterior motive of bringing friends together for some fun and talking.

3.3.4 SINGLE-PLAYER
A game that is played by only one player.

Outside Examples	Second Life Examples
Metroid	The Kaaos Effect
Dragon Quest	Numbakulla
Portal	The Devil's Labrynth

The least common type of game within its dimension, single-player games almost seem to contradict the very nature of *Second Life* as a predominately social platform. In fact, it's difficult to qualify any of these games as being truly single-player due to all of them being built on top of *Second Life* engine – environments and game spaces in *Second Life* are usually public and open to interference from other players. It's similar to a playground or a spook house in that other players are free to involve themselves in your experience rather than having their own separate, isolated environments.

For example, while *The Devil's Labyrinth* is designed as a single-player experience, it was extremely common for me to see other players passing me or communicating with one another. Some players even cooperated with one another, such as a high-level player defeating low-level enemies so that another player could pass through a room unharmed.

Figure 29: Players cooperating in *The Devil's Labrynth*

The Kaaos Effect provided an interesting technical solution for this problem. Using its encapsulation method, the game was capable of isolating several different players from one another. Even if two players were playing in, say, the Wild West environment, they wouldn't be capable of interacting with one another – each player would be contained within his own separate "pod", each having their own individual gameplay experiences. (However, there did seem to be a limit to the total number of active game instances. Should the limit be reached, new players would have to wait until a pod was no longer in use before beginning or resuming play.)

4. Advantages and Disadvantages of Second Life as a Gaming Platform

As a platform for games, *Second Life* has several distinct advantages and disadvantages that should be examined and understood if it should ever be explored as a serious creative outlet for game developers.

4.1 Advantages

4.1.1 Common Platform and Interface

Since all games are built on top of *Second Life*, there is a single platform and interface across all games. Players do not necessarily need to learn completely new control schemes or become used to new interface elements. If a player can navigate his inventory and maneuver around the virtual world, he has the basic knowledge to play most games in *Second Life*.

4.1.2 Cross-Game Avatar Consistency

Everything in *Second Life* is tied to a player's avatar, and that avatar stays consistent across all games. This is not a common practice in mainstream games, but it has its advantages. Developers can always be assured that the player is represented as someone he identifies with and that the avatar will be completely tailored toward the player's personality and sense of self. This could make many games more immersive when a player feels as if he has truly been transplanted in the game and is experiencing the game's content "first-hand", so to speak.
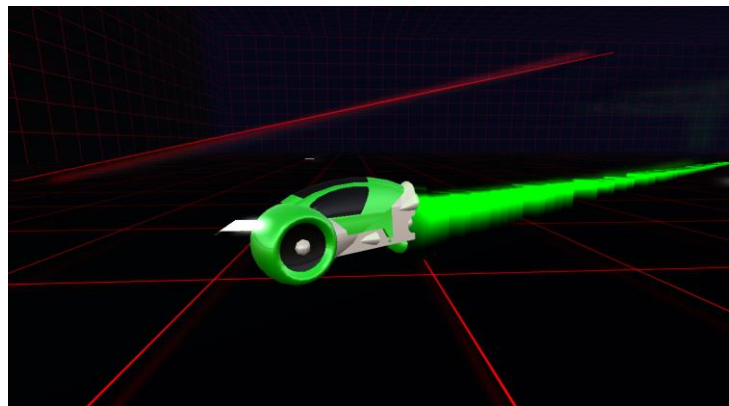
Figure 30: CyberCycle Challenge encourages users to create and distribute their own tracks using provided resources and tools.

4.1.3 Content Creation

Second Life does not store any major data or resources client-side. The greatest advantage of this is the amount of variety and content that can be created. Any player can customize his

appearance with whatever items or resources he desires without having to be concerned with whether or not other players will be able to see it. A developer can add a completely new environment to a game without players having to download it. The game world can be as dynamic as players and developers want to make it – they are only bound by their own creativity.

4.1.4 Ease of Scripting

LSL is a very approachable scripting language designed to be easy to learn for the layman. This ties into content creation in that it allows for nearly anyone to create in-game content, allowing for further variety and creativity within the virtual world.

Figure 31: I was able to easily create Lights Out! in a single evening
due in part to the accessibility of LSL and real-time development feedback.

4.1.5 Real-Time Development

Second Life allows for development to take place in real-time. A developer can model an item in-game without the need to compile it first. This allows for quick feedback and iteration, speeding up the development process.

4.2 Disadvantages

4.2.1 Limited Controls and Interface

While having a consistent control scheme and user interface across games can have its advantages as I noted above, it can be a hindrance to most games. Very few mainstream games share the exact same controls and interface – most games customize these elements to optimize their gameplay experiences. In fact, it could be argued that having these elements remain consistent implies a sort of manufactured quality that somewhat cheapens the experience. These limitations within *Second Life* extend to other gameplay elements as well, such as camera control.

**Figure 32: *Limbo* (left) and *Metroid Prime* (right) utilize
completely different controls, cameras, and user interfaces**

4.2.2 Physics and Engine Limitations

Second Life's default physics – and, indeed, the entire engine as a whole – are used as the underlying framework for all *Second Life* games. This is appropriate for certain games, but it should certainly not be assumed that all games can be built and designed under the same physics and engine structure. Even between two similar platformers from the early 1990s – say, *Super Mario Bros.* and *Sonic the Hedgehog* – it would be unthinkable to presume either game could be designed under the physics and attributes of the other. Even with my limited play experience, nearly all *Second Life* games began to feel like variations of one another, part of which was due to their all using the same basic engine. Meanwhile, the spatial and physics puzzles and gameplay of a game like *Super Mario Galaxy* would be impossible within *Second Life*'s physics framework.

**Figure 33: Super Mario Galaxy has players manipulating gravity and physics
to accomplish such feats as walking upside-down or flying through space**

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4.2.3 Online Lag and Slowdown

By far one of the most detrimental disadvantages to *Second Life*, its online lag and slowdown makes entire games and genres unplayable and unfeasible. While *Second Life*'s advantage is its ability to allow for endless content that doesn't need to be stored client-side, the other side of the coin is that all of that data must be streamed to a player through his or her *Second Life* viewer. This is incredibly taxing, making even a simple walk across a bridge a frustrating experience.
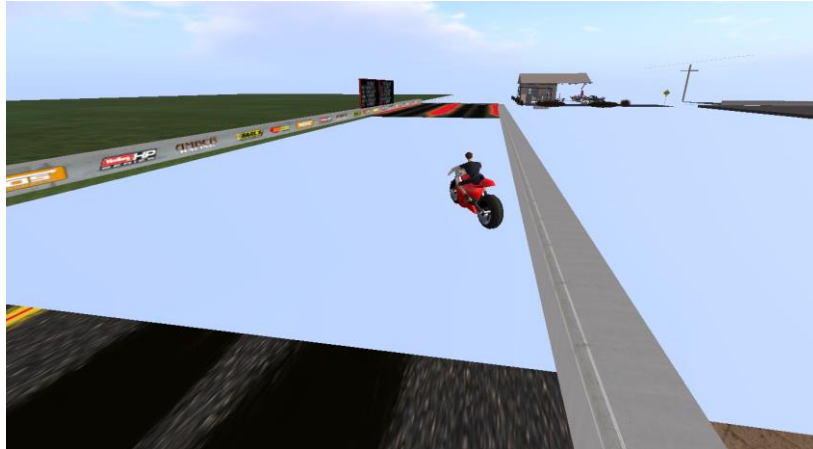
**Figure 34: Roads around Amber Dragstrip can't load fast enough
to keep up with the speed of my vehicle.**

4.2.4 2D Gameplay

Related to the issue of engine limitations, there does not seem to be a means of creating true 2D gameplay in *Second Life*. Even if there were a means of limiting a player's field of movement to two axises and forcefully positioning the camera to a suitable location, the game would still be built using 3D models and environments. There's something to be said for traditional 2D animation and graphics, whether they be hand-animated or pixelated, and the gameplay possibilities they provide. The only games I could find in *Second Life* with any semblance of 2D gameplay were virtual cabinets that most often contained gambling games. I don't completely understand how these games are constructed, but a number of them seem to utilize flat objects that resembled paper cut-outs – they were still modeled in 3D, but were layered on top of one another to resemble a flat virtual "screen". These screen elements were mostly likely individually scripted to generate gameplay. While this is a clever workaround, it's not enough to match the level of detail and depth available on other platforms, nor is it particularly compelling in its own right. It also feels rather clunky and inelegant to be using one game interface (*Second Life*) to manipulate the virtual controls of a second game interface, like playing a video so that you can watch a movie the person in the video is watching. It would be better if *Second Life* could provide some sort of native 2D support for these types of games.
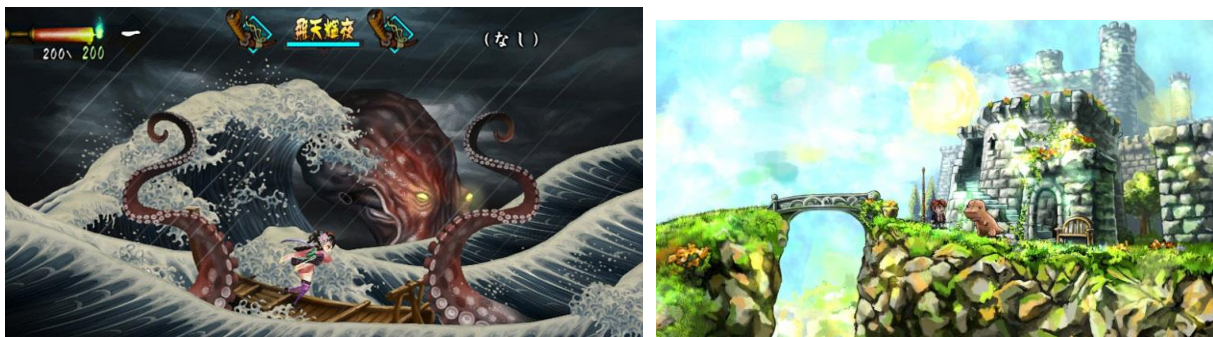
Figure 35: *Escape from Devil's Labyrinth*

Figure 36: 2D games like *Muramasa: The Demon Blade* (left) and Braid (right) are as strong and inspired as ever.

4.2.5 Graphics

Obviously, *Second Life*'s visuals don't have the graphic fidelity of most modern games, and that comes with its own creative and technical limitations. Due to the issue of lag, most games are forced to be more conservative with their prim counts lest they become unplayable. As a result, most games in *Second Life* look worse than games that had been released on other platforms nearly ten years prior. With performance being such an issue, extravagant or detailed environments are impractical. This problem extends beyond just prim counts – as far as I can tell, all *Second Life* games must be rendered by the same default engine. While this may be suitable for a number of games, the engine's inflexibility prevents developers from tailoring their own unique visual styles to their games. That said, I've played games like *The Kaaos Effect* and *The Devil's Labyrinth* that made extensive use of *Second Life*'s built-in lighting effects to create a moody atmosphere, but it would be interesting to see how far developers could push their games without the limitations mentioned above.

Figure 37: *Resident Evil* **circa 2002, one year before Second Life launched.**
Clever usage of pre-rendered environments and lighting effects give the game an effective visual style.
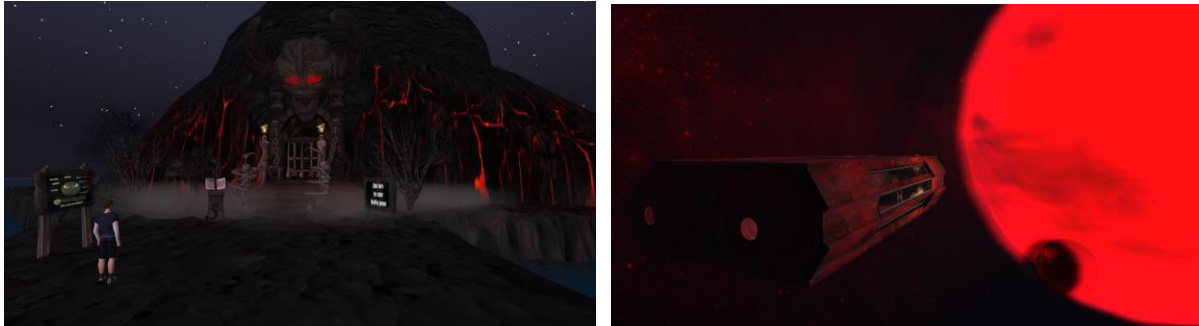
Figure 38: *The Devil's Labyrinth* **(left) and** *The Kaaos Effect* **(right),**
utilizing extensive lighting effects to create a distinctive atmosphere.

4.2.6 Avatar Limit

Obviously, having a limit to the number of avatars that can feasibly participate in a game space is a major disadvantage to certain game types. In fact, many MMORPGs are designed around having possibly hundreds of players participating in any one event. *Second Life* would need to increase its avatar count to make these games viable.

Figure 39: World of Warcraft

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5. *Comparisons to Other Game Development Platforms*

As a game design enthusiast I've had some experience with a few game development platforms in the past, such as Valve's Source game engine and Blizzard's Galaxy Editor. I was interested in seeing how they compared to *Second Life*.

Beginning with Source, the most obvious difference is the user interface. Source incorporates a sort of CAD-like interface, complete with 2D grid-based plane views of every axis as well as a fourth 3D view. A developer creates "brushes" (the equivalent of "prims" in *Second Life*) using the plane views to define the shapes in three dimensions, which are then reflected in the 3D view. Gameplay mechanics and objects are represented by "entities" which are placed in the game world via the same three-plane interface. Each entity can be defined as having some sort of effect or function, such as a light_dynamic that will dynamically illuminate the area around it, a prop_static that will add an aesthetic visual model to the world, or a logic_relay that aids in defining gameplay logic and rules. Once the level, map, game, etc. is finished, it is compiled and exported. The final product can then be downloaded and played by other users.
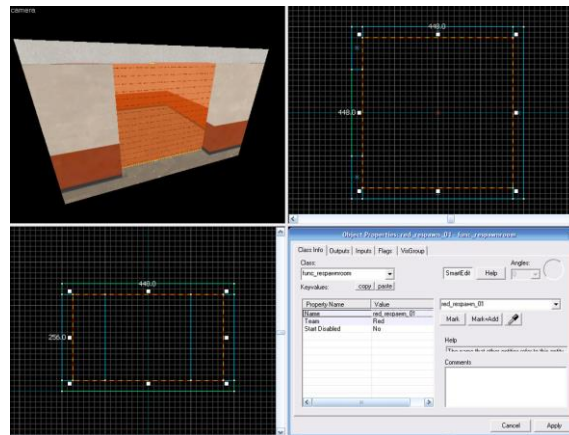

Figure 40: Building a room in *Source*

The Galaxy Editor also utilizes a 3D viewing window, but it does away with a grid-based, multi-plane interface. Instead, units, items, triggers (things that activate certain events based on specific conditions), and other gameplay elements are either "dropped" into the 3D view or are defined in separate spreadsheet-like editor windows. Since the Galaxy Editor was designed to accommodate more of the top-down strategy, RPG, and adventure genres, so there's not much of an emphasis on designing along the Z-axis. This makes it much more specialized than Source or *Second Life*, but limited in creating other types of games. Once finished, a project is compiled and exported just like in Source.

Figure 41: *Team Fortress 2*, a team-based FPS built using *Source*

Second Life contrasts the other two platforms in a number of ways. Both the Galaxy Editor and Source use development tools separate from the actual game clients, but *Second Life* allows for game development to take place in real-time through the same interface a player uses to play games in *Second Life*. This is advantageous in that it allows for quick and easy development and iteration – without a need to compile, a developer will receive immediate feedback. A somewhat appropriate comparison would be that *Second Life* is similar to a scripting language like Perl, while development tools like Source and the Galaxy Editor are closer to programming languages like C++ or Java. I would not have been able to develop *Lights Out!!* in a single evening if it were not for this "script-like" advantage.
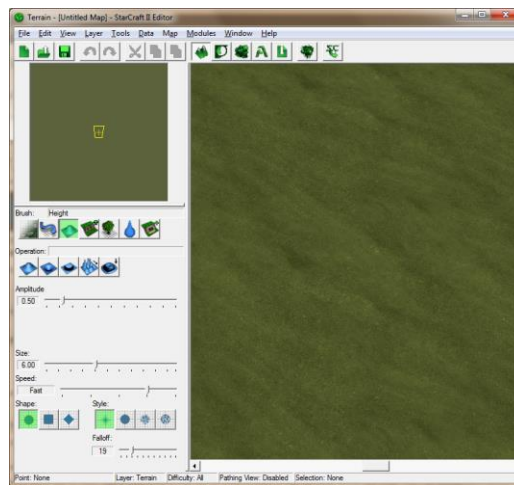
Figure 42: Starting from scratch in the *Galaxy Editor*

When it comes to larger-scale and more ambitious designs, however, I found *Second Life* more difficult to work with. For example, Source's CAD-like interface made design incredibly tight and efficient – I could define the exact shape and position of brushes and world geometry. I could build entire worlds contained within customized skyboxes and world physics. *Second Life*, on the other hand, was more difficult to create exact shapes and geometry without a defined grid and while fighting with the in-game camera. When I'd create a prim, I couldn't define its

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position in absolute terms, only relative to itself. (If there's a way around this, I must be ignorant to it.) Everything I built was contained within an already pre-existing parcel of the world, under pre-defined world attributes and physics.

Figure 43: *Blizzard DOTA*, an RTS built using the Galaxy Editor

An advantage of *Second Life*'s development environment is also a sort of disadvantage. As I've mentioned, LSL is a very simple and effective means of scripting objects in *Second Life*. It can be used to add all sorts of functionality to the virtual world, not just for games. While this gives it a lot of practical uses, it also means it's not tailored specifically for game development. Every tool and resource in Source and the Galaxy Editor is designed explicitly to facilitate game development. If I need to define a specific rule or trigger, there are tools for that, but in *Second Life* I have to figure out how to code and define that logic in LSL.

Overall, my impressions of *Second Life* versus other game development platforms almost exactly reflects the game content produced by each. *Second Life* excels at quickly, easily, and cheaply producing in-game objects with simple functionality. It's approachable and easily understood by most competent people so that even a casual player will be capable of adding something fun and interesting to his environment. However, its scope and technical limitations prevent it from realizing serious, significant games at the same level of execution as other more specialized development platforms.

5.1 The Current State of the Artistic Significance of Games in Second Life

As the game medium progressed these past few decades, it has become more and more apparent that it has incredible potential as a medium for artistic expression. If we intend to develop *Second Life* as a serious platform for game development, it is imperative that we evaluate the artistic significance of its current games so that we might improve it in the future.

5.1.1 What Makes a Game Compelling?

Before examining the artistic significance of games in *Second Life*, we should explore what exactly makes a game compelling. While it is arguably a very subjective matter, I will be basing my judgments on my extensive personal experiences playing and analyzing games as well as ideas I've adapted from numerous game critics and developers. In particular, I'll refer back to Mr. Iwata's belief that a game's worth is dependent on the value of a game's response relative to

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one's input. Whether this be a meaningful story or engaging gameplay, a compelling game must communicate its value directly through a player's actions. A compelling game, I believe, will also have depth, meaning that individual actions will have purpose and not become trivial or meaningless long after the game has been extensively studied and practiced (an idea I've adapted from noted designer David Sirlin).

Figure 44: *Shadow of the Colossus***, considered by many to be**
one of the most artistically significant games of the past decade

5.1.2 Storytelling

When most people think of the artistic significance of games, storytelling is one of the things that immediately comes to mind. While it's certainly not the element that solely justifies the medium as an art form, it is most definitely a significant component. Unfortunately, very few games in *Second Life* make use of any sort of plot. The few that do are, frankly, fairly trite. For example, *The Devil's Labyrinth* can be summed up as its name implies: "You are trapped in a labyrinth crafted by the Devil himself. Escape and survive!" The only other stories I found were in *Numbakulla* and *The Kaaos Effect*, and neither proved to be terribly compelling – it's difficult to be immersed in a story when the writing is wrought with spelling errors and the occasional smiley, never mind the absence of an interesting plot.

Figure 45: *Mass Effect* **is a popular series with extensive storytelling.**

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It almost seems pointless to mention when there's such a lack of storytelling in the first place, but it bears mentioning that no *Second Life* game I've played takes advantage of dynamical meaning, one of the greatest tools a game developer has at his disposal. A term coined by respected developer Jonathan Blow, good dynamical meaning is a harmonious alignment of gameplay and story to enhance how a game resonates with its player(s).

An excellent example of this is in *The Legend of Zelda: Majora's Mask*, wherein the player participates in reuniting lost lovers Anju and Kafei before, unbeknownst to the couple (but not the player), an apocalyptic event will occur soon after their planned wedding. Despite having been jilted once before, Anju waits patiently for Kafei out of a faith restored by the player. Meanwhile, the player is waiting for Kafei as well out of a desire to complete the quest and receive his reward. As Anju and the player wait, the clock ticks closer and closer to certain doom, and the player may become anxious with the knowledge of his impending fate, questioning if Kafei has decided to abandon his lover once again. However, by waiting for Kafei, the player silently demonstrates his shared faith in Kafei and in the strength of the couple's relationship. Kafei will indeed arrive moments before the end, and the player will receive his reward. However, what is more important is the synergy between the game's story and gameplay, emphasizing and enhancing its thematic significance and meaning to the player on a level that's impossible to replicate in any other medium.

Figure 46: Waiting for Kafei with Anju

As I mentioned, I encountered no *Second Life* games with a compelling story, let alone dynamical meaning. In fact, I encountered numerous examples of the contrary. For example, in *The Devil's Labyrinth*, the player is encouraged by the game to explore and interact with his environment. However, after attempting to open a treasure chest with a magic spell, I was informed that I didn't have the proper knowledge of magic to open the chest and consequently had my health and magic drained as punishment for "being so foolish as to think I could open a treasure chest with magic". This is an example of disharmonious dynamical meaning, where the story is telling me one thing, but the gameplay is clearly communicating the opposite.

It's a shame that *Second Life*'s games lack compelling stories, but there *is* potential in *Second Life* for particularly effective dynamical meaning given its advantage of cross-game avatar consistency. With a more personal and identifiable avatar, there should be numerous possibilities to have players better relate to story elements in *Second Life* games, given that the gameplay elements are appropriately designed.

5.1.3 Sound

There's not much to say about sound or music in *Second Life*. Nearly every game I encountered had a radio playing in the background, and only one or two games utilized any sound effects whatsoever. Cars would drive by without so much as a putter; evading alien invaders in a technological complex would be accompanied by 80s soft rock. Games like *The Devil's Labyrinth* provided a melancholic drumming sound in the background, but that was about the furthest extent of "music" I heard. Certainly, *Second Life* has a long way to go before it can match the sounds of Koji Kondo, Nobuo Uematsu, Tommy Tallarico, and other well-known game composers.

5.1.4 Visuals

I've already touched on the visuals of *Second Life*, mentioning that while they are decent in their own right, they lack the flexibility to be truly expressive. There's no means of visually communicating a game's themes or personality through unique graphics styles like how, say, cel-shading is used on other platforms. What's even more disconcerting is how similar all of *Second Life*'s games look – the visuals across games often look very generic, like they're all rendered by the same engine. And that's the problem – they *are* all rendered exactly the same, causing most games to lack any sense of identity.

Figure 47: Killer7 demonstrates an effective use of cel-shading.

**Figure 48: Okami's custom graphics and filters draw inspiration
from classic Japanese ukio-e printing styles.**

A perfect example of this is *Numbakulla*, a game that is obviously inspired by the *Myst* series of games. *Numbakulla* attempts to immerse players in a fantasy world, succeeding to a certain extent. However, the low prim counts and blurry textures betray its ambitious goals. Meanwhile, its source of inspiration achieved a high level immersion through the use of pre-rendered environments, an unsupported technique in *Second Life*. Since *Numbakulla*'s gameplay doesn't depend on its open-world environments, it would also have greatly benefited from the use of this graphical technique. If *Second Life* provided more rendering options for developers, we might find more *Second Life* games with compelling visuals despite their technical limitations.

Figure 49: *Numbakulla*, released in 2005

**Figure 50: *Riven*, the 1997 sequel to *Myst***

5.1.5 Gameplay

Being the one element that uniquely defines games as a medium and justifies their status as art, I was particularly interested in seeing what kinds of gameplay *Second Life* would be able to achieve. I found that there were a number of games, such as *Numbakulla* and *The Kaaos Effect*, that I would consider as having decent gameplay, in that they weren't absolutely frustrating to play. However, while not explicitly bad, most of their gameplay mechanics were fairly standard, predictable, and uninteresting.


Figure 51: *Tatsunoko vs. Capcom*, a fighting game with incredibly compelling gameplay

On the other end of the spectrum, I encountered plenty of games with extremely poor gameplay. Besides absolute chaff like *Zyngo* and the other gambling games, there were many games that simply attempted to try my patience, like when *DarkLife* asked me to spend hours watching my avatar auto-attack rats for gold and EXP. Other games had any potential gameplay ruined by lag or slowdown, such as all of the racing games I played.

For a game to have compelling gameplay, it needs to incorporate creative mechanics with clever implementations. Games like *Portal* and *Echochrome* play with our sense of spatial relationships while games like *Tatsunoko vs. Capcom* achieve incredible depth and balance despite including characters with wildly unique gameplay attributes. I've seen no indication that this sort of content is currently available in *Second Life* – the difference in quality between the games I've just mentioned and game content in *Second Life* is similar to that of chess versus tic-tac-toe.
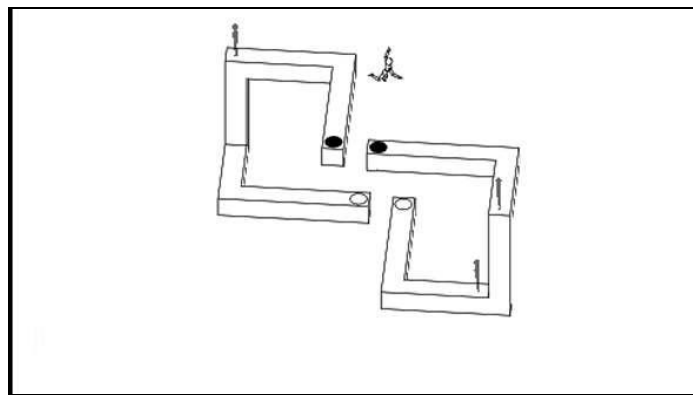
Figure 52: Echochrome involves gameplay and puzzles that look like they've been pulled from the mind of M.C. Escher.
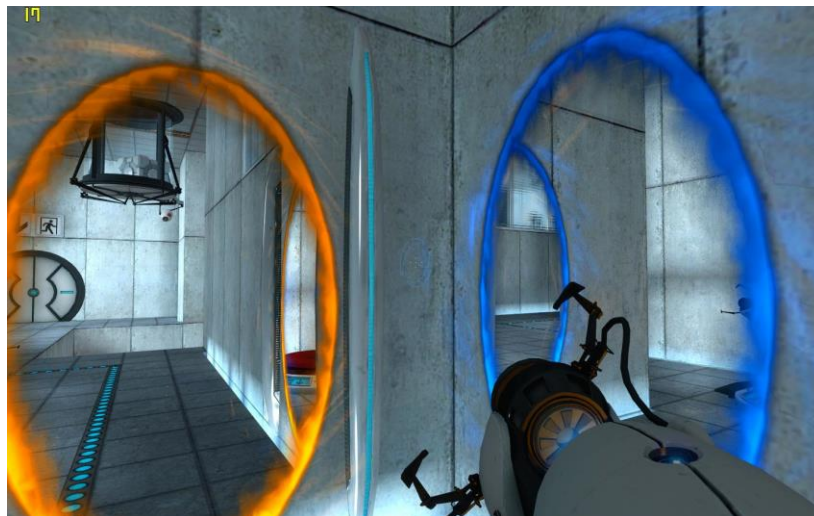
Figure 53: Spatial manipulation in Portal

Once again, I think the lack of compelling gameplay in *Second Life* is tied to the limitations of the engine. Beyond the obvious lag problems associated with real-time actions and gameplay, I haven't seen any indication that gameplay like that of *Portal* is possible, where a player can

directly manipulate the spatial fabric of the virtual world. That isn't to say that all of *Second Life*'s gameplay issues would be solved by allowing such functionality; rather, it's just indicative of the type of technical and creative limitations that prevent a developer from realizing a vision when using a common platform that isn't primarily intended for game development.

5.2 Are Second Life Games Compelling?

To be perfectly honest, speaking as an experienced gamer, I would not consider any game I've played in *Second Life* to be truly compelling or artistically significant (ignoring converted or ported games like chess). Referring back to my original statement, not once did I ever feel that the time and effort I was putting into these games was worth the return. It is not particularly compelling to me to spend two hours to watch a single digit change (as in *DarkLife)*, or to mindlessly wander and click on in-game objects with the hopes I won't be arbitrarily punished (as in *The Devil's Labyrinth*).

That said, it's not all bad. I found many players that seemed to be genuinely enjoying themselves, so there is most definitely an audience eager for *Second Life* game content. And certainly, there are games like *Numbakulla* and *The Kaaos Effect* that demonstrate there is potential inherent in the platform for it to one day reach a high level of value and richness, but several significant changes will have to be made in the meantime for that to happen.

5.3 How to Improve Second Life to be a Viable Platform for Games

There's no point in criticizing a platform without offering suggestions for improvement. The following are a number of possible functionalities that could be added to *Second Life* to improve its viability as a gaming platform.

5.3.1 Mandatory and Automatic Downloading of Key Region and Game Resources

The lack of any client-side storage for game resources is an incredibly limiting and debilitating restriction. With the permission of a player prior to entry, a game could make downloading of its key region and game resources mandatory and automatic to make gameplay more smooth and responsive. This is common in other games – for example, to play on a new map in *Team Fortress 2*, the map file and resources are downloaded prior to play.

5.3.2 Built-In Encapsulation

Taking a cue from *The Kaaos Effect*, it would be better if *Second Life* could define certain regions of a game as being prioritized upon entry. For example, after entering a particular room, the avatar's client would cease to stream data from anywhere outside of that small parcel of space. It would be as if the avatar indicated to the game: "I have entered this space. I intend to play in this space for an extended period of time. Consequently, it is unnecessary for me to stream data from anywhere outside this space."

Decouple *Second Life* from its Online Dependency for Single-Player Games – Although it somewhat defeats the purpose of using *Second Life* as a platform for development if there's no intention of including interaction between avatars, there's no need for a player to have to be tied to an Internet connection to play a single-player game. Rather than be subject to the fluctuations of lag, it would be nice if I player could simply download the game and play it without needing to stream the entire experience.

5.3.3 Region-Defined Physics and Gameplay Mechanics

Only a minority of game concepts can be realized in *Second Life*'s current default world physics and mechanics. It would be nice if developers could identify a parcel of land as being part of their game and define every possible attribute, including the player's controls and camera.

5.3.4 Enhanced Engine Functions and Options

As I said, I don't think *Second Life* is versatile enough to be a viable platform for the most creative developers – it would need several enhancements to engine functions and options to support more game types and ideas. This is a fairly general and open suggestion – I can't possibly list or predict all of the functions that a developer would need to realize his idea. However, examples could be allowing a developer to alter the center of gravity, or providing options for players to directly manipulate the world geometry using an intuitive game interface. Mechanics like these would make for very interesting and compelling games.

5.3.5 Developer Control of Avatar Status

While it can be an advantage to allow a player to play as his own avatar, developers should not be forced to always do this. Upon entering a game or beginning play, a developer should be allowed to take control of an avatar, including its appearance, equipped items, etc. Some developers might even design games without the need for any avatars at all.

5.3.6 Remove Avatar Population Limits

A fairly obvious suggestion, but there are a good number of games that would benefit from allowing more avatars to play in a given space than is currently allowed. I'm sure there are some technical obstacles that would need to be overcome for this to happen, but it would be well worth the effort.

5.3.7 2D Gameplay

Second Life should allow for 2D gameplay in some capacity. Possibilities include a virtual screen within the game that could be used like a normal television screen, or perhaps some sort of dynamic HUD that functions as a 2D screen. Developers could also be given the option of limiting a players movement to two axes in addition to absolute control of the position of a player's camera.

6. Conclusions

My experiences with *Second Life* have been interesting and eye-opening. I've gleaned a greater insight into virtual worlds and what they mean for the video game medium. I also have a better understanding of what functions and capabilities are important for the success of a game platform.

Second Life's strengths lie in its openness to development and the social aspects it brings to games as a living, breathing virtual world. While it is still in its infancy as a platform for serious artistic games, it has a lot of potential to be used as means of connecting people through its social games. If its advantages can be embraced and its disadvantages corrected, the virtual world could indeed become home to many a great game. From here on out, it's up to developers to build onto *Second Life* and make it into a truly compelling platform capable of supporting any type of game.

7. *Biography*

Taylor Yust – Yust is a junior student Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. He has had extensive experience playing, analyzing, and critiquing games and has been a member of the University of Arkansas Game Development Club. He has had experience with various game development platforms, including Allegro, Source, the Galaxy Editor, and now *Second Life* and LSL. He's also studying Japanese and has achieved an N5 ranking in the international Japanese Language Proficiency Test. He's currently applying for an internship at Blizzard Entertainment and intends to work in the game industry upon graduation.

Dr. Craig Thompson, Mentor – Thompson is a professor in the Computer Science and Computer Engineering Department. He leads the Everything is Alive research project that is currently focusing on how to simulate pervasive computing using 3D virtual worlds. See http://vw.ddns.uark.edu.

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Appendix A - List of Significant Second Life Games Played

The Second Life URLs for these games can be found using Josh Eno's search engine:
http://csce.uark.edu/~jeno/vwsearch.

Amber Dragstrip

One of a number of *Amber*-branded racing games. This one involves players racing driving vehicles down a dragstrip for the best time. All of the vehicles include a "gear" system, but it does not function like a normal gear system – the highest gear immediately provides the maximum speed, so there is no reason to *not* be in max gear the entire time. Ultimately, the game was more of a reflex test, a challenge to see who could hit the gas button first as soon as the signal light turned green. Unfortunately, the race track does not load fast enough to keep up with the speed of the cars, so the track is invisible during the latter half.

Amber Motocross

One of a number of *Amber*-branded racing games. It also uses the "gear" system. Uses a motocross theme with a motocross track, complete with hills and gaps. Still very susceptible to lag and slowdown, but the varied world geometry kept it vaguely interesting. Uses a series of scripted checkpoints to ensure players are staying on the track, but the checkpoints are easily abused.

Amber Skyline Raceway

One of a number of *Amber*-branded racing games. It also uses the "gear" system. Uses standard cars and go-karts. It has varied curves and turns to keep things somewhat interesting. Still very susceptible to lag and slowdown, but the varied world geometry kept it vaguely interesting. Uses a series of scripted checkpoints to ensure players are staying on the track, but the checkpoints are easily abused.

Cheeky Cow Golf Club

A golfing game implemented in *Second Life*. A golf club object must be equipped to play. Hitting a ball involves a timing-based "strength" meter to determine the distance the ball is shot. Wind mechanics can redirect the ball's trajectory. The course is particularly small, probably due to technical limitations and practicality.

Celestial Game Tower

Celestial Game Tower wasn't so much a game as it was an enormous virtual store for various smaller scale games. I played far too many to list, but I'll provide a few of the highlights:

- *Avatar Don't Worry* – A *Second Life* implementation of the board game *Parcheesi*.
- *Bomb Squad* – A *Second Life* implementation of the video game *Bomberman*.
- *Chess* – The classic board game realized in *Second Life*.
- *Fruit Fiesta* – A slot machine with a fruit theme.
- *Mad Monkey Money* – A gambling game with a puzzle twist. This one adopts the popular gameplay mechanics of *Bejeweled*, tasking players with swapping colored jewels within a grid to make as many connections as possible. Jewels and colors are randomly

generated as the game is played. Borders on being a full-fledged puzzle game, but it emphasizes its gambling features too much to be considered so.

- *Pirate's Treasure* – A slot machine with a pirate theme.

- *Puzzled* – A gambling game with a puzzle twist. It involves falling block shapes that must be matched to clear, ala *Tetris*.

- *Streetz* – A gambling game with a puzzle twist. Players are given random track pieces and must use them to connect as many cities as possible within a grid.

- *zBek* – A *Second Life* implementation of the board game *Battleship*.

CyberCycle Challenge

Another racing game in the vein of the *Amber*-branded racing games. However, *CyberCycle Challenge* instead utilizes a series of "TouchPad" objects that teams of racers must run over to claim, the winner being the one with the most claims. It also uses the "gear" system in addition to a custom HUD to change the player's color/team. Interestingly, the game advertises that it can be easily copied so that other players can create their own custom tracks using TouchPad objects.

DarkLife

Second Life's self-proclaimed "first MMORPG". Uses a custom HUD to track player stats and level. Magic and armor can be bought with gold, which is earned by defeating monsters. The game emphasizes "grinding", which means sinking unreasonable amounts of time to progress. There is little decision-making in the game – a player simply heads to his pre-defined leveling range of monsters and lets his avatar auto-attack and defeat monsters until he is low on health, at which point the player returns to the initial village to heal at a fountain. This process is repeated until a player reaches a particular level, at which point it is more advantageous to grind at another patch of slightly stronger monsters, usually adjacent to the previous patch. Ultimately, the game appears incredibly shallow with no real gameplay decisions being made or worthwhile stories (or any stories at all) being told.

En Garde!

A *Second Life* adaptation of the 1990s board game of the same name designed by renowned board game designer Reiner Knizia. A turn-based strategy board-game for two, it probably had more depth than possibly any other *Second Life* game I played. Players simply take turns moving their characters up and down a fencing mat, performing different actions using hands of specialized cards, ultimately trying to land a strike on their opponent.

Escape from Devil's Labyrinth

A pseudo-2D action game that involves quickly navigating a small maze by grabbing a key and taking it to a door. There are only four levels and the mazes are incredibly trivial. The game is mostly only noteworthy for being an attempted implementation of 2D gameplay in *Second Life*.

Hangman

A *Second Life* implementation of the game *Hangman*.

Holly Kai Golf Club

A golfing game implemented in *Second Life*. A golf club object must be equipped to play. Hitting a ball involves a timing-based "strength" meter to determine the distance the ball is shot. Wind mechanics can redirect the ball's trajectory. The course is larger than the one in *Cheeky Cow Golf Club*, but it has noticeably more lag.

KJ Racing Island

Another racing game in the vein of the *Amber*-branded racing games. It also uses the "gear" system. It has varied curves and turns and even varying altitudes as the track reaches outside the housing building and onto the roof. While having probably the most scenic track, it was by far the worst racing game in terms of lag, most likely due to being so large and open.

Pay-Back

A "game" that displays the top players that have payed money to have their names displayed on a list. Other players can pay more money to have their opponents' names removed so that they can pay money to have their names displayed instead. Ultimately, it's a game that challenges players to see who can pay it the most money. It sounds ridiculous, but there are plenty of popular social games that are exactly that, just better disguised.

Solitaire

A *Second Life* adaption of the real-life card game. Nothing seems to be lost in the translation, although the game is often used in *Second Life*'s virtual casinos.

The Devil's Labyrinth

Designed and developed by MadPea Productions, *The Devil's Labyrinth* is a dungeon-crawling RPG with adventure game elements. Trapped in a labyrinth designed by the Devil himself, players are tasked with finding four hidden emblems to escape. There is a HUD that tracks the player's status and level. There are enemies to attack and earn EXP from, but the combat is so nonsensical and the mechanics so frustrating that it's much better to just simply walk past every enemy (and they will do little to stop you). In all of my time playing the game, I didn't level up once. The puzzles varied from vaguely interesting to incredibly infuriating, especially those that require arbitrary actions. I played for a couple hours and acquired two of the four emblems before tiring of the game.

The Kaaos Effect

Probably the most overall enjoyable game I experienced in *Second Life*, *The Kaaos Effect* is a *Myst*–like adventure game with a time-traveling theme. Utilizes a HUD interface to track player progress and player location. When players start the game, they are given their own isolated pods that encapsulate all of the game's environments and objects and are separated from the outside environments and other players' games. This results in far improved performance. Utilizes extensive lighting effects and graphical tricks (such as simulated skyboxes) to provide effective visuals and the illusion of an open world. The puzzles are probably the most interesting I've experienced in *Second Life*, if just because they involve more than clicking on the occasional environmental object.

The Pot Healer Adventure: Numbakulla

A *Myst*-like adventure game about a lost explorer on a mythical island. Players explore the island looking for clues, often picking up and using various items and exploring empty ruins of civilizations long past. Most of the game involves basic *I Spy* mechanics, trying to find and pick up certain items that are hidden in the world geometry. Such items then act as keys to open new areas that also contain their own hidden items. For what it's worth, it had probably the most creatively designed environments. Although there was plenty of aimless exploration to be had, there weren't any actual puzzles that I encountered – the game seemed to simply emphasize admiring and wandering amongst the world geometry.

The Vorago

An FPS that involves a mobile HUD object and asks players to play in first-person (although the game cannot enforce this restriction). There are no projectiles or "shooting", but clicking on an object while in first-person is supposed to simulate this functionality. Ultimately, I found the game extremely frustrating given that my HUD could not keep up with my movements, I couldn't pick up any of the in-game items or weapons, and the shooting mechanics didn't even work (or, at least there was no indication to me that my shots were hitting their marks). Targets were, quite literally, flat, static cut-outs that stood for several seconds before despawning.

Tiny Empires

A HUD-based, turn-based strategy game that almost works like a pyramid scheme. Players convince other players to join the game and serve under them so that they can advance in rank. The higher a player's rank and the more players working beneath him, the more money he makes, giving him more resources to expand his virtual empire. Doesn't appear very compelling in terms of actual gameplay, it seems mostly attractive solely for the artificial social ranks it gives players. If one realizes the titles are ultimately meaningless, the rest of the game also appears to become meaningless and uninteresting.

Tombstone

An incredibly large role-playing environment set in the Wild West. There are no actual gameplay mechanics – the entire game is based on true role-playing and player-driven stories. There are no built-in rules, but there are a great deal of player-observed rules that must be obeyed at the risk of being banned. Players simply role-play their characters within the context of the setting and environment.

Virtual Hockey League

A *Second Life* version of the real-life sport. Played in real-time, it mostly emulates the real sport with a few exceptions. It uses scripts to determine when certain conditions have been met (such as a goal being scored), but requires a human referee to monitor when other rules have been broken (such as "no flying").

Zyngo

A gambling game that advertises itself as being skill-based when, in actuality, it requires the same amount of skill to win as a slot machine (and is as equally compelling as one). Incredibly popular and ubiquitous within *Second Life*.