Transmedia, Flow, and Narrative in Simulations

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ABSTRACT

Transmedia, Flow, and Narrative are some of the important characteristics of games that can be used to improve education and training through simulations. This paper explains how simulations and serious games relate at a fundamental level and explores the key features that researchers could leverage to improve training through engaging interactive simulations and games.

1.0 SERIOUS GAMES

The term Serious Games, an umbrella term that has come to mean any games that have any goals other than pure entertainment, was popularized in 2002 when Ben Sawyer of Digitalmill, and David Rajeski of the Foresight and Governance Project at the Woodrow Wilson International Center for Scholars founded the Serious Games Initiative (SGI). The SGI was founded to pursue the goal of helping to organize and accelerate the adoption of computer games for non-entertainment purposes, this included exploring new techniques in development and building new partnerships between the games industry and other interested parties. [1] Since 2002, the Serious Games community has grown to include hundreds if not thousands of developers and millions of dollars have gone into the development of these Serious Games [2].

2.0 DESIGNING SERIOUS GAMES

Designing a good game is a difficult task that professional entertainment game developers fail at every day. Assuming they all understand what made a good game and that they could articulate it perfectly, they should always make a hit game. This of course is not the case. This task is even more difficult when designing a serious game. These games have the added pressure of making otherwise boring content engaging. As a result Serious Games have a bad reputation among many game designers as being simulations, unengaging, or just poorly made in general. In an effort to get to design models that will lead to good Serious Games we must first understand what a good serious game is and how it relates to both games and simulations.

3.0 DEFINING GAMES

Many definitions are far too simple to describe all games well. One of the most oft mentioned definitions is Sid Meier's declaration that, "A game is a series of interesting decisions." [3]. While this might be true of good strategy games, the type of games Meier is known for, this does not include simple twitch or rhythm games, where the player is tasked with maintaining good timing, but is limited on the decisions they can make. The definition cited by Jane McGonigal, a well known proponent of gamification, in her book, Reality is Broken, is the philosopher Bernard Suits. He stated, "Playing a game is the voluntary attempt to overcome unnecessary obsticles." [4][5] This definition, while open ended enough to justify gamification as a legitimate type of game does not provide enough details to even meet the features McGonigal suggests in her book, of goals, rules, feedback, and voluntary participation [4].

The game designer who's games are most often cited when the question of what makes a game versus a simulation is Will Wright. His games include SimCity, The Sims, and Spore, but he doesn't consider them games, he describes them as toys. "People call me a game designer, but I really like to think of these things more as toys." [6].

One of the earliest game scholar's, Johan Huizinga defined games in his book, Homo Ludins as: "… a free activity standing quite consciously outside "ordinary" life as being "not serious", but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means." [7]

3.1 What is and isn't a game

Jesper Juul provided a definition that attempted to encompass the various views one could take on games. In doing so, he categorized definition in the categories of: the game as a formal system, the player and the game, the game and the rest of the world, and other [8].

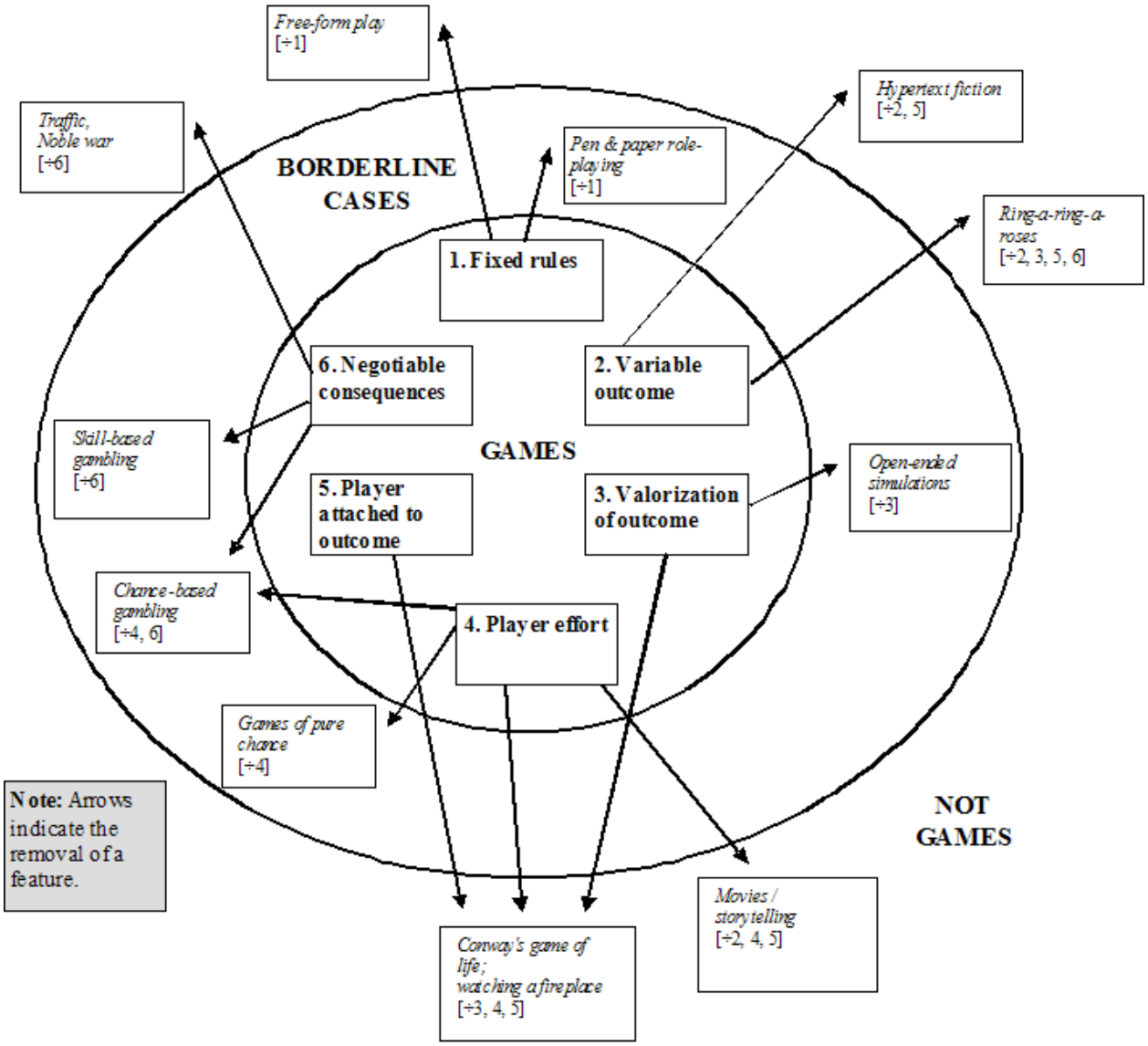

Figure 1: A Map of the Space of Games.

At the same time Juul began mapping the space of games. Figure 1 shows what game features constituted a game versus borderline cases and of course things that are not games. Everyone has this internal notion of what is and isn't a game, but when working on researching their design it is important to define these formally.

3.2 Features of Games

In order to map mechanics to learning outcomes it is important to understand what features of games support what types of mechanics. Further in order to insure those games support learning it is important to have an understanding of what features of games support what learning outcomes. By mapping these features against each other, an understanding of how game mechanics map to learning outcomes can be gained.

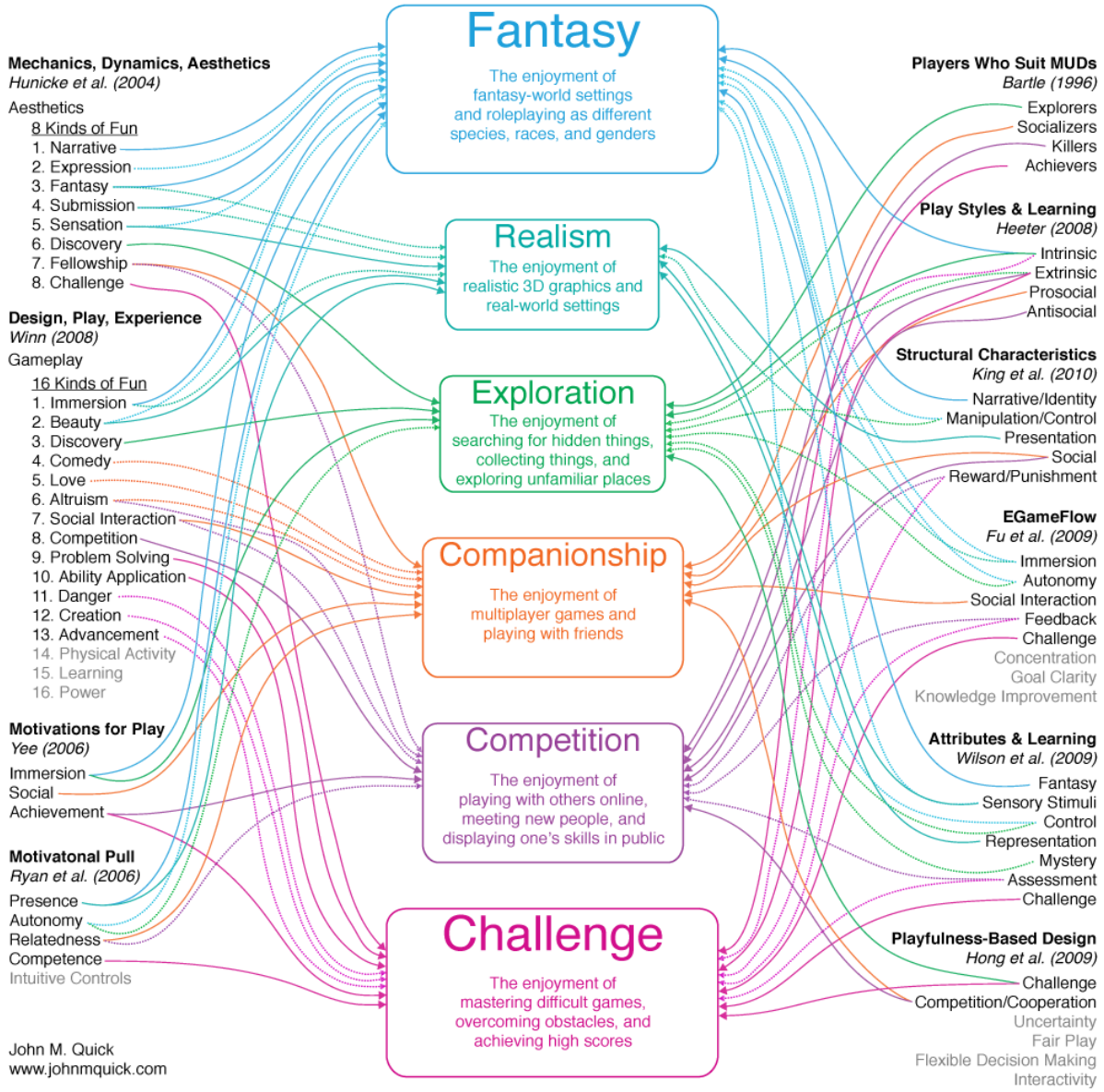

Figure 2: Features of Games Important to Undergraduate Students.

In a survey of university students who play games, researcher John M. Quick was able to find six features that students found important to enjoyment of games. Challenge was one of the major features students are looking for in games. Further, one aspect of challenge: competition, was also highly desirable. When Quick correlated these features to current game design models, challenge was a top cited feature as well. [9]

3.3 A Working Definition

As this work is particularly concerned with learning games, a good definition would consider a game as a formal system that can be applied to learning. As such the definition of games used moving forward here will be Katie Salen and Eric Zimmerman's definition provided in their book Rules of Play. Salen and Zimmerman like many other game researchers developed their definition though a thorough analysis of various definitions. In particular, they used a total of eight leading definitions that were suitably feature rich. Three of these definitions have already been discussed; all of them are by leading game researchers or

designers themselves. By carefully comparing these definitions and analysing their meaning, they settled upon their definition and in so doing they have provided a workable framework for the features that make a game. [10]

Elements of game definition	Parlett	Abt	Huizinga	Cailois	Suits	Crawford	Costikyan	Avedon
Proceeds according to rules that limit players	X	X	X	X	X	X		X
Conflict or Contest	X					X		X
Goal-oriented/outcome-oriented	X	X			X		X	X
Activity, process, or event		X			X			X
Involves decision-making		X				X	X	
Not Serious and absorbing			X					
Never associated with material gain			X	X				
Artificial/Safe/Outside ordinary life			X	X		X		
Creates special social groups			X					
Voluntary				X	X			X
Uncertain				X				
Make-believe/Representational				X		X		
Inefficient					X			
System of parts/Resources and tokens						X	X	
A form of Art							X	

Figure 3: Features of Games Important to Game Scholars.

Using this framework as a guide, Salen and Zimmerman defined a game as: "A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome." [10] Using this definition, a game can be broken up into the follow set of core features: System, Players, Conflict, Rules/Goals, Outcomes, and the Artificial. This set of features will be used moving forward in this research.

4.0 SERIOUS GAMES CHARACTERISTICS

Learning games at their core can and should be considered games, and as games they should exhibit the same features of games that define games themselves. Therefore determining a list of features that defines learning games is a redundant process. The interesting task is in determining the features of games that support learning.

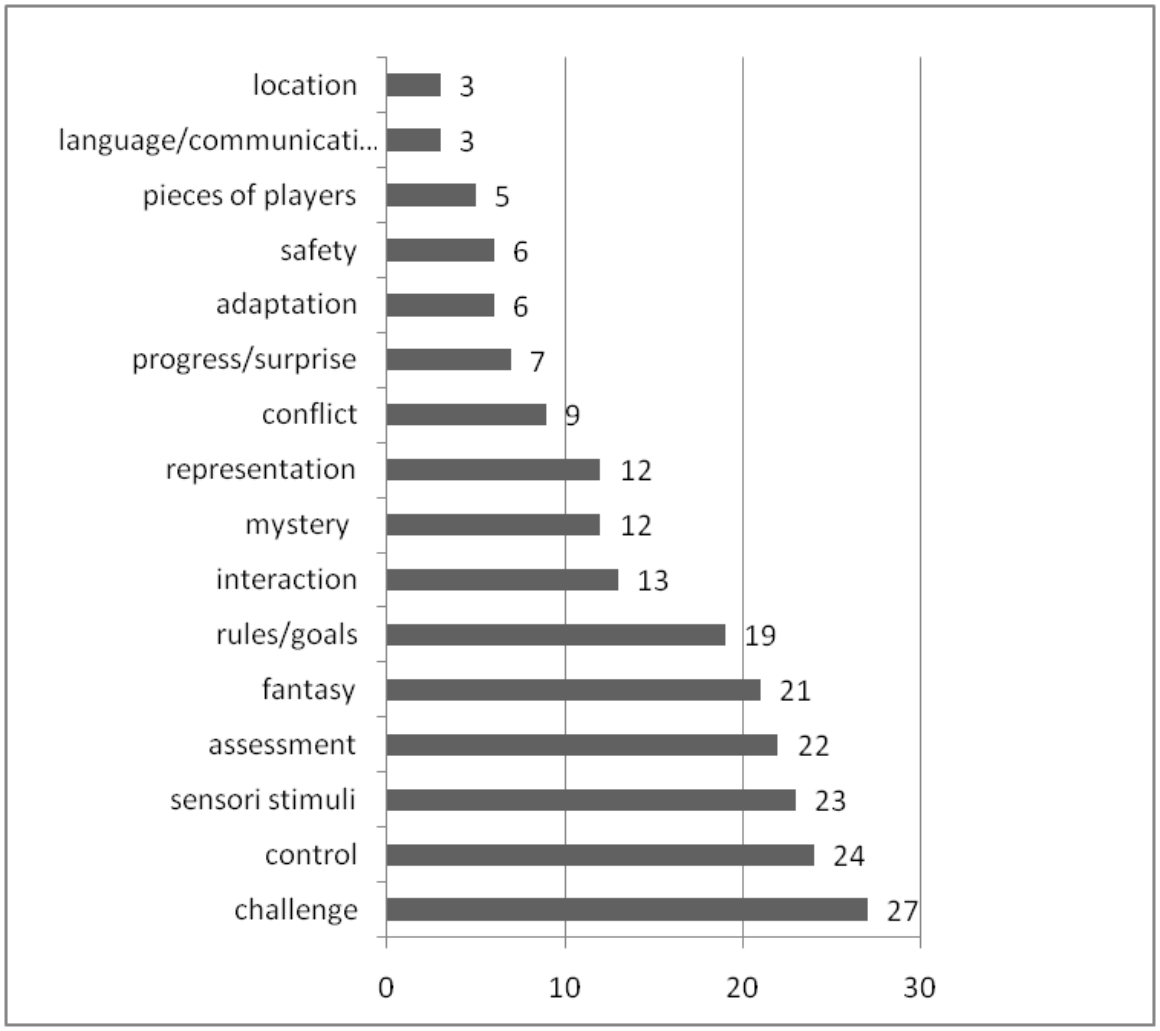

Figure 4: Features of Games Important to Serious Games Researchers.

In a comprehensive review of over 41 papers preformed in 2009, researchers identified over a dozen features of games that would support learning [11]. Upon closer inspection of the data provided, some features overlap with each other. Others are along considered features of games by a miniscule fraction of the 41 researchers. As seen in Figure 3, over 27 researchers found challenge to be an important feature for learning in games, while only 3 suggest location is important. For this research, only features agreed upon by 10 or more researchers will be considered agreed upon features. Further, overlapping features will be combined.

In particular, the feature of interaction, or the ability for the player to interact with the game, will be combined with control. Control is the ability for the player to maintain control of the flow of the game, an activity accomplished through interaction.

Another overarching feature of games is their aesthetic feel. This feature is represented by mystery, fantasy, representation, and sensory stimuli. The Aesthetics determine if a game provides a mystery to unravel, if the game is fantasy based or based in realistic representation of reality, and they are responsible for the type and form of sensory stimuli provided to the player. Once repeated features are consolidated and fringe features are removed we are left with the following list: Interaction, Challenge, Rules/Goals, Assessment, and Aesthetics.

4.1 Systems

Salen & Zimmerman use a definition of system that is taken from Stephen W. Littlejohn, and include 4 defining elements. They are objects, attributes, internal relationships, and environment [12]. Using this definition, Salen & Zimmerman further define systems as simulations [10].

The system is the core structure of a game. It determines how the environment works and what types of objects can operate within it. When other features are applied to it the game becomes fully formed. This is important when considering the game versus simulation debate. It is easy to imagine that a game is a simulation with others gaming features added to it. This, however, is not the case.

In his 2010 keynote address to the GameTech Conference, Will Wright defined his particular types of games as toys. These toys, SimCity, The Sims, Spore, among others, are commonly used to frame the argument between what is a game and what is a simulation. Will Wright further stated that his toys exist as a constrainment of freeform play, and if they were constrained more they could be considered games. He did not want to constrain them with preformed goals, outcomes, or challenges. [13]

Taking a similar approach to the space of modelling and simulation one could consider a constructive simulation as a constrainment of the space, but a simulation still provides a level of freeform use that makes it similar to how Will Wright refers to toys in the space of play. Simulations need a facilitator to add goals, outcomes, and challenges to the exercise. Further constraining a simulation by introducing gaming features may result in a game.

4.2 Players/Interaction

Interaction is a key feature of games. Games are to be played by players, not observed or reported on. Interaction is sometimes defined by the players themselves, “Players interact with the system of a game in order to experience the play of the game.” [10] Other times it is defined through the type of hardware, such as a game controller, or mouse and keyboard combinations. Interaction can occur in many ways, and through many mechanisms, the important part of the equation is that the players input is accepted by the game through any means and has effect on the game.

4.2.1 Game Feel

Steve Swink defines game feel as the intersection of Real-Time Control, Polish, and Simulated Space. He argues, in his book Game Feel [14], that the player’s ability to control a game should be similar to a conversation. Much like how a conversation between two people requires a person to listen, think, and then speak, a game requires a player to see what is happening in the game, think, and then press a button. This back and forth should go smoothly in both the conversation and in the game. The only way for a game to feel perfectly right is for the game to understand the input, make the changes in the simulated space, and have enough polish for the output to feel right to the player.

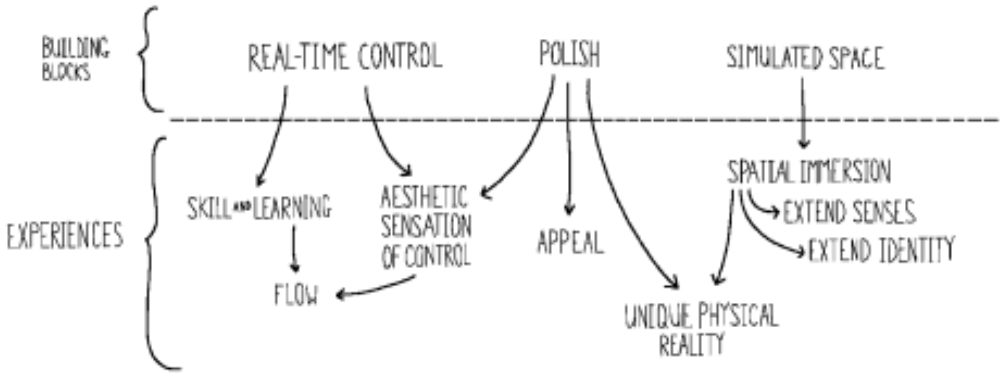

Figure 5: A Model of Game Feel.

In the model of Game Feel in Figure 5, it is clear that these building blocks work together to create the overall experience of the game. For the player to feel in complete control of a game all three elements must be balanced for the player.

4.2.2 Experimental Controls

On the opposite side of the spectrum are experimental controls. These are controls that go beyond the standard mouse keyboard combination, or the joystick. These include controls like the Microsoft Kinect that allows players to move around in front of its 3D cameras to control a game; the Leap Motion which allows players to use hand gestures at a high degree of fidelity; custom controllers that simulate an actual interface; or any other new experience.

One such controller is the new Steam Controller. It uses two touch panels instead of the standard thumb sticks on a normal joystick. These touch panels have mouse touchpad sensitivity, and use technology similar to speakers to change the feel of the controllers surface. As new controllers become available the challenge is to understand how to best utilize them so that they are not relegated to being only a short lived gimmick and actually improve training.

4.3 Conflict/Challenge

"All games embody a contest of powers. The contest can take many forms, from cooperation to competition, from solo conflict with a game system to multiplayer social conflict. Conflict is central to games" [10]. While Salen & Zimmerman prefer to call it conflict, they have captured the essence of what this research will refer to as challenge. Challenge can be cooperative, competitive, or individualistic. It can also be a combination of any of the three. For example team versus team challenge has competition with inter team competition.

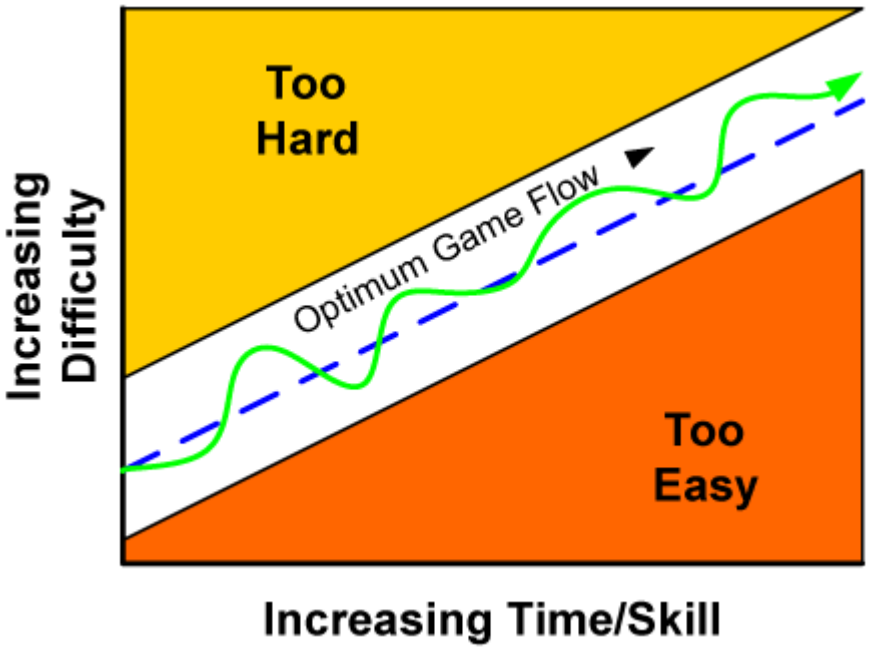

Figure 6: A Model of Flow.

> "Optimal experience: a sense that one's skills are adequate to cope with the challenges at hand, in a goal-directed, rule-bound action system that provides clear clues as to how well one is performing. Concentration is so intense that there is no attention left over to think about anything irrelevant, or to worry about problems. Self-consciousness disappears, and the sense of time becomes distorted." [15]

Many game designers have used the model of flow. [16][14] Flow experiences, first defined by Mihaly Csikszentmihalyi, is the thought that challenge should be balanced with skill to generate an optimum experience. [15] Obtaining maximum flow in a game is a major goal of entertainment game designers and is the result of very precisely balanced challenges. Similarly, game researchers have used the term "motivational tension" to describe the optimal amount of challenge in a game [17]. This tension is derived by the player not knowing if their current skill level will allow them to meet the current challenge. This unknowingness when perfectly balanced with the player's current skill levels leads to optimum experience in games. Getting to this level of optimum challenge in learning games is a constant struggle.

4.4 Rules/Goals

Wilson coupled the terms rules and goals into a single feature, while Salen & Zimmerman refer to only rules. "Rules provide the structure out of which play emerges, by delimiting what the player can and can-not do." [10] They instead associate goals with outcomes. Goals in particular are difficult to separate from other features, and are possibly their own feature.

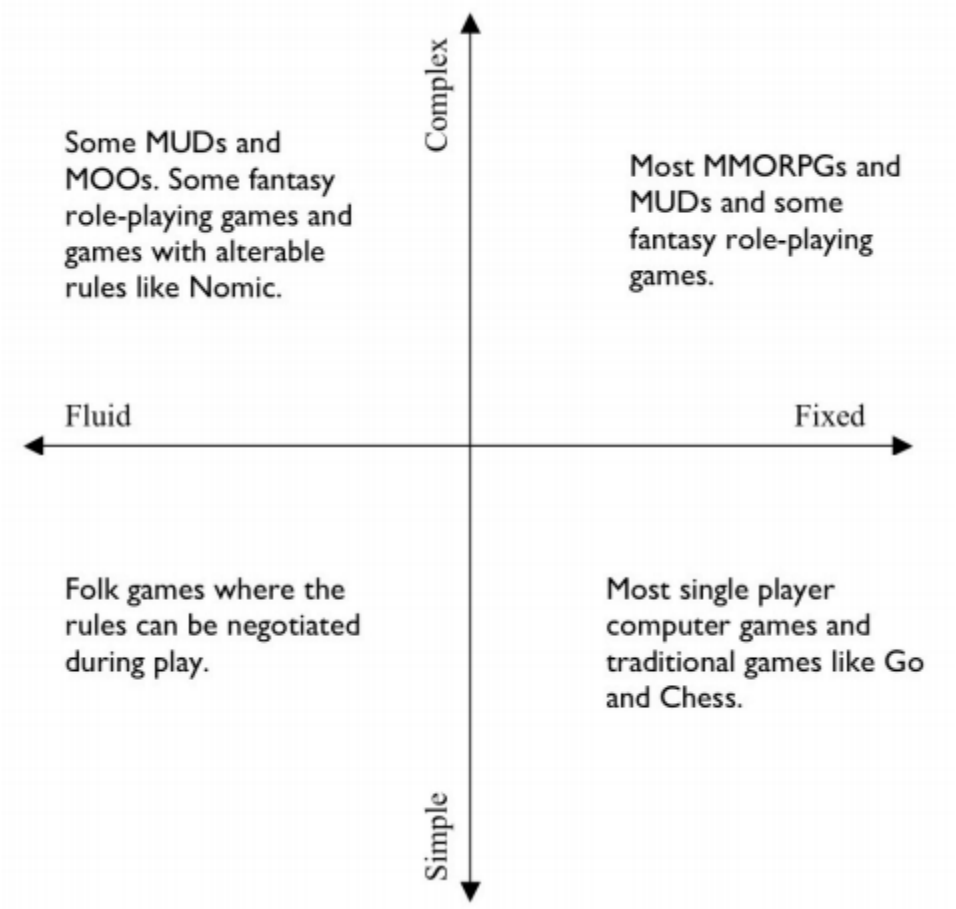

Figure 7: Rule Structures.

Figure 7 represents a model of rule structures. Rules fall in a spectrum between simple and complex, and between fluid and fixed. Many modern day games have very complex rules and rely on the player understanding an overall system with many layers of control. However, it seems that games that stand the test of time often have simple rules like Go, and Chess. [18]

4.5 Outcomes/Assessment

"Games have a quantifiable goal or outcome. At the conclusion of a game, a player has either won lost or received some kind of numerical score." [10] Games must provide feedback to the player in the form of an assessment or outcome. While the assessment might not be explicit to the player in all games, the game must provide the appropriate outcome based on the performance of the player in the game.

4.6 Artificial/Narrative

"Games maintain a boundary from so-called "real life" in both time and space." [10] Games provide aesthetics to the player. This might be fantasy or reality based. It might mean a deep storyline filled with interesting plot twists or it might mean a simple song and falling blocks. While the Aesthetic is important, it can vary widely between games.

4.6.1 Forms of Narrative in Games

While narrative in games commonly follows standard forms like the 3 act play structure, games have the luxury of not having to force a linear path, like books or movies.

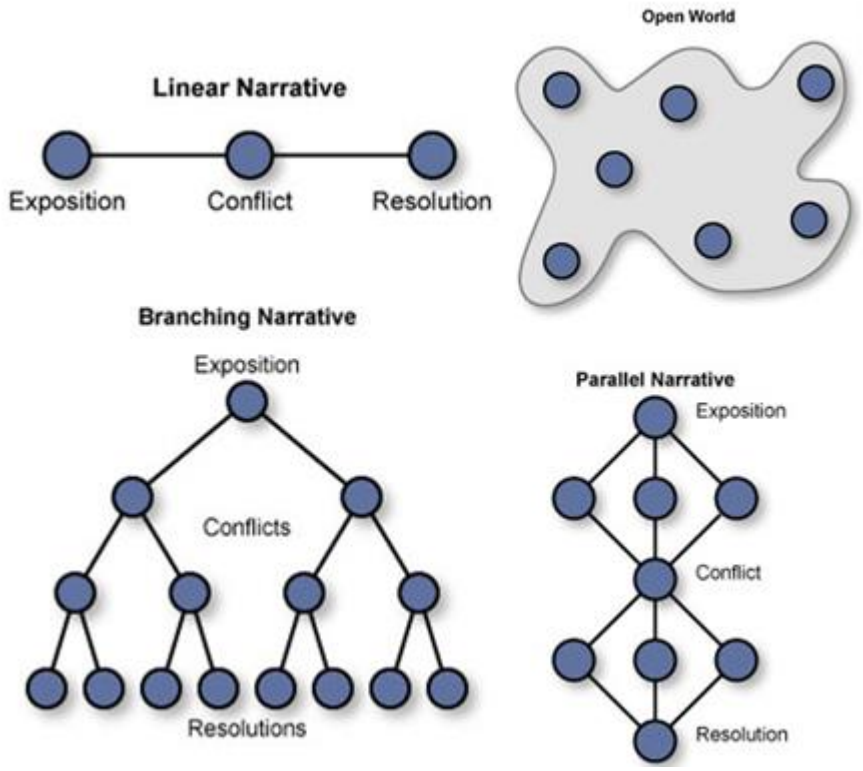

Figure 8: Game Narrative Structures.

There are four predominant forms of narrative in videogames. The first is of course the linear narrative. This is used primarily in games with a set level structure that the player goes through and receives a cut scene between levels. Another is the Branching Narrative. This form provides a new branch for each decision made in the game. There were many games made with this strategy tying together video clips based on decisions the player made. The negative to this structure is that it gets very big and complex very fast and most players only see a small portion of the content. The game Deus Ex popularized the Parallel Narrative model. In these games the player make a choice that leads them to new path, but it is a false choice as the narrative always brings them back to the same core linear path eventually. This allows for a consistent approach with some variation. The last major type is the Open World model. This model provides narrative around nodes in an open world. The nodes can be approached at any time, but depending upon current skill they may or may not open new storylines for the player. [19]

4.6.2 Transmedia Storytelling

In 1991 Marsha Kinder coined the term Commercial Transmedia Supersystems, which was later shortened to Transmedia Storytelling by Henry Jenkins of MIT. [20] The basic premise of Transmedia is telling a story through the use of multiple media platforms. People experiencing a Transmedia story will interact with a video game and then extend the story by reading a prequel comic, or watching a movie. They might have an additional experience on mobile app, or engage with the story through social channels. Each channel will provide a unique experience that extends the story further in the life of the person experiencing it.

Star wars is a particularly good example of this. They have the movies, which explain the main story. They have multiple videogames that explain event before, between, and after the movies. They have a series of books that may cover characters that never appear in any other media form. They further extend the story through, theme park rides, comics, games, TV shows, and many other channels. Each channel bringing another aspect of the universe to the customer, and in the end they all provide a synchronized narrative to the overall experience.

5.0 APPLYING CHARACTERISTICS TO DESIGN

The current generation of Learning Games has come a long way since the early 1980s. They have undergone much refinement through the lessons learned that led Michael Zyda to declare them a failure. [21] Despite the evolution they are still considered subpar by many due to the lack of development guidelines, and underprepared designers. Jacob Habgood of The University of Nottingham's Learning Science Research Institute labeled them to be "Chocolate-Covered Broccoli" due to their poor marriage of games and learning [22]. His suggestion to solve this is a tighter integration between game mechanics and the learning content or what he terms as Intrinsic Integration [23]. This is a sentiment shared by NavAir's Dr. Robert Hays in his game based research literature review as illustrated in Figure 9 [24].

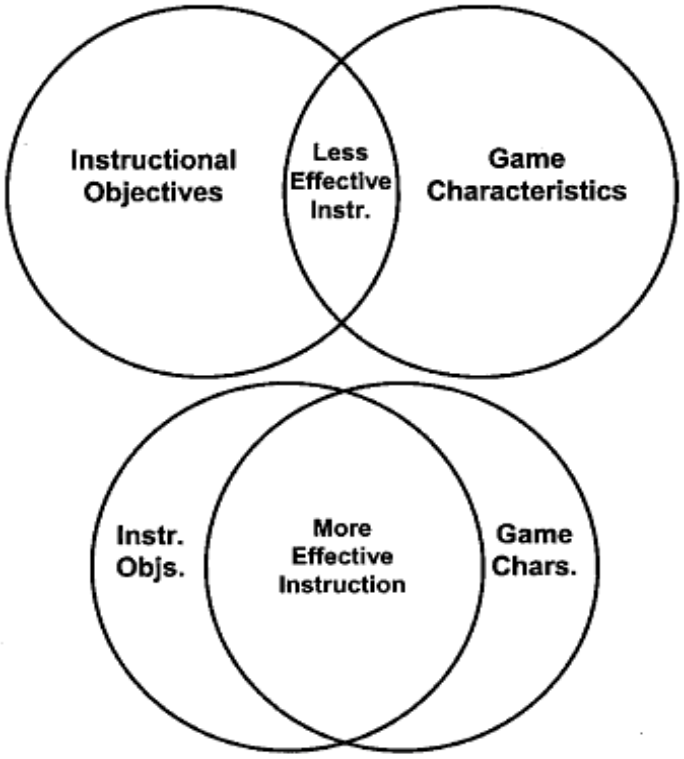

Figure 9: Relationship between Instructional Objectives and Game Characteristics.

Both Habgood and Hays understood that for good learning outcomes to occur gaming characteristic or features needed to support instructional objectives completely. This of course means that learning games need to go beyond the "lightly sprinkled… game-like interfaces and cute dialog" Zyda [21] used as a charge against edutainment. They need game mechanics that support both gameplay and learning at the same time. Game mechanics are, "mechanisms through which players make meaningful choices and arrive at a meaningful play experience." [10]

5.1 Formal Design Models

As game design is maturing as a field a number of formal design models have emerged. The Mechanics Dynamics and Aesthetics (MDA) model is one that takes into account the perspectives of both designers and players and applying them to the three methods of the model. In the model Mechanics describe the particular components of the game, at the level of data representation and algorithms. These are the Rules. These are designed by the designer. Aesthetics describe the desirable emotional responses evoked in the player when they interact with a game. This is the narrative and the synthetic world. Dynamics describe the runtime behaviour of the game and how the rules and narrative interact. [25]

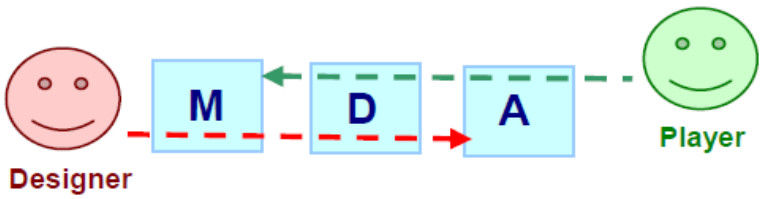

Figure 10: MDA Model of Game Design.

Applying the game characteristics defined above to formal design models such as the MDA model will help Serious Games designers understand the expected outcomes of their designs. While the MDA model is not the only formal design model it does lend itself to this process. Before defining the mechanics of a game a Serious Games designer could potentially consult the research around a particular gaming characteristic and determine the outcomes associated with it. This feature could then inform the mechanic that is chosen to support the desired outcome.

6.0 CONCLUSIONS

While designing Serious Games is a hard challenge an understanding of how they work will make the job easier. By breaking down games to their base components and applying those components to formal design models we can begin to anticipate outcomes of various features in serious games.

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