Game Taxonomies: A High Level Framework for Game Analysis and Design

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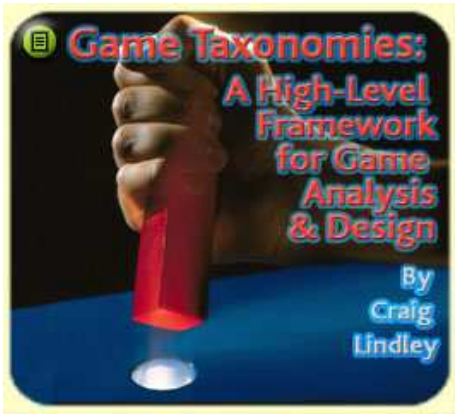

In 1999, Doug Church proposed the use of formal abstract design tools for game design [3]. Part of Church's suggestion was to develop a common design vocabulary. It's ironic that while the game design community has started to develop these more rigorous design principles for games, there is much confusion even about the most basic of questions, such as what a game is, compared to a story or a simulation. This confusion only increases when we start to consider new and emerging forms like mobile games, location-based games and pervasive games. It's obvious that we need some basic distinctions and definitions at the highest level, so that more detailed methods can be sorted into their appropriate areas of application.

Developing a basic language for describing different types of games requires different dimensions of distinctions. That is, we need *orthogonal taxonomies*: not everything falls into a simple hierarchical system of categories and subcategories. Orthogonal taxonomies allow design concerns to be separated. So we can, for example, consider whether a game is a real-time strategy game or a warfare simulation, irrespectively of whether it is created for PCs, mobile devices, or technologically supported physical environments. The gameplay patterns for an RTS may apply irrespectively of the implementation strategy. Or at least, we can specify for a particular pattern what range of games it applies to within a system of orthogonal categories. In some cases, we can even shed light on issues that still plague academic game researchers, such as the relationship between gameplay and narrative. How nice it would be to put this debate behind us once and for all!

In the taxonomy system proposed here, some fundamental distinctions are drawn between game forms and functions based upon narrative, repetitive game play and simulation; computer games can be seen to manifest these three functional and formal aspects to differing degrees, depending upon the particular game or game genre. Beyond the boundaries of games played only via computers and consoles we identify further classification dimensions, from virtual to physical gaming, and from fictional to non-fictional gaming.

This taxonomy has been developed within the Zero Game Studio of the Interactive Institute in Sweden [9]. We developed the taxonomy after many long design discussions, and have found the resulting framework to be very useful, saving time and getting us past some very basic questions and confusions. It is, of course, impossible to precisely classify many specific games, since their different aspects may belong to multiple or ambiguous classifications. Nevertheless, this scheme provides a heuristic and practical tool for clarifying many design issues, saving time in proposal writing and design meetings, and providing higher level categories for identifying where more detailed design methods may be applied.

Games and Game Play

Computer games encompass a vast range of interactive media productions. In the broadest possible sense we call all of these things "games". However, this is not necessarily useful in understanding distinctions among the different creations that we're considering. It's much more useful to adopt a narrower definition of "game". So let us narrow the definition a little and state: *a* game *is a goal-directed and competitive activity conducted within a framework of agreed rules*. This can be referred to as the *ludic* or *ludological* definition of game, the kind of definition at the base of traditional game theory in disciplines like economics.

Given this definition of a game, it is often said that learning to play a game involves learning the rules of the game. Notice however that our definition does not require this. It *does* require that activity obeys the rules, and that we implicitly or explicitly agree to those rules.

The rules establish what as a player you can or cannot do, and what the behavioral consequences of actions may be within the world of the game. But, successful play does not necessarily require learning all of the game rules -- only those necessary to support a particular playing style. Learning to play a game, making progress within a game, and, with persistence and basic ability, eventually completing or winning a game are a matter of learning how to interact within the game system and its rules in a way that supports progress. This is a matter, not necessarily of learning the game rules (although at least some of these may become consciously known) but of learning a *gameplay gestalt*, understood as a pattern of interaction with the game system. Playing the game is then a matter of performing the gestalt. It is what the player does, within the system and as allowed by the rules of the game.

A gameplay gestalt can have many forms for a particular game, capturing different playing styles, tactics and approaches to progressing through the game and (perhaps) eventually winning. In general, it is a particular way of thinking about the game state from the perspective of a player, together with a pattern of repetitive perceptual, cognitive, and motor operations.

A particular gameplay gestalt could be unique to a person, a game, or even a playing occasion. More generally though, recurrent gameplay gestalts can be identified across games, game genres, and players. Some examples of gameplay gestalts include:

Action games: shoot while being hit, strafe to hiding spot, take health, repeat

RPGs: send fast character to lure enemy from group, all characters kill enemy, take health, repeat

Strategy Games: order peasants, send to work, order soldiers, send to perimeters, repeat while slowly expanding the perimeters (up to the point of catastrophic win/lose); OR: move x archers to tower y every n minutes to head off the enemy camel musketeers from the east who arrive every n+1 minutes

In General: overcome barrier, save if successful, reload and retry if unsuccessful

Such patterns may or may not be explicitly designed for by the creators of a game. They are *not* game design patterns in the same sense that the paper/scissors/rock system is, ie. they are not designed into the system of a game. If designers do take them into account, it is in supporting the development and emergence of these patterns in play, never, in a good design, by forcing them on the player.

Narrative

Stories and narratives can be defined as broadly as game: everything is a narrative/story. Again, this is not very useful. We can define a narrative as an experience that is structured in time. Different structures then represent different forms of narrative, and a narrative is an experience manifesting a specific narrative structure. A very common narrative structure used in computer games, borrowed from film scriptwriting, is the three-act restorative structure. The three act restorative structure has a beginning (the first act) in which a conflict is established, followed by the playing out of the implications of the conflict (the second act), and completed by the final resolution of the conflict (the third act). This narrative structure also specifically includes a central protagonist, a conflict involving a dilemma of normative morality, a second act propelled by the false resolution of this dilemma, and a third act in which the dilemma is resolved by an act that reaffirms normative morality. Each act within the three-act structure culminates in a point of crisis, the resolution of which propels the plot into the following act, or to the final resolution.

In computer action games that use the three-act restorative structure, the central conflict form usually manifests recursively (ie. the structure is repeated at different levels of temporal scale). In action games, for example, the overall restorative three-act model may be applied to the game experience as a whole, with the dramatic arch being completed when the user finishes the game. At this level the story is usually not interactive, since act one, key scenes within the story of act two, and the playing out of the consequences of the final resolution in act three are typically achieved by cut scenes, sequences of non-interactive video material.

The next level down within the recursive structure is that of the game level. The game level is designed for the pursuit of a goal, that of the player reaching the end of the level, that serves the purpose of progressing the player through the second act of the higher level three-act structure of the game narrative. Conflict is achieved by resistance to the player achieving that goal, in the form of opposing enemies, puzzles, barriers, and the like. There is rarely if ever a one-to-one correspondence between game levels and acts; more typically, the first act and the end of the third act are presented via cut scenes, with playable game levels summing to form a highly extended second act followed by the final resolution of the third act as the end of game play (e.g., by overcoming the final and toughest enemy, usually at the heart of the central conflict in the story). The sense of level-specific conflict can be enhanced by increasing difficulty through a level, or by an internal dramatic structure that emphasizes the point of completing the level, such as the defeat of a level boss, the big barrier creature at the end of the level. The false resolution that drives act two of the three-act restorative model at the highest level may be seen as a repetitive phenomenon at the end of each non-terminal game level; when the game level is resolved (completed), the player only finds themselves at the beginning of the next game level full of conflicts.

At the next level of the recursive decomposition of action game structure, we see a series of smaller-scale conflicts and challenges within a game level, which may include monsters to be defeated or avoided, puzzles to be solved, or treasures, clues or keys that must be found in order to progress in the current or future game levels, etc. Usually it is only this lowest level of the action game plot that is highly interactive. The linear and non-interactive cut scenes framing game play are revealed in a predefined order, and within a level all players usually start in the same place and must have completed the same specific set of tasks in order to complete the level. The low level and interactive parts of the game are played by performance of a gameplay gestalt. So game play usually has little if any bearing on the story being told; the story is for the most part a structure imposed on top of, and different from, game play. The perspective upon games that emphasizes the narrative or story aspects of the game can be referred to as the narratological perspective.

Narrative Versus Gameplay

Given these definitions, the question of the relationship between gameplay and narrative can now be phrased more clearly. In particular, the apprehension of an experience as a narrative requires the cognitive construction of a narrative gestalt, a cognitive structure or pattern allowing the perception and understanding of an unfolding sequence of phenomena as a unified narrative. The three-act restorative structure is a very common, in fact the dominant, example of a narrative gestalt in games and films. It is a pattern that people understand and expect, and will often be disappointed if it is not satisfied (e.g., if the story ends before the central conflict is resolved, or if the hero dies permanently during the story). In playing a computer game, one must learn and then perform a gameplay gestalt in order to progress through the events of the game. To experience the game as a narrative also requires the creation of a narrative gestalt unifying the game experiences into a coherent narrative structure. The tension between gameplay and narrative can now be viewed as a competition between these respective gestalt formation and performance processes for perceptual, cognitive, and motor effort. Within the range of effort required for immersion and engagement, if gameplay consumes most of the player's available cognitive resources, there will be little scope left for perceiving complex narrative patterns (e.g., we forget the motivation behind the character's battles, and what *was* the uber-villain's name again?). More than this, the narrative adds little to player immersion and engagement (who cares, it's fun anyway). Conversely, focusing on the development of the sense of narrative (e.g., in the case of multipath movies) reduces the player's need and capacity for a highly engaging gameplay gestalt.

Good game design achieves better integration of the gameplay and narrative structures of the game. This can be done by methods like continuously but unobtrusively reminding the player of the narrative context (rather than having a few perfunctory cut scenes), and using cut scenes and cinematic sequences as rewards at appropriate moments within the

rhythmic patterns of game play (so they naturally fall within pauses and rests, and are not perceived as interruptions).

Notice, however, that at the lowest level of the dramatic structure of a game, the conflict within the detail of the gameplay experience is never actually one of the player-character's survival, but one involving tradeoffs within cognitive, emotive, and performative effort. Is it worth trying to jump over a ravine at the risk of falling and having to reload a past game state for the sake of a health pack that may help me to get past the tough enemy ahead without then having to reload and retry when the enemy defeats me? The conflict is an ergonomic one within in terms of performing gameplay gestalts. And this has nothing to do with the higher-level narrative context. So the tension between gameplay and narrative is even more fundamental than being a simple competition for cognitive and performative resources: the player's investment in the low level conflict as an active participant is disconnected from any deep narrative significance understood in terms of the shape of the higher level narrative gestalt. Understanding this explains the perceived tension between narrative and game play and suggests strategies for overcoming this tension by developing game play mechanics that are fundamentally dramatic, in that their consequences *do* affect the higher level narrative patterns of the game.

Simulation

Much has been made over the last couple of years of the view of games as simulations. But what exactly is a simulation, such that it's different from a narrative or a game? A simulation can be defined as: *a representation of the function, operation or features of one process or system through the use of another*.

Hence a simulation may involve no specific repetitive and goal-oriented activities (there may be no obvious end state, other than the player getting bored), and no specific predefined patterns in time. Time patterns emerge over the course of running a simulation, and can be completely different for different runs. Repetitive action may be used to operate a simulation, but may not be directed to any specific overall goal.

It's interesting to regard single-player strategy games from the simulation perspective. During competitive play, there is an obvious goal. But many games will allow us to continue playing after all of the enemies are defeated. Until resources run out, these games may then chug along indefinitely simulating a simple economic system. There is no more gameplay by our strict ludic definition, and the narrative after winning has no interesting temporal (dramatic) structure. Simulations like flight simulators are often interesting from the perspective of skill development; they are not interesting as games or stories, but for understanding how a particular system functions in different circumstances.

A Unified Classification Plane

Taking these three forms, the ludic game, narrative and simulation, we can construct a classification plane as a triangle with one form at each point, as shown on Figure 1. It is then possible, as a heuristic (ie. a useful working tool) for comparing different games and genres, to place games and genres on that plane, emphasizing the relative degree to which they embody elements of ludic gaming, simulation and narrative.

In this scheme we can place avatar worlds and vehicle simulators at the simulation extreme. Early avatar worlds were three dimensional virtual spaces in which a user could be represented by a movable avatar. These worlds rarely presented much to do, however, since they lacked any ludic or narrative content.

Board games and games that do not represent any kind of fictional world, such as *Tetris*, belong at the game play extreme. These games are very abstract, but still engaging. *Tetris* can be placed above and to the less narrative side of chess, since chess is an abstracted representation of warfare, while *Tetris* presents a very active functional model.

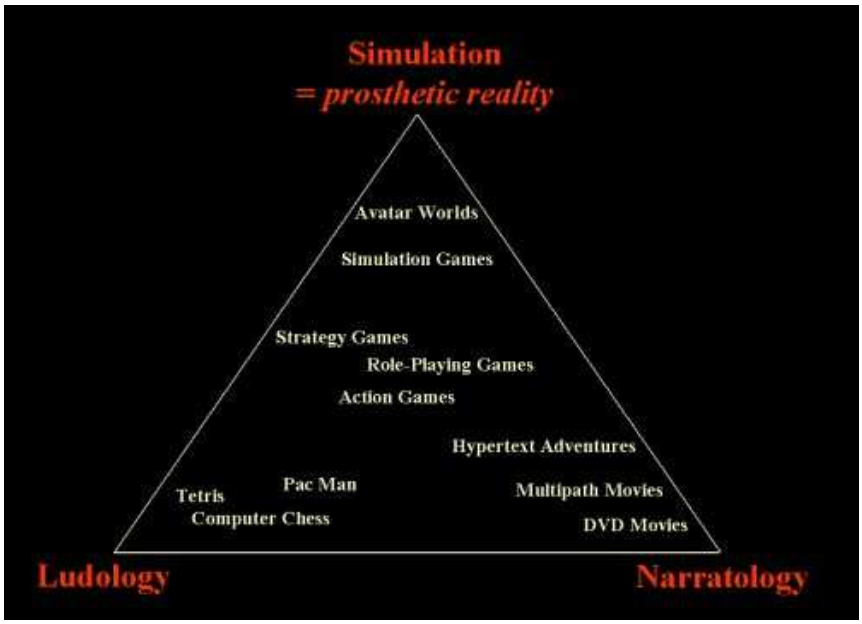

Figure 1. A 2-dimensional classification plane shows the comparative degrees to which a particular game or genre is ludic, narrative, or simulation-based.

At the narrative extreme we place the fixed narrative structures of digital linear movies. Multipath movies hint at game-like interaction by presenting choices for the viewer, while hypertext adventures provide a high degree of interaction in the player's creation of specific narrative experiences.

Action games, strategy games and RPGs incorporate prominent features of all forms, being games, simulators and narratives. RPGs generally have more narrative content than action games, and strategy games have more simulation than narrative.

Gambling and A Three-Dimensional Classification Space

Gaming is often also understood in the sense of gambling. The world of computer gamers usually appears to be very separate from the world of gambling, although gambling companies are certainly game companies that deliver many gambling products as games. To continue with our definition fetish, we can define gambling as: *decisions of gain or loss made by chance within a framework of agreed rules*.

Chance is central to the idea of gambling. Of course, many forms of gambling have scope for skill; but these can be placed somewhere between gambling and ludic gaming by the definitions presented here. In fact, we can add another point to our classification system and extend our two dimensional classification plane to produce a *three-dimensional classification space*, as shown on Figure 2.

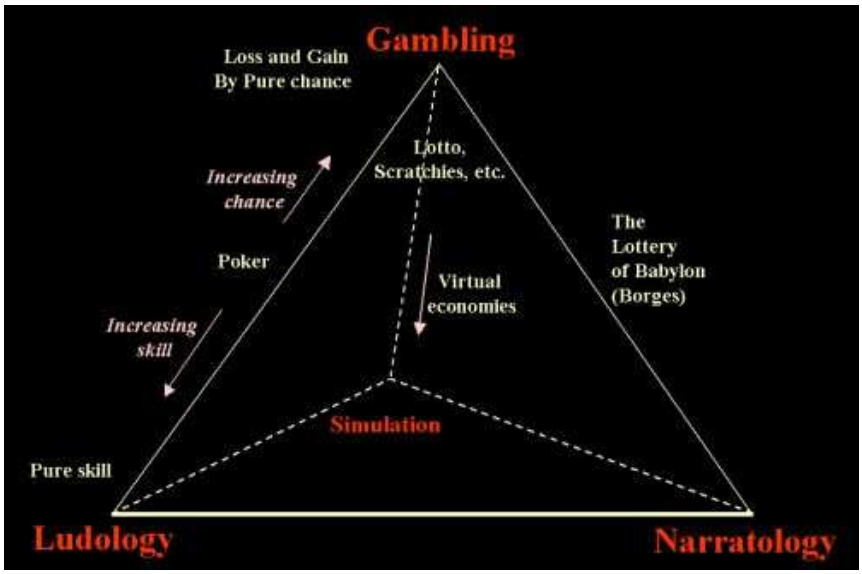

Figure 2. A 3-dimensional classification space introduces pure stochastic, or probabilistic, decision processes as a new element of form.

The different points within this space represent different degrees by which a production represents a game, a narrative, a simulation, or a gambling system. For example, the game of poker has elements of pure gaming and also elements of gambling, since it presents a win/lose scenario played according to a rule set, in which chance has a significant impact upon the outcome but within which skill can also have a major role. If we look at the dimension from gambling to simulation, we enter a very undeveloped zone of virtual economies, while the dimension heading towards narrative suggests experiences structured in time but significantly determined by chance.

From Fiction to Non-Fiction Gaming

There is another distinction to be made between games involving the creation of a fictional world and those that do not involve a fictional world. Since this is a range of variation between two extremes, we can represent the distinction as a third dimensional extension of our basic classification space, as shown on Figure 3. We're running out of easily pictured representations, but this can be solved by representing only three of the previous categories, such as the ludic/simulation /narrative classification plane. The result is a three dimensional triangular prism in which we can classify games according to the degree to which they involve pure ludic form, narrative and simulation, and also to the degree that they involve a fictitious world. In this space we can place team sports and game shows as highly ludic experiences, but with no creation of any kind of fiction. Adventure sports, like mountain climbing, caving and diving are similarly non-fictional, but have more of the nature of narratives than of games, being structured in time, usually not competitive and having rule structures concerning safety rather than constituting arbitrary game rules.

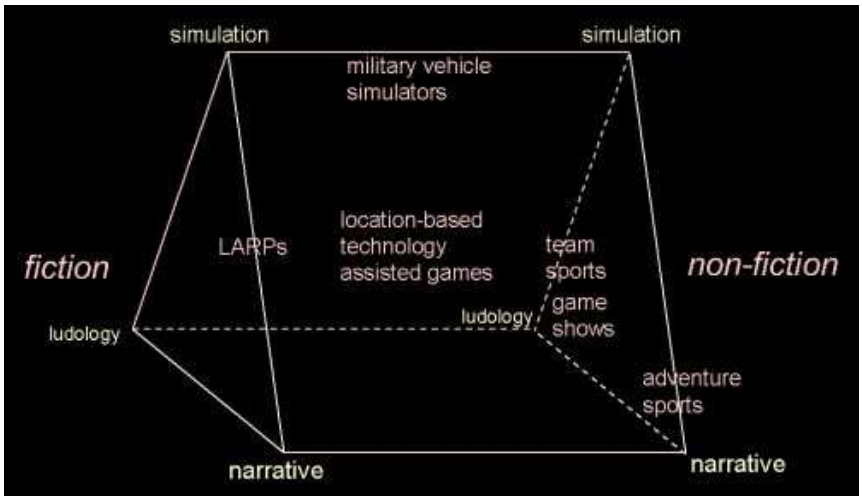

Figure 3. Variations in degree of fictional content are independent of the ludic/narrative/simulation classification of a game, and so are represented along the third dimension of a classification prism.

Military vehicle simulators lie strongly at the simulation extreme, but combine elements of both real and fictitious worlds. The fiction is realized by imaginary (ie. simulated) components like enemy vehicles and battlefields, while the non-fiction elements include accurate functional modeling of real systems, and the use of physical vehicle models as interaction and staging technology.

Live action role-playing, or LARP, games involve performances of game characters in physical space. LARPing may be more or less game-like, depending upon the degree to which players use rule sets. But most of the experience is a form of improvisational theatre in which the players are the audience. Hence LARPing tends to be highly fictional, but lies between simulation and narrative.

From Virtual to Physical Gaming

The last main classification dimension to be considered here is that between virtual and physical gaming. By virtual gaming we mean games that have most of their mechanics processed within a computer and have their audiovisual content delivered by computer peripherals, rather than being played out and experienced in physical space. The continuum between virtual and physical gaming can, like the fiction to non-fiction continuum, be represented as the third dimension of a classification prism, as shown on Figure 4.

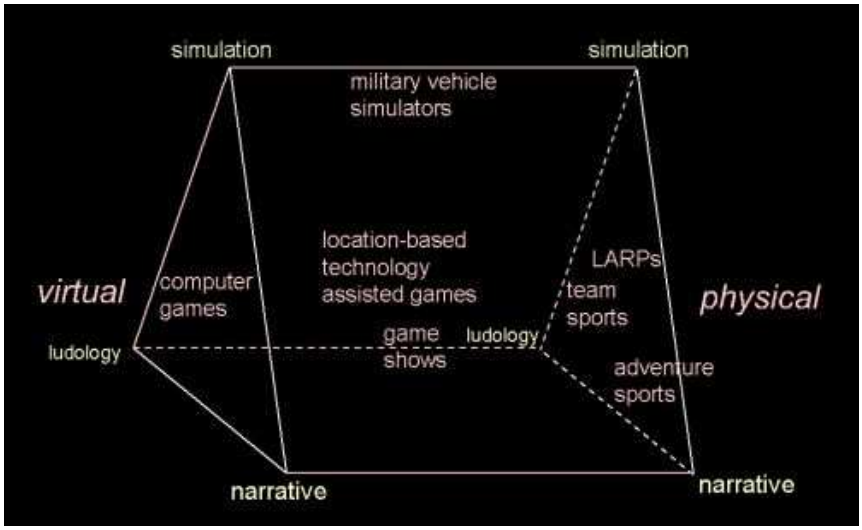

Figure 4. Representing the continuum from physical to virtual gaming forms a game classification prism clearly differentiating live action gaming from screen-and-keyboard/controller-based computer games.

Sports games by this definition are very much at the physical extreme, while current computer games are predominantly virtual. New forms of location based and mobile gaming combine both virtual and physical gaming, often using a computational and mobile infrastructure to support game play action in the real world. Only a small number of technology based games have been developed that use real-world location as a significant factor in gameplay. Perhaps the most famous example is *Botfighters*, developed by the small Swedish mobile-games studio It's Alive! [7]. The game tracks GSM-cell location and allows players within range of each other to score kills and gather resources to buy upgrades. Portugese company Ydreams have recently launched a *Botfighter*-like anti-terrorist game introducing the concept of physical sanctuary in certain locations, malls and restaurants. The projects *Can You See Me Now* and the recent *Uncle Roy All Around You*, created by the UK mixed-reality performance group Blast Theory [8], both use handheld computers, GPS location tracking, and invisible online players to construct games where fast physical movement and device-mediated teamwork are central to gameplay.

Uses of Game Classification Spaces

So, we have a bunch of definitions, and we can use these to define some classification planes and spaces. Of what use is this in practical game design?

One use is as a high-level road map for mapping out where other design techniques can be applied. It is very important to have systematic principles for knowing where more detailed techniques, such as abstract formal design tools and game design patterns [4, 6], should be applied. The distinctions of the taxonomy also allow us to see where techniques from other fields can be applied. For example, acknowledging the narrative elements of a game indicates where methods for the construction of narratives, heavily developed for film script writing, can be applied within games.

The classification dimensions also allow us to separate concerns. A good example of this is the previously described tension between game play and narrative. Using definitions of game and narrative that clearly separate them as forms makes it clear why there is often a perceived tension between them. The distinction also suggests a more clear-headed approach to resolving those tensions. If we clearly identify which aspects of the game experience are to have narrative structure and which are to be patterned gaming, we can apply narrative techniques at the right level and consider detailed mechanics for integrating narrative with game play. We can also rethink some more fundamental questions, for example, can we define game mechanics that *do* seriously advance the higher-level narrative?

The classification dimensions also support brainstorming for game ideas. If a new game is placed in a particular place in the classification system, designers can ask themselves about different possible techniques for integrating the different formal aspects of the game. More than this, if we look for areas of the planes and spaces that are empty, we can explore new types, forms and genres of games. For example, in the ludology/simulation/narrative plane, the space between narrative and simulation is quite empty. As a thought exercise, we can explore what it would mean to fill this space. That is, what does it mean to create something that has aspects of both simulation and narrative, but not much to do with game play? What might this feel like as an experience? What will it require technically? Can we have worlds in which the simulation functions interact to create experiences that over time have particular kinds of narrative structure to them? What are the simulation elements needed to facilitate such emergent narratives?

The most obvious use of the kinds of definitions presented here is to follow Doug Church's suggestion of developing a common design vocabulary. This must begin at the highest level, and can save much time and confusion in high levels discussions about what a game project is going to be. The distinctions presented here came out of practical experiences in discussing game design, and discussions that often suffered from confusion due to the lack of a well established design vocabulary at the highest level. This happens a lot in discussions about where games are going, what we can expect to see over a time frame extending five or ten years into the future. New technical possibilities for location-based and mobile gaming present many new possibilities for game form and experience. We need clear languages for discussing and making decisions about these possibilities.

High level taxonomies are also a crucial precondition for defining the scope of game design patterns [4]. While a number of patterns have been identified [6], this is very preliminary work, and the most useful forms of design patterns must be regarded as a topic of ongoing exploration. In fact, this work will be endless, just as the scope of possible games is endless. Our taxonomies must also continue to evolve, as will the kind of heuristic design rules comprising Hal Barwood's "400 Design Rules" [1,2]. All of these tools represent complementary and evolving methods for game design. They cannot yet be regarded as stable and fully validated, but a high level classification system can nevertheless save much time and confusion in game design, and provide a contribution to the eventual development of comprehensive and systematic tools for designing games of ever increasing complexity.

References

[1] Hal Barwood "Four of the Four Hundred 2001", GDC lecture, 2001.

[2] Hal Barwood and Noah Falstein "More of the 400: Discovering Design Rules 2002", GDC lecture, 2002.

[3] Doug Church, "Formal Abstract Design Tools" Gamasutra, July 16, 1999.

[4] Bernd Kreimeier, "The Case For Game Design Patterns", Gamasutra, December 12, 2002.

[5] Craig Lindley 2002 "The Gameplay Gestalt, Narrative, and Interactive Storytelling", *Computer Games and Digital Cultures Conference*, June 6-8, Tampere, Finland, 2002.

[6] http://www.gamedesignpatterns.org/

[7] http://www.itsalive.com/page.asp/

[8] http://www.uncleroyallaroundyou.co.uk/

[9] http://zerogame.interactiveinstitute.se/

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