

Procedural ecology: A Framework of Video Game Rhetorical Discourse

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Abstract

Procedural rhetoric is a recent concept arising from the study of how a video game uses *procedure* – the rules, operation, and reward system – to direct the behavior of the player towards a desired end (Bogost, 2007). However, while Bogost is primarily concerned with the effects of the procedural on the individual player, video games are experienced by hundreds, thousands, or even millions of people. As a result, even single-player games develop large social dialogues surround them as the players who have shared in the experience of the game communicate with each other. Thus, the procedural systems of the game not only influence the individual, but the social as well. In fact, the social interaction related to a video game is constrained by the procedural system of the video game itself. The object of this essay is to utilize and expand upon Bogost's concepts of procedure and *procedurality* in order to create a model of *procedural ecologies* - environments in which social communication arise from, and affects change on, the *possibility-space* created through the procedural systems of a video game. *Procedural ecologies* are large, with close supporting interrelationships between the audience-created texts and the primary artifact. Most importantly, in *procedural ecologies*, participants have the ability to affect change on the procedural system, which creates an ongoing environment worth deeper academic study.

Despite videogames becoming nearly ubiquitous in American culture over the last couple decades, research into the rhetorical aspects of games is just starting to emerge from scholars. Ian Bogost has been the most active scholar in this area, creating the idea of Procedural Rhetoric - “the practice of authoring arguments through processes” (2008) to describe how the procedural systems of a game can be a channel of persuasive communication. As the author of *Persuasive Games* (2007) and of the chapter, “The Rhetoric of Video Games” in Katie Salen’s *The Ecology of Games: Connecting Youth, Games, and Learning* (2008), Bogost has been influential in advancing the video games as rhetorical artifacts by demonstrating the potential for locating rhetorical meaning embedded in a game’s rules of interaction.

Though Bogost makes insightful observations regarding how a social community can arise around a video game and its procedural system, Bogost does not fully explore the potential of procedural systems as communication ecologies. Instead his focus is what the procedural system means to the individual player, and he demonstrates its rhetorical power through a critical analysis of the procedural system through a contemporary societal lens. Despite Bogost’s success in describing a new object of rhetorical criticism, two things arise from his work. First, a question: how does the procedural influence the social? Video games are experienced by more than just the individual player. Secondly, a problem is exposed: rhetoricians (and for many other scholars) do not seem to be able to shift into a view of video games as locales of study, but instead still see video-games as a collective text – a grouping of various rhetorical artifacts to be analyzed in terms of our various offline social/political standpoints.

Using the term locales should suggest exactly what is meant – that virtual worlds are places where individuals communicate with each other within the boundaries of the *possibility-space*, from their socio-economic standpoint within it, and in relation to each other. In

understanding that, in virtual-worlds, communication is no more or less ‘real’ than in any other time or location, there is a realization that multitudes of traditional rhetorical artifacts – speech, ceremony, visual - are constantly being created. However these artifacts are not receiving attention because cannot be examined from the point of view of offline experience. They must be analyzed from within the context of the *possibility-space* and its participants from which they originated.

However, while every procedural system creates a *possibility-space* – every game creates a virtual world – that doesn’t mean those worlds are inhabited. Communication requires participants. If rhetoricians are to study, the virtual-world must have a critical mass of ongoing participant interaction to spur rhetorical discourse. Not every popular culture artifact develops a significant following, and some of those followings are short-lived. Therefore not all video games are suited for rhetorical scholars to inhabit. The question then, is how to discern which virtual worlds are suitable, and in doing that we answer our first question regarding just how the procedural and the social intertwine.

The object of this essay is to utilize and expand upon Bogost’s concepts of procedure and *procedurality* in order to create a model of *procedural ecologies* - environments in which social communication arise from, and affects change on, the *possibility-space* created through the procedural systems of a video game. *Procedural ecologies* are large, with close supporting interrelationships between the audience-created texts and the primary artifact. Most importantly, in *procedural ecologies*, participants have the ability to affect change on the procedural system, which creates an ongoing environment worth deeper academic study.

In order to undertake this task, this essay will first examine the reasons why rhetorical scholars have not been effective in moving to the digital world and then theorize about the potential benefits of shifting rhetorical scholarship into these new human cultures. This will be

followed by an examination of Bogost's initial concepts and a section on defining this essay's use of the term ecology. Following that, the concept of *procedural ecology* will be presented, including examinations of its defining aspects: size, *procedural knowledge-sharing*, *theorycraft*, and participant-influenced procedural change. Once the model of a *procedural ecology* is defined, it will then be applied to the online multiplayer game *League of Legends*.

Rhetoric and Video Games

Traditional rhetorical studies have not realized the full potential of video-games as rhetorical engines. Instead, video-games have been looked at as a type of packaging for a collection of audio, visual, and narrative elements. Rhetorical analysis of games has been mainly critical, and based upon current societal issues and social constructions such as sex and violence. Ethnographic approaches to virtual worlds, despite producing interesting and informative snapshots of virtual life (Valkyrie, 2011; Castronova. 2001), still dwell on comparisons between the real and the virtual. While other communication-related fields such as technical communication (Eyman, 2008; Mason, 2013) and education/learning (Salen, 2008) have realized that there is 'something different' about video-games and are attempting to design frameworks in which to facilitate research, Bogost's work is the closest rhetorical scholarship has come to recognizing the unique potential of video-games. Part of the problem could be what Gunkel describes as a false-dichotomy of the real and the virtual -the "Virtual Dialectic" (Gunkel, 2007) . Traditional western philosophic thought favors the real over the illusionary, and the necessary paradigm-shift that recognizes that the boundary between these two is itself an illusion has not yet occurred.

Another issue may be simply experiential; some, or even many, scholars may not have experienced virtual-worlds in ways that facilitate an understanding for the communication processes involved. Like an individual moving into any new culture, acclimating into the history,

traditions, and other social constructions takes time. A few hours – or even weeks – are not enough to explore Second Life, nor any other large online virtual-world. As a result, a disconnect can develop between scholars, who do not have such experience, and their students, who have spent significant portions of their lives immersed in various other realities.

In either case, one way that might assist in developing an understanding of a game is to look at rhetorical criticism from familiar, but slightly different, standpoint. In a general sense, rhetorical criticism is done from within an ecology. Though this is true in a biological sense as well, the meaning here is that from a social construction perspective, humans live in various geographical ecologies in which class, gender, religion, and other demographic influences interact with shared local and international social and political concerns. While this idea pervades interpretive spheres of rhetoric, and is why ethnographic scholars were the first to make headway into understanding virtual-worlds (Castronova, 2001; Valkyrie, 2011; Woleslagle, 2007), rhetorical scholarship's general operation is to understand the ways we interact and make meaning in our world, in our ecology. Models of rhetorical criticism fall short, in that the standpoint of the criticism is from the context of the 'real world.' The assumed ecology is of the offline public, from which none of us can escape.

What happens if we allow rhetorical scholars to work from within a new ecology? What could be learned from the rhetorical discourse that occurs within a virtual community? Would we find that whatever grand communication that was required to inspire 4000 players, from multiple in-game social groups, and from all over the world, to temporarily abandon their offline existence (and even sleep) in order to risk thousands of dollars worth of virtual ships and items in a war over virtual territory ("Eve players stage giant online space battle", 2013), was equal in scope and importance within the community as was any offline orator's utterance? Would existing rhetorical standpoints even apply within virtual worlds? Could there be racist undertones

in communication between orcs and goblins in *World of Warcraft (2004)*? What can be learned by comparing rhetorical discourse and artifacts from with online ecologies to those from offline ecologies? To begin to understand the scope of the new world the framework of *procedural ecology* opens up, Bogost's concepts of *procedurality* and procedural rhetoric must first be examined.

Procedurality and Procedural Rhetoric

At the heart of Bogost's work is his concept of *procedurality* – “craft[ing] representations through rules.” (2008) By building an interactive representation of a world through a collection of procedural rules – ‘generating’ the world rather than directly constructing it - a developer creates a *possibility-space* that participants can experience and interact with. Bogost stresses that though negative connotations of ‘procedure’ are often that it is constraining, static, or even authoritarian, in this case, the collection of rules –which this essay will refer to more simply as the procedural system - are rules that create rather than destroy. Bogost then builds on this concept to define procedural rhetoric as “the practice of using processes persuasively.”

As an example of this concept, Bogost refers to the highly popular game Animal Crossing. While Animal Crossing's visual and textual narrative is a cute caricature of farm and community life, Bogost's reading is that “Animal crossing is a ... game about long-term debt. It is a game about the repetition of mundane work necessary to support contemporary material property ideals.” (2008) Through this example, Bogost shows that rhetorical analysis of video games shouldn't be limited to the narrative choices or to audio/visual imagery, as would be with less interactive artifacts. Instead, the procedural system – developer-created rules in which the interactive existence of the player is defined and constrained within a *possibility-space* – is itself a rhetorical artifact that deserves analysis to uncover embedded assumptions or ideologies.

Bogost then uses a concept from Lave and Wenger (1991) to suggest that “Video game play could be understood as a “community of practice”” in that the people who play video games develop values, strategies, and approaches to the practice of play itself.” He uses the online forum “Animal Crossing Community” to show that the game’s *possibility-space* gives rise to a community that exists outside of the procedural system, but is centered on constructing and/or assisting other players with their existence within the *possibility-space*.

Bogost’s use of Lave and Wenger’s concept is intriguing and enlightening. First, by defining the collective of players as a ‘community of practice’, Bogost is suggesting that the game itself should be considered a larger system in which the community of practice develops. Additionally, Bogost notes that the primary text’s audience – the community - has created a new text separately from the game that exists to support participants – support their practice - within the primary. The community’s text’s existence is to facilitate the sharing of technical information – “look up the value of different fish, insects, or furniture,” develop gameplay strategies, and create cultural values and norms regarding to the social interactions surrounding playing the game (Bogost, 2008). By pointing out the interaction between the primary text and the audience-created text, and by describing the communication types found in the audience’s text, Bogost has, in essence, shown the two defining features of a *procedural ecology*: audience-created texts exist to share *procedural knowledge* and provide a space for *theorycraft* (Paul, 2011). However, to better understand the concept of *Procedural ecology*, the framework of understanding should be shifted.

Bogost’s use of Lave and Wenger’s “community of practice” (1991) concept for video-games has trouble because it does not scale well. Bogost suggests that the game-playing community as a whole is the ‘community of practice.’ However, this is overly inclusive. Many games are complex and varied that participants within the same *possibility-space* required and/or

develop specializations that others would have no need for, or interest in. That doesn't mean

Bogost was incorrect: in many games, those with few participants – such as unpopular single-player games, or 'niche' political webgames – and/or games that have limited complexity, the community will likely be too small, and too generalized in individual abilities and knowledge, to support or develop any further specialization.

However, for *possibility-spaces* with high levels of complexity and populations, Bogost's use is too general. One would not say that all individuals in the medical field, nor even all doctors, are in the same community of practice. Likewise, for larger games such as MMORPGs, simply labeling all players as part of the 'community of practice' is too general due to the complexity of the game. For instance, in the MMORPG *Eve Online* (CCP, 2003), while the participants themselves group up and create corporations, alliances of corporations, and even alliances of alliances; each of these groupings has production-oriented players and combat-oriented players who have distinct knowledge and skill differences between them. How can this entire group be considered one 'community of practice'? Generalizing all players in this way limits the ability to discern the variety of communication patterns and artifacts that arise from the participatory audience.

As Bogost has used the endpoint of Lave & Wenger's (1991) framework, the potential for further refinement is limited. One option is to shift the positioning of individual video games back and forth within the framework - between 'community' and 'practice' - depending upon some criteria being met, criteria that may be unclear or arbitrary. This goal of this essay is to create a simplified model that is inclusive to all procedural systems that meet a few large-scale traits. For that reason, a concept of 'ecology' is more comfortable in vernacular, and is simpler in that it generalizes the entirety of the *possibility-space* while still leaving avenues for further classification and refinement.

Ecology

The term ecology provides a better starting point for understanding the complexities of *possibility-space* and participants. First, ecology is a more effective generalization of the community that surrounds a procedural system, as it is inclusive of all of the various texts that surround the primary, while still leaving avenues for finer distinctions between participants and the types of texts produced. Next, because it is an apt descriptive term for a *possibility-space*, it is an environment in which living things exist and interact. Finally, this essay uses the term because ‘ecology’ comfortably describes the collection of intertextual and interpersonal interactions arising from participation with, or the sharing of, a primary text.

As mentioned above, Bogost’s use of ‘community of practice’ is too general in that within the framework the term is appropriated, there is little room for further classification. While this essay borrows terminology such as ‘primary text’ from Fiske (1987), his classification system also would need significant restructuring in terms of the definitions of ‘secondary’ and ‘tertiary’ texts, as they do not fit well within an interactive system in which audience created texts are so closely intertwined with the primary. To be as inclusive as possible in regards to the collection of texts that may surround a video game, while still leaving open the possibility of further refinement, this essay uses the term ecology.

When speaking about virtual-worlds, the term ecology is clearly suitable. Ecology is “the relationships between a group of living things and their environment” (Merriam-Webster, 2013). The *possibility-space* is an environment to which the participants are inherently related by nature of their existence within it, and by which the participants are related to other participants. *Procedural ecologies* are environments generated through *procedurality*. The *possibility-space* generated is environment in which individuals develop relationships.

Ecology is a term that has seen use within multiple fields aside from biology (Postman, 1979; Altheide, 1994; Spinuzzi, 2003; Salen, 2008; Eyman, 2008; Mason, 2013). Generally, the term is used to describe an environment of people involved with a field of interrelated texts. For instance, ‘Trekkies’ (not to be confused with the movie which used the term) are participants in a community that revolves the various texts related to the Star Trek Universe. They write fan-fiction, dress as their favorite characters, share history, and argue endlessly regarding finer points of narrative meaning. They are part of an ecology that has arisen through the shared experience of the collection of primary texts that comprise Star Trek. Music too is full of ecologies, either based on genre (hip-hop), artist/group (Jimmy Buffet’s ‘Parrotheads’), or even songs (Rickroll!). Each of these are collections of interrelated texts revolving around singular or multiple primary texts. A video game is no different in this regard. However, a *procedural ecology* differs in some key ways that will be later in essay. Before then, the concepts of *procedural knowledge* and *theorycraft* (Paul, 2011) shall be explained.

Procedural knowledge: Complex Technical Communication

As mentioned earlier in this essay, Bogost himself noticed two key aspects of video game ecology when he applied Lave and Wagner’s framework (1991). He had noticed that while the audience-created text – an Animal Crossing forum – existed outside of the procedural *possibility-space*, it supported participants’ existence within the *possibility-space*. The primary text and the participants’ text were interrelated through the procedural system. Bogost also noticed that the outside text’s existence was to facilitate the sharing of technical information – to “look up the value of different fish, insects, or furniture,” to develop game play strategies, and create cultural values and norms regarding to the social interactions surrounding playing the game (Bogost, 2008). The interrelationship between the primary text and audience-created texts

in which procedural information – *procedural knowledge* – is a key defining feature of *procedural ecologies*.

It holds true for any game, that players possessing limited understanding of the procedural system of a game are severely limited in their ability to interact with it. For players that want to win, players must understand the procedural system and interact with its *possibility-space* in the way defined. To do this, players must then seek knowledge in order to conform to the procedural expectations of the game.

Historically, the traditional way to develop *procedural knowledge* of a game is through repetitive play or some form of trial-and-error; i.e. “playing the game.” In many games, a mistimed jump or misplaced puzzle piece results in the inability to continue playing - a procedural “fail.” Conversely, proper timing or placement is rewarded with continued play and/or narrative advancement. This system works simply because the desire to compete and achieve underpins the desire to acquire procedural understanding. However, players do not limit themselves to simply playing the game in order to acquire the knowledge required to advance.

Games do not exist in a vacuum; they are part of a larger social construct. To use a basic example; the single-player game is an individual experience, but it is experienced by many individuals, and in similar fashion. This allows those who play the game early to pass on knowledge to those who play the game later, assisting them in avoiding missing valuable clues or avoiding common mistakes. Players seek out knowledge from others through discussions with peers, or through “expert” advice found in guides or walkthroughs. At the same time, as games become more complex, more knowledge is required to exist with the procedural systems, therefore more social interaction is required to assist players in navigating that complexity. As this *procedural knowledge* is essentially technical, the communication processes have garnered the attention of some in the technical communication field.

Eyman is one such technical communication scholar who has recognized that videogames often have massive amounts of information that needs to be shared with participants in order to facilitate their existence within, and has created a an ecological framework for analyzing technical communication within video games (2008). In it, Eyman highlights the vast amount of complex knowledge that is required to participate in modern video games and so creates a framework that delineates game communication into *Environmental Action, Para-Textual Development, Documentation, Infrastructural processes, and Research*, and then explains how technical communication is either present in each, or how technical communication scholars can assist with game design to facilitate them (2008).

As games become more complex, more knowledge is required to exist with the procedural systems, therefore more social interaction is required to assist players in navigating that complexity. Eyman's technical communication ecology framework is particularly situated around multiplayer games because Eyman sees "...MMORPGs as representative of the most complex rhetorical systems that are explicitly shaped as games" (2008). Indeed, the procedural information required to exist with an MMO is of a vastly larger scale and complexity than that which is required to exist within a typical game on the original Nintendo Entertainment System (NES). Even though Eyman focuses on MMOs, Mason has been able to apply technical communication theory to player-generated documentation in single-player games (2013). This is important in that *procedural ecologies* are not limited to multi-player games. Some single-player games have been experienced by far more players, and continue to be more intertextually referenced within popular culture than widely played modern MMOs with hundreds of thousands (or millions) of active players.

As a framework for a technical communication analysis of videogames, Eyman's work can be useful in identifying aspects of games that technical communication scholars can provide

insight and assistance to developers. The framework also has use in identifying which aspects of game communication may be better suited to organizational or interpersonal scholars. From the point of view of a *procedural ecology*, Eyman's framework can be useful in examining and classifying the types of *procedural knowledge* that must be transmitted between participants to facilitate acceptable interactions with the *possibility-space* and with other participants within it. However, it does not seem suitable to deal with higher-level social construction of *procedural knowledge* into value or aesthetic based theories how to play a game 'right'. For that we turn to *theorycraft*.

Theorycraft and Participant-Influenced Procedural Change

Once a player has developed a familiarity with the *procedural knowledge* required to interact with the game, the player is then equipped to take part in another key aspect of *procedural ecologies*: the social construction of 'how' to interact with the *possibility-space*. That social (re)construction of *procedural knowledge* is called *theorycraft*, a concept developed by Christopher Paul in 2011.

Theorycraft is “a discursive construct predicated on advising players how to optimally 'play' a game” (Paul, 2011). Paul recognized that for some video games, “the external discourse ... can function productively to reshape how procedures are designed” and that “*theorycraft* is generally tied to a higher quality of play; increased understanding about the game and how it works; and as fun.” For the purposes of the *procedural ecology* model, the concept of *theorycraft* is being slightly adjusted. While Paul would likely have argued that *procedural knowledge* falls under the term, this essay distinguishes the two. For this essay, while procedural-knowledge must be attained through various means, *theorycraft* is the construction and application of a value-system upon that procedural-knowledge and on interactions within the *possibility-space*.

Theorycraft can revolve around the 'optimal' choice of characters or abilities to facilitate specific tasks within the *possibility-space*. *Theorycraft* could be the discussion of how to play or finish a game the fastest, or delve into the relative merits of different playstyles. In MMOs, *theorycraft* often revolves around which roles – such as 'healer' or 'tank' – each character in a group should play, which items are more or less suitable for each role, and how each role is played. While *procedural knowledge* is concerned with communicating the technical aspects of characters, items, or environments, such as the amount of damage a particular character will do with a particular item, or the amount of damage a 'Frost Dragon' can do, *theorycraft* takes this knowledge and then applies it within specific contexts to attain specific outcomes, such as deciding that an orc, armed with a halberd, has the best chance to defeat the abovementioned dragon.

Theorycraft is key to *procedural ecologies* in that it is within this discourse that values and opinions regarding the constraints of the *possibility-space* are developed. Through *theorycraft*, participants are able to discern aspects of the *possibility-space* in which change may be desirable, or that proposed changes are unwanted. As *theorycraft* is discursive (Paul, 2011), it is inherently rhetorical. Players construct meanings, develop opinions, and judge themselves and each other through value frameworks related to *theorycraft*. However, they don't limit their opinions to each other; they develop opinions on how the *possibility-space* 'should' work as well.

This brings up the final requirement for a *procedural ecology*: the potential for *participant-influenced procedural-change*. This is what makes a *procedural ecology*, in a truer sense of the term, an ecology. When players develop and implement modifications to a game, such as is infamously common for many shooters, they are changing the *possibility-space* directly. They are remaking the *possibility-space* to conform to their own ideas and preferences.

By doing this, they create a new collection of procedural-knowledge, and therefore restarting the cycle.

Another avenue for player influence is through forums. Increasingly, game developers are interacting with their player base by incorporating design ideas and procedural rule changes. This too reinvigorates the entire ecology with influx of new *procedural knowledge* to disseminate, new *theorycraft* to generate, and more critical discourse with the developers.

Procedural ecology

As with all ecologies - such as those that arise around music genres, television shows, or other types of fandom – *procedural ecologies* are surrounded with a large variety of supporting texts produced by fans; such as musical tributes, fan-fiction, or desktop wallpapers. And, like other ecologies, these audience-created texts serve to expand and reinforce the shared experience of the ecologies' primary texts within the psyche of their participants. At the risk of stating the obvious, it is important nonetheless to realize that social interactions within any ecology are defined by the primary text's existence. The dialogue and social construction are in response to, and about, the audio/visual artifact. Put simply, there can be no supporting audience-created texts without a primary to spur them.

Procedural ecologies differ to other ecologies in that the audience participates within the constraints of the primary text. Participants exist and operate within the *possibility-space* created by the procedural system. Whereas social construction surrounding a text was previously limited to the surface, in *procedural ecologies*, social construction occurs both externally and internally. As a result of the participatory nature of the text, the communication surrounding the shared experience is no longer limited to the aesthetics of the text – meaning-making, technical discussion such as lighting choices or sound editing, or narrative criticism - communication now includes the construction of one's own existence within the text. As a result, supporting texts,

which are created by the participatory audience, serve to facilitate the conveyance of *procedural knowledge* – the rules/operations of the procedural system and/or quantified information of other participants’ existence within the primary text - and for *theorycraft* – that is, a meta-analytic synthesis and valuation of the above information into overall optimal methods of play and player interaction.

Similarly put, the social communications surrounding videogames are interrelated with the procedural systems of the video games they surround. However unlike audience-created texts based off of more traditional artifacts - such as fan-fiction - the texts found within *procedural ecologies* are often technical in nature, and exist to provide other players with *procedural knowledge* of some sort. Game walkthroughs and guides on GameFAQs.com (2013) and other websites give players the information needed to play each game “correctly.” While seemingly outside the desires of both game developers and players, discussions of ways to play the game incorrectly, and/or to cheat, are still constrained by the procedural system the ‘trolls’ or the cheaters are trying to find ways around. Even qualitative dialogue regarding the “best” way to exist and interact within the *possibility-space* is still constrained by the procedural system. Therefore, in a *procedural ecology*, the social environment itself is an extension and reinforcement of the procedural system, pressuring players to play and experience the game in a specific manner.

More simply, a *procedural ecology* is a large social communication ecology in which audience-created texts are fundamentally intertwined with the procedural system that underlies the ecology. These texts function to transmit *procedural knowledge* and provide communication-space for the construction of theories of optimal play (*theorycraft*). In addition, and most importantly, a *procedural ecology* provides mechanisms for the participatory audience to affect change on the *possibility-space* itself. As a result, a *procedural ecology* is a self-renewing

cyclical system of procedural rules constantly influencing, and reacting to, the participating audience. In order to see how the model works, it will now be applied.

Applying the Model: *League of Legends*

While the most obvious application of the *procedural ecology* model may be to a MMORPG such as *World of Warcraft* (Blizzard, 2004) or *Eve Online* (CCP, 2003), the existence of a large, persistent, virtual world is not a requirement for the model. In fact, there are likely many single-player games that have been developed that could also qualify. For this essay, the multiplayer online game *League of Legends*, a game in which at most ten participants are interacting for a limited period of time, was chosen. *League of Legends* serves as an example of a *procedural ecology* because of its large player base, its highly complex *possibility-space* results in an abundance of *procedural knowledge*, which is distributed through audience-created texts which also provide communication space for ongoing *theorycraft*, while developer-player discourse often leads to participant-influenced change in to the procedural system that generates the *possibility-space*.

Large player base, large audience

Initially released in 2009, by 2012 *League of Legends* was “the world’s most played video game” with 32 million active players each month – nearly triple that of previous title-holder, *World of Warcraft* (MacManus, 2012). *League of Legends* also beat out other popular competitors, such as games in the popular *Call of Duty* franchise, in terms of concurrent players; hosting 12 million users a day, and 3 million at any given time.

Not only are gamers playing *League of Legends*, but they’re also watching. The *League of Legends* All-Star game, broadcast online, had a viewership of over 18 million, a number that Riot Games - the publisher of *League of Legends* - claims is “... stronger than 80 or 90 percent of the sports covered on ESPN” (Campbell, 2013). Demand for tickets resulted in the Season 3

Championship for *League of Legends* to be moved to Los Angeles' Staples Center, an 18,000-seat venue that nearly doubles the sold-out capacity of previous year's championship (Snider, 2013), in which the winning team walked away with one million dollars (Toyad, 2012). As can be seen, the *possibility-space* is interacted with by a large population. As this fulfills the most basic requirement for a *Procedural ecology*, the next task is to ascertain how complex the game is, and the level of knowledge required to interact with it.

High Complexity generates large amounts of *procedural knowledge*

League of Legends is a team-based Multiplayer Online Battle Arena - "MOBA" (giantbomb.com, 2013) centered around two teams of five players each. The playing area - "map" - is vaguely square, with each team having a base in either the top right, or bottom left, corner of the map. There are three "lanes" - top, middle, and bottom - leading to and from each base, and there are multiple maze-like pathways between each lane. Each base consists of a "Nexus," eleven automated turrets (three in each lane, two protecting the Nexus), and three "Inhibitors". Each player controls a character - the "Champion" - and the object of the game is to break through the enemy team's defenses and ultimately destroy the enemies' Nexus. Each game lasts, on estimate, about 40 minutes.

Players interact with the *possibility-space* through a 'champion'. Players are allowed to select a champion to control for the duration of the game, which can last from twenty minutes to over an hour. There are numerous champions in the game, each being different to the others in some way. Champions have varying starting "stats" such as hitpoints and attack strength; and each champion has a different selection of abilities along with an 'ultimate' - a special, limited-use ability. Champion abilities will either cause physical or magical damage to an enemy champion, or they can cause 'status effects' in which enemy (or ally) players could be healed, slowed, or otherwise helped or harassed.

The player can augment his champion's starting stats through the use of 'Mastery Points' and 'Runes.' Access to both systems is gained through continued play. Players are rewarded one mastery point, and one 'Rune Slot' for each level they achieve over time, up to thirty. Both runes and mastery points can be arranged in various combinations and specialty groups that increase starting stats in offense, defense, or other specialized areas. As runes and mastery points can be redistributed at any time prior to the start of the game, players can easily tailor their specializations to the champion they are using.

In-game, champions can be additionally augmented through the purchase of items. These items increase attack speed, damage, hitpoint and/or power levels, or provide other benefits. Money to purchase these items is accrued within the game over time, by killing enemy players, or by killing "minions" – non-playable-characters (NPCs) that are either spawned by each teams' Nexus and travel down each lane, or are found at various places within the map.

Further complicating matters, some champion's abilities can complement the abilities of another, working in tandem to make both champions stronger, while at other times the abilities of a champion may be disadvantageous when faced against a particular enemy champion, whom may have abilities that "counter" or otherwise limit the first champion's effectiveness.

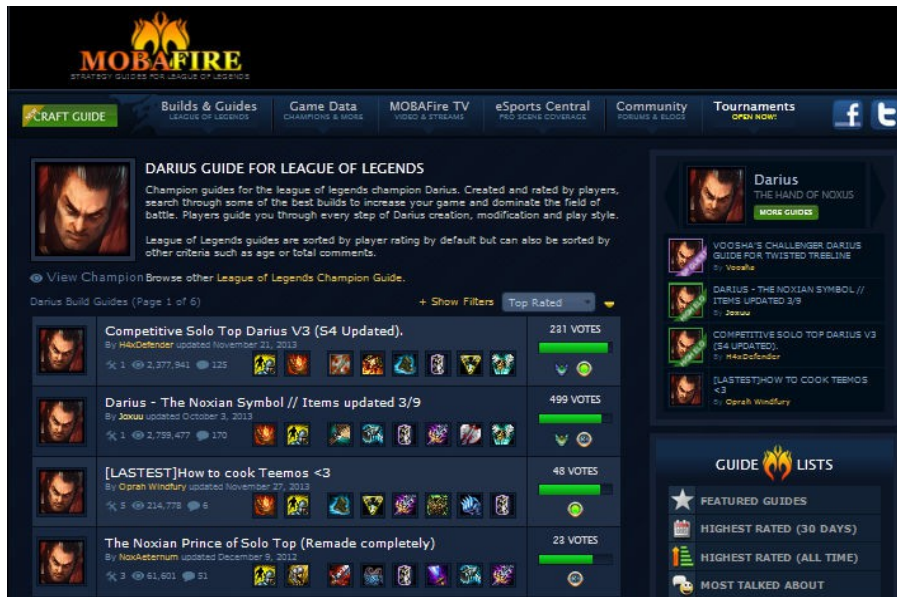
Clearly, the high levels of complexity require the player to have a vast store of *procedural knowledge* regarding the abilities, strengths, and weaknesses of various champions when pitted against each other, and the effectiveness and optimal distribution of Runes and Mastery Points for each, along with an understanding of each in-game item, and its usefulness within the context of the specific battle. The next question is then, how this knowledge communicated to the participants?

Participant Texts: Communicating Knowledge and Generating *Theorycraft*

As a result of the massive amount of *procedural knowledge* required to interact within the *possibility-space*, *League of Legends* has spawned an abundance of participant-created texts that serve to disseminate this information.

There are a variety of websites dedicated to cataloging and explaining various gameplay strategies such as lolking.com (2013), mobafire.com (2013), and leaguecraft.com (2013). Each site provides the basic stats and abilities of each champion, as well as a listing of all items along with their respective bonuses and augmentations. Some sites also have information regarding the stats of the in-game NPC characters, as well as comprehensive explanations of gameplay mechanics. Additionally, live streams on websites such as twitch.tv (2013) and lolesports.com (2013) demonstrate each champion's abilities, costume designs, and gameplay concepts. However, not only do these texts provide the *procedural knowledge* required to interact with the *possibility-space* they also provide communication space for the generation of *theorycraft*.

Theorycraft, the application of constructed values on *possibility-space* interaction, can be found throughout the texts created. For example, 'Character Builds' are offered by players as collections of recommended runes, mastery-point distributions, items, and other recommended gameplay aspects. These collections are then voted on by players in a system in which the most popular (and/or effective) builds are higher valued than others. An example of this system – a collection of 'builds' for the character Darius – can be seen below.



Another space where *theorycraft* is generated is through live streaming matches. Players of various skills and backgrounds will often stream their games on websites such as twitch.tv (2013), often providing a running narration as they play in which they make value judgments on the abilities and playstyles of both themselves and others, as well as gameplay aspects they find agreeable or otherwise. Concurrently, values are applied to individual achievement within the *possibility-space* through websites such as lolking.com (2013) which tracks players win rates, as well as websites that track the earnings of top *League of Legends* players such as lolarnings.com (2013).

As can be seen, the large player base has combined with the highly-complex *possibility-space* to spur the creation of audience-texts which serve to distribute *procedural knowledge*. This knowledge is then socially constructed through *theorycraft* in order apply values to interactions within the *possibility-space*. To close out this application of the *procedural ecology* model, the interaction system that allows player-

The *League of Legends* online forum provides a close interaction system between developers and participants. At any given time, many aspects of the *possibility-space* are being debated, including gameplay styles, items, Champions, and design philosophy. One example of

this can be found in the questions asked in the forum thread “Undeath, Terror and Acid Hunters: Let's talk Urgot”, in which the lead game designer, “Meddler” invites players to comment on a champion that is about to be reworked:

“If you play Urgot, what is it that appeals to you about him, both in terms of theme and gameplay? Which of his abilities define what it's like to play Urgot for you? If you don't play Urgot, are there particular reasons you're not interested in doing so?

When playing as Urgot are there things that feel unnecessarily difficult to do or ineffective? When playing against Urgot are there things that feel unfair?”

(2013)

The developers recognize that each player constructs their interaction within the *possibility-space* differently, and that players can offer insight and opinions based on their relative knowledge and experience.

As demonstrated, *League of Legends* has a large player base, has a highly complex *possibility-space* that generates an abundance of *procedural knowledge* that must be learned/acquired by the playerbase, that the player base has created a number of texts in order to both disseminate that knowledge and develop socially constructed values regarding the application of that knowledge through *theorycraft*, and that players have an avenue for participant-influenced procedural change through ongoing interaction with the game's developers. By meeting these requirements, *League of Legends* can be considered a *procedural ecology*.

Conclusion

The object of this essay was to use Bogost's concepts of *procedure* and *procedurality* (2007; 2008) to construct a framework for understanding large-scale player social interaction

within and around the *possibility-space* generated by a video game. To do this, a model was created that outlined the distinguishing features of a *procedural ecology* - a unique type communication ecology in which the audience is not only limited to constructing meanings of the text, but in which their existence within the text itself is both procedurally and socially constructed as well.

A *procedural ecology* is a highly populated, highly complex procedural system in which audience-created texts disseminate the abundance of *procedural knowledge* required to participate within the *possibility-space* generated by the procedural system (*procedurality* (Bogost, 2007; 2008)). That knowledge is then reconstructed through *theorycraft* (Paul, 2011), in which socially constructed values and opinions regarding optimal ways of interaction within the *possibility-space* are developed. Finally, *procedural ecologies* have mechanisms in which *theorycraft* leads to participant-influenced procedural change, either through direct action, or through rhetorical influence in developer-player discourse. This ability to influence the *possibility-space* creates a cyclical system by providing a fresh influx of *procedural knowledge* to be disseminated, creating an ongoing process.

Increasingly, more and more people are spending large chunks of their existence online. As technologies become even more advanced and accessible, the percentage will likely grow. As a result, a large amount of rhetoric discourse is taking place that is essentially being ignored. Either due to a lack of understanding, or a lack of ability to identify both where discourse is taking place, or what types of discourse are available for study. Rhetoricians cannot remain stuck in the ‘real’ world when significant rhetorical discourse is taking place all around, and expand their spheres of study to include the discourse taking place within these ecologies.

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