

ABSTRACT

Massively Multiplayer Online Role-Playing Games
As Constructivist Learning Environments

by

Mark Douglas Wagner

M.A., National University, 2000

B.A., California Polytechnic State University at San Luis Obispo, 1998

Proposal Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
in
Educational Technology

Walden University
February 2008

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Formal K12 education remains much as it did a century ago, but in the era of the Internet, cell phones, and videogames, students have changed. Videogames and simulations show potential as engaging and motivating learning environments. MMORPGs in particular have social and cooperative elements that might be valuable for educational purposes. However, despite a breadth of research about videogames and learning in general, the potential uses of MMORPGs in formal education are poorly understood. Therefore, this study aims to inquire into potential applications for MMORPGs as constructivist learning environments in formal K12 education , and to understand related benefits and drawbacks. Two pillars of theory support this study: constructivist learning theory and digital game-based learning theory. The study will employ a grounded theory paradigm of qualitative research and the Delphi method of inquiry. The expert panel will consist of 12 to 24 adult experts drawn from the field of videogames and learning. Both industry professionals and academics will be represented in the population. The consensus of the panel's predictions, and any outlying or dissenting perspectives, will be reported in the final dissertation.

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CHAPTER 1: INTRODUCTION TO THE STUDY

Introduction and Background

Nearly a century ago Dewey (1915, 1916, 1938) laid out a progressive new approach to education. He called for schools to break away from the traditional medieval model of education in which teachers handed down pre-defined knowledge to relatively passive students. He believed that experience is the best education and created a system of education that would focus instead on learning-by-doing. Today, many young people learn by doing in a virtual context while using computer-based simulations – or even videogames meant for entertainment purposes.

If Dewey believed that all education is experience, then Vygotsky (1978, 1986, 1997) believed that all experience is social. It follows that all education is social. Furthermore, Vygotsky believed that all human development (even human thought) is social. He introduced the concept of the zone of proximal development (the ZPD), which is now familiar to educators worldwide. This concept suggests that a student can perform more sophisticated tasks with help than they can unassisted. Based on this paradigm, educators can provide support, or scaffolding, for students to help them improve their unassisted performance. Ideally, educational tasks will fall within the ZPD and so provide a challenge without totally frustrating a student. Good videogames excel at challenging players without frustrating them; a videogame cannot be successful without doing this in

an individual and differentiated way for each player. What happens instantaneously in a videogame is difficult for teachers to reproduce in a classroom environment, even with considerable preparation, planning, and skill.

Piaget (1929, 1950, 1952) introduced the formal constructivist concepts of assimilation and accommodation, which describe the way in which a student constructs his or her own meaning as they experience the world. This philosophy is in keeping with Dewey's focus on learning by doing and Vygotsky's focus on social learning (particularly in Piaget's later work). Piaget's student, Papert (1980, 1993, 1996) applied these concepts to his work with children and computers. He believed that if a student can use a computer, they should be able to program the computer. The children's programming language Logo was the result of his work. Using Logo students could actually create their own videogames; Papert came to believe that if students can play videogames, they should be able to program videogames.

Bruner (1966, 1971, 1986, 1990, 1996) built upon the constructivist philosophies of Dewey, Vygotsky, and Piaget as he explored the process and the culture of education. Like Papert, other educational technologists, such as Jonassen (1992, 1999, 2000, 2003) applied these mature theories of social constructivism to the implementation of educational technologies. Jonassen focused on the use of technology to support intentional rather than incidental learning. While there is now little disagreement that a good deal of incidental learning takes places in videogames (after all, this is what people presuming takes place when they fear that videogames will make children more violent),

it may also be possible to harness the technologies of videogames for purposes of intentional learning in formal K12 educational institutions, just as Jonassen harnessed the incidental learning that happens when browsing the web for intentional purposes.

This approach may border on being necessary to engage and motivate 21st century students. Prensky (2001b) introduced the metaphor of Digital Natives and Digital Immigrants, in which students who have grown up in a time of cell phones, email, instant messaging, ubiquitous Internet access, and –of course – videogames are considered Digital Natives who speak “digital” fluently. People who were born before these technologies were invented (including most educators) are then Digital Immigrants who must learn to speak “digital” as a second language. Digital Natives expect to be engaged and motivated and they expect individualized and differentiated attention. Videogames can provide this for them as entertainment, and they may be able to provide this for educational purposes as well.

Much has already been written on the use of videogames in education. Prensky (2001, 2006) showed how videogames are being used for training purposes in the military and corporate world, and he explained to teachers and parents what students can learn from various genres of videogames. Gee (2003, 2004, 2005c), a linguist and cognitive scientist explored 36 principles of learning that good games embody that many classrooms do not. He also discussed ways in which videogames might be better for student’s academic performance than traditional teaching methods. Aldrich (2004, 2005) focused on the educational benefits of simulations, and even created a simulation to help

players develop a traditionally difficult to teach soft skill, leadership. Shaffer (2006), like Gee, was interested in using games and simulations to help students develop new identities, particularly professional identities that include innovative ways of thinking. Other dissertations have also been dedicated to exploring the effectiveness of learning in videogames; for instance, Squire (2003) researched the use of *Civilization III* with high school students, and Steinkuehler (2004) explored the learning by apprenticeship that happens in MMORPGs. Others have written about games that are explicitly created for purposes other than entertainment; Michael and Chen (2006) discussed games meant to educate, train, or inform. Such “serious games” include games for change such as the World Food Program’s *Food Force* and Impact Games’ *Peacemaker*, which hint the power of videogames to not only educate, but to effect positive social change of the sort Dewey and other early constructivists sought. Unfortunately, little of this research addresses the potential applications of MMORPGs in a formal K12 educational environment. A detailed review of literature appears in Chapter 2.

Problem Statement

Formal K12 education remains much as it did a century ago, but in the era of the Internet, cell phones, and videogames, students have changed. Videogames and simulations show potential as engaging and motivating learning environments. MMORPGs in particular have social and cooperative elements that might be valuable for educational purposes. However, despite a breadth of research about videogames and

learning in general, there have been no studies focused on the potential uses of MMORPGs in formal education. With the notable exception of Steinkuehler (2004a, 2004b, 2005a, 2005b), who investigated the sort or informal apprenticeship learning that takes place in MMORPGs, there is a significant gap in the literature regarding learning and MMORPGs. Other videogame theorists, including Prensky (2001, 2006) and Aldrich (2004, 2005) discuss MMORPGs as a learning platform, but only briefly, and when they do, they disagree about the value of the games for learning. Therefore the aim of this study is to inquire into potential applications for MMORPGs as constructivist learning environments in formal K12 education, and to explore the potential benefits and drawbacks of such applications.

Nature of the Study

This qualitative study will employ the Delphi method of inquiry. A panel of experts will be asked to make predictions in response to multiple iterations of a questionnaire. After each iteration, responses will be coded and analyzed by the researcher. Following iterations will be modified in light of these responses. Participants' responses will also be anonymously shared with the other participants so they have an opportunity to alter their predictions prior to the next iteration. Through this process, the panel will move toward consensus in their predictions. Outlying or dissenting predictions will be consideration by the researcher as well.

The research population will be a panel of approximately 12 to 24 adult experts drawn from the field videogames and learning. Both industry professionals and academics will be represented in the population. The researcher will draw upon this population by asking them to complete three iterations of a Delphi questionnaire over a period of no more than eight weeks. Each iteration will require one hour or less of their time. The researcher will aim for a panel of at least 12 experts to complete the study. In order to allow for attrition during the study, the researcher will invite as many as 24 experts to participate.

Research data will be collected in the form of participants' written responses to the Delphi study questionnaire. This data will be coded and analyzed by the researcher after each iteration so that results can be presented to the participants and the following iteration of the questionnaire can be composed. A detailed discussion of the proposed research method appears in Chapter 3.

Research Questions

The study will be guided by the following two overarching questions:

1. What are the potential benefits of using MMORPGs as constructivist learning environments in formal K12 education?
2. What are the potential problems related to using MMORPGs as constructivist learning environments in formal K12 education?

Additionally, based on the literature review the following six research questions will be used to focus the study:

1. Engagement and motivation: How might MMORPGs be used to motivate and engage students, and what problems might be associated with using MMORPGs for this purpose?
2. Context: How might MMORPGs be used to provide a context for student learning, and what problems might be associated with using MMORPGs for this purpose?
3. Inquiry: How might MMORPGs be used to provide students with opportunities for inquiry-based learning, and what problems might be associated with using MMORPGs for this purpose?
4. Social Negotiation: How might MMORPGs be used to support social negotiation of meaning (including facilitated collaboration, cooperation, and competition), and what problems might be associated with using MMORPGs for this purpose?
5. Reflection: How might MMORPGs be used to encourage student reflection and metacognition, and what problems might be associated with using MMORPGs for this purpose?
6. Social Change: How might MMORPGs used in formal K12 education be used to effect positive social change?

Purpose of the Study

The goal of this study is to identify potential applications of massively multiplayer online role-playing games as constructivist learning environments in the context of formal K12 education. The purpose is to identify the potential benefits and drawbacks of such applications and to recommend courses of action for future research by academics, future game development by industry professionals, and future instructional decisions made by public educators.

Conceptual Framework

Two pillars of theory support this study: constructivist learning theory and digital game-based learning theory. The primary underlying theory of learning supporting this study is constructivism, as typified by the works of Dewey, Piaget, Vygotsky, and Bruner. The theories of constructivist educational technologists such as Papert and Jonassen also contribute to the constructivist foundation for this inquiry. In particular, six elements of a constructivist learning environment have been identified: engagement and motivation, context-embedded learning, inquiry-driven learning, socially negotiated learning, reflection and metacognition, and the importance of effecting positive social change.

Existing digital game-based learning theories have also been influential in the development of the research problem. Particularly influential works have including those of Prenksy, Gee, Aldrich, Schaffer, Squire, Steinkuehler, Beck and Wade, Michael and Chen and others. Constructivist themes run throughout these books as they suggest that

videogames can offer engagement and motivation, a context for learning, opportunities for student inquiry, a framework for collaborative learning, support for reflection and metacognition, and a medium for effecting positive social change. Each of these elements is explored in greater detail in Chapter 2.

Operational Definitions

This section includes definitions of special terms used in this proposal. This list does not include terms that are generally understood by those in the field of educational technology. However, it does include definitions for some terms that are relatively new to the field, terms that are sometimes used ambiguously, and terms that are used in a more (or less) specific way than their general use. No new terms were invented for use in this proposal. The terms presented here are directly relevant to the study, and the terms presented in the glossary (see Appendix A) are supplemental to the study.

Consensus: the state in which the results of a survey are “at least acceptable to every member [of the expert panel], if not exactly as they would have wished” (Reid, 1988, as cited in Williams & Webb, 1994, p. 182).

Constructivist Learning Environment: A learning environment in which students are actively engaged and motivated, and in which learning is context-embedded, inquiry-driven, and socially negotiated. Constructivist learning environments also

promote reflection and metacognition. For the purposes of this study, an effective constructivist learning environment will also be considered one that can effect positive social change.

Expert: someone who has demonstrated knowledge, experience, or formal authority in the field being studied (Baker, Lovell, and Harris, 2006).

Games for change: a movement and community of practice dedicated to using computer and videogames for social change. An individual videogame may also be referred to as a “game for change” if it is produced by this community or shares its ideals (Games for Change, 2006).

Games for health: a community and best practices platform for the numerous games being built for health care applications. This is a subset of the games for change movement (Games for Health, 2007).

Ludology (ludologist): the still-young field of analyzing videogames from a social science or humanities perspective. A ludologist studies ludology.

Massively multiplayer online game (MMO): a type of videogame that is played online, allowing large numbers of players to interact with one another. This is a

more inclusive term than MMORPG (below), which specifies role-playing games in particular, but for brevity's sake MMO is often used in place of MMORPG.

Massively multiplayer online role-playing game (MMORPG): a genre of videogames (and subset of role-playing games) that is played online, allowing large numbers of players to interact with one another in a persistent virtual world.

Metagame: a broad term usually used to define any strategy, action or method used in a game which transcends a prescribed rules set, uses external factors to affect the game, or goes beyond the supposed limits or environment set by the game. Metagame can also be a verb meaning to take any such action.

Microworld: a virtual world inside which a student can explore alternatives, test hypotheses, and make discoveries.

Role-playing game (RPG): There are two kinds of Role-Playing games discussed in this proposal. The first is a tabletop role-playing game, a type of game (played with paper, pencils, and dice) in which the participants assume the roles of fictional characters and collaboratively create stories. Participants determine the actions of their characters based on their characterization, and the actions succeed or fail according to a formal system of rules and guidelines. Within the rules,

players can improvise freely; their choices shape the direction and outcome of the games. A human gamemaster prepares, facilitates, and referees the story in addition to playing all non-player characters. The second kind of role-playing game is a videogame in which the player (or players) assume the role of a fictional character in the game, but in which they have considerably less flexibility to determine their actions due to the limits of computers to improvise and react to human improvisation.

Serious games: a type of game (or simulation) that is meant for a purpose other than education, for instance serious games may be meant to educate, train, or inform, and may be used in many fields including education, government, health, first response, science, and the military (Serious Games Initiative, 2007).

Assumptions, Limitations, Scope, and Delimitations

The researcher's assumptions, the limitations of the study, the scope of the study, and the researcher's delimitations on the study are discussed in the following sections. These sections address facts assumed to be true, but not actually verified, potential weaknesses of the study, and the bounds of the study.

Assumptions

Fundamental to this inquiry are the twin assumptions that the constructivist pedagogies developed by Dewey, Vygotsky, Piaget, and Bruner are more effective than traditional teaching techniques, and that existing educational institutions have failed to effectively implement these constructivist pedagogies. Similarly, it is assumed that existing 21st century schools have largely failed to implement educational technology in the revolutionary ways described by Papert and Jonassen, which are also assumed to be more effective than traditional techniques. In addition, it is assumed that very few schools have also adopted the use of videogames in their curriculum.

The literature review in Chapter 2 has revealed that videogames may be an effective medium for teaching today's students. Perhaps more importantly, videogames may help close the gap between traditional classroom learning and real-world learning-by-doing (Aldrich, 2005). It is assumed that these things may also be true of MMORPGs in particular. In addition, because of the social nature of MMORPGs, it is assumed that they may hold even greater potential as constructivist learning environments. Finally, it is assumed that the development of persistent open-ended online learning environments in which students are able to take on new roles in a meaningful context may offer an opportunity to develop a better and more accessible educational system that could be made available to students world wide.

Limitations

This is a Delphi study meant to provide useful predictions about the future. The results of this study will not be a description of any existing phenomena, except as a description of whatever consensus in expert opinion that may be reached through the process of the Delphi questionnaires. This study aims to make predictions about the potential benefits of using MMORPGs as constructivist learning environments, and about the potential problems related to such use. Predictions, of course, should be treated only as predictions, not as guarantees of any particular results.

This study is further limited by the generalizability of the study. The expert panel will consist of only 12 to 24 individuals, who will most likely be highly educated, economically advantaged, English-speaking residents of North America and Europe. They are expected to be well versed in theories of videogames and learning and in constructivist learning theory. As such, they may be subject to bias based on their experience and education, and their views therefore may not reflect the views of other educators or citizens. Also, this study is focused specifically on the use of MMORPGs in a formal K12 educational environment. Results will not necessarily be generalizable to other genres of videogames or to other learning environments. Similarly, this study explores the use of MMORPGs with respect to constructivist pedagogy and results may not be generalizable to other schools of thought such as traditional or behaviorist pedagogy.

Scope of The Study

The scope of this study will be limited by several factors. The researcher will only be implementing a maximum of three Delphi rounds, at which point he will report on the level or lack of consensus among the expert panel. The scope will be further limited by the number of participants on the expert panel. Only 12 to 24 individuals will complete the study. The particular identities of the experts on the panel and their particular expertise and experiences will also limit the scope of the study. The particular limits that this factor imposes on the study will not be known until after a panel of experts is recruited. Also, the scope will be limited by the medium of interaction. All questionnaires will be distributed and collected via the web. Only participants with the skills, inclination, and access to technology necessary to complete this process will be included. Finally, the study will be bound by its duration. Each iteration of the Delphi questionnaire will allow only one week for collection of responses and only one week for preparation of the next round, for a total of six weeks, plus two more weeks for the final consensus check.

Delimitations

The researcher will impose certain delimitations on the study. Most importantly, the study will focus only on the potential benefits (and problems) related to the use of MMORPGs as constructivist learning environments. This present study will not explore any issues related to the design of such games, including issues related to inclusive game design. Similarly, the organizational change necessary to implement such games will

remain outside the boundaries of this study, as will the role of the teacher in supporting such games. Also, though MMORPGs are role-playing games and although they may help students develop additional 21st century skills, the benefits of role-playing in general and the need to teach 21st century skills are also beyond the delimitations of this study. The delimitations, along with the limitations and scope discussed above, represent potential weaknesses of the study.

Significance of the Study

The goal of this dissertation is to identify potential applications of MMORPGs as constructivist learning environments in the context of formal K12 education. The purpose is to identify the potential benefits and drawbacks of such applications and to make recommendations for future research by academics, future game development by industry professionals, and future instructional decisions by public educators. In this way, the study aims to contribute to reducing the knowledge gap identified in Chapter 2; currently, there is very little written about the use of MMORPGs for learning, particularly in formal educational environments. This study is also significant because it aims to explore a technology that may have the potential to improve (and perhaps revolutionize) education for 21st century students and educators.

Summary of The Study

This chapter provided an introduction to the study, including background information. Sections describing the problem statement, the nature of the study, and the purpose of the study were also included, as were details related to the conceptual framework, operational definitions, and bounds of the study. Finally, the significance of the study was articulated.

Chapter two includes a detailed review of literature related to the use of videogames as (or in) constructivist learning environments. This begins with an overview of constructivist theory, followed by detailed discussion focused on elements of constructivist learning environments. This discussion is organized based on the research questions revealed above and as such is organized into sections focused on engagement and motivation, context-embedded learning, inquiry-driven learning, socially negotiated learning, reflection and metacognition, and effecting positive social change. Chapter two also includes a review of literature related to the Delphi method and other potential methodologies considered for this study.

Chapter three then presents a detailed discussion of the research method. This begins with an overview of the research design, including the qualitative research paradigm and the role of the researcher. The research context is described and justified, and details related to participant selection are shared, including measures to be taken for the ethical protection of the participants and the criteria for selecting participants. The data collection and data analysis procedures and software are then explained. This is

followed by a discussion of efforts taken to improve the credibility, transferability, dependability, and confirmability of the study. Finally, the results of a previous quantitative exploratory study are summarized.

CHAPTER 2: LITERATURE REVIEW

Introduction

The goal of this study is to investigate the potential benefits and drawbacks of using MMORPGs as constructivist learning environments in formal K12 education. Therefore, this literature review begins with an overview of constructivist learning theory, and the elements of a constructivist learning-environment. The following sections are then focused on individual elements of a constructivist learning environments, including: engagement and motivation; context-embedded learning, inquiry-driven learning, socially negotiated learning, reflection and metacognition, and effecting positive social change. In each of these sections, the literature review has revealed much that has been written with respect to videogames and learning, but very little literature directly related to the use of MMORPGs in formal education. Each section of the review demonstrates a gap in the literature that this study aims to address through the research questions listed in chapter one. This chapter concludes with a review of literature related to the Delphi method and other potential methods considered for this study.

The Search Process

The literature review began with a search of the Walden University library databases, the University of California Irvine library, and the online library at

Questia.com. The review also included searching the public World Wide Web, primarily via Google Web Search and Google Scholar, though several other services were used to create RSS-based search feeds. Primary search terms included “videogame,” “computer game,” “digital game,” “electronic game,” “simulation,” and “MMORPG.” These were often combined with terms such as “education” or “learning” and with specific terms related to constructivist learning environments such as “context,” “inquiry,” “collaboration,” or “reflection.”

The Core Constructivist Belief

Literature extolling the educational virtues of videogames often relies on a foundation of explicitly constructivist beliefs about the nature of knowledge and the process of learning. In contrast to the empirical behaviorist view that knowledge about an objective reality can be simply and reliably passed on from teacher to student, the kernel of constructivist philosophy is the belief that all knowledge must be actively and subjectively constructed in the mind of each individual.

Dewey (1916) articulated this belief when he described a new form of education that was an active and constructive process rather than a passive process of learning by absorption (p. 38). Piaget (1952) formalized this thinking with his theories of *assimilation*, which accounted for both the act of incorporating new data into existing mental structures (or schema) and also the construction of entirely new schema into which data could then be incorporated (p. 6, 410, 416), and *accommodation*, which

referred to the ways in which existing schema are modified to account for new input (p. 7). Even Vygotsky (1986), who stressed the importance of social relationships in learning, believed that “direct teaching of concepts is impossible and fruitless” (p. 150). Later, Bruner (1986), who was explicitly constructivist, believed that each individual’s perception of reality is a symbolic construct of his or her own mind (p. 95).

This core belief of constructivists such as Dewey, Piaget, Vygotsky, and Bruner continues to inform the work of 21st century researchers, including those exploring the educational potential of videogames. For example, Shaffer (2006) sites Dewey, Vygotsky, and Bruner extensively in *How Videogames Help Children Learn*, and the foundation of Schafer’s theories is Piaget’s schema view of learning (p. 149). Even game designers Salen and Zimmerman (2004), who are not writing with an educational end in mind, base their theories on the importance of the schemas (p. 103) and cognitive frames players develop to “interpret actions and events” (p. 374). Steinkuehler (2006b) has studied similar forms of meaning making within the cultural context of existing massively multiplayer online role playing games (MMORPGs) created for commercial and entertainment purposes. MMORPGs created for educational purposes might be able to harness and support these core processes, but this remains to be studied.

Corollary Constructivist Beliefs

The most important corollary of this core constructivist belief is the adage of learning by doing. Dewey (1938) called for “education of, by, and for, experience” (p.

29), a sentiment that echoed in the work of videogame scholars such as Jenkins, Klopfer, Squire, & Tan (2003), who explain that “knowledge developed through game play... is valuable information when confronting new challenges and solving problems” (p. 6). Slator (2006) also finds value in “virtual role based worlds for education... constructed purposefully for student immersion” (p. 11). As role-playing games, MMORPGs might offer students virtual worlds where they can learn by doing in ways that are impractical or impossible in a classroom, however this has yet to be investigated.

Learning is also considered by many constructivists to be a social phenomenon. Dewey (1915) discussed the notion that cognitive development is a social process (p. 99), and later Vygotsky’s (1978) zone of proximal development (ZPD) was based on the observation that students can accomplish more with the help of others than they can independently. Based on these earlier theories, Shaffer (2006) discussed the use of computer games as scaffolding to help students move toward mastery of skills in their zone of proximal development (p. 152). MMORPGs may also provide a social network to student learning, but this has not been formally investigated.

It is also accepted by many constructivists that individual learners will have different interests as well as different strengths and weakness. Gardner (1999), for instance, identified ten independent capacities for aptitude in individuals. In addition to being able to engage students through multiple modalities and to allow students to exercise more of Gardner’s intelligences than a traditional classroom might, videogames can also work to help players develop their weaker intelligences (Prensky, 2006, p. 95). It

may be that MMORPGs can fulfill this role as well, but there is as yet no specific evidence to support this view.

Engagement and Motivation

One of the fundamental properties of an effective constructivist learning environment is that it engages and motivates students. For more than a century, traditional classroom lessons - including lectures, reading, and written assignments - have often failed to effectively or reliably engage and motivate students (Dewey, 1938; Slator, 2006). In recent decades, videogames (and other interactive media) may have exacerbated this problem because students now come to school with higher expectations of engagement (Papert, 1993; Prensky, 2001a, 2001b, 2006; Carstens and Beck, 2005). However, these same technologies, including videogames, can also offer a solution to the problem by being used to engage and motivate students for academic purposes (Papert, 1993, Prensky, 2001a, 2006; Gee, 2003, 2005c; Jonassen, 2003; Shaffer, 2005; Shaffer and Gee, 2005).

The Value of Play

Constructivists have long considered play a valuable learning process (Dewey, 1926; Piaget, 1950; Bruner, 1966; Vygotsky, 1978; Dixon-Krauss, 1996). Today, Modern game scholars share these perspectives. For example, Salen and Zimmerman (2004) consider play valuable for developing meaning (p. 33-34), social relations (p. 462), and

identity (p. 519), among other things. For Salen and Zimmerman, as for Prensky (2005b, 2006), the complexity of the game is an important factor in whether or not the play is meaningful (Salen and Zimmerman, 2004, p. 170). Koster (2005) expressed the value of complex social play succinctly: “from playing cops and robbers to playing house, play is about learning life skills” (p. 61). Slator (2006) concluded that “the value of play in learning can hardly be overemphasized” (p. vii). Others, such as Prensky (2001, 2006), Gee, (2003, 2004, 2005c), Aldrich (2004, 2005), and Shaffer (2006) have made the value of play a cornerstone of their theories. Though much of what they have written would likely apply to MMORPGs, they rarely address MMORPGs specifically.

Hard Fun

There seems to be little doubt that modern videogames are deeply motivating and engaging to many of the same students who struggle to pay attention in school – despite the fact that games continuously and consistently challenge students, often to the brink of frustration (Papert 1993; Johnson, 2005; Shaffer, 2006). This is the foundation of Papert’s (n.d.) concept of *hard fun* – that games are fun because they are hard, not in spite of being hard. As Jenkins (2005a) shared, the worst thing students can say about homework is that it’s too hard, while the worst thing they can say about a videogame is that it’s too easy. To be fun (and thus commercially successful), a videogame has to remain squarely in Vygotsky’s (1978) zone of proximal development, challenging but not frustrating players – even players of significantly varied skill levels. Constructivists have long considered

play a valuable learning process (Dewey, 1926; Piaget, 1950; Bruner, 1966; Vygotsky, 1978; Dixon-Krauss, 1996), and today this property of videogames to deliver hard fun can be an educational asset (Caperton, 2005; Jenkins and Wright, 2005; Schaffer, 2006).

MMORPGs in particular often require players to perform repetitive tasks that seem suspiciously like work, and yet these games are among the most compellingly immersive experiences available. Shaffer (2006) notes that many things that players do in an MMORPG “don’t, on their own, seem like fun” (p. 22). He quotes one player as saying, “I’m just running some boring errands in the game” (p. 22). However, there are at least four types of players with different motivations and reasons for playing an MMORPG: those who enjoy “achievement within the game context,” those who enjoy “exploration of the game,” those who enjoy “socializing with others,” and those who enjoy “imposition upon others” (Bartle, 1996). According to Steinkuehler (2006a), MMORPGs have a “capacity for sustained engagement” (p. 7) and are becoming “a compelling means of enculturation into the globally networked community” (p. 7). However, despite this apparent potential, there has yet to be any formal research dedicated to understanding the effectiveness of MMORPGs to engage and motivate students in an academic context.

Intentional Learning

Despite advocating for the value of fun and play in education, the constructivist perspective does not recommend an environment free of structure. In contrast, the hope is

to harness the strategies of engagement and motivation responsible for the incidental learning that takes place in many good games and put these strategies to use for the purposes of intentional learning in formal educational environments. According to Dewey (1926, p. 196), “it is not enough just to introduce play and games... everything depends upon the way in which they are employed” (p. 196). In his wake, social constructivists such as Bruner (1971) and Mooney (2005), educational technologists such as Papert (1993) and Jonassen (1999), and videogame scholars such as Squire (2005b) and Shaffer (2006) also focused on the importance of intentionality and goals in educational play. Aldrich (2005) also warns against what he calls *motivatism*, a philosophy of learning “that suggests if a learner is sufficiently motivated, he or she will pick up everything needed on his or her own” (p. 82). It remains to be seen if MMORPGs will have value for intentional learning beyond the initial elements of engagement and motivation.

Games Are No Panacea

Videogame scholars caution, too, that not all games will appeal to all students, even those that consider themselves gamers. Squire (2005b), for instance, found that 25% of students who played *Civilization III* in school “complained that the game was too hard, complicated, and uninteresting, and they elected to withdraw from the gaming unit and participate in reading groups instead” (p. 2). He also found that “some students (including gamers) rejected the game experience in school... because playing *Civilization III* in a school context was *compulsory*” (p. 4). In addition, videogames are not an effective

instructional medium for students that consider themselves non-gamers; Littleton (2005) found that students who do not play videogames for entertainment were less likely to be motivated by (or to learn from) videogames in the classroom. Of course, even among students who consider themselves gamers, some will have strong preferences for or against particular videogame genres. Unfortunately, there have been no such studies focused specifically on MMORPGs and student motivation.

Context-Embedded Learning

Perhaps the most fundamental property of a constructivist learning environment is that it offers a context for student learning. Context-embedded learning has been a cornerstone of the constructivist movement since at least the early 1900's. Now, nearly a century later, videogames and simulations can offer new contexts for student learning that would not have been available to students in the past. Videogames are able to provide students with a context that allows them to learn by doing, remain in a state of flow, explore microworlds that allow easy transfer of learning, develop situated and distributed understanding, exercise new identities, and benefit from role-playing.

Learning By Doing

While traditional teaching and learning tends to be a passive experience for the student who receives knowledge from the teacher, constructivist pedagogy emphasizes learning by doing, learning from experience, and problem solving in context. In order to

learn by doing, a student must not simply read from a textbook or listen to a lecture. Rather, the student must engage authentic (or real-world) problems in their authentic context. Dewey (1915, 1938) considered schoolwork to be remote and isolated in comparison to real-world activities, and he called for students to be given responsibility for their own problem solving. Bruner (1966) also considered traditional schooling to be removed from meaningful life in society, and urged educators to consider learning in a situated cultural context. He was more interested in history as a discipline and a culture than as a curriculum, and he was ultimately interested in knowing as doing (Bruner, 1996).

Modern videogame scholars have argued that video and computer games can help provide such a context for learning. Prensky (2001, 2005a, 2006) highlighted the importance of game contexts (including characters), suggested that game goals must be worthwhile to students, wrote about five levels of learning by doing in games, and predicted that future educational games will be more realistic, experiential, and immersive while including better storytelling and characters. Like Prensky, Gee (2003, 2004) discussed ways in which videogames can provide a context for learning by encouraging active and critical thinking while players engage with a domain of learning as a complex system rather than as isolated facts. Gee (2005a, 2005b) also expected good games to help learners build accurate simulations in their own minds and to learn new skills by providing an amplification of meaningful input to the learner and an opportunity for a greater amount of practice time on-task. Aldrich (2004) pointed out that this is most

effectively achieved if the simulations in the game accurately represent the activity being learned, particularly if they are high fidelity when necessary to impact learning yet simple and streamlined when additional detail would be unhelpful (p. 173-175); he also opposed simulations that present the world as it should be rather than as it is, even if this is done in the name of political correctness. Shaffer (2004), too, noted that “new technologies make it easier for students to learn about the world by participating in meaningful activity” (p. 1403). His epistemic games “are about having students do things that matter in the world by immersing them in rigorous professional practices of innovation” (Shaffer & Gee, 2005, p. 12). McMahan (2003) also discussed the value of the *presence* and *immersion* offered by videogames (p. 68-77).

Though Prensky (2001, 2006) and Gee (2003, 2004, 2005) pointed out many existing videogames that effectively provide a context for learning in the ways they discussed, few of their examples included any MMORPGs. And although Aldrich (2004) and Schaffer (2006) created the educational simulations as proofs of concept illustrating their theories, they both opted not to create an MMORPG, on account of the additional logistical challenges inherent in the genre. So although it may seem that MMORPGs might be able to provide many of the elements discussed above, the potential value of MMORPGs to provide a context for learning by doing thus remains unproven.

The Flow State

When students are in an environment where they can learn by doing, ideally they will be challenged without being frustrated, and thus remain in a state of flow, an ideal state of learning (or performance). Csikszentmihalyi (1997) described flow experiences as “exceptional moments” (p. 29) that tend to occur “when a person's skills are fully involved in overcoming a challenge that is just about manageable... a fine balance between one's ability to act, and the available opportunities for action” (p. 30). This bears resemblance to Vygotsky's (1978) Zone of Proximal Development, which also describes the way in which students learn when challenged just beyond the horizon of their mastery, but not so far beyond that they become frustrated. Early in his description of the optimal experiences that generate flow states, Csikszentmihalyi (1997) noted that “it is easy to enter flow in games” (p. 29), at least in part because games, like other flow activities, “provide immediate feedback” (p. 30).

Videogames, in particular, are designed to provide individualized levels of challenge and feedback for players. Shaffer (2006) made the connection between videogames and Csikszentmihalyi's work, pointing out that “we learn best when working on things that are neither too easy nor too hard” (p.125). Shaffer went on to point out that, as Dewey suggested “the obstacles have to be relevant to the thing you are trying to do: They have to push back on issues that are related to the task at hand, rather than being something irrelevant or extraneous that you have to overcome in order to keep working” (p. 125). Relevance is key to the use of flow experiences for learning – and

needs to be present in educational games. Massively multiplayer online role-playing games (MMORPGs) are a medium in which such relevance might be easily incorporated; as Steinkuehler (2004b) points out, in an MMORPG “information is given ‘just in time,’ always in the context of the goal-driven activity that it’s actually useful for – and made meaningful by – and always at a time when it can be immediately put to use” (p. 7), thus facilitating playing and learning in a state of flow. However, more research into this phenomenon is necessary if MMORPGs are to be used in an educational context.

Microworlds

In order to support student’s early efforts, the learning context can be a microworld, or simplified version, of the real-world context in which similar skills might be used – and to which students’ new skills will eventually be expected to transfer. Microworlds model only the elements of the experience that are important to a student’s developmental level, while limiting other distractions. Papert (1980) originated the concept of microworlds as incubators for knowledge (p. 120). Jonassen (2000) later observed that many videogames are in fact well-designed microworlds that require players to master each environment before moving onto the next one.

What Prenksy (2006) calls a complex game might be considered a microworld; he differentiates between trivial games or mini-games (such as most board games or most fighting-based videogames) and modern complex games (such as computer-based role playing games) that can take up to 100 hours to master as players learn a wide variety of

new skills and strategies often requiring outside research and collaboration – and often requiring the assumption of alternate identities within the context of the game. Gee (2003) also notes that games can provide an authentic context for student tasks because learning in a game takes place “in a (simplified) subset of the real domain” (p. 137). Gee (2005a) called such a game a “sandbox” (p. 27), a term that might also be considered roughly synonymous with microworld.

In the tradition of Papert’s microworlds, Aldrich (2004), too, was interested in the way “simulations describe small worlds” (p. 152) as a context for learning. The simulation he designed, *Virtual Leader*, provides a microworld in which players learn about leadership, a skill that is typically difficult to teach (and assess) in a traditional classroom environment. Shaffer (2006) also developed several educational videogames that provide a microworld in which students can learn and pursue meaningful goals in subjects as diverse as geometry, biology, journalism, debate, and architectural design. Like Prensky, Shaffer believed that the “videogames... of children’s culture today demand strategic thinking, technical language, and sophisticated problem-solving skills” (p. 6). And, in the tradition of Dewey, he believed that videogames can provide a “*simulated* ‘world of hard conditions’” (p. 127). Holland, Jenkins, and Squire (2003) also discussed an example of an explicitly educational videogame that provided a microworld in which students could learn curricular material, in this case physics. In addition to these explicitly educational games, there are many ways in which even commercial off the shelf videogames can serve as valuable microworlds for learning (Jenkins, Klopfer,

Squire, & Tan, 2003; Squire, 2003; Squire & Jenkins, 2003; Shaffer, Squire, & Gee, 2005).

Though MMORPGs may be some of the best commercial examples of microworlds, these studies do not explicitly concern MMORPGs and it is thus debatable whether or not they are an appropriate medium for education. However, they show a great deal of promise. As Steinkuehler (2005b) pointed out, “MMOGaming is participation in a multimodal, and digital textual *place*” (p. 98). She also explained that “within videogames... the reader becomes or inhabits a symbol, enabling him or her to interact with signs as *if* they are the very things they represent” (p. 99), a property of videogames that supports learners in transferring new skills to other environments. Even so, more research into this area is required.

Transfer

The transfer of skills from a learning situation (such as a microworld) to a real-world scenario is one of the goals of any educational system. Slator (2006) expressed this goal by writing that “students who learn through simulations should acquire content-related concepts and skills as a consequence of playing the game, and this learning should transfer to knowledge contexts outside the game” (p. 4). Several videogames designed for educational purposes have been successful in achieving this goal, including *biohazard* (Holland, Jenkins, and Squire, 2003), and *Escher's World* (Shaffer, 2006). Pillay (2005) also established that skills acquired in a computer game do transfer to other similar

activities, though the games and activities he studied were comparatively unsophisticated. While this sort of transfer may be the goal of any educational game, it is important to note that a game alone is unlikely to reliably produce this effect; rather, a traditional interaction with teachers, students, and academic texts might be required for students to be fully prepared for the game and to fully benefit from the game experience (Squire, 2002). This suggests that playing MMORPGs alone would not be sufficient for students to transfer their knowledge from the game to real-world applications, but research is required to explore this suggestion.

Situated and Distributed Understanding

Learning that happens within a microworld (or other authentic context) is what constructivists consider situated learning, which allows students to develop a situated understanding of the skills they are developing and problems they are solving. Constructivists such as Bruner (1996) and Duffy and Jonassen (1992) believed that knowledge is always situated in authentic activities – which need not be the actual real-world context as long as students are engaging in similar activities and using similar tools. In the constructivist tradition, Gee (2003) argued that learning involves situating (or building) meanings in context, and that “videogames are particularly good places where people can learn to situate meanings through embodied experiences” (p. 26). Many other scholars also believed that videogames and simulations can provide environments in which such situated learning can occur (Shaffer, Squire, Halverson, & Gee, 2005;

Dede, 2005; Shaffer, 2006). Steinkuehler, who studied MMORPGs specifically, was also interested in “the situated meanings individuals construct” (p. 17).

Many microworlds (and other authentic contexts) also offer opportunities for students to develop a distributed understanding of skills and problems. Unlike in traditional testing situations, students do not need to memorize all of the answers to their problems and information required in the learning context. They can call upon tools and other individuals within the context to aid them in their efforts. As Bruner (1996) expressed it, intelligence is “not simply 'in the head' but [is] 'distributed' in the person's world" (p. 132). Gee (2003) believed that in good games “thinking, problem solving, and knowledge are ‘stored’ in material objects and the environment” (p. 111).

Though it may seem likely that MMORPGs would support the development of both situated and distributed understanding among students, this position is not supported in any existing literature. Additional research is required.

Identity

As students develop situated and distributed understanding within a learning context, they are essentially exploring an identity within that context – a way of acting and thinking that is specific to the context and problems at hand. Shaffer, Squire, and Gee (2005) believed that “the virtual worlds of games are rich contexts for learning because they make it possible for players to experiment with new and *powerful identities*” (p. 106). Gee (2003) in particular was most interested in the way that good games can

facilitate learning by requiring players to take on a new identity and form “bridges from [their] old identities to the new one” (p. 51). Citing Gee, Shaffer (in press) aimed to “give adolescents new possible selves that are based on authentic experiences with innovative thinking that matter in the world” (p. 158). This experience can also extend to selves that are impossible in the real world, including an identity of a different race or sex (Lahti, 2003; Yee, 2006). Steinkuehler (2006a) studied the nuanced development of such new identities in MMORPGs in particular (both in and out of game identities), suggesting that MMORPGs too might be a medium in which students might develop meaningful new identities. However, this has yet to be established in an educational context.

Inquiry Driven Learning

Another fundamental property of constructivist learning environments is that they facilitate inquiry-driven learning. Like Dewey (1916) and Bruner (1996), many constructivists believe that direct instruction is impossible and that educators should instead tap into students’ interest in asking questions and discovering things about the world. Though constructivists have long maintained that their pedagogies can help, computers and videogames can now be used to expand the opportunities students have to exercise their powers of inquiry (Shaffer, 2006).

Active Learning

Active engagement of the student is a critical part of Inquiry-driven learning. Dewey (1915, 1916) was interested in actively enlisting students' own dispositions and developing in them their own intrinsic direction. Later, Papert (1993) introduced children to computers in part because he was convinced that students' best learning takes place when they are in charge of the experience. The potential for games to offer opportunities for active learning appeared in Prensky's (2001) work when he suggested that students feel constrained when required to follow a single path or thought instead of being allowed to make their own connections (p. 54-55). Gee (2003) also illuminated the potential of videogames to provide learners with opportunities for active learning – through his active critical learning principle (p. 39), the probing principle (p. 107), and the multiple routes principle (p. 108). Gee (2005b) encouraged educators and game designers to empower learners; he asserts that “good learning requires that learners feel like active agents (producers) not just passive recipients (consumers)” (p. 25). In this respect he felt that “the best commercial videogames are already state of the art learning games” (Gee, 2005b, p. 1). This may be true of commercial MMORPGs as well, but this is not addressed directly in the literature.

Asking Questions

The heart of inquiry-driven learning is the opportunity for students to ask questions and seek answers (in an authentic or real-world context). In Dewey's (1938)

ideal of progressive education, each student has a question of his own and is actively engaged in answering it – with structured support from the teacher. Bruner (1986), too, hoped to see a focus on supporting the process of inquiry. Today, some videogames can provide both the opportunity for educational inquiry and the structure to support it (Jenkins, Klopfer, Squire, & Tan, 2003; Squire, 2003; Squire & Jenkins, 2003; Klopfer and Yoon, 2005). However, it remains to be seen if this is true for MMORPGs.

Discovery Learning

An integral element of inquiry-driven learning, perhaps even the goal of inquiry-driven learning, is the possibility of student discovery. Dewey (1915) supported discovery learning in schools, but again cautioned a structured approach. Bruner (1966, 1971, 1996) also recognized discovery as an intrinsic motivator and crucial element of learning. In modern videogames students can choose their own path through a structured environment via a process of exploration and discovery, which can be both meaningful and motivating for the student (Prensky, 2001; Gee, 2003; Shaffer, 2005; Slator, 2006). Presumably, the same sort of experience is possible in the large scale virtual worlds of current MMORPGs, but this is not discussed in detail in the existing literature.

Problem Solving

This process of posing questions and discovering answers naturally encourages students to make new connections in their minds, the essence of building schema in the

constructivist philosophy. Dewey (1916) sought this sort of problem solving in his method of education. Jonassen (2003) believed that “solving problems can... be the most meaningful kind of learning activity” (p. 20), especially during intentional learning, and he illustrated examples in WebQuests, web publishing, and virtual travel. Open-ended videogames are another natural choice of technology to provide students with opportunities for problem solving that grows from their own goals and interests and has a potentially infinite number of resolutions (Squire & Jenkins, 2003; Shaffer, 2006). The open-ended nature of MMORPGs suggests that they, too, might be able to perform this function, but again this is missing from the literature reviewed.

Self-Regulation

While educators can encourage inquiry and support student discovery, constructivists hope that students come to learn the importance of self-regulation (or discipline and diligence) in pursuit of their goals. Dewey (1915, 1916, 1938) felt so strongly about this that he considered it development of self-regulation in students to be the goal of his progressive method of education. Today, many students are interested in videogames, but in order to master them, they must develop a good deal of discipline (Squire & Jenkins, 2003; Gee, 2005b, Shaffer, 2006). Players must be dedicated and disciplined to succeed in commercial MMORPGs and though it has yet to be illustrated in an educational context, this might be a useful attribute of the genre.

Individualized Learning

Because different individual students will ask unique questions and bring unique experiences to the learning environment, inquiry-driven learning is necessarily individualized. Dewey (1915, 1938) believed that if educators do not tap into students' personal experiences and interests, then students will approach their learning without hunger – and without vigorous inquiry. Bruner (1966), too, advocated for the personalization of learning by creating educational environments that allow students to be engaged in different ways and to progress through the curriculum in different ways. Prensky (2001) suggested that well-designed videogames can provide an interactive environment which allows students to learn in this way, and which adapts to their needs. Many of Gee's (2003) thirty-six learning principles (that good games embody and many classrooms do not) address or necessitate an individualized learning experience. Shaffer (2006) was also interested in using videogames to provide both multiple pathways to learning and multiple ends for learning, depending on each student's aptitudes and interests. Of course, the nature of students' individuality guarantees that no educational game will appeal to all students. Koster (2005), a game designer, notes that "since different brains have different strengths and weaknesses, different people will have different ideal games" (p. 105). This truth of commercial game design has proven true in classroom situations as well (Squire, 2005; Littleton, 2005). If MMORPGs are also an appropriate format for such individualized instruction, which has not been addressed in the literature, then they too may experience this limitation, but this remains to be seen.

Gateway Learning

One key to individualized learning, and to inquiry-driven learning in general, is to discover something each student is interested in or passionate about – something that can be used as a gateway to other learning. Dewey (1915) discussed the use of sewing, which was then a vocational curriculum, as a point of departure for learning a variety of subjects. Papert (1980, 1993), whose childhood love of gears led to his love of mathematics and computers, brought a similar philosophy to the use of educational technologies; he felt that if students are to play videogames, they should also program videogames. In this way a student's interest in videogames themselves can provide a gateway to other learning. This transfer of interest isn't limited to technical skills, though, as an interest in videogames can often engender interest in other knowledge, skills, and media (McDivitt, 2005; Squire, 2005b; Shaffer, 2006). Though the literature does not explicitly include an exploration of MMORPGs in this respect, they may serve as a gateway to further student learning and are thus worthy of investigation.

Islands of Expertise

Also, while student interests serve as gateways to new learning, students will develop islands of expertise that may be unique. Though many constructivists advocate helping students develop certain commonly important concepts, they tend to resist hegemony of the curriculum. Bruner (1966) noted that “we get interested in what we get

good at” (p. 118), a phenomenon that creates a sort of positive feedback loop in which each student to develop islands of expertise in the areas that they are already interested in and good at. An island of expertise is “any topic in which children happen to become interested and in which they develop relatively deep and rich knowledge” (Crowley & Jacobs, 2002, p. 333, as cited in Shaffer, in press, p. 5). This expertise develops “as the culmination of a long series of collaborative interactions that are opportunistic and relatively unremarkable when viewed individually, but which collectively create a powerful linkage between understanding and interest. Shaffer’s effort to use videogames to help student develop epistemic frames, which “have a basis in content knowledge, interest, identity, and associated practices” (Shaffer, in press, p. 10), is very much an effort to help students develop new (and valuable) islands of expertise.

Relevance

Ultimately, by fostering inquiry-driven instruction, constructivists create a learning experience that is relevant to students because it taps into their interests, desires, and cares. Dewey (1915) believed that the best learning took place when it was relevant to students and he aimed for progressive education to reflect students’ desires. This principle is also at work behind the hope that videogames can help students learn valuable skills. If important information is embedded into the game environment such that it is available on-demand and just-in-time to support student inquiry, then this information too will have greater relevance to the students (Gee, 2003). Relevance is also

a key ingredient in Shaffer's (2006) explicitly educational epistemic games. It might be possible to build this sort of relevance into an educational MMORPG, but this has not been attempted or investigated.

Creativity

Ideally, students will learn to be innovative and creative as they ask their own questions and solve their own problems. Papert (1980) believed that creativity was an important part of the learning process, and Jonassen (2003) suggested that videogames, especially those that allow user creation with the game environment, can take advantage of this. Gee (2005b) also suggested that videogames can provide learners with the tools necessary to manipulate elements within the learning context in order to help students feel empowered to be creative, and Aldrich (2005) acknowledged that players enjoy a simulation more if there are multiple paths to success and they are able to be creative with their solutions. In fact, many educational technologists and videogame scholars have suggested that students should be creating their own videogames (Papert, 1993; Prensky, 2001; Aldrich, 2005b), or at least elements within a game (Squire & Jenkins, 2003; Shaffer, 2006). As Steinkuehler (2005b) shared, MMORPGs too can inspire player creativity, however this has not been examined in an educational context.

Socially Negotiated Learning

A constructivist learning environment does not leave a student in isolation, but rather facilitates socially negotiated learning. Early constructivists believed not only that all learning is experience, but also that all experience is social - and that thus all learning is social. In fact, some social constructivists maintain that meaning is not so much made within an individual mind, but socially negotiated and shared between individuals. Now, modern videogame scholars believe that videogames and simulations, particularly multi-player games, might be able to support such socially negotiated learning.

Experience is Social

Dewey (1916, 1938) believed that all human experience is social and that all social life is educational, but he felt that traditional schools often isolate students from educational social situations. Piaget (1950) also assigned a great deal of significance to “social factors in intellectual development” (pp. 171-182). Vygotsky (1997) thought that even individual cognitive development was a social process, and Bruner (1966) also considered thought an internal version of social dialog. Like these constructivist theorists, videogame scholars such as William and Facer (2004) are similarly interested in the way computer games are situated within social contexts, the social environments created in or around games, and the “the potential applications of games practices to the formal educational setting” (p. 264). Others also discussed ways in which multi-player videogames might provide a context for learning and a framework for collaboration

(Prensky, 2001, 2006; Gee, 2003, 2004, 2005c; Steinkuehler, 2004n; Winograd, 2005).

Though multi-player games appear in the literature, most are not massively multiplayer, and much remains to be investigated regarding ways that MMORPGs might support a social learning experience.

Social Negotiated Meaning Making

Early constructivists came to believe that meaning is not so much made within an individual mind, but socially negotiated and shared between individuals. Dewey (1916), for instance, believed that “meaning depends upon connection with a shared experience” (p. 15), and that “persons modify *one another’s dispositions*” (p. 31). Bruner (1986), who was even more concerned with the influence of culture on cognitive development wrote that “most of our approaches to the world are mediated through negotiation with others” (p. 68), and he went on to say that “it is this truth that gives such extraordinary force to Vygotsky’s theory of the zone of proximal development (p. 68). Bruner (1996) was concerned with “the making and negotiating of meanings... the cultural 'situatedness' of all mental activity” (p. x), and shared negotiable ways of thinking. According to Bruner, “learning is an interactive process in which people learn from each other, and not just by showing and telling” (p. 22). He explained that intelligence is located not in a single head and “not only in your particular environment of books, dictionaries, and notes, but also in the heads and habits of friends with whom you interact, even in what socially you have come to take as given” (p. 154). Bruner was

also careful to point out that “making sense jointly need not be *hegemony*... nor unanimity, but more consciousness. And more consciousness always implies more diversity” (p. 96-97).

Today many social constructivists maintain that “access to knowledge, including literacy, is socially constructed” (Cutts-Dougherty, 1991, as cited in Dixon-Krauss, 1996, p. 176). Game scholars Squire and Jenkins (2003) note that even in effective military simulations, “learning is guided by more experienced members of the military community, and the meaning of these activities is negotiated through social interactions” (p. 9) These philosophies are now evident in many modern volumes on videogames and learning, most notably including Gee’s (2003) and Shaffer’s (2006) work, but these do not focus on MMORPGs in any detail.

Scaffolding

The concept of the ZPD has given rise to the concept of scaffolding, which suggests that teachers can provide structure and support for students as they build their own understanding. Not only can teachers provide this structure, but so can peers, especially those with greater expertise (Bruner, 1996). Videogames and simulations can be used to offer students scaffolding - opportunities for error correction, the expansion of their horizons, and the development of new patterns of investigation (Jenkins, Klopfer, Squire, & Tan, 2003; Squire & Jenkins, 2003; Shaffer, 2004).

MMORPGs in particular inherently provide a measure of social scaffolding. Steinkuehler (2004b) notes that MMORPGs “are not mastered by overt instruction but rather through apprenticeship” (Gee, 1999; Lave & Wenger, 1991; Tharp & Gallimore, 1988 as cited in Steinkuehler, 2004b, p. 5). As Steinkuehler (2004b) pointed out, “newcomers [in an MMORPG] learn the game through full participation in genuine game play with more knowledgeable/skilled others... [they] have to play with others if [they] ever hope to develop genuine expertise” (p. 7). Steinkuehler (2006b) also observed that “gamers who have already mastered the social and material practices requisite to game play enculturate, through scaffolded and supported interactions, newer gamers who lack such knowledge and skill” (p. 3). She explained the way a more experienced MMORPG player:

scaffolds her students by modeling successful performance, focusing her attention on key material, social, and contextual aspects that are crucial to its success... entrusting more and more control over the ongoing actions to the apprenticeship, and allowing numerous opportunity for practice and situated feedback. (Steinkuehler, 2004b, p. 7)

These attributes of MMORPGs have been studied in commercial games, but not in an explicitly educational game. More research is required to identify the value of MMORPGs in providing scaffolding to students for intentional academic purposes.

Culture Impacts Development

The culture (or cultures) within which learning takes place can affect student development, making the culture of the learning environment another important aspect

for educators to consider. Dewey (1915) saw the school as a community with its own culture and was particularly interested in its relationship to other forms of social life. Culture was also important in Vygotsky's (1978) work, as he focused on the sociohistorical elements of development rather than the biological. Bruner (1996), too, believed that culture played a larger role in individual learning and development than biological factors, and he eventually came to consider himself not a constructivist, but a culturalist.

Bruner (1990) also discussed the importance of narrative, including fictional and empirical narratives, in creating and passing on knowledge. Naturally, videogames, particularly role-playing games, can provide a narrative structure for meaning making and the social negotiation of meaning, and this property of role-playing games might be harnessed for intentional educational purposes. Bruner (1996) believed that "education must be conceived as aiding young humans in learning to use the tools of meaning making and reality construction" (p. 20), so it follows that any such games would need to contribute to this purpose. Videogames have the potential to be something "a culture does to assist the development of the powers of mind of its members is, in effect, to provide amplification systems to which human beings, equipped with appropriate skills, can link themselves" (Bruner, 1971, p. 53). Though Gee (2003) and others touch on the social elements of videogames, the element of culture is relatively absent from the literature, even with respect to role-playing games, including MMORPGs.

Cooperation and Collaboration

In order to support social negotiation of meaning, one aim of a constructivist learning environment is to promote cooperation and collaboration between students, as opposed to isolating students and placing barriers between them. According to Dixon-Krauss (1996), cooperation and collaboration make up the backbone of Vygotsky's theory of social teaching and learning. In the wake of such constructivists, Prensky (2001, 2004a, 2004b) saw the potential of video and computer games to provide support for cooperation and collaboration, and he considered interaction between players more important than their interaction with the computer running the game (or with non-player characters in a game). Like Prensky, Gee (2003) also found a good deal of value in games as a framework for cooperative and collaborative learning among what he called affinity groups, and Shaffer (2004) explored collaborative learning in games that were competitive as well as cooperative. Explicitly educational games can provide opportunities for both cooperative and competitive student collaboration (DeKanter, N., 2005).

When Gee (2003) addressed multiplayer games, including MMORPGs such as *Everquest*, he wrote explicitly about learning as a social process that happens in the game (p. 169). However Aldrich (2004, 2005) dismissed MMORPGs as an ineffective format because of the logistical issues related to getting students in the same virtual place at the same time, the games' unreliability in creating genuine role-playing, and the general lack of replayability. Given this disagreement in the literature regarding the value of

MMORPGs for encouraging cooperation and collaboration among students, additional research is justified.

Transfer

Constructivists maintain that the skills that students develop when collaborating in a learning community will transfer to real-world contexts more successfully than those skills developed in isolation using traditional teaching techniques. Shaffer's (2004) research showed that skills acquired in simulated negotiation not only helped players of an epistemic game acquire real-world negotiation skills, but also helped students understand the issues involved from multiple perspectives. Ultimately, Shaffer (in press) argued that games based on socially valued practices "have the potential to help students develop ways of thinking that persist beyond the game environment... [and to thus] provide an alternative model for organizing our educational system" (p. 19). Though others have noted that the skills learned by guild leaders in MMORPGs transfer well to the business world (Carstens & Beck, 2005), it has not been shown that MMORPGs could be used to develop knowledge that would transfer into other academic contexts.

Social Relevance

Ideally, constructivists hope not only for a transfer of skills, but also that the learning occurring in schools will itself have relevance to the student and to the greater society as well. Dewey (1926), in particular, was concerned with education's social ends

and wanted to see an education system that was both relevant to society and actively promoting positive social change. Modern videogame scholars also subscribe to this need for social relevance. Shaffer (2004), for instance, looks to epistemic games as a way to teach ethics; in one case study, “enacting professional learning practices helped... students think about ethical dilemmas” (p. 1414). Existing MMORPGs fall primarily into the genres of science fiction and fantasy. Their relevance to contemporary society may be said to be low, and they are certainly not explicitly focused on social change. It remains to be seen if they can be made to be more socially relevant.

Videogames Are Social

Many videogame scholars maintain that videogame playing is often a deeply social experience and that well designed games can provide a learning environment that facilitates socially negotiated learning. Squire (2003) asserted that gaming is a fundamentally social phenomenon and that videogames generate rich social interactions. Later, Shaffer, Squire, & Gee (2005) noted that videogames create new social and cultural worlds that help players to learn. Shaffer (2005) explained that videogames can offer virtual worlds in which students can interact, and he believed that videogames could help bring together communities of practice.

MMORPGs Are Social

MMORPGs are inherently social, requiring dialog, cooperation, and collaboration between players. Learning communities and communities of practice are commonplace in MMORPGs and though it may not be common among casual players, the games are designed to promote role-playing within the environment.

Jonassen's (2003) discussion of building technology-supported learning communities on the Internet is significant for its approach to MUDs, MOOs, and role-playing games. In contrast to the usual classroom dynamic where students are "disconnected or competing with each other" (p. 72), Jonassen is interested in fostering learning communities where students "share common learning goals or interests" (p. 72), and where emphasis is "placed on the social and cognitive contributions of a group of learners to each other, with students collaborating and supporting each other" (p. 73). MUDs and MOOs can support such learning communities by "engaging learners in high-level conversations that support personal reflection" (p. 101). MUDs and MOOs were originally text based, but modern massively multiplayer online role-playing games (MMORPGs) now offer similar experiences in 3D graphical virtual environments. In the text based games, "visitors not only interact, but, depending on their level of experience, can participate in the design and construction of the environment itself" (p. 101) and this is beginning to be true of graphical games as well; most allow players to craft items, and some, such as Linden Lab's *Second Life* rely on user creation of almost all elements of the online environment.

Such an environment might be ideal for sort of mentoring that Jonassen (2003) advocates (pp. 108-109), and could also be an environment in which a teacher could foster community, provided the infrastructure would allow for communication – especially feedback (p. 111), attention to student differences (pp. 111), shared culture (pp. 111-112), adaptation to the needs of student groups (p. 112), dialogue (pp. 112-113), access to information (p. 113), membership (pp. 113-114), and motivation (p. 114). Jonassen offers the advice to teachers that “the concept of learning communities is [only] an ideal” (p. 114), that “technology, resources, and models can help” (p. 115), that “it’s not all or nothing” (p. 115), and to “respect [their] own knowledge and situation” (p. 115).

Steinkuehler (2006a) shares a view of “*cognition as (inter)action in the social and material world*” (p. 3) and she considers MMORPGs to be “social simulations” (2006b, p. 4). She explains that MMORPGs are “learning environments, albeit naturally occurring, self-sustaining, indigenous ones dedicated to play rather than work or school” (p. 3). Her ethnographic work lead her to characterize MMORPGs as “rich settings for reciprocal forms of teaching and apprenticeship, [because] successful in-game problem solving often requires access to the collective intelligence... of the communities attending them” (p. 3). She considered such games to be “rich spaces for social interaction and enculturation, requiring complex cognitive/cultural knowledge and skills” (2006a, p. 25) and she believed they operated as “sites for socialization, enculturation, and learning” (2005, p. 30).

Squire and Steinkuehler (in press) stated that “understanding [MMORPGs] as cultures and not just environments is crucial... [because] these communities are defined by and through their cultural practices – the shared customs, procedures, rituals, and beliefs” (p. 3). They also maintained that “despite frequent public dismissals and indictments, [MMORPGs] do constitute complex and nuanced sets of multi-modal social and communicative practices” (p. 4). After all, as Steinkuehler and Williams (in review) point out, “the basic medium of multiplayer games is communication” (p. 11). MMORPGs allow “*socially [and] materially distributed cognition* [to] aid [players] in unpacking the situated interactions of individuals with their environment, tools, artifacts, representations, and other actors” (Steinkuehler, 2005b, p. 96).

According to Steinkuehler (in press), MMORPGs are sites for socially distributed cognition, collaboration, and meaning-making. She notes that in MMORPGs, players can take on not only new identities, but new social roles. Ultimately, MMORPGs are “complex social spaces of affiliations and disaffiliations, constructed largely out of shared (or disparate) social and material practices” (p. 24). Steinkuehler’s work also highlights several shared elements in MMORPGs, including interests, goals, activities, discursive resources, textual practices, social interaction, ways to coordinate, folk theories, systems of value, and epistemologies (p. 18-19).

In addition, Jenkins, Klopfer, Squire, and Tan (2003) found that multiplayer games, including MMORPGs, are living communities in which each player has different experiences, and in which players become a social community full of differing opinions

and competing interests. Squire and Steinkeuhler (in press) also noted that MMORPG communities evolve based on a combination of both the designers' and the players' intentions. Like other videogames, MMORPGs can also generate rich social interactions outside of the games themselves, and gamers use the game to create their own cultural artifacts and social interactions (Steinkuehler, in press). It is this highly social nature of MMORPGs that suggests they might be an effective medium for the social negotiation of meaning in a formal K12 educational context, but this has not been the subject of any formal research.

Reflection and Metacognition

A fifth fundamental property of constructivist learning environments is that they support reflection and metacognition. Reflection can be a powerful mechanism for meaning-making, particularly as students sort out relationships between the actions they take, the consequences of their actions, and other variables affecting their experiences. Metacognition, the practice of thinking about one's own thinking (including decision making and strategies), is also a powerful tool for students to promote their own cognitive development.

Supporting Reflection

Dewey (1916, 1938) and Bruner (1986, 1996) both highlighted the importance of reflection in education – and in life. Jonassen (2003), who followed in the constructivist

tradition of Dewey and Bruner, called for educational technologies to be used to support reflective education rather than what he called prescriptive education (p. 15). Videogames may be a natural technology for encouraging such reflective education. Players already reflect on the games they play (Prensky, 1996; Gee, in press, as cited by Squire and Steinkuehler, in press, p. 16), but meaningful reflection is more likely to occur if time is set aside after gameplay for the explicit purpose of debriefing and reflecting on the action (Aldrich, 2004; Prensky, 2006; Shaffer, 2006). Even a commercial off the shelf game such as *SimCity* or *Civilization III* could be used to support student reflection in this way (Squire, 2003; Shaffer, 2006). The strategic nature of MMORPGs may inherently require more reflection of players even without additional debriefing, but with teacher support more might also be possible. However, neither supposition has been formally explored in detail.

Supporting Metacognition

Constructivists such as Bruner (1996) have been interested in the role of metacognition in learning for years. Papert (1993) suggested that educators encourage “learning about learning” (p. 49-50) by “engaging children about strategies for learning” (p. 50) when they are playing videogames. In the same tradition, Gee (2003) saw the importance of being able to think about new learning in videogames “at a ‘meta’ level as a complex system of interrelated parts” (p. 23). Designers of videogames and elearning games also consider metacognition an important part of the game, especially

when learning is the goal (Salen & Zimmerman, 2004; Iverson, 2005; Quinn, 2005).

Some game scholars focus on the metagame, the conversation and other interactions that take place outside the formal boundaries of a game (Squire & Jenkins, 2003; Salen & Zimmerman, 2004). Others focus on meta-rules, or rules that state “how rules can be changed” (Frasca, 2003, p. 232), and games’ meta-narratives, or “all the divergent options and trajectories within the game world” (Grodal, 2003, p. 153). Steinkuehler (2006), was specifically interested in the metastrategies developed by MMORPG players, and the way they debrief and theorize about games (p. 3). These practices of MMORPG players commonly lead them to become part of a social meta-group, or a group outside of the game that revolves around the game (Freeman, 2004, p. 2411-2412). It remains to be seen how such strategies or meta-groups might impact formal learning.

Reflection and MMORPGs

MMORPGs may offer opportunities for groups of students to reflect on the consequences of their in-game actions – perhaps using formal processes such as after action reviews. Jonassen (2003) noted that “internet-based multiuser environments [such as MUDs, MOOs, and MMORPGs]... are engaging learners in high level conversations that support personal reflection” (p. 101). Prensky (2001), too, noted that RPGs and MMORPGs can include elements of reflection (p. 167), the inclusion of which Prensky (2001b) considers “one of the most interesting challenges and opportunities” of teaching digital natives (p. 5). As Jenkins, Klopfer, Squire, and Tan (2003) pointed out, “the power

of a multiplayer game is that it is a living community... students [can] pull back from the immediate play experience and reflect on the choices they have made” (p. 9).

Steinkuehler (2006) suggested that MMORPG game play “includes all the traditional characteristics of problem solving... [including] debriefings [and] theorizing about the problem space” (p. 3). These practices of MMORPG players commonly lead them to become part of a social meta-group, or a group outside of the game that revolves around the game (Freeman, 2004, p. 2411-2412).

Social Change

A constructivist learning environment is not complete without explicit social goals. Societal development is as much a part of the constructivist philosophy as individual development. Constructivist thinkers have long focused on the cultural importance and implications of educators’ work. Modern educational technologists and videogame scholars, too, are concerned with how educational technologies, including videogames and simulations, can effect positive social change.

Constructivists and Social Change

Largely due to the influence of his wife, Dewey was interested in the study of education as a force for social change (Mooney, 2000, p. 1). Dewey (1915) considered school the key to a harmonious society and expected schools to broaden students’ horizons and prepare them for a life of service to society. For Dewey (1926), a part of this

preparation of students for social service was an effort to develop their moral character. Equity and diversity were also important to Dewey (1926). He was concerned with providing such a moral education not only to upper class students, but to all members of the democracy (p. 290). Ultimately, Dewey wanted students to have the “desire and ability to share in social control, the ability to become masters of their [own] fate” (p. 320).

Rieber and Robinson (2004) characterized Vygotsky’s learning theory as “a theory of cultural transmission” (p. 172). In short, Vygotsky (1997) saw education as a means to a social end and as a powerful tool for social change. Echoing Dewey and Vygotsky, Bruner (1966, 1986) also suggested that in the modern world, society needs an education system designed to effect social change. This rested on his belief that “at the heart of any social change one often finds fundamental changes in regard to our conceptions of knowledge and thought and learning” (Bruner, 1986, p. 121). He also wanted each individual student to develop a sense of self that allows him to become “a member of the culture-creating community” (p. 132). He saw successful schools as countercultures (Bruner, 1996, p. 82) and challenged educators to “move beyond regulations, [and to] focus on renewal” (p. 85).

Videogames and Social Change

Shaffer was interested in just this sort of renewal. His work was not so much about “how computer and videogames can help kids do better in school... [but rather]

about how computer and videogames can help adults rebuild education for the postindustrial, high-tech world by thinking about learning in a new way” (Shaffer, 2006, p. 5) Among other things, his epistemic games aimed to help students understand how their actions impact society (p. 135). Like Bruner, Shaffer was explicitly interested in educational equity across demographics and saw videogames as a way that all children could have access to powerful learning experiences (p. 8). However, he acknowledged the conflict between the culture of games and the culture of school, and the difficulty teachers have finding the time and support to pursue the innovative use of videogames and simulations in the current educational culture, particularly in the United States (p. 183). These issues will need to be explored further if videogames, including MMORPGs, are to be used in formal K12 education.

Shaffer, Squire, and Gee (2003) wrote that “videogames have the potential to change the landscape of education as we know it” (p. 111). They urged that games be designed with “sound theories of learning and socially conscious educational practices” (p. 111). However, they also noted that the theories of learning embedded in videogames as a medium run counter to the presiding theories of learning in schools. Elsewhere, Squire and Gee (2003) explained that games may be viewed as suspect in an era when the value of instruction is measured by standardized tests (p. 30).

In the wake of constructivists such as Bruner, even game designers Salen and Zimmerman (2004) believed that games are one way in which society passes on its values and that some games can actually transform the culture around them. They discussed the

use of games (and game design) as cultural resistance focusing on culturally transformative play (p. 569). This is the aim of many serious games, particularly games for change, such as *Food Force*, *Peacemakers*, and *A Force More Powerful*, which aim to use leisure time to broaden players' horizons and motivate them to service in ways that might have excited Dewey. Unlike narratives such as a history text, a game or simulation is built on the basic assumption that change is possible (Frasca, 2003). However, the game designer(s) agenda can "slip into the game's inner laws" (p. 233). This ability to model reality for students can be put to good use by game designers and educators to effect positive social change, but it can of course also be abused. An important part of game literacy or simulation literacy is understanding that the underlying rules of a game, including a serious game, may not necessarily model reality accurately. The player must consume this new media at least as critically as a reader would consume the printed word. Issues such as this need to be much better understood and explored if games, including MMORPGs, are to be used in formal education.

MMORPGs and Social Change

MMORPGs may be a particularly powerful genre of game for effecting positive social change. Steinkuehler and Williams (in review) found that MMORPGs "function as one novel form of a new 'third place' for informal sociability" (p. 2). These games are low profile, playful, accessible, and accommodating neutral grounds (and social levelers) where conversation is the main activity and where regulars can find a home away from

home (p. 8-17). Steinkuehler and Williams noted that participation in MMORPGs “affects participants’ social capital in terms of both broad but weak social networks... and deep but narrow social networks” (p. 3). They found that MMORPGs can also serve as “a window into new worlds of people and ideas” (p. 22) and that players have the ability to “explore, construct, and resist” game for change dominant culture (p. 13). In terms of formal K12 education it may be even more important that in MMORPGs it is common for teenagers to mentor “adults twice their age and education in how to lead” (p. 20) and that “large percentages of MMOGamers play online with ‘real life’ romantic partners, family members, co-works, and friends” (p. 15). Though the genre is largely untapped for education purposes, these properties suggest that MMORPGs may be an ideal format for a serious game, though no such game has been developed. Of course, this potential will require further study.

The Delphi Method

The Delphi method is used to help a group of purposefully selected experts come to a consensus regarding the answer to a question, particularly if the answer involves a phenomenon about which little is known or requires making predictions about the future (Skulmoski, Hartman, & Krahn, 2007). The Delphi method is a flexible technique with many permutations (Lindstone and Turoff, 1975, p. 3). Rowe and Wright (1999) noted that Delphi is often used in the field of education in particular. Hartman (1981) concluded

“the Delphi technique is a forecasting tool with proven benefits for long-range educational planning” (p. 495).

The Delphi method is thus an appropriate choice for this present study. The field of videogames and learning is only in its infancy; it is not well defined, well understood, or well quantified. In the case of this present study, the questionnaires will focus on forecasting the potential benefits and drawbacks of using MMORPGs in formal K12 education.

History of The Delphi Method

The Delphi method is named for the Greek Oracle of Delphi where it was said that the god Apollo could predict the future by speaking through a number of priests who functioned as informants - and as multiple data sources (Williams & Webb, 1994; Bowles, 1999; Kennedy, 2004, as cited in Baker, Lovell, & Harris, 2006, p. 60). Though “the first Delphi-type study sought to forecast the outcome of horse races” (Bowles, 1999, p. 32), formal use of the Delphi technique began with defense research conducted by the RAND Corporation for the United States government in the 1950’s (Helmer & Rescher, 1959, cited in Williams & Webb 1994, p. 181). Dalkey and Helmer, who worked for the RAND Corporation, then published a study in 1963 and are often credited as the developers of the formal Delphi method (Baker, Lovell, & Harris, 2006, p. 60). Following their work, the Delphi method became more widely used (Bowles, 1999, p. 32). Today the Delphi is a well-established mainstream research method used by a wide

variety of organizations in a wide variety of fields (Williams & Webb, 1994; Ludwig, 1997; Bowells, 1999; Rowe and Write, 1999; Baker, Lovell, and Harris, 2006). Even so, the Delphi is considered “an under-used methodology” (Ludwig, 1997, p. 1). In recent years, the Delphi, which was traditionally administered by mail, has often been administered by email (the e-Delphi) or via the Web (the Web Delphi) (Wong, 2003, p. 18), making it an even more attractive choice for 21st century researchers, particularly when the experts involved can be expected to have the necessary technical savvy.

Key Features

The classical Delphi has four key features. These are anonymity of the participants (from each other), various iterations of the survey instrument (or instruments), controlled feedback, and statistical aggregation of group response (Rowe & Write, 1999; Skulmoski, Hartman, & Krahn, 2007, p. 3). As Rowe & Write (1999) explain, “anonymity is achieved through the use of questionnaires” (p. 354). There are many versions of the Delphi method, but in all “anonymity of respondents during the process is an important aspect” (Ludwig, 1997, p. 1) This allows iterations to be productive, because “with the iteration of the questionnaire over a number of rounds, the individuals are given the opportunity to change their opinions and judgments without fear of losing face in the eyes of the (anonymous) others in the group” (p. 354). The mechanism for this is the controlled feedback provided by the researcher between rounds so that the participants “are informed of the opinions of their anonymous colleagues” (p.

354). Though many classic Delphi studies include statistical aggregation of group responses in a quantitative form, some studies have also been conducted in a purely qualitative fashion (MG Taylor Corporation , 1983; Skulmoski, Hartman, & Krahn, 2007).

Overview of The Process

According to Skulmoski, Hartman, and Krahn (2007), “the Delphi method is an iterative process to collect and distill the anonymous judgments of experts using a series of data collection and analysis techniques interspersed with feedback” (p. 1). In Figure 1 Joppe (n.d.) provides a simple illustration of the Delphi process.

Flowchart for the Delphi Method

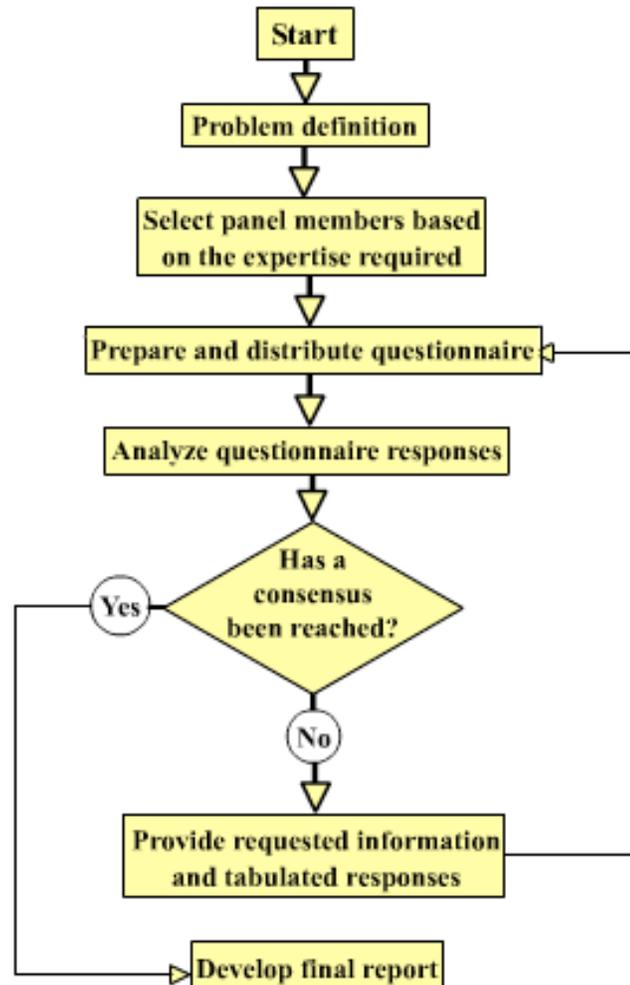


Figure 1: Flowchart for the Delphi Method (Joppe, n.d.)

Though it can take several forms, the first round questionnaire usually consists of one or two broad open-ended questions meant to gather a wide range of responses from the expert panel (Ludwig, 1997; Skulmoski, Hartman, & Krahn). The second round questionnaire then includes two major parts: a review of the first round responses, and an additional round of more structured questions written in light of the first round responses

(Ludwig, 1997; Okoli & Pawlowski, 2004; Skulmoski, Hartman, & Krahn, 2007). This process usually continues for at least one more round, or until consensus is reached by the expert panel (Ludwig, 1997; Okoli & Pawlowski, 2004; Skulmoski, Hartman, & Krahn, 2007).

Experts and Consensus

The selection of experts to participate in a Delphi panel is critical to the success of a Delphi study. The quality of the results depends directly on the expertise of the participants (Rowe & Write, 1999). Unfortunately, this is “the most important yet most neglected aspect of the Delphi method – choosing appropriate experts” (Okoli & Pawlowski, 2004, p. 16). Though there is no widely accepted definition of expert used in all Delphi studies, Baker, Lovell, and Harris (2006) have identified three key elements of expertise: demonstration of knowledge through publishing books or peer-reviewed articles, demonstration of experience through professional qualifications and accomplishments, and demonstration of formal authority through ability to influence policy. Skulmoski, Hartman, and Krahn (2007) also suggest that Delphi participants should meet four requirements to be considered experts fit for the study; they must not only demonstrate knowledge or experience, but must also have the capacity, time, and communication skills necessary to participate.

The conclusion of a Delphi study occurs once the participating experts reach a consensus. However, establishing how to determine consensus is also sometimes

overlooked by researchers. One definition of consensus that has been used is that the results are “at least acceptable to every member, if not exactly as they would have wished” (Reid, 1988, as cited in Williams & Webb, 1994, p. 182). Williams and Webb (1994) also recommend specifying a range of consensus levels at the outset of a Delphi project in order to be able to identify a high level of consensus or a low level of consensus in the final findings.

Strengths and Criticisms

The Delphi method has a variety of strengths. Chief among them is its flexibility and usefulness in a wide range of situations (Williams & Webb, 1994; Okoli & Pawlowski, 2004; Skulmoski, Harman, & Krahn, 2007). The Delphi method also allows for the development of consensus among experts while reducing the effects of ego, defensiveness, and a tendency to bandwagon present in face-to-face meetings (Williams & Webb, 1994). Other benefits include the use of an expert panel, controlled anonymous feedback (with less pressure on panel members to conform than in a committee), systematic refinement, development of consensus, and easy, inexpensive access to a large number of experts who may be geographically distant (Bowles, 1992, p. 32). Also, those who read and evaluate the study will appreciate that “the uniqueness of Delphi lies in its reliability, given the variableness of human opinion” (Bourgeois, Pugmire, Stevenson, Swanson, and Swanson, n.d., p. 1).

Despite its evident strengths, there are significant concerns and criticisms related to the Delphi method. The flip side of the Delphi method's flexibility is the lack of specific guidelines for implementing an effective Delphi study (Williams & Webb, 1994), the lack of a widely accepted definition for consensus or expert (Williams & Webb, 1994; Bowles, 1999; Baker, Lovell, and Harris, 2006), and the lack of an accepted ideal panel size (Bowles, 1999). In addition, participants with extreme views are less likely to complete a Delphi process and this attrition might affect response bias (Williams & Webb, 1994; Bowles, 1999; Rowe & Write, 1999). Another concern related to participants is a challenge to the value of anonymity when valuable data may be lost because panelists cannot interact directly (Bowles, 1999). There is even concern over the Delphi's reliability, especially given the potential for researcher bias throughout the process (Williams and Webb, 1994; Ludwig, 1997; Bowles, 1999). In addition "all the questionnaire design issues of a survey also apply to a Delphi study" (Okoli & Pawlowski, 2004, p. 19). Finally, Bowles (1999) raises a concern over the cost of the Delphi due to the multiple iterations.

Other Potential Methodologies

Rowe and Wright (1999) compared the Delphi method to other comparable methods by examining which predictions were more accurate. Delphi was more accurate than "staticized group" by 12 cases to 2 (p. 364), and more accurate than "interactive

groups” by 5 cases to 2, with 2 “ties” (p. 365). Several other methods were also found to be less accurate than the Delphi (p. 366).

Okoli and Pawlowski (2004) “judged the Delphi method to be a stronger methodology (than traditional surveys) for a rigorous query of experts and stakeholders” (p. 18). Furthermore, the Delphi has many of the same advantages of traditional surveys. For instance, “Delphi is desirable in that it does not require the experts to meet physically, which could be impractical for international experts” (p. 18). Also, “the questionnaire can include questions that solicit quantitative or qualitative data, or both” (p. 19). More importantly, “non-response is typically very low in Delphi surveys since most researchers have personally obtained assurances of participation” (p. 19).

Okoli and Pawlowski (2004) also suggested that the Delphi method “permits the collection of richer data leading to a deeper understanding of the fundamental research questions”(p. 18) than is possible with other comparable methods. Janio (2007) pointed out that the Delphi method has several advantages over traditional methods of phenomenology, grounded theory, ethnography, and case studies (p. 89). Unlike in a phenomenological study in which the researcher must “consciously suspend any previously held views and expectations... the Delphi method focuses on actively seeking professionals who are already familiar with the phenomena studied” (p. 90). Similarly, the panel of experts is missing from a traditional grounded theory study (p. 91). Also, a Delphi study allows the researcher to draw on the expertise of geographically distant experts, which would be impossible in an ethnographic study requiring immersion into a

local culture (p. 92). A simple case study is similarly limited to a specific time and place (p. 93). Most importantly, all of the methods mentioned above fail to address the need to make useful predictions about the future.

Conclusion

This chapter included a detailed review of literature related to the use of videogames as (or in) constructivist learning environments. This began with an overview of constructivist theory, followed by detailed discussion focused on elements of constructivist learning environments: engagement and motivation, context-embedded learning, inquiry-driven learning, socially negotiated learning, reflection and metacognition, and effecting positive social change. This chapter also included a review of literature related to the Delphi method and other potential methodologies considered for this study. The following chapter presents a detailed discussion of the research method.

CHAPTER 3:

RESEARCH METHOD

This chapter provides a detailed discussion of the research method. It begins with an overview of the research design, including the qualitative research paradigm and the role of the researcher. The research context is described and justified, and details related to participant selection are shared, including measures to be taken for the ethical protection of the participants and the criteria for selecting participants. The data collection and data analysis procedures and software are then explained. This is followed by a discussion of efforts taken to improve the credibility, transferability, dependability, and confirmability of the study. Finally, the results of a previous quantitative exploratory study are summarized.

Research Design

This study will employ a qualitative Delphi method due to the relatively new and emergent nature of the field being studied. Because MMORPGs in particular are not actually currently being used for explicitly educational purposes (with the notable exception of *Second Life*, which while massively multiplayer is not technically a game in and of itself), there are therefore no current or emergent phenomena to study; therefore, the Delphi method was chosen in order to make predictions about the potential benefits and drawbacks of using MMORPGs in formal K12 education.

Due to the lack of existing implementations of MMORPGs in education there is very little known about the potential benefits and drawbacks of such an implementation. Statistical or model-based procedures are inappropriate in this context, and development of an MMORPG for use with test subjects (and not with a control group) would require time and resources far beyond what is available to the researcher. The researcher is thus investigating something that does not exist yet. Because this topic of inquiry is not yet well defined or quantified, a qualitative approach to the Delphi process was chosen for this study.

Qualitative Research Paradigm

This researcher is explicitly interested in theory building as a result of this study, and as Okoli and Pawlowski point out, “researchers can use the Delphi method in a number of ways related directly to theory building” (p. 19). In this respect, the Delphi method can be used to support the grounded theory paradigm, in which “the researcher attempts to derive a general, abstract theory of a process, action, or interaction grounded in the views of participants in a study” (Creswell, 2003, p. 14). Like a Delphi study in particular, any grounded theory study is also a “complex iterative process” (Trochim, 2001, p. 160) involving “multiple stages of data collection and the refinement and interrelationship of categories of information” (Strauss & Corbin, 1990, 1998, as cited in Creswell, 2003, p. 14). According to Leedy and Ormrod (2005), “the major purpose of a grounded theory approach is to *begin with the data and use them to develop a theory*” (p.

140). This Delphi study will also involve the practices of identifying core concepts, linking the participants' responses, coding responses, and aiming for conceptual density in the findings, as any other grounded theory study might (Trochim, 2001, p. 160-161).

Trochim (2001) defines qualitative measures as “any measures where the data is not recorded in numerical form), [including] short written responses on surveys; interviews; anthropological field research; video and audio data recording; and many other approaches” (p. 152). Trochim suggests that qualitative research can play an important role in developing new theory - and can help the researcher achieve a deep understanding of the related issues (p 152). Because the development of new theory to guide educators and serious game designers is a goal of the researcher – and because the researcher aims to develop expertise in the field, a grounded theory qualitative research paradigm is an appropriate choice.

Role of The Researcher

As Creswell (2003) wrote, “qualitative research is interpretive research, with the inquirer typically involved in a sustained and intensive experience with participants” (p. 184). Furthermore, as Merriam (1998) pointed out, “in a qualitative study the investigator is the primary instrument for gathering and analyzing data” (p. 20). Defining the role of the researcher is therefore critical to the success of a qualitative study.

Merriam (1998) recommends that a qualitative researcher must have “an enormous tolerance for ambiguity” (p. 20), must be sensitive or “highly intuitive” (p. 21),

and must be a good communicator who “empathizes with respondents, establishes rapport, asks good questions, and listens intently” (p. 23). Merriam also stressed the importance of being a careful observer when conducting qualitative research (p. 94). Though this study is not being conducted face-to-face, these qualities will be no less important to the researcher’s success. In the proposed study, the researcher will be personally responsible for all aspects of implementing the Delphi process. He will recruit all participants, compose all questionnaires, analyze all data, and interpret all findings. Though he will retain all responsibility for these elements, he may from time to time employ clerical help to aid him in dealing with each of these elements.

Research Questions

As previously described in Chapter 1, the purpose of this qualitative Delphi study is to understand the potential benefits and drawbacks of using MMORPGs as constructivist learning environments in a formal K12 educational context. The study will be guided by the following two overarching questions:

1. What are the potential benefits of using MMORPGs as constructivist learning environments in formal K12 education?
2. What are the potential problems related to using MMORPGs as constructivist learning environments in formal K12 education?

Additionally, based on the literature review the following six research questions will be used to focus the study:

1. Engagement and motivation: How might MMORPGs be used to motivate and engage students, and what problems might be associated with using MMORPGs for this purpose?
2. Context: How might MMORPGs be used to provide a context for student learning, and what problems might be associated with using MMORPGs for this purpose?
3. Inquiry: How might MMORPGs be used to provide students with opportunities for inquiry-based learning, and what problems might be associated with using MMORPGs for this purpose?
4. Social Negotiation: How might MMORPGs be used to support social negotiation of meaning (including facilitated collaboration, cooperation, and competition), and what problems might be associated with using MMORPGs for this purpose?
5. Reflection: How might MMORPGs be used to encourage student reflection and metacognition, and what problems might be associated with using MMORPGs for this purpose?
6. Social Change: How might MMORPGs used in formal K12 education be used to effect positive social change?

As this is a Delphi study, the actual questions asked in the second and third round questionnaires will be based on participants' earlier responses during the study. In this

respect, the questions will be emergent from the study. However, the specific questions above will serve as initial objectives to provide sufficient focus to the study.

Research Context

Unlike many studies, this Delphi study will not take place in a specific physical location. Instead, the entire study will be conducted online. Communication with the participants will be conducted via email, and all iterations of the Delphi questionnaire will be collected via the web using [surveymonkey.com](https://www.surveymonkey.com). The online nature of the study will allow the researcher access to a geographically dispersed panel of experts. It will allow the experts to participate in a way that is convenient and flexible enough to accommodate their individual schedules.

Access to Participants

Because the study is not taking place at a particular site, physical access to the participants is not a concern. However, the researcher will need to contact each participant via email. In most cases, this will not be a challenge. Many of the videogame scholars included in the literature review freely disseminate their email addresses along with their work. Academics are also accessible via the email addresses lists on their institutions' websites. Naturally, game developers are also easy to contact via the email addresses listed on their organizations' websites. Also, the researcher has met and corresponded with many of the authors reviewed in chapter two and with many

practitioners in the field. Contacting them with an invitation to participate in this study following IRB approval will be a trivial task.

Researcher-Participant Working Relationship

The working relationship between the researcher and the participants will be established in the initial email invitation to participate. Following IRB approval of the study, each potential participant will receive an email from the researcher that includes the approved Consent/Assent form describing the study, the participant's roll in the study, and the researcher's roll in the study. The participant's roll is to offer thoughtful and complete responses to each iteration of the Delphi questionnaire, and to respond to the researcher's email and other communications when necessary. As discussed above, the researcher's roll will be to recruit all participants, compose all questionnaires, analyze all data, and interpret all findings. The researcher will be the participants' sole point of contact regarding this study. Most communication between the researcher and the participants is expected to be conducted asynchronously via email, though the telephone or a voice-over-IP service such as Skype might be used if necessary to facilitate synchronous communication.

Measures for Ethical Protection of The Participants

Fortunately, the potential ethical issues related to this proposed study are minimal. No protected classes will be involved and no participants will be at risk of any harm as a

result of their participation (nor will any issues of a person's right to service come into play, as there is no service being rendered and no control group in the research design). Also, because the research will be conducted via the web, there are no issues related to gatekeepers and access to research sites. Participation in this proposed study will be voluntary; that is, "people will not be coerced into participating in the research" (Trochim, 2001, p. 24). To this end, the "research participants [will] be told the nature of the study to be conducted and given the choice of either participating or not participating" (Leedy and Ormrod, 2005, p. 101). The researcher will provide participants with "sufficient information to make informed decisions about participating in [this] study" (Glesne, 1999, p. 114) and will receive informed consent from each participant; each will "be fully informed [in writing] about the procedures and risks involved in [the] research" (Trochim, 2001, p. 24). The researcher has submitted the necessary documentation to the Walden University Institutional Review Board and will receive approval from the board before recruiting participants or beginning the study.

Criteria For Selecting Participants

The expert panel will consist of 12 to 24 adult experts drawn from the field of videogames and learning. Both industry professionals and academics will be represented in the population. Each participant selected will be an expert who has demonstrated knowledge, experience, or formal authority in the field of videogames and learning

(Baker, Lovell, and Harris, 2006). Participants will also be selected based on the degree to which they have the capacity, time, and communication skills necessary to participate (Skulmoski, Hartman, & Krahn, 2007). No consideration will be given to other demographic factors.

Sampling

Because the proposed study will be using the Delphi methodology, all of the participants selected will be experts in the field being studied. For this reason, in a Delphi study, “randomly selecting participants is NOT acceptable” (Ludwig, 1997, p. 2). As the researcher will be actively recruiting experts for this study, he will explicitly not be using typical case sampling, network sampling, or convenience sampling, as defined by Glesne (1999). Instead, this study will use a form of purposeful sampling, which “is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned” (Merriam, 1998, p. 61).

The number of participants recruited for the Delphi panel varies widely, with metastudies revealing panel sizes usually ranging between 3 and 98 experts (Rowe and Wright, 1999) and some panels with over a hundred – or even several hundred - participants (Skulmoski, Hartman, and Krahn, 2007). However, panel sizes of between 10 and 20 experts are generally recommended (Ludwig, 1997; Skulmoski, Hartman, and Krahn, 2007; Bourgeois, Pugmire, Stevenson, Swanson, and Swanson, n.d.)

There is a trade-off between quality of the Delphi results and the manageability of the study. As Skulmoski, Hartman, & Krahn explain, there is a reduction in group error (or an increase in decision quality) as sample size increases. However, above a certain threshold, managing the Delphi process and analyzing the data becomes cumbersome in return for marginal benefits” (p. 10). Naturally, it is recommended that researchers use “the minimally sufficient number of respondents” (Debecq, Van de Ven, & Gustafson 1975, as cited in Ludwig, 1997, p. 2).

In Delphi studies it is recommended that the researcher recruit at least two respondents for every question being investigated (Alder & Ziglio, 1996, as cited in Janio, 2007, p. 6). Based on the number of subquestions articulated in chapter one, the researcher will aim to recruit at least 12 participants for this Delphi study. This number of participants will also allow the researcher to recruit approximately three participants in each of the primary subcategories of expert: educators, educational technologists, academics, and videogame designers. Additional participants will be acceptable in order to protect against attrition. However, in order to maintain a manageable panel size, the researcher will at no time invite more than double this number (24) of experts to participate.

Data Collection

The data collected during this proposed study will be written qualitative data provided by purposefully selected experts in the field of videogames and learning.

The Delphi method requires collection of data via anonymous written surveys. In recent years, the Delphi, which was traditionally administered by mail, has often been administered by email or via the Web (Wong, 2003, p. 18). This proposed study will implement the Delphi method via the web. The online survey service SurveyMonkey.com will be used to conduct each iteration of the Delphi. Initial contact with the participants, as well as instructions for each round of the Delphi, will be communicated via email.

Specifically, the researcher will use the service at surveymonkey.com to distribute surveys and collect responses. This service allows the researcher to compose a survey using simple online forms (or to cut and paste existing questions into these forms). The researcher will then have a variety of options for disseminating the survey, including placing a link on an existing webpage or emailing a link to each participant. In this case, the researcher will choose the later. Each email will be sent separately (or addressed via the BCC field) so that participant identities are not revealed in the To or CC field of the message. Participants click on the link sent via email; this opens a web page which presents the survey questions and prompts participants to enter their answers. Once participants have entered their complete responses they will click a button to submit their answers. The researcher will then be able to access and download participants' answers via the admin interface at Surveymonkey.com.

The round one survey will include only two broad and open-ended questions. These will be identical to the research questions driving this study:

1. What are the potential benefits of using MMORPGs as constructivist learning environments in formal K12 education?
2. What are the potential problems related to using MMORPGs as constructivist learning environments in formal K12 education?

In the second round of the Delphi, the questions will be based on the literature review conducted by the researcher and on the participants' responses. Based on the literature review, the second round questions might appear identical to the subquestions being explored by this study (See above for these questions).

The research subquestions are expected to evolve during the course of the Delphi study. Once the expert panel has been recruited in keeping with IRB policy, the invitation to participate in the first round questionnaire will be emailed to all participants. They will be allowed one week to complete the questionnaire, which is expected to take less than one hour of their time. Once all responses are collect, the researcher will allow an additional week to perform an initial analysis of the responses and to compose the round two questionnaire. The second round will also require one week for data collection, and an additional week for preliminary analysis (and composition of the third round questionnaire). Following another week for collecting third round responses, the researcher will take a sixth week to analyze these and send a final summary of the panel's responses to check for consensus among the participants. As with the other three rounds, one week will be allowed for responses. Then the final analysis will begin. The complete process of data collection is thus expected to take a total of eight weeks.

Data Analysis

Following the collection of responses for each round of the Delphi survey, the researcher will review and analyze the data. The first step in this process will be to “organize and prepare the data for analysis” (Creswell, 2003, p. 191). Next, the researcher will “read through all the data” (p. 191). This will be important for the researcher to “obtain a *general sense* of the information and to reflect on its overall meaning” (p. 191).

At this point, the researcher will “begin detailed analysis with a coding process” (p. 192). According to Creswell, “*coding* is the process of organizing material into ‘chunks’ before bringing meaning to those ‘chunks’... It involves... segmenting sentences (or paragraphs)... into categories, and labeling those categories with a term” (p. 192). Merriam (1998) defined coding as “nothing more than assigning some sort of shorthand designation to various aspects of your data so that you can easily retrieve specific pieces of the data” (p. 164), and Trochim (2001) defines it as “a process for categorizing qualitative data and describing the implications and details of these categories” (p. 160). These categories, according to Merriam (1998), should reflect the purpose of the research and be exhaustive, mutually exclusive, and all of the same level of abstraction (p. 184). Glesne (1999) explained coding as “a progressive process of sorting and defining and defining and sorting those scraps of collected data... that are applicable to your research purpose” (p. 135). To facilitate this coding process the

researcher will use qualitative analysis software, such as TAMS Analyzer for Mac OS X, an open source qualitative analysis tool that supports complex hierarchical codes. The coding process is especially appropriate for a Delphi study because it can help the researcher “develop a more specific focus or more relevant questions” (p. 133).

The results of the coding process will then be used to “generate... themes for analysis” (Creswell, 2003, p. 193). Following the first and second iterations of the survey, these themes will inform the composition of the next iteration of the survey. Following the third (or final) iteration of the survey, these themes will then serve as the basis for the findings. In the final report, “a narrative passage [will be used] to convey the findings of the analysis” (p. 194). Finally, the researcher will make an interpretation as to the meaning of the findings (p. 194-195). At this point, the researcher will be theorizing, or “thinking about data... [and taking] a step toward developing a theory that explains some aspect of educational practice and allows a researcher to draw inferences about future activity” (p. 188), which is of course the goal of a Delphi study. In this respect the researcher’s role in the proposed study will be to build “from the data to broad themes to a generalized model or theory” (p. 132).

Because of the iterative nature of the Delphi study, the researcher’s analysis of round one responses will amount to a form of early data analysis, in which “data analysis done simultaneously with data collection [which will enable the researcher] to focus and shape the study as it proceeds” (Glesne, 1999, p. 130). The researcher will also keep a research log in order to practice memo writing (or memoing) “by getting [his] thoughts

down as they occur, now matter how preliminary or in what form” (p. 131). As Merriam (1998) points out, “data collection and analysis is a *simultaneous* activity in qualitative research” (p. 151), and “data that have been analyzed while being collected are... illuminating” (p. 162).

The nature of the Delphi study also means that the participants will play a role in the analysis of data as well. In addition to generating the responses to be analyzed, after each iteration of the survey they will receive feedback from the researcher allowing the previous responses (from other participants) to influence their responses on successive iterations of the survey.

Discrepant Cases

Discrepant cases, or dissenting opinions, are particularly important to a Delphi study. As an attempt is made to identify consensus among the participants, it is critical not to minimize or marginalize dissenting opinions. As Glesne (1999) articulates, “because real life is composed of different perspectives that do not always coalesce, discussing contrary information adds to the credibility of [a study]” (p. 196). At each stage of the Delphi process, when controlled feedback is offered to the participants, dissenting opinions will be highlighted as well, so that each participant can then make their next responses in light of all opinions, not just that of the majority. Also, dissenting opinions will be reported in the findings of the study. In addition, reasons behind these discrepant cases will be discussed in the final chapter of the proposed dissertation.

Ultimately, readers will be able to make their own judgments about the credibility of any consensus that may arise from the study based on exposure to the dissenting opinions as well.

Coding Procedure and Software

A coding procedure will be used to make sense of the qualitative data following the collection of responses for each round of the Delphi survey. The researcher will assign shorthand designations to various sections of data in order to easily retrieve, categorize, and synthesize the data (Merriam, 1998, p 164). To support this process, the researcher will be using software that has been specifically developed for use with qualitative data. Participant responses will be copied into the Mac OS X version of the Text Analysis Markup System (TAMS) Analyzer. The researcher will read several responses and make a list of all important topics represented in the responses; these topics will be abbreviated as codes (Creswell, 2003, p. 192). The codes will then be applied to portions of text in all of the responses using the TAMS Analyzer software. This will be a cyclical and “progressive process of sorting and defining and defining and sorting... scraps of collected data” (Glesne, 1999, p. 135). Once themes, elements of consensus, and discrepant cases have been identified, these will be included in the text of the controlled feedback offered to participants before the next round of the Delphi survey - and at the end of the final round for the final consensus check.

Credibility, Transferability, Dependability, & Confirmability

In a qualitative study the terms validity and reliability are not applicable as they are in traditional quantitative research, but there are still clear steps the researcher can take to improve the quality of the study. Trochim (2001) shared “four criteria for judging the soundness of qualitative research” (p. 162): credibility, transferability, dependability, and confirmability.

“The credibility criteria involves establishing that the results of the qualitative research are credible or believable from the perspective of the participant in the research” (Trochim, 2001, p. 162). This form of credibility is to some degree integrated into the Delphi process. After each iteration of the Delphi questionnaire, feedback is provided to the participants, who are then able to react to the researcher’s interpretations of their responses and to affect the direction of the study through their responses to the next round questionnaire. In addition, the final consensus check will be an opportunity for the participants to indicate their level of agreement with the consensus identified by the researcher. This is not unlike what Okoli and Pawlowski (2004) suggested when they wrote that “the Delphi method can employ further construct validation by asking experts to validate the researcher’s interpretation and categorization of the variables” (p. 19). Perhaps more importantly, the weight of this credibility will depend a great deal on the credibility of the participants, in a colloquial sense; if the participants are highly credible (i.e. published and recognized experts), then the study will be more credible. Therefore, the plan is to recruit those experts with the most knowledge and experience in the field,

as discussed above. As Baker, Lovell, and Harris (2006) pointed out, “within consensus methods of research, especially Delphi panel techniques, the use of ‘experts’ is fundamental to reliability” (p. 59).

“Transferability refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings” (Trochim, 2001, p. 162). This is primarily the responsibility of the researcher, who will in this case make every effort to “enhance transferability by doing a thorough job of describing the research context and the assumptions that were central to the research” (p. 162). The thick rich narrative planned for the final report of the findings (based on the researchers notes throughout the data collection process detailed above) will help ensure the transferability of the results.

According to Trochim (2001), “reliability is the consistency or repeatability of your measures” (p. 88), and “the traditional view of reliability is based on the assumption of replicability or repeatability” (p. 162). In much qualitative research, though, neither is anything being measured nor can the study be performed in exactly the same way twice. So, the concept of quantitative reliability may be replaced with the concept of qualitative dependability, which “emphasizes the need for the researcher to account for the ever changing context within which research occurs” (p. 163). Again, in this proposed study, the researcher will take responsibility for describing the changes that occur [throughout the study] and how these changes affect the way the researcher approached the study” (p. 163).

Confirmability, then, “refers to the degree to which the results could be confirmed or corroborated by others” (Trochim, 2001, p. 163). In order to enhance the confirmability of this proposed study, the researcher will document the data analysis procedures throughout the study, identify a colleague to serve as a devil’s advocate to the results (and document the result), and will actively search for and document any dissenting opinions among the panel of experts (p. 163). Creswell (2003) also recommends several strategies for validating the accuracy of findings in a qualitative research study (p. 195-197). The researcher aims to employ these following eight strategies to varying degrees: triangulation, member-checking, rich thick description, bias clarification, negative or discrepant information, prolonged time in the field, peer debriefing, and an external auditor (p. 196).

Exploratory Study

The researcher conducted a related exploratory study in the fall of 2004. The study was conducted as part of a research methods course that included instruction in statistical analysis. As such, the study was a quantitative exploration of teacher perceptions of massively multi-player online role-playing games (MMORPGs) as constructivist learning environments.

This study aimed to investigate Teachers' Perceptions of Massively Multiplayer Online Role Playing Games (MMORPGs) as Constructivist Learning Environments. The study postulated that MMORPGs have the potential to serve as constructivist learning

environments for students. However, in order to help teachers to accept and embrace this technology, their perceptions of these games must be understood. Marc Prensky (2001) suggested that the “games generation” of those born after 1960 having a markedly different perspective on videogames and on learning. It remained to be seen if this is true regarding teachers' perceptions of MMORPGs as constructivist learning environments. This study investigated whether teachers born in 1960 or before have a significantly different perception of MMORPGs as constructivist learning environments in comparison to teachers born after 1960. A survey of 20 closed-ended questions and an interview protocol of similar but open-ended questions were used for data collection.

Statistical analysis of the quantitative survey data was used to determine that the sample did not provide enough evidence to support the claim that teacher perceptions of the potential of MMORPGs to serve as constructivist learning environments differed based on their age, but it did reveal that younger teachers are more comfortable playing MMORPGs in their personal life than teachers born in 1960 or before. Analysis of the qualitative data did not shed additional light on the answer to the research question, but did provide greater insight into the younger teacher's perceptions and additional inspiration for future research.

In addition to the quantitative data collected, participants were given the opportunity to offer qualitative comments to explain their answers. The qualitative data collected for this study suggested a variety of additional studies to explore the following concerns:

- High quality game design that encourages learning
- An educational “engine” to encourage and capture student learning and understanding
- Integrated assessment tools
- The balance between open endedness and structure for learning
- Modern and motivating graphics that are not overly violent or sexual
- Privacy issues
- Protected environment issues
- Inclusion of a wide-range of students and interests
- Engaging and accurate story lines

The present proposed study was in part inspired by the results of this exploratory study.

Conclusion

This third chapter of the proposal provided a detailed discussion of the research design. It began with an overview of the research design, including the qualitative research paradigm and the role of the researcher. The research context was described and justified, and details related to participant selection were shared, including measures to be taken for the ethical protection of the participants and the criteria for selecting participants. The data collection and data analysis procedures and software were then explained. This was followed by a discussion of efforts taken to improve the credibility,

transferability, dependability, and confirmability of the study. Finally, the results of a previous quantitative exploratory study were summarized.

Videogames and simulations show great potential as engaging and motivating learning environments. However, despite a breadth of research about videogames and learning in general, the potential uses of MMORPGs in formal education are not well represented in the literature. Therefore, this study aims to inquire into potential applications for MMORPGs as constructivist learning environments in formal K12 education , and to understand related benefits and drawbacks.

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