Information Literacy in Interest-Driven Learning Communities: Navigating the Sea of Information of an Online Affinity Space

By

Crystle A. Martin

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The dissertation is approved by the following members of the Final Oral Committee:

Constance Steinkuehler, Associate Professor, Curriculum and Instruction
Kurt Squire, Associate Professor, Curriculum and Instruction
Catherine Compton-Lilly, Associate Professor, Curriculum and Instruction
Rebekah Willett, Assistant Professor, Library and Information Studies
James Paul Gee, Professor, Education

Abstract

Information is ubiquitous in today's digital world, and the creation and application of a personal "crap detector" (Hemingway in Manning, 1965; Rheingold, 2011) is imperative to be effective in the information universe. The knowledge communities for online video games offer a place for studying informal and interest-driven learning, as well as the development and use of crap detectors. This study explores the information literacy practices that take place in the c*onstellation of information*, which is the in-game and out-of-game information resources, of the massively multiplayer online (MMO) game *World of Warcraft* (*WoW*).

The dissertation builds a picture of the information literacy practices from the individual to the collective intelligence and offers a new perspective on how information literacy can be employed to create a better educated populace. It illustrates that at any level these affinity spaces encourage collaborative information literacy practices. The individuals through information horizon maps orient themselves toward the information and community available depending on play style and level of expertise. The use of community created resources like knowledge compendiums and the use of the collective intelligence of the community through forums and chat logs traces the individual and their contact with the group. The group interactions of the chat logs and forums demonstrate the information literacy practices used between members of the community. Then the collective intelligence of the community underlines the accuracy of answers given in the community created resources. The significance of this work, beyond studying information literacy in a new setting, is that it identifies the visible information literacy processes of community using frameworks developed from the literature but grounded in data.

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Dedication

I dedicate this thesis to my partner, Arnold,

whose talents are endless and love is enduring.

TABLE OF CONTENTS

INTRODUCTION

Information is easier to access than ever before. You find it everywhere you go: in your email, on the web, on TV. But how do you know what is good information and what isn't? Crap detection is one way of thinking about it. How often has this happened to you? You are going about your day and you come across something that makes you say "I wonder..." So you pull out your mobile device or go to your computer to access the cloud and start looking for information. Where you end up is the information universe—a nearly infinite sprawling web of choice, filled with dead ends, garden paths, and snake pits. It is also filled with the information you are looking for, if only you could find it. While searching, it is easy to make a wrong turn, or be lured down a rabbit hole. There is a combination of misinformation, superfluous distractions, and the information you actually need. More often than not it is hard to see the forest for the trees. With all the diverse information sources, before you know it you can become lost, lost on a sea of information. It can be difficult to get your bearing and navigate to your destination. How do you find your way? What sort of landmarks do you traverse by, or what sort of orienteering skills can you use in this landscape? Crap detection is one part of finding information. Howard Rheingold has been sharing his extension of Hemingway's (Manning, 1965) idea of crap detection on his blog, in presentations, and in the classes he teaches at Stanford and University of California-Berkley (2011). Crap detection is part of a larger set of practices known as information literacy.

Information literacy, although traditionally studied from the field of library science and within traditional institutional settings like libraries and schools, needs to be studied from a broader perspective. It is not merely important to students, librarians, and academics; instead, *all* people need to understand how to find and evaluate information. Information literacy can be seen as a variety of

practices ranging from the individual to the collective intelligence of a group. Information literacy is critical for active and informed participation in everyday life.

In this dissertation, I explore and challenge information literacy through the development of a new coding framework. This framework is developed from an analysis of information literacy literature covering a broad range of definitions and standards, including those created for K-12, university, and general library/information use, particularly focusing on those most influential and most used. To demonstrate this framework in action, I use it to code synchronous and asynchronous chat data from an affinity space. This data comes from the massively multiplayer online (MMO) game *World of Warcraft* (*WoW*) affinity space. The affinity space around *WoW* was chosen because at the time of data collection it had not only the largest population of any MMO, but also a vibrant and active community outside of the game. Research exploring information literacy practices in a space such as this has only been published in one previous study, which was conducted by Martin and Steinkuehler (2010). All of the previous research on information literacy has been developed for institutional settings (American Association of School Librarians (AASL), 1998; American College Research Libraries (ACRL), 2000) and keeps a strict (and artificial) division between academic/work information seeking and that which people do in their "everyday" lives (Agosto and Hugheshassell, 2005; Savolainen, 2008).

I develop this framework to call attention to the disparate and hitherto un-recognized elements of information literacy, and to position information literacy broadly such that people are recognized as being able to translate their practices across contexts (e.g., from work to everyday). This dissertation looks at an ecology of information literacy processes that encompass the positioning of individuals to the constellation of information, the information literacy processes of groups, and the information literacy processes embedded in the collective intelligence of the community. This global theorizing of

information literacy offers a new perspective for research that better illuminates actual practices, creates a new descriptive information literacy framework, and finally does justice to the easily overlooked and undervalued information literacy practices and collective intelligence that occur around videogames.

Theoretical Overview

Naturalistic studies have previously been conducted in online affinity spaces, including MMOs, that focus on informal scientific reasoning (Steinkuehler & Duncan, 2009), online fan fiction (Black, 2007a, 2007b, 2008), mathematics (Steinkuehler & C. Williams, 2009), literacy practices in transnational contexts (Lam, 2009), and other areas as well. These previous studies all highlight the collaborative and social nature of these spaces. Gee (2004) describes two characteristics of affinity spaces that are especially apt when examining information literacy in these spaces: the use of specialist language, which is important for knowing what information you are looking for; and the use of distributed and dispersed knowledge, which is important for accessing information about a given affinity space.

Online affinity spaces can be considered a third space, a place where people meet to socialize outside of places like work and school (Steinkuehler, 2005). The interactions in these online social spaces involve direct engagement of the affinity space, as well as social interaction with fellow participants. These spaces act like levelers, allowing groups of people of different ages and backgrounds to come together and put their differences toward the back, foregrounding the activities of the space and mutual interests. Such foregrounding is one of the crucial aspects of affinity spaces, as the common endeavor brings people together. Social interaction is the main activity between the player and the affinity space (Steinkuehler, 2005). An affinity space, like *WoW*, for many becomes a home away from "home", where the player plays regularly and their absence is noted and remarked upon by others, and

where participants can become “regulars” or recognized staples of the community (Steinkuehler, 2005). Such recognition is just one of many routes to participation in affinity spaces, and at the other end of the participation spectrum, a player can choose to remain completely anonymous and have no one recognize that they have come and gone. Consequently, sociality and participation are self-selected in affinity spaces, with each individual deciding what level of visibility, activity, and contribution they want.

Affinity spaces are inherently social and inherently connected. Steinkuehler and Duncan (2009) describe the collective work that the community undertakes in order to accomplish a variety of tasks, using skills like argumentation and scientific reasoning to fulfill their information needs. Such collective intelligence is not the idea of single-mindedness like the Borg in *Star Trek* (which Levy (1997) would also say is not collective intelligence), but instead is collaborative and requires social knowledge construction and negotiation between the participants. Collective intelligence can be seen as every individual *being* culture: not a part of the culture, but the culture itself. The individual, although vastly important for input and ability to reason, is, at the same time, more. Participatory culture is a necessary ingredient for the creation of collective intelligence, as it has low barriers to artistic expression and civic engagement, with strong support for creating and sharing one’s creations with others. Furthermore, such spaces include information mentorship, where what is known by the most experienced is passed along to novices, where participants believe that their contributions matter, and where participants feel some degree of social connection with one another (Jenkins, 2009). Without a participatory culture, there is no contribution by individuals, and therefore the distributed network of people that creates a collective intelligence does not come to fruition. Levy (2001) in particular views it important to recognize that participation in cyberculture creates more effective collective intelligence implementations and an accelerated rate of “technosocial change” (p. 11).

Information around affinity spaces happens with no boundaries or order, but in a space that is continuous in all directions. A user in an MMO, for example, is not limited by the position of their avatar in the world in terms of access to information, but instead has access to all the information of the world that they wish to seek. A player's access to information and the knowledge of the collective intelligence is constantly available, whether she is at level one or at level cap. Interconnectivity, the creation of virtual communities, and collective intelligence, moving from simple to complex, have been the driving force behind the development of cyberspace, allowing for a naturalistic creation of structure on top of the entropy of unfettered activity (Levy, 1997). Collective intelligence, more than artificial intelligence, has mobilized the use of technology and brought together creativity, skills, the effective use of time, and the vast interests of people.

The significance of this work is that it takes data collected naturalistically and drills down into the information literacy practices implemented in online affinity spaces. Information literacy encompasses both individual and group practices, and is explored at the individual and community level. For example, an individual has the option to participate with the constellation of information (i.e., the information available in and around an affinity space) at a peripheral level, accessing the asynchronous resources in a passive way by reading wikis and forums and not actively participating in the creation of wikis, discussions on forums, or asking questions through synchronous chat. Depending on an individual's level of participation and their player identity (e.g., whether they consider themselves social, whether they only consider people they know as trusted resources, whether they consider themselves an expert, etc.), they can demonstrate a wide variety of information literacy practices.

The group practices also vary depending on context and format. For example, information literacy practices for synchronous *WoW* in-game chat are different from the asynchronous forum

context because the format of chat is fast paced and the community culture deems it impolite to ask long and complicated questions in chat. In sum, information literacy practices in online affinity spaces are social in multiple ways, with individuals and the group playing multiple roles: people as the source of information, people as norming agents into some information literacy practices and not others, people as designers of information resources (authors of posts, for example), and people as making up collective intelligence, wherein there is impetus or pressure for developing highly differentiated knowledge. Information literacy is more than just the sum of individual skills: it is a set of practices that are learned and altered by each individual, as well as the culture of each group to fit the given needs.

Research Questions

Through this study I will explore and describe information literacy in affinity groups by examining the research question: What are the forms of information literacy practices engaged by participants in by an online affinity space? Specifically:

SubRQ 1. How do players situate themselves within the constellation of information available around their affinity space? [Chapter 2]

SubRQ 2.How are information literacy processes practiced in the community? [Chapter 3]

SubRQ 3. Does collective intelligence happen in these affinity spaces? [Chapter 4]

Information literacy and affinity spaces are both terms used in the research questions and consequently need to be operationalized. Information literacy is defined and operationalized as the intellectual process of recognizing the need for information to solve a problem or issue regardless of setting, and working through the process in a manner that arrives at information that fulfills the given need to the satisfaction of the seeker. Affinity space is being operationalized as a place to gather with others who share common interest and through these interests participants develop knowledge, literacies, communication skills, and many others learning pursuits in the quest for information or to solve a problem as a group, based on Gee's (2004) original definition of affinity space.

Research Question	Data	Analytic Method

SubRQ 1 Players perception of information literacy in context	Information Horizon Maps & Structured Interviews	Analysis of Maps and structured interviews, using method based on Sonnenwald (1999)
SubRQ2 Information literacy processes in practice	Chat logs and Forum Posts	Coded using analytic framework
SubRQ 3 Degree of accuracy of information when using collective intelligence of community	Forum Posts	Compare to Wikis to check degree of accuracy information given in real time

Table 1: Sub-Research Questions, Data Type, and Analytic Method

CHAPTER 1:

Literature Review

Introduction

The communities that exist around online activities, especially video games, have been shown to be sites of high level intellectual activities (Steinkuehler, 2007, 2008; Malaby, 2006; Chen, 2011). Many forms of intellectual activity have been found in these informal spaces, like literacies and scientific thinking (Martin & Steinkuehler, 2010; Steinkuehler, 2007, 2008; Steinkuehler & Duncan, 2009). MMOs have been studied as communities that promote learning and literacy. Game communities produce vast amounts of information in a variety of formats, including knowledge compendiums, forums, game walkthroughs, information on specializing characters, etc. Information is also available to the community synchronously and asynchronously, and in various modalities, such as video, text, images, etc. With all the available information, it can be difficult to know what information is useful, what is not useful, and what information is bad. Ernest Hemingway said in 1965 that we all need a built-in crap detector so we can ferret out useful and non-useful information (Manning, 1965). He felt that education was the path to this crap detector, and I further assert that information literacy is the personal crap detector necessary to traverse the path of learning. Recently, Howard Rheingold (2009) brought the concept of *crap detection* back into the spotlight. Rheingold feels that crap detection is a necessary and basic practice for the 21st century. Critical thinking, another 21st century skill (Partnership for 21st Century Skills, 2009), is the basis of any process that includes determining what information is useful and not, such as crap detection, but it "is not always sufficient in itself as a strategy for navigating through the information universe" (Catts & Lau, 2008, p. 396). As access to information has improved through the spread of technology, the exploration of people's use of information has not kept pace with the variety

and ubiquity of information (Bundy, 2004). John Seeley Brown, along with Lang Davison and John Hagel, describe what they refer to as stock and flow of knowledge (2002). In other words, people need to continually refresh their stocks of knowledge by interacting with new flows of knowledge. Flows of knowledge can include transfer, or creation of knowledge with other individuals, which is fundamental for both individuals and institutions in all contexts and situations. I see information literacy as a tool to help people think critically about the information that they come across in their daily lives and make informed decisions, including in their online leisure spaces.

People use a variety of mechanisms to make it through the information they encounter every day. Information literacy is critical to successfully navigating the information landscape (Partnership for 21st Century Skills, 2009). Information literacy, though, is more than just a set of skills, it is a literacy, a mark of learnedness, which is essential for a person to find and use information successfully in all life situations, be they work, academic, or leisure (ALA, 1989; Clausen, 1997; Rader, 1995). However, the current state of information literacy as portrayed by the literature is limited in scope, focusing on institutional settings and standards and leaving a gap in the research in naturalistic and digital settings. The importance of information literacy is seen not only within the community studying it, but also by the public and government officials. Clive Thompson in a recent *Wired* article stressed the fact that students are not successful when searching for information in school-based tasks (Thompson, 2011). President Barak Obama declared October to be National Information Literacy Month in 2009, and information literacy has also been a focus of UNESCO (United Nations Educational, Scientific, and Cultural Organization) (Catts & Lau, 2008), both of which emphasize that people lack the skills to find the information they need. What if the problem here is not lack of skill? What if the problem is in the contexts? People, including youth, are able to find information in their leisure spaces (Martin &

Steinkuehler, 2010). The shift in context of information literacy studies from institutional environments to leisure spaces requires a shift in definition and in application. The following explores the current research on information literacy and online affinity spaces, and their potential overlap.

Information Literacy

The term information literacy was originally coined by Zurkowski in a government report in 1974 compiled for the National Commission of Library and Information Science. Zurkowski offered no concrete definition of what information literacy *is*, but described it as "people trained in the application of information resources to their work" (p. 6). Even though Zurkowski offered very little in defining information literacy, he stated at the end of the report that the Commission should establish a national program to achieve what he called "universal information literacy" by the year 1984 (p. 27). Considering that the report lacked a definition for information literacy, did not define or create parameters for instruction of information literacy, and did not describe how to recognize successful information literacy when demonstrated by a person, the goal of universal information literacy in ten years was quite unrealistic.

The first major definition of information literacy in the United States was in the American Library Association (ALA) Presidential Committee of Information Literacy (1989) report. The report stated that "to be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (para. 3). These three abilities have become the basis for most other information literacy definitions and standards (e.g., Clausen, 1997; ACRL, 2000). To be an information literate person, according to the report, one must engage in *learning how to learn*, which is supported by information literacy, and such skills will create lifelong learners who are informed and prepared individuals, with the authors suggesting that education

needs to be reformed around a “learning-learning” model. This model would be a mixture of resources from the “real world” and active integrated learning, which help to make the students interested learners.

Clausen (1997) built on the definition of information literacy developed by the ALA Presidential Committee on Information Literacy (1989), pushing back on the notion that information professionals were automatically considered information literate even though they may not have mastery of information systems, like the internet. This critique is answered by a set of information literacy standards. The American College Research Libraries (ACRL) (2000) standards were also based upon the ALA definition of information literacy (1989). The ACRL standards expanded the ALA definition and gave a list of competencies that an information literate person should possess:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one’s knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally (p. 2-3)

The standards stated that, “gaining skills in information literacy multiplies the opportunities for students’ self-directed learning” (p. 5). The ACRL (2000) standards have become canonical in the literature of higher education and information literacy and were used as a basis for many studies in the area of library and information science. However, Owusu-Ansah (2003) makes the point that the ACRL

standards reached neither librarians nor faculty effectively, and has consequently been restricted to the realm of academia.

Bundy (2001), in an white paper for the first national roundtable on information literacy held by the Australian Library and Information Association, described an information literate person as someone who has "learned how to learn," (p. 1) reiterating the ALA report (1989). Bundy created a list of attributes based on the ACRL standards that he assigned to an information literate person, adding the below three to the above list of ACRL standards:

- Recognize a need for information
- Classify, store, manipulate, and redraft information collected or generated
- Recognize information literacy as a prerequisite for lifelong learning

Bundy's also focus on efficiency, which was his main addition to the information literacy definition built upon the work by ACRL (2001; but see also SCONUL (Society of College, National and University Libraries), 2003; Lowe & Eisenberg, 2005; Doyle 1992). Information literacy provides a higher level of efficiency in the person's private and professional life, according to Bundy (2004). He adds the following two criteria: that an information literate person must be able to use information and knowledge for participative citizenship and social responsibility, and to experience information as part of independent learning and lifelong learning (see also Lau, 2006). Bundy also suggested that information literacy practices manifest in multiple levels of mastery, moving beyond keyword selection (the simplest level) to extended synthesis (the most complex level). Bundy argued that critical elements of learning were necessary to become information literate, such as: (1) experiencing information literacy (learning); (2) reflection of experience (being aware of learning); and (3) application of experience to novel contexts (transfer of learning).

Candy (2002), in his document prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy tied information literacy more strongly to learning than any previous definition. Candy listed several aspects of society which support "new learning" (p. 3) and new literacies including the effects of new technologies, globalization, changing patterns of work, alterations in family and community relations, and finally, an explosion in available information. He also broke down learning into three types: formal, nonformal, and informal; with traditional definitions of information literacy applying to the formal and nonformal, but proving to be incompatible with the vast and varied informal contexts.

Bruce (1997) described an information universe and the process by which changes in this universe have led to the conception of information literacy. There are three distinct information universes which she divided into "the universe of everyday information, comprising natural communication networks; the universe of scholarly knowledge, including natural and designed communication networks; and information storage and retrieval systems, comprising designed and rational communication networks" (p. 3) and stated that in order for people to be efficient in their personal and professional lives they need to be effective in the "ever changing information environment" (p. 3). Bruce advocated for a non-skills based approach to information literacy, emphasizing that to be information literate a person must also draw on their experience and discourse. Bruce (2004), in a white paper for UNESCO described information literacy as "conceivably the foundation for learning in our contemporary environment of continuous technological changes" (sect. 1, para. 2), and combined a set of other models and standards (Eisenberg & Berkowitz, 1990; Doyle, 1992; Bruce, 1997; AASL, 1998; ACRL, 2000). This combination of models and standards into educational

components has helped create an educational approach to information literacy that could be implemented in academic library instruction programs and in-classroom instruction.

Edwards (2006) based her definition of the process of information literacy on that of Bruce (1997), stating that information literacy is the ability to effectively use information found through information resources. Edwards focused on *information searching*, which she describes using a model that has four categories: (1) Looking for a needle in a haystack (search topic); (2) Finding a way through a maze (topic & search process); (3) Using the tools as a filter (search tool structure); and (4) Panning for gold (information quality). Her research emphasizes personal and community empowerment, as she states that "we may be unable to provide access to technology for those who do not have it, but we can empower communities of learners that do not have access, through information and technology literacy" (p. 9). The goal of this information literacy definition includes creating equity by attempting to ensure that everyone has equal access to information by providing them with the appropriate means through education. Information literacy is viewed as intrinsic to lifelong learning, and important to entire communities.

The American Association of School Libraries (1998) developed a set of standards and indicators for education and information literacy. Their standards for K-12 students for information literacy are as follows:

> **Standard 1**. The student who is information literate accesses information efficiently and effectively
> **Standard 2.** The student who is information literate evaluates information critically and competently
> **Standard 3**. The student who is information literate uses information accurately and creatively
> **Standard 4**. The student who is an independent learner is information literate and pursues information related to personal interests
> **Standard 5**. The student who is an independent learner is information literate and appreciates literature and other creative expressions of information

> **Standard 6**. The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation
> **Standard 7**. The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society
> **Standard 8.** The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology
> **Standard 9**. The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information

This set of standards moved beyond information literacy as a skills-only set, adding standards and indicators for independent learning and community engagement.

Catts and Lau (2008) took a different tack, moving away from the individual perspective of information literacy standards and indicators. They outlined five elements of information literacy that reflect the basis for many definitions of information literacy: (1) recognize information needs; (2) locate and evaluate the quality of information; (3) store and retrieve information; (4) make effective and ethical use of information; and (5) apply information to create and communicate knowledge. Parts of these elements have been seen in nearly every other information literacy definition, but Catts and Lau suggest assessment indicators that focus on the population, measuring information literacy practices at the aggregated level, and not the individual.

Information Literacy Issues

There are several issues that are commonly associated with information literacy research. Webber and Johnston (2000) laid out issues with the skills list of information literacy like those in the ACRL standards, just as Bruce (1997) and Maybee (2006) have. The skills list can lead to a check-the-box approach to teaching and assessment, as well as not supporting successful transfer. VanLeer (2006) noted that this type of approach can cause superficial engagement, and used the example of MMOs as

an 'information pull', an opportunity that encourages players to find helpful information. In contrast to MMOs, the author classified online library tutorials as an 'information push'. VanLeer felt that *World of Warcraft* was an example of an effective implementation of the ACRL standards, and made the observation that what library tutorials were missing was an element of fun. However, creating a game to teach information literacy is not the same as an information literate person seeking information around a game, or developing information literacy in order to improve performance in an activity he is interested and engaged in. The difference, as will be discussed later, is between authentic or imposed information needs. Bush (2006) offered that information literacy should be assessed at multiple levels, like basic, proficient, and exemplary, and was also interested in the effect of a person's information literacy practices on their community, and vice versa. Mackey and Jacobson (2011) discussed the issues of reframing information literacy under *metaliteracy*, trying to locate similarities between many different literacy studies so that a framework could be developed to incorporate all literacies at once. As information literacy requires higher order thinking in a collaborative environment, Mackey and Jacobson mark it as a metaliteracy. The full framework of metaliteracy in online social spaces was built on existing definitions of information literacy, but Mackey and Jacobson did not offer evidence of the framework being implemented.

Information Seeking

Information seeking as a subset of information literacy has created many descriptions of the phenomena, and as many ways of studying it (see also Krieklas, 1983; Ellis, 1993; Ellis, Cox, & Hall, 1993; James, 2006; Heinstrom, 2006; Foster, 2006; Hjørland, 2000). Information-seeking behavior as defined by Krikelas (1983) is "an activity of an individual that is undertaken to identify a message that satisfies a perceived need" (p. 6). Large, Nesset, & Beheshti (2008) divided the information needs of children,

defined as those under the age of 12, into two categories: that of leisure and education (although I would use the terms *self-determined* and *imposed*, respectively). They found that children prefer browsing over searching in the catalog and that browsing physical materials still plays an important role in their information seeking. Children did not view search results as directly responding to their search terms, and often repeatedly tried the same set of keywords (i.e., using a set of keywords, not getting good results, and then using them again) (Chelton & Cool, 2004). This also limited the children's ability to narrow and broaden searches. Middle school students showed improved performance on information seeking tasks when they were self-generated, not assigned (Bilal, 2002). High school honor students reported that they usually searched for information when they needed it but sometimes did not. They gave a variety of the reasons for this lack of pursuit, including the assignment being low priority, time constraints, or procrastination/denial in terms of completion of the assignment (Latrobe & Havener, 1997, p. 191). As can be seen in these previous studies, the development from browsing to searching would match the development of vocabulary and breadth of information exposure that would occur between elementary and high school.

There are several other forms of information seeking that are worth mentioning. Multitasking information seeking and searching processes as defined by Spink, Ozmutlu, & Ozmutlu (2002) is "the process of searches over time in relation to more than one, possibly evolving, set of information problems" (p. 640). Everyday information seeking is traditionally considered separate from information literacy because information literacy is situated in education or workplace settings. Everyday-life information seeking (ELIS) focused on the idea that a person will employ a variety of information practices depending on information needs and what the situation requires (Savolainen, 2008; Agosto & Hugheshassell, 2005; Davenport, 2010), often employing two very common strategies: "good enough"

and “read the best and skip the rest” (Savolainen, 2008, p. 203-204) to determine when they have reached the end of their search. Browsing and “berrypicking” is a method for information searching for online databases and a subset of information literacy (Bates, 1989). Bates asserted that real search strategies use a combination of strategies, and recent work has born that assertion out, finding that information literacy is not a linear process (Martin & Steinkuehler, 2010).

Kuhlthau (1993) presents a constructivist view of learning as a theoretical framework for the information seeking process, using sense-making tasks as the underpinning for the construction of information seeking (Dervin, 2003). Solomon (2002) characterizes information as “being constructed through involvement in life’s activities, problems, tasks, and social and technological structures, as opposed to being independent and context free” (p. 229). Williamson (1998) studied the incidental information discovery of older adults, in which the author found distinctions between a person being informed unexpectedly and a person actively seeking information.

Online Reading Comprehension

Online reading comprehension is a part of literacy studies, and as the name implies it is the study of how people read and comprehend online reading materials. Although there is not yet a direct connection in the literature between information literacy and online reading comprehension, they are very closely related. For example, Leu et al. (2001) viewed online reading comprehension through the lens of new literacies, framing online reading comprehension as problem-based inquiry, which means that online reading comprehension requires new skills, strategies, and dispositions on the internet. These new skills, strategies, and dispositions allow the user to create questions, which she then uses to locate, critically evaluate, synthesize, and design and communicate possible solutions (p. 3), a process

that is strikingly similar to many definitions of information literacy. Leu and Zawilinski (2007) reaffirmed the list of skills needed for online reading comprehension by determining there were five major functions of online reading comprehension:

1. Developing important questions
2. Locating information
3. Critically analyzing information
4. Synthesizing information
5. Communicating information (p. 2)

Here again, information literacy definitions and standards, like the ACRL (2000) standards, nearly line up point for point on how one should properly employ information literacy. The online reading comprehension definition align with the following ACRL standards: determine the extent of information, accessing information, focus on evaluation, incorporate information, and use information. The only thing that ACRL standards include that is not a major function of online reading comprehension is the standards focus on respecting copyright.

Information Literacy Discussion

This review reveals limitations in scope and research methodology within the field of information literacy. First and foremost is the overwhelming number of definitions and standards, often with similarities but constantly altered to encompass the nuances of each situation. Secondly, very few of these definitions or standards are based on evidence about people engaging in the practices of information literacy, and are instead based on the expertise of professionals. Consequently, while these frameworks could describe how information professionals enact information literacy, they may also

create unreasonable expectations and rather unnecessary thresholds for most people's information seeking, particularly novices. Third, the separation of information literacy between imposed (work and school) and self-determined (e.g., affinity space) information seeking makes little sense. For example, does it take different abilities to find an article in the New York Times archives that you would choose to read for pleasure, to search for an article on Google Scholar or a library database for work-related research, or to look up information about increasing effective damage rates within *World of Warcraft*? My position is no, as the information literate person should be able to navigate between all three spaces. And what about someone like a games researcher who plays games: how do you decide what actions constitute information literacy that are related to work or school, and what is everyday information seeking having to do strictly with personal information needs? For this (hypothetical) person, researching *WoW* falls under the categories of work, school, *and* personal. Fourth, there are many subsets and offshoots that could be synthesized back under the umbrella of information literacy if a definition or theory were created that accounted for information seeking in multiple situations. Finally, the definitions and standards tend towards rigidity and are unable to account for the true complexity of the process of solving an information need. The developers of standards worked to develop a coherent and homogenized view, but doing so may have actually set a confusing and unrealistic ideal. Consequently, I posit that the standards format is not the best fit for information literacy, particularly because the situations in which information literacy is employed are not uniform, and standards should be used for assessment not for learning (Bowker & Star, 1999). Lamplan (2009) stated "to standardize an action, process, or thing, means, at some level, to screen out unlimited diversity. At times it may mean to screen out even limited diversity" (p. 13). To date there are few models that reflect what

actually happens in information literacy practice and what makes someone information literate, and Lamplan's warning is additional motivation for developing a better account and model.

Let me be clear that, as discussed earlier in this paper, information literacy is more than just a set of skills, like library skills (Bawden, 2001). Information literacy has a broader area of competence, moving beyond formal classroom settings and into the realm of lifelong learning (Bruce, 1997). It requires reflection and self-knowledge as well to be successful (Ward, 2006). Information literacy is necessary for informed decision making in all walks of life, helping a person to be a more informed citizen as well as making personal decisions. Information literacy, especially as it has developed around digital technology, can also be considered a part of the "new" literacy family (Gee 1996), being that information literacy requires interpretation and allows for the creation of "meaningful content" (Knobel & Lankshear, 2007). Considering information literacy a new literacy is a reasonable choice as it is more than a checklist set of skills, and it takes interpretation and content creation to be able to call oneself information literate.

Campbell elaborates the issue with standards based information literacy definitions, noting that when people's information literacy proficiency end up rated on the same grounds as standards set by professionals in higher education, many people are considered to be information illiterate. She called for a more comprehensive view of information literacy that focuses on critical thinking and awareness of information, as opposed to a tools based approach. This is a holistic approach to information literacy that is a possible different path to explore for future research. Bruce (1997) rejected the idea that studies should be done after the fact to justify unresearched definitions for information literacy. Her rejection of this method was based on the fact that information literacy "involves being able to learn and relearn in the face of constant change" (p. 39), and spending valuable research time justifying

previously unresearched definitions, instead of creating new ones, seemed counter-productive—like trying to learn an out-of-date technology. In Chapter 3 I develop an analytical framework from this literature review that will be used to analyze forum and chat logs in that chapter. These data come from the constellation of information created in the affinity space of *World of Warcraft.* Affinity spaces are explored below.

Affinity Spaces

Affinity groups and online communities offer support through groups of peers interested in a wide variety of interests and a wide range of expertise. Lave & Wenger (1991) emphasize that understanding informal contexts for learning is crucial to advance educational theory and practice. People come to these spaces with interest in a particular topic from a variety of backgrounds, and the structure of the spaces allow people to create and share information or seek help from others in the community. Julia Davies notes that online affinity spaces are embedded in people's lives, primarily because people find these communities to be compelling and enjoyable to the point where the learning that takes place in affinity groups surrounding online spaces like wiki and fan fiction communities enables participants to reconfigure the way they see themselves (2006). Culture and "society exists through a process of transmission quite like biological life" (Dewey, 1916); this combination of leisure space and commitment to topic create a rich environment deserving of further research.

Educational Virtual Worlds

As a note, there is a vast array of literature regarding designed online learning spaces. These spaces, like *Quest Atlantis* and *River City* are collaborative spaces just like *Wikipedia* or *World of Warcraft,* except that they were intentionally designed as educational environments (Barab, Arici, &

Jackson, 2005; Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Ketelhut, 2007; Ketelhut, Dede, Clarke, Nelson, & Bowman, 2007). Such intent stands in contrast to *Wikipedia and World of Warcraft* and its information sphere of external sites, in which learning has been shown to occur naturally (Black & Steinkuehler, 2009; Martin & Steinkuehler, 2010; Steinkuehler, 2007; Steinkuehler & Duncan, 2009; Steinkuehler & King, 2009). The exploration of research into designed spaces is outside the scope of this paper and therefore designed collaborative online learning spaces will be excluded from the discussion.

Discourse and Affinity Spaces

The individual and his interaction with culture is a major part of affinity spaces and online communities, since without interactions between participants, the spaces would not exist. Discourses (with a capital "D") have distinct modes of communicating, orally and in writing, as well as through behavior (Gee, 2008). The framework of Discourses serves to describe the culture of a group, and what an individual has to do to be recognized as a certain type of person, the recognition of which requires interaction with the community or social group through apprenticeship and enculturation. Steinkuehler (2008) theorized MMOs as a Discourse which allows for the exploration of meaning-making, explicates interactions within the space and relationships, and helps to distinguish practices that create the Discourse from those peripheral to it. The theory of Discourse used within the context of affinity spaces creates a bidirectional influence, meaning that an individual can interact with and become enculturated in an affinity space but that the individual also has the ability to change the social norms and expected behaviors that make up the culture of the affinity space.

Affinity Spaces and Communities of Practice

Affinity spaces diverge from the model of communities of practice laid out by Lave and Wenger. Instead of focusing on the people and the idea of membership into a community, Gee (2004) asserted that focusing on the space was a better way to capture the phenomena without assigning people to groups. He discussed the limitations of communities of practice as used for learning, and although he acknowledged that the theory of communities of practice had allowed for the exploration of learning in ways that are unique, the term community carried with it many assumptions. The two main issues that surround the term community are that of an implied level of connectedness between members, which members may or may not feel, as well as a sense of stability and rigidity within the group, which may be appropriate for physical communities where few members come and go over time. However, the freedom of a digital space, if the theory is applied there, allows for people to enter and leave groups at their will, offering as wide of a range of options to a person as they are interested or willing to explore (Gee, 2004). The main problem, according to Gee, with the idea of communities of practice is that it can appear that the researcher is assigning people to a group. Approaching an area or site as a space and not a community allows the attention to fall on the activity of the place instead of the people, which helps to avoid the sticky situation of labeling people.

From the problems concerning communities of practice that Gee (2004) illustrated in *Situated language and learning: A critique of traditional schooling*, he offered the idea of affinity spaces in its place. Affinity spaces are informal learning environments and function differently than formal educational systems. Gee (2005) gives a list of attributes that describe an affinity space.

Features	**Description**
Common endeavor, not race, class, gender, or disability, is primary	People relate to each other because of common interest.

Newbies and masters and everyone else share common space	People of all skill and experience levels interact and participate together
Some portals are strong generators	These spaces allow for peer-production of resources
Internal grammar is transformed by external grammar	The conversation of participants on forums, etc. can create changes in the original activity (in the case of this dissertation that would be changes in *World of Warcraft*)
Encourages intensive and extensive knowledge	Participation in these spaces requires specialized and general knowledge
Encourages individual and distributed knowledge	These spaces encourage both the development of knowledge used by an individual as well as the use and participation in knowledge held by the group
Encourages dispersed knowledge	These spaces encourage the use of knowledge from multiple sites to facilitate participation
Uses and honors tacit knowledge	These spaces recognize knowledge someone has developed from experience as legitimate
Many different forms and routes to participation	People participating in these spaces have many avenues through which to conduct their participation
Lots of different routes to status	People participating in these spaces have many avenues through which to develop status within the group
Leadership is porous and leaders are resources	People can be leaders and followers in different aspects of the community

Table 1: Affinity Space Attributes (p. 225-228)

The enactment of these attributes is often seen in online communities. These informal learning environments are mutable, experimental, and quick to respond to the needs of the learner, whereas formal learning environments are invariable, conservative, and focused on averages instead of individual learners (Gee, 2005).

New Literacies

Lankshear and Knobel (2007) described literacies that interact heavily with technology as new literacies. In order to be called a new literacy, the literacy needs to encourage participation, distributed expertise, collective intelligence, collaboration, dispersion, sharing, innovation, experimentation, creativity, information sharing – as opposed to broadcasting, and the creation of self-made products – like machinima, remixes, wikis, etc. Steinkuehler, Black, and Clinton (2005) expound on the idea of affinity spaces and the Discourses within them by observing the literacies enacted within them. This article describes literacy from three perspectives. Viewing literacy as a tool, a fan fiction website would offer a typology of information exchange and social interactions (Steinkuehler, Black, & Clinton, 2005). Literacy functions as a place within and around MMOs, while participation in an MMO is participation in a "multimodal and digital textual place" (p. 98). Affinity spaces described by a literacy perspective would include principles of commitment to inclusion, collaboration, and participation, and offer a model of what successful performance looks like, with guidelines to the participants, and support for novices from experts.

Black (2007a) added the idea of social construction of space in virtual settings, stating that social practice, language, and literacy play a role in the "discursive construction and maintenance" of online fan communities (p. 384). This approach helps to draw attention to how language and discourse have the potential to change and define social spaces. The bidirectional flow of information in these affinity spaces is what develops the strength of the space and its attraction to participants. As Black illustrated, the learning opportunities in online affinity spaces gives the affordance of learning outside of the classroom in ways that "will facilitate student knowledge of multiple modes of meaning making, access, participation, affiliation, learning, and success in a globalized, networked society" (p. 395).

Fan Communities

Black (2007b) and Black and Steinkuehler (2009) continued this idea of fan communities functioning as affinity spaces. Black and Steinkuehler (2009) noted that fan communities refrained from using the term *adolescent* unless absolutely necessary because in the online fan fiction sites, the role of the expert is often taken on by younger participants in the group, and consequently, they conclude that expertise plays a more significant role in these communities than age. These expert participants, although younger in physical age, often have greater experience with the pop culture content material and with writing fan fiction, and consequently, give feedback based on their expertise. On sites where writing and critical response are main activities, like fan fiction sites, the participants of the affinity space are able to improve their composition, proofreading, and editing skills, as well as develop the "metavocabulary" (Black & Steinkuehler, 2009) that is developed through the practice of professional writing. Black (2007) stated that the affinity space Fanfiction.net has participants using a variety of skills, including digital literacies that allow them to explore and problem solve writing and reading problems, with the participants of affinity space having a range of age and education levels. Sites like Fanfiction.net also allow for the users to have some control over their experience, being able to ask for specific types of feedback, as well as offer their original work in a fashion not always supported in other spaces. Participants have many opportunities to contribute both knowledge and content to affinity spaces, which is not an opportunity generally available in K-12 classrooms. Furthermore, the younger affinity space participants also have the opportunity to demonstrate expertise, which is rare in a student-teacher relationship or a formal educational setting.

MMOs and Affinity Space

MMOs are another type of virtual world that supports the creation and development of an active online affinity space, which functions as a third space – a place where people meet to socialize outside of work and school (Steinkuehler, 2005). The interactions in these online social spaces involve direct engagement of the affinity space both during in-game play and out-of-game activities. These spaces also serve as levelers, allowing groups of people of different ages and backgrounds to come together into a space where such differences are backgrounded, and the activities of the affinity spaces are foregrounded as the common endeavor that brings people together. Social interaction is the main activity between the player and the affinity space (Steinkuehler, 2005). Conversation is important for the enculturation of new participants, for players who need assistance, and for the maintaining and changing of social norms over time. Dmitri Williams (2006) conducted a naturalistic study that observed the social impact of the MMO *Asheron's Call 2*, determining that MMOs can cultivate a sense of good-will and helpfulness which may extend to the offline world. For many, an MMO becomes a home away from "home", where the player plays regularly and their absence is noted and marked upon by others.

Steinkuehler (2007) discussed the literacy practices of MMOs, using *Lineage II* as an example, and described the set of literacy practices as a constellation of literacies, a set of literacies that contains both in-game and out-of-game activities. These activities include being able to decode and use the in-game interface, use in-game chat and Voice over Internet Protocol, and access and participate in game-related fan sites and blogs, discussion boards, fan fiction and art, annotated game screenshots and cartoons, and wikis, as a selection of resources and activities (p. 302-3). The shared practices of this type of space allow for a variety of learning opportunities in literacies that affect both the participant's game practices as well as other literacy practices that can apply to a more broad set of activities. Along with

the previous literacies and activities listed above, participants use the "symbolic, cultural materials" (Black & Steinkuehler, 2009) available to create their own cultural worlds as affinity spaces.

Collective Intelligence in Affinity Spaces

In the digital age, the connectedness of individuals through digital communications and the instantaneous nature of those connections create a ready platform upon which collective intelligence can flourish. Collective intelligence, the pooled intellect between people to solve problems and create new information, can be seen as every individual *being* culture, not a part of the culture but the culture itself. Collective Intelligence as defined by Levy (1997) "is a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skill" (p. 13). Participatory culture is a necessary ingredient for the creation of collective intelligence. A participatory culture is one in which the focus is removed from the individual, and is shifted to the community, or collective (Jenkins, 2009), a depiction that describes my focus on affinity spaces quite well. Participatory cultures have low barriers to artistic expression and civic engagement, with strong support for creating and sharing one's work with others. Without the existence of a participatory culture, there are no contributions by individuals, and therefore the distributed network of people necessary to create collective intelligence does not come to fruition. Cybertechnology, defined as computer technology especially that which involves the internet or cyberspace, is what is needed to create the space required for collective intelligence and collaboration. Collective intelligence is created particularly effectively through cyberculture, which consequently serves to accelerate the rate of "technosocial change" (Levy, 2001, p. 11). Collective intelligence requires the participation of many interested individuals.

Levy (1997) focused on the potential importance of the resources of a network of people, especially in the context of online communities. Collective intelligence does not promote a cybernetic (or artificial) intelligence; instead, it encourages the development and use of communities of intelligence, of groups of people's social and intellectual potential. Collective intelligence relies on apprenticeship in the intellectual community, meaning that as queries are made in the affinity space and information is returned, one participant has actively taken on the role of the apprentice or learner and one or more have taken on the role of the mentor. Tapscott and Williams (2006) referred to a similar phenomenon in *Wikipedia* involving professionals and amateurs working together. This sharing of information creates a "circuit of exchange" and cultivates a "sociability of knowledge" (p. 11). The purpose of collective intelligence is "the mutual recognition and enrichment of individuals rather than the cult fetishized or hypostatized communities" (p. 13). Collective intelligence is based on the growth and development of individuals, not an amalgamation process where the thoughts and intelligence of all individuals are melted down such that no individual is distinguishable. The transition to collective intelligence is from *cogito* (I think) to *cogitamus* (we think); it is an awakening of many thinking for themselves.

Levy (1997) distinguished collective intelligence from any sort of singular intelligence by pointing out that collectivity does not equal solidity or uniformity, it is not mono-thought. Instead, the larger the number of intellects that one person is involved with, the larger the pool of knowledge to which the person has access. Shirky (2009) distinguishes the two by stating that collective intelligence is a social and not a hive mind (Shirky, 2009). These collective intellects develop ever-changing languages and construct virtual worlds and cyberspaces (p. 139), particularly for the purpose of the creation and navigation of knowledge (p. 118). The collective intellect is always working within a shifting and

changing information universe. The structure of the information universe is not an *a priori* structure, but is developed and changed by the collective intellect itself. Virtual worlds were a major focus of Levy (1997) as a place to see collective intelligence at work. He stated that, "virtual worlds will thus emanate collective intellects and depend for their existence on the human communities from which they arise" (p. 100). The creation of new tools will be necessary to create environments for "cooperative parallel processing of problems" (p. 61).

Information around virtual worlds has no boundaries or order but rather, exists in a space that is continuous in all directions. A user in a virtual world is not limited by the position of their avatar in the world in terms of access to information but instead has access to all the information of the world that they wish to seek, even if some information is not intellectually or conceptually understandable at the time (Levy 2001). Video games, especially MMOs, are good examples of virtual worlds, as a player's access to information and the knowledge of the collective intelligence is available from the beginning, and although probably not completely comprehensible to a novice, it is nonetheless available.

Information available in virtual worlds, like information available on the internet at large, is usually accessed through two methods. The first method is that of *hunting*, where the seeker looks for something in particular. The second method is that of *gathering*, where a person is just browsing around when they find useful or interesting pieces of information (Bates, 1989; Krikelas, 1983). Interconnectivity, the creation of virtual communities, and collective intelligence, moving from simple to complex, have been the driving force behind the development of cyberspace, allowing for a naturalistic creation of structure on top of the entropy of unfettered activity. Collective intelligence, more than artificial intelligence, has mobilized the use of technology and brings together creativity, skills, effective use of time, and the vast interests of people.

Jenkins (2009) saw collective intelligence function in what he calls *convergence culture* or the space where different types of media, digital and traditional alike, meet and mingle. To fully participate in a convergence culture a person needs five skills: (1) ability to pool knowledge with others in a collaborative environment; (2) ability to make connections across scattered pieces of information; (3) ability to share and compare value systems by evaluating ethical dramas; (4) ability to express interpretations and feelings toward popular fiction through a folk culture lens; and (5) ability to circulate works via the internet to share with others internet (p. 185). These bring together both information literacy and critical thinking skills and can be used for ends other than those of analyzing or building upon pop culture. Jenkins' five skills can create and support a critical citizenry, raise civic engagement, utilize collective intelligence to parse information, and organize and produce actionable activities. Through activities of interest and choice, people are developing and using abilities, many of which are information literacy practices such as being able to evaluate, determine trust, argue against, disseminate, and utilize collective knowledge. Such literacy practices are vital for lifelong learning, engaged civic participation, and the process of information literacy to navigate the vast information universe.

The rise of participation by people around topics of their interest has produced a vast array of tools that are used for collaboration (Shirky, 2009). These spaces of participation function because of the hybridization of the tools and community, with both the social group and the tools working to protect against vandalism. Wikis, in particular, are a good example of this. The social tools facilitate the collective action by allowing for the interaction and organization of people across great distances, and by allowing the social group to create systems to admonish people who have been behaving in a way that is contrary to the norms of the affinity space.

Affinity Space Discussion

Thomas and Brown (2007) discussed the connection that anchors learning in these spaces from a perspective that is a mixture of those offered above using MMOs, namely *World of Warcraft*, as an example. Play, Thomas and Brown stated, is a disposition toward the world. Online communities and online affinity spaces are for the most part leisure activities and many are "play". Disposition is important to the intersection of play and learning because it describes the attitudes or comportment toward the world, and dispositions do not serve as descriptions of events, but rather, explain the underlying mechanisms that engender events or practices (2007). An example of a player's disposition in the context of an MMO is a questing disposition, evidenced through the player's interest in finding, analyzing, and evaluating resources that are needed in order to complete a quest. The player's disposition motivates the player to utilize the resources of the online community or online affinity space in order to accomplish the task. Often the ability to evaluate and determine applicability of information comes from the interactions with the culture or affinity space. A novice has a more difficult time determining what types of information are needed in a specific situation, or determining the most likely place to look for those resources. Consequently, it is but through enculturation in the affinity space or community that a novice can gain useful information and evaluative abilities instead of spending tedious time learning the skills herself through trial and error.

The literacies that emerge out of the play of MMOs are linked to the agency allowed by the game space. The agency players have in games and the surrounding community or affinity spaces offers them the chance to affect change within the space. Another attribute to which agency is linked is coordinated action (Thomas & Brown, 2007), which is the collective ability of players to solve problems,

make plans, and function as a unit. Coordinated action is extremely important, especially around MMOs, as well as in many other affinity groups and communities, and a subtype, emergent coordinated action, occurs when players in a group are forced to function together without a predetermined plan (Thomas & Brown, 2007). For example, if a group happens upon an unexpected monster, they must function together on the spot. The successful overcoming of a such an unprepared for situation requires each individual to have an understanding not only of her character and her character's abilities, but also her character's role in the group, and the experience to enact that role without being explicitly directed. Sometimes these unexpected encounters are successful, but just as often they fail and offer the group a learning experience—at least if reflected upon by the players. Thomas and Brown offer that amalgamation of disposition, agency, and imagination as the basis for innovative thinkers.

Thomas and Brown (2009) continued this line of exploration in the paper *Why Virtual Worlds Can Matter*. Here they discuss why shared interests provide a reason to come together, which ties into the perspective of Discourse within an affinity space. An affinity space and Discourses exist solely because people with shared interests have come together to create the space. MMOs and virtual worlds in general allow for new affordances for the participants within them. They allow participants to transform and apply old practices to the new situations created in these virtual spaces, consequently creating new practices that only exist within the virtual spaces themselves. The creation of new practices with a particular application to virtual spaces supports the idea of learning through the construction of new knowledge and practices. Virtual worlds change, and the information created by—and collective intelligence of—the affinity group or community changes over time. Effective strategies for accomplishing a particular task change as the collective intelligence of the group adds new information and insights.

The way for a participant to gain expertise in the affinity space is to focus on *knowing* rather than *knowledge* (Thomas & Brown, 2009). Knowledge can be viewed as static and is sometimes associated with the term *facts*; however, the facts change in these affinity spaces frequently and remembering them for situations which the participant has moved beyond is not useful. Rather, knowing where information of a certain type would be located or who to ask for the information is much more useful in the long term. People who have experienced the situation most recently are the ones with the most accurate information. Of course, there will always be someone or some group of people who are the first to experience changes in a virtual world, and it is important for those people to participate in the affinity group or community, so they can share the information and the community can access it. In turn, the community members need the ability of "knowing" so that they actively engage in applying new information and can transfer previous experience to the new situation. Some virtual worlds, and MMOs in particular, offer challenges like puzzles, which are great opportunities for problem solving and learning; however, the real challenge in these spaces is not the puzzle but the collective action. The need to coordinate with others to achieve a goal is the basis of the perspective of collective intelligence, and the root of learning. Collective action allows players to skip the stage of "learning about" the MMO and allows them to go directly to "learning to be", regardless of the player's skill level.

"Learning to be" is an apprenticeship process that would be encompassed in the perspectives of situativity theory (Greeno & Moore, 1993) or Discourse theory within an affinity space. The more agency players have, the less a game or virtual world needs to invest in institutional structures. The agency of the player or participant allows for the affordances of the space to be malleable and flexible. Thomas and Brown (2007 & 2009) provide the groundwork for a new model that encapsulates the perspectives

of Discourse and collective intelligence. These two perspectives are the most adjusted to studying online spaces, and have the processes available to describe the interactions in said spaces. To describe the role of online communities and online affinity spaces in learning, it is necessary for the space and interactions within the space to be considered. Situativity theory and its component parts are also not the best fit in this situation. As Gee (2004) pointed out, there are issues with the term *community of practice*, most prominently the issue of deciding which people belong to and which are outside of a community. However, many aspects of situativity theory, excluding communities of practice, are already accounted for in Discourse and affinity spaces, so it is unnecessary to include situativity theory on its own. A hybrid of perspectives is required to create a model that describes learning in these spaces and that shows what the role is of the spaces are in learning. My hybrid model will combine aspects of the theories of Discourses and collective intelligence within an affinity space. Discourse theory allows the study of language used specifically within a community, and provides a theory of language-in-use and language-in-action that will let the researcher determine significance, activities, identities, relationships, politics, connections, and sign systems and knowledge within the affinity space or community (Gee, 2005, p. 11-13). The construct of affinity spaces describes the space and also the people who inhabit it. People who come together because of a common interest and to share space also share information and work together to solve larger problems. From the perspective of collective intelligence, looking at the information production and problem solving of the group, the experience of information creation and evaluation can be described. My hybrid model will use the lens of Discourses within an affinity space to examine the actions and interactions of both the individual and the group through the use of collective intelligence.

Conclusion

The role of online communities and online affinity spaces in learning is to offer people a place to gather with others who share common interests, and through these interests the people develop knowing, literacies, communication skills, and many other such learning pursuits in the quest for information or to solve a problem as a group. This does not mean that the group always develops the best answer or that they are the most efficient, but it does offer a place for researchers to observe the actions of a group in authentic learning situations centered on authentic problems.

Affinity spaces offer researchers a chance to study a variety of practices in natural context. This offers a new avenue for research for information literacy, which generally been studied in institutional settings like schools and libraries and studied through designed experiments. In these contexts exploring information literacy is raw and natural. After reviewing the research on affinity spaces and information literacy, the information experience in informal spaces is so important, that when people do not have access to it, we need to provide them with that access. Combining the research on information literacy, affinity spaces and collective intelligence comes together to create a unique space allowing for more in-depth study of practices as they occur and not as determined through top down construction of standards.

CHAPTER TWO:

Information Horizon Maps

Introduction

The multiple identities (Weber & Mitchell, 2008) of gamers are built through many types of interactions and can vary depending on the type of game, the community, and the situation. Role-playing video games (massively multiplayer and single player) are excellent spaces to study identity formation within games because they offer the player autonomy in choosing a character's identity, making decisions on what activities and goals to pursue, and making volitional choices (Rigby & Ryan, 2011). Erickson (1950) wrote that a "sense of identity provides the ability to experience one's self as something that has continuity and sameness and to act accordingly" (p. 42). Massively multiplayer online games offer social identity building within the game itself (Steinkuehler, 2004; Yee, 2006), but also outside the game. "Since much of the excitement of the game depends on having personal relationships and being part of [the] community's developing politics and projects, it is hard to participate just a little" (Turkle, 1995, p. 184). People also participate in the constellation of information (Martin, 2011) that surrounds the game, which is mainly generated by the community. The identity of how people situate themselves within the constellation of information has only begun to be researched and has not been explored using information horizon maps.

This paper explores the identity of male youth who range in experience in the MMO *World of Warcraft* (*WoW*) from late novice to expert through the use of information horizon maps (Sonnenwald, Wildemith, & Harm, 2001; Sonnenwald, 2005), focusing on the research question: How do players situate themselves within the constellation of information available around their affinity space? The youth in the study range in age from 14-18 years (8-12th grade) and are split between being successful in school and having failed in traditional schooling but successful in an alternative school setting. An

information horizon map is a data collection and analysis method in which a participant is asked to draw a map oriented around himself and connected with resources that they use for a specific purpose, in this case *WoW* information needs. Along with the maps, structured interview data is collected with the participant explaining the map, the order in which they would use the resources for an information need, and how they situate themselves within the constellation of information and therefore within the community. This paper examines the identity of youth male players in WoW, how they situate themselves, and how their identity is tied to their play style. As mentioned in the introduction to this dissertation, information is an individual and community practice, and information literacy is a process that takes place on both an individual and a group level. In this section the practices of individuals are examined to explore the players' identity with and orientation to the information resources they access for the game.

Theoretical Framework

The theoretical framework of *human information behavior* is used to explore actions that occur in and around the information sphere of *World of Warcraft*. This framework is designed to study information in the context of social, institutional, or individual need, or a combination of these contexts, as well as use of information (Sonnenwald, 1999). This framework has been chosen because of the use of selection of information horizon maps as a data collection methods. Sonnenwald's (2005) framework consists of five main propositions. Proposition One states that human information behavior is created by individuals, social groups, and the activities of the group as well as affecting each of these three in return. Proposition Two states that individuals and groups in a particular context may evaluate changes in themselves or others, or their surroundings like information sources. Proposition Three states that an

information horizon exists within any context and that the context specific information horizon is the only one in which we can act at the time. Proposition Four states that information seeking is a collaborative action between the information seeker and the resource, which encourages shared meaning. Proposition Five states that information horizons can be made up of many resources and therefore can have a dense population. These propositions outline the boundaries of the theoretical framework used for this dissertation.

One of the methods of data collection frequently used within this theoretical framework is that of information horizon maps. An information horizon happens within a context and situation. These can involve a variety of resources including a social network, information sources, information retrieval tools, and trial and error on the part of the information seeker (Sonnenwald, Wildemith, & Harm, 2001). Information horizons may be densely or sparsely populated depending on the information literacy practices of the individual. Any individual seeking information or using information literacy is always acting within the contexts of an information horizon (Sonnenwald, 2005). In the information seeking process, the person and the resource are working in collaboration and the collaboration is bounded by the individual's information horizon. Consequently, both social and individual factors determine information horizons. The opinion of the peer group or, in this case, affinity group affects an individual's opinion of a specific resource (Sonnenwald, 2005). The interactions in the affinity space of an individual with other participants will make her aware of her own opinions on specific information and resources. Information horizon maps have been used in the past in order to determine the place of the Internet in a person's larger everyday information seeking habits with reference to self-development, and were designed to be used in work and non-work settings (Savolainen & Kari, 2004), which was an advancement in information research methods at the time as most focused on either work or everyday

and did not attempt to account for both. In summary, information horizon maps is a data collection method that was implemented in this study and fall under the theoretical framework of human information behavior (Sonnenwald, 2005).

Information Horizon Maps

An information horizon map is a visualization of an individual's information horizon. The original model for collecting information horizon maps was to combine them with an interview process (Sonnenwald, Wildemith, & Harm, 2001). The participants were asked a series of questions. The questions included asking about a specific recent information seeking situation, as well as about a time they had difficulty finding specific information. Then they were asked to draw a map and do a talk-aloud while they are drawing. After they finished the map, the researcher used prompting to elicit more information. Follow up questions included (Sonnenwald, Wildemith, & Harm, 2001):

- Do you use any other resources?
- When, or why, would you go to this particular resource after/before going to this other one?
- Do any of these resources proactively provide you with information?
- Or suggest other information resources to you?
- Previously, you mentioned x resource. Would you include them/it on you information horizon? Why? Or, why not?

Sonnenwald (2005) offered a slightly different approach. The drawing was created first, still using a think-aloud method. Then the participant was asked to describe situations they have encountered where they were very successful or unsuccessful in finding needed information, using follow up questions to get more details about the situation.

Sonnenwald's original analysis method is described in depth below, with a modified analysis method following which was used in this study. An example of an information horizon map from Sonnenwald can be seen in Figure 1.

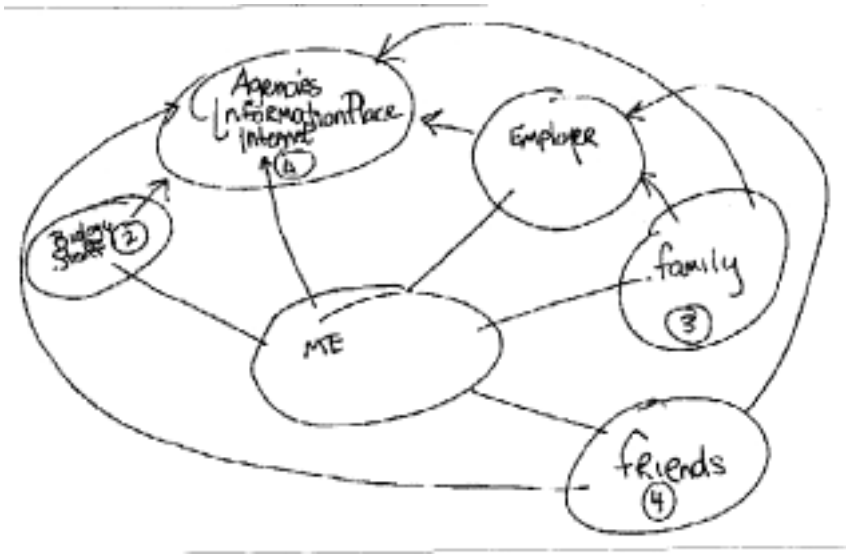

Figure 1: Information Horizon Map (Sonnenwald, 2005, 195)

Of course, each information horizon map is unique. Each participant will locate herself on the map and then draw the information horizon around it, or in any orientation she sees fit.

To analyze the maps a matrix was created (Sonnenwald, 2005). The matrix consisted of the participants functioning as the columns and the information resources the participants include in their maps as the rows. The identification and inclusion of all information resources was important for the analysis. Then the matrix was populated by numbers denoting the order in which the participants used the sources on their individual. Aggregated counts of the number of participants using each resource, the number of times it was mentioned on the maps (if categories are created), and the number of links each participant created between herself and the resources were added as columns. A master map was

constructed from the table. The master map was a conglomeration of the resources and the connections between them (see Figure 2 for an example).

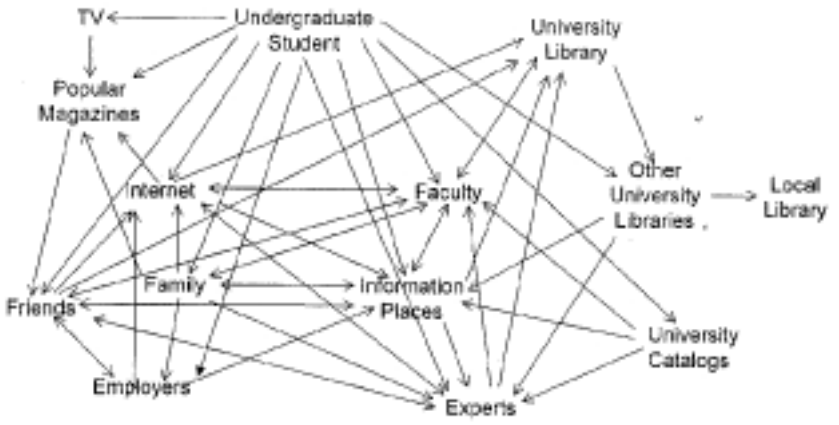

Figure 2: Network of Information Resources for Students (Sonnenwald et al., 2001, p. 74)

Next, a table was created that focuses on the links between nodes. This table had *link types* (whether the link is headed in or out of the resource) as columns and *resource type* as row. Sonnenwald et al. (2001) also created a column for *node type* which they explained by noting that each resource plays a role in the information literacy process which is either to transmit, receive, or 'pass on' communication between nodes. They used the terms 'starting', 'focusing', 'balanced', 'recommending', and 'ending', to note the role of each resource in the overall process. The final stage of the analysis method created by Sonnenwald et al. was to create a map that showed the strong connections between information resources (see Figure 3).

Figure 3: Stronger Connections (Sonnenwald et al., 2001, p. 76)

The method was altered for this study. First, The interview was kept separate from the information horizon map, modeling off of the method used by Sonnenwald (2005). Second, the information horizon map was described to the participants, giving them the following instructions:

> "I would like you to draw an information horizon map. Locate yourself somewhere on the map and mark resources you use when you have an information need around game or non-game situations, as well as connections you see between the information sources. The map can be whatever you want it to be; it is your visualization of your information horizon."

The reason for the change in implementation is to lessen the influence on the participant's creation of their map. It was important that they add what they thought to be important to the map without influencing them by suggesting types of resources or methods of map creation. After the map was finished, the participants were asked to talk through the map, explaining their information seeking process. The information horizon maps that were gathered are analyzed below along with data from their talk-throughs. The analysis determined patterns in the descriptions of the maps between

participants, as well as individual identities of specific participants. Examples of an information horizon map collected in this study with their descriptive analysis can be seen in Figure 4-8 below.

For this analysis, the method was modified mainly due to the fact that most participants viewed all connections as non-directional. Furthermore, the original method was used within a library context and was developed to determine the connections between resources more than between the individual and the resources. The focus of this analysis, on the other hand, was to determine the resources the participants used, why, and in what order, as well as how play styles and player identity influenced the types of resources and methods of information retrieval chosen. This analysis was meant to elicit the importance of these resources to the affinity space.

The method of information horizon maps fosters reliability and validation through multiple methods (Sonnenwald, 2001). The first method to ascertain reliability is through interviews to corroborate that the maps the participants drew were accurate to their process. Another method is to have participants map multiple constructs for themselves. This happens by giving them the constructs like work, school, and leisure and analyzing the different maps to see if similar patterns or processes occur across each participants map. Representative reliability can also be used as a method to determine reliability. This method establishes reliability across the group by looking for patterns across the maps of the participants. There are benefits that the data collection method of information horizon maps possesses natively as a reliable method of data collection. Also information horizon maps can create a combination of generality, which is the map, with specificity, which is the part of the interview that asks about a specific incident. Information horizon maps, because they include verbal and graphical representations in both general and specific terms, provide data triangulation which improves validity.

Data Analysis and Discussion

As mentioned previously the participants in this study ranged from 14 to 18 years old and are all *WoW* players. Their mastery of *WoW* varies and will be discussed with their individual maps. As can be seen from Table 1 the participants were all male, a combination of middle and working class socioeconomic status, with a variety of schooling situations. The participants who failed in traditional school settings but succeeded in alternative settings shared similar thoughts about school; they disliked schools except for their alternative school. When asked about their alternative school, they said it was great and was not like school at all, especially because they had choice in what they studied, their input was sought after and utilized, and they felt that they could make an impact on the school by their choices and interests. This aligns strongly with how they present themselves in game and with the identities that they take on in that space, which will be discussed below. All names used in this paper are pseudonyms and were chosen by the participants themselves. The participants had complete control over what they chose to include or not include in their map, and as apparent below, some of the participants chose to include resources they used in other contexts besides games, while others chose to just include their game resources on their map.

Participant (Pseudonym)	Age	Grade	SES	School Success	Race/ Ethnicity	Location
Noel	17	12	Working class	Failed traditional, Succeeding in Alternative	White	College town
Nick	17	12	Working class	Failed traditional, Succeeding in Alternative	White	College town
Roger	17	11	Working/Middle class	Failed traditional, Succeeding in Alternative	African American	College town
	15	10	Working/Middle	Failed	White /	Rural

Neil			class	traditional, Fair in Charter	Native American	town
Aidan	17	12	Middle class	Successful. School OK	White	Rural town
Brandon	18	13	Middle class	Successful	White	College town
Walton	17	12	Upper middle class	Successful	White	College town
John	14	8 Math/Sci 13 Reading/Social Studies	Middle Class	Home School	White	College town

Table 1: Demographic information for participants

John was the youngest participant in this study and chose to locate himself on the map by very literally drawing a stick figure of himself. As can be seen from the map in Figure 4, he relied heavily on in-game information like Quest Logs and Maps. John was the only person who listed *prior knowledge* as a source he went to for information. In-person requests for information, namely asking his dad and then his younger sister and mom if his dad did not have the answer to the question, were priority information sources. For him, his dad was the number one information source, as in his interview he said that he only goes to other sources when his dad cannot answer his question. In other words, the personal connection was his main information source. John was a novice to intermediate level player who plays because of his family and for him the social aspects of the game were mainly limited to his family group. From his interview and the map it was apparent that he viewed the internet and Thottbot, which is a *WoW* database, as equal in weight and interchangeable. He felt that whether he searches through a search engine or directly on Thottbot, the results he wants will come from Thottbot. Through his map and his interview, John identified himself as a player who values physically co-present connections for information above all other sources. Going to other sources of information, in his experience, was

something that happened on very rare occasions, and he felt that it was much riskier to get information from sources other than in-game or in-person.

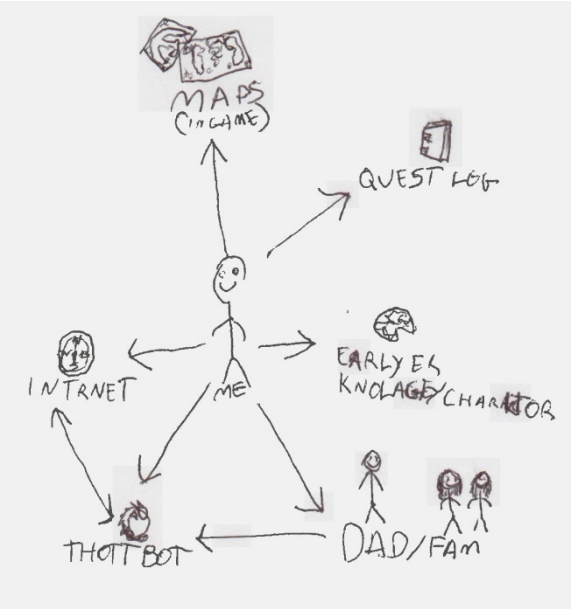

Figure 4: Information Horizon Map of John (14)

Noel (Figure 5) was a very different player than John. Noel was 17 years old and a senior. He was one of the participants who felt that his alternative school experience was a much better fit for him, feeling that it gave him the autonomy he needed to function and grow. In his alternative high school he felt that he had the agency to suggest curriculum modifications, has run the computer lab for the school, and helped the school find and apply for grants to pay for technology upgrades. Being involved and helping out were both part of his gamer and his everyday identity. He really enjoyed helping those around him that were learning the game or had questions about higher level content. Noel was an expert player; he had played *WoW* since the beta came out in 2004. As can be seen in Figure 5, Noel outlines the connections between the resources he used for gaming and those he used for educational settings. This distinction between educational and games settings was not divided along the traditional

lines of *school is learning and games are not learning*. Instead, in his interview, he described that when he drew this map he was hoping that the two sets of resources were similar because he knew he used the same skills for finding information in both situations. His educational resources look to be heavily interwoven; this was because he listed sites like CNN, NBC, and Fox as containing a variety of content such as "speculation, guides, and opinions," in his words. The visualization method emphasized the sophistication with which he approached information because he evaluated information for authenticity even when presented in an authoritative manner. Noel described how resources he uses for education were more interconnected by content type than *WoW* sources because they cover much broader topics, and acknowledged that the different content types on his map for *WoW* do share some overlap but it was limited because he saw the *WoW* resources as more specialized and therefore less interconnected.. He knew the variety of resources available to him because of his expertise in the game, and he accessed them as needed.

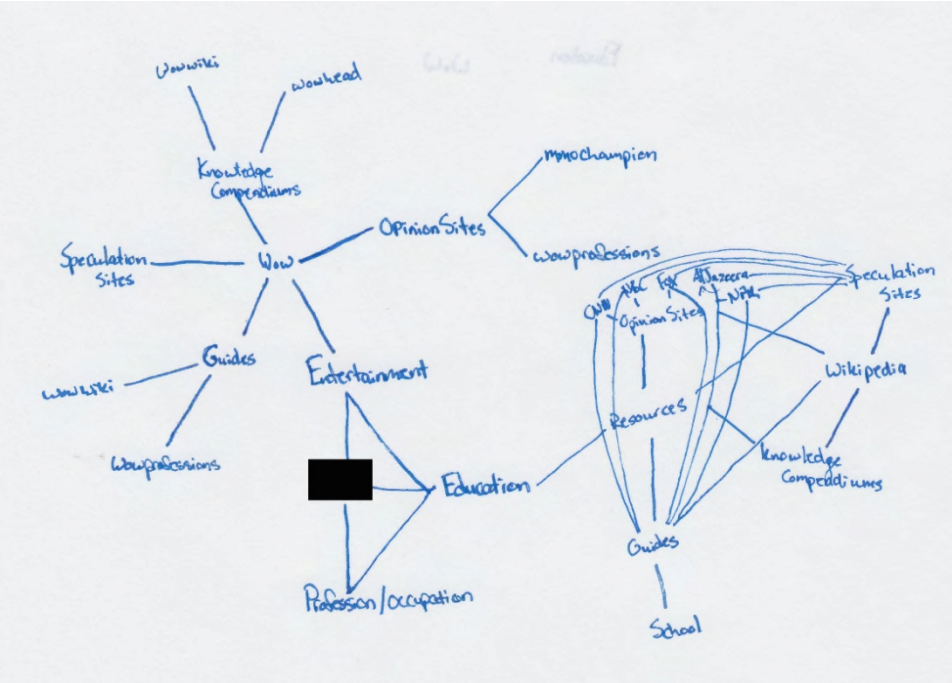

Figure 5: Information Horizon Map of Noel (18)

Nick (Figure 6) was a novice player, having played several years previous to the study but just starting to play again at the time of the interview. Like John, Nick located himself on his map with a stick figure and created a visualization of his computer which he located between himself and all the digital resources he used. On the opposite side of the stick figure from the computer there was one resource listed, the strategy guide. Nick was the only interviewee to list a non-digital resource. Many players prefer online wikis to paper strategy guides, especially for MMOs which are regularly patched and changed. The problem with the printed resource is that it goes out of date as soon as the first patch is released, whereas the wiki is constantly being updated and changed by the community. Nick's map was also drawn in a nearly literal step-by-step manner: he goes to his computer, he accesses the internet, he goes to Google, and from there he accesses all the resources that he needs. Instead of breaking the resources down by type as seen in Noel's map, Nick listed them in a mixed way, some by name for example Wowwiki and Wowhead and some by type such as "forums on classes" and "talent tree build sites". He also used the official *WoW* website which only one other participant used, as most of the advanced players use other forums and resources because the Blizzard forums were viewed as lesser quality resources. Similarities with Noel were seen in Nick's use of Wowhead and Wowwiki but Nick emphasized that these sites are gateways to other places such as "Links to random places" or "Links to Maps". Nick's map did not hold the level of precision that Noel's map had with site names, but Nick's map did underline his view of the complexity of his information surroundings. He also illustrated that he was less knowledgeable of the information resources available than Noel, because he used a general search to start every time he needed information instead of going directly to the relevant source. Nick's strategies within his information space was to use a broad resource like a search engine in order to find

what he was looking for, he was more likely to use officially sanctioned resources like the strategy guide and the official *WoW* forum sites, and he was also constantly seeking information for in-game play because he a tendency to frequently start new characters. Nick also had a less sophisticated view of information than Noel because he was willing to follow random links to places, wandering through information then happening across something he needs.

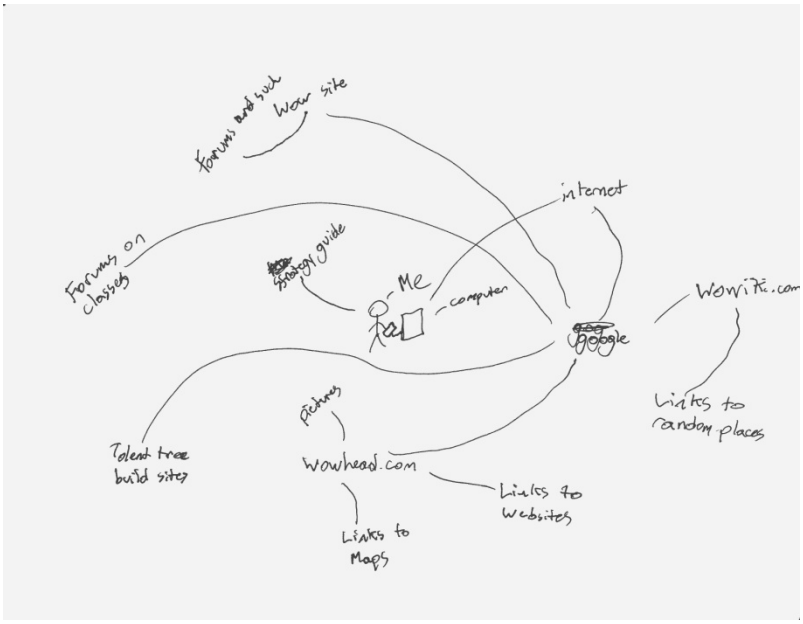

Figure 6: Information Horizon Map of Nick (17)

Neil was an expert player like Noel. He was a member of a raiding guild, which is a group of people who cooperatively work together to complete high end, late game content; the guild had a medium to high level rank in terms of its relationship to other guilds based on skill level and objectives completed. Neil has several characters that he has played through to the level cap, which at the time of data collection was level 85. His map looked very different than that of Noel, despite the fact that they were both experts. The variation was accounted for in several ways. First, unlike Noel who was a very social player and who enjoyed helping those around him, Neil was a very solitary player who did not like

to ask other people for help. Second, he played characters in the same classes and rarely started new characters so he did not go through the normal cycle of needing a lot of new information at the start of playing a character. The resources pictured in Figure 7 were very limited, both because Neil was an expert and because he has been playing the same type of character for a long period of time. The three resources he used are Wowhead, which is a knowledge compendium; Elitist Jerks (EJ), an intellectually high end guild website that discusses topics around *WoW* including classes, raids, and other in-game content with a focus on mathematically optimizing performance in these situations; and gnilo, which was his guild. Neil's interview revealed that he had a very formulaic way of searching for information. First, he went to EJ. If he could not find the information there, he went to Wowhead, which he viewed as a more general search than EJ, which is clearly a very specific type of affinity space. If he could not find the information he needed from either of those two resources, then as a last resort he would ask his guild mates. This was somewhat unusual because as his guild mates were knowledgeable in the game and because Neil had to perform complex, coordinated tasks with them, it would seem likely that Neil would have some trust in their skills and abilities. However, Neil focuses on his independence in the game. He feels that he should not have to ask others for help because he has a level of proficiency that should allow him to find information on his own.

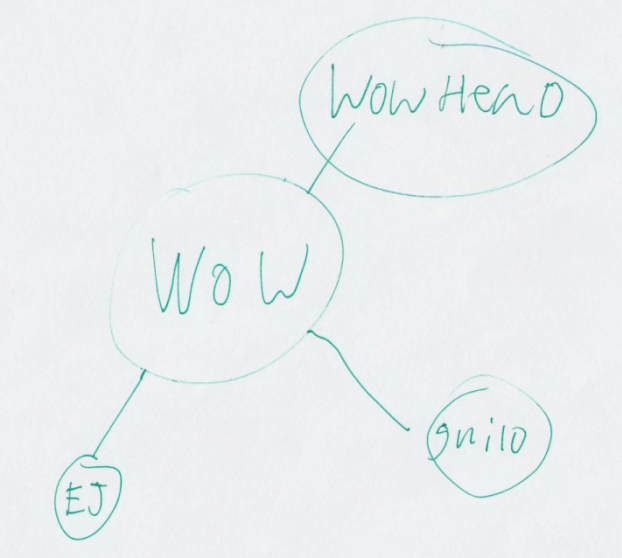

Figure 7: Information Horizon Map of Neil (15)

Walton is the last participant we look at in detail. Out of the maps specifically discussed in this paper he was the only one succeeding in a traditional school setting. As can be seen from his map he also includes non-game resources that he uses when he has an information need in different contexts. This is very similar to Noel, and it accentuates the actual complexity of information that he faces on a day to day basis. Also, like Noel, he divides his information resources into categories under each context. For example under games, he lists wikis, blogs, and video guides/tutorials as categories of resources. From there he breaks it down to specific resources like Wowwiki, YouTube, and game development blogs for games like *Minecraft*. He was the only participant to list other specific game resources, although Noel mentioned that he used similar types of resources for other games he played. Walton was a former expert in *WoW* as he had played intensely previously but now was only playing casually. However, because of his previous fervor for the game he still had an in depth knowledge of available resources and how he would go about solving an information need in that context. He included other game information because he currently was playing *Team Fortress 2* (which is denoted on Walton's map

as TF2), *Fallout 3*, and *Minecraft* more than he was playing *WoW*. This was similar to Noel who although he was still playing *WoW* regularl,y he was playing *Guild Wars* even more intensely. Walton identified himself as a social player who liked to be able to play with friends, whether online or face-to-face. He played to an expert level in *WoW* while his friends were playing and then moved to on other games as his friends moved on to other games. However, despite the fact that he enjoyed playing with his friends, they were not reported as information sources when asked. He felt he knew where to look for information and could do that when necessary as a solitary act.

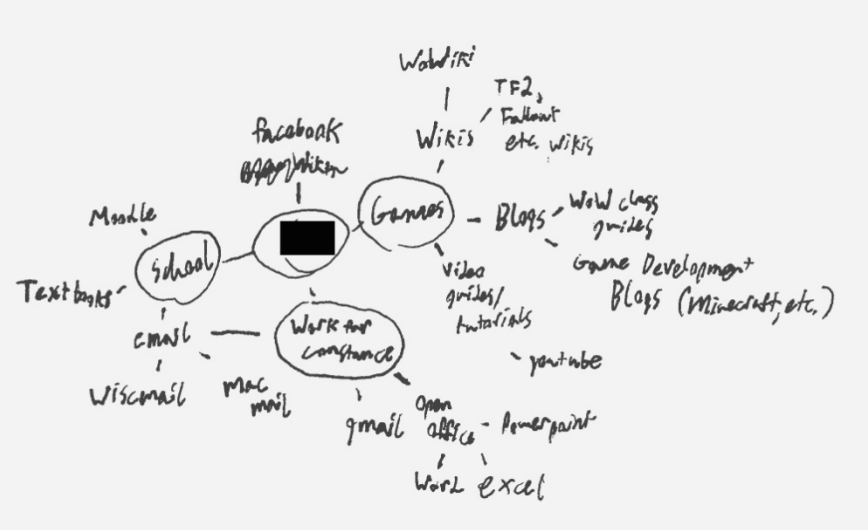

Figure 8: Information Horizon Map of Walton (17)

The maps discussed above were a sample of the total number of maps collected. To analyze the maps as a whole, the data is examined both as aggregate and by participant. For the data aggregation only data pertaining to their game spaces was used, because only some participants created maps with information resources not related to *WoW*. Table 2 combines all the terms used in the information horizon maps by participants. As can be seen by looking over the list there are many resources that

share very similar terms or are similar in type, such as Wowhead, Wowwiki, and Thottbot, which are all knowledge compendiums.

Resource	Number of References
Wowhead	4
gnilo (guild website)	1
Elitist Jerks	1
Forums on Classes	1
Wow site	1
Wow site forums	1
Strategy guide (paper)	1
internet	1
google	3
wowwiki.com	5
links from wowwiki.com	1
links from wowhead.com to maps	1
links from wowhead.com	1
talen tree build sites	1
knowledge compendium	1
speculation sites	1
guides	1
wowprofessions	3
opinion sites	1
mmochampion	1
game wikis	3
wow class guides	1
Game development blogs	1
youtube	1
video guides & tutorials on youtube	1
Friends	2
Chats	1
game forums	1
Experimenting in game	1
In game people	1
Trade Chat	1
internet	1

Table 2: Totals of Resources by Name

Table 3 shows the number of times each specific resource or category of resource was mentioned. Knowledge compendiums were by far the most used and most mentioned resource type. These include Wowwiki, Wowhead, and Thottbot. These are one type of peer-produced information sources, along with forums, online guides, opinion sites, blogs, guild websites, YouTube videos, and speculation sites.

Resource	Total Times Mentioned
Knowledge Compendium	19
General Search	6
Chat	5
In-Person	4
links from preferred sites	4
Forums	3
Guides	3
Opinion Sites	3
In-game resources	3
blog	3
Guild Websites	2
Youtube	2
Corporate Site	1
Speculation Sites	1
Strategy Guide	1

Table 3: Totals of Resources by Category

Table 4 showed the order in which each participant would use each category of resource based on their interviews. So the numbers in the columns of this table are rankings with 1 being first, 2 being second, and so on. They do not represent counts of the number of times a participant used a category. Numbers could be repeated as evidenced by Nick, who uses general search first, then knowledge compendiums, forums, and the corporate *WoW* site in no particular order, depending on the information need. Followed by links from preferred sites, like knowledge compendiums, third and the print strategy guide fourth. The total row of this table on the right hand side shows the number of students who used each specific resource category.

Resource	Noel	Nick	Neil	Aidan	Brandon	Roger	John	Walton	# Students
Knowledge Compendium	1	2	1	3	1	3	2	1	8
Forums		2				4			2
Corporate Site		2							1
Guild Websites			2						1
General Search		1			2	1	3		4
Speculation Sites	4								1
Guides	2								1
Opinion Sites	3								1
Chat						5			1
In-Person				2		2	1		3
Strategy Guide		4							1
links from preferred sites		3							1
In-game resources				1			4		2
blog								3	1
Youtube								2	1

Table 4: Aggregated Resource Categories by Participant

Aggregated onto one map, the combined information horizon maps of these participants appear in Figure 9. Some lines have arrows because they were indicated as directional by the participants, other do not because participants did not feel that the information flow had a specific direction. Of course on the map in Figure 9 it is assumed that all resources are connected back to an information seeker but the map is too cluttered with those lines added in and have consequently been omitted. As can be seen by the map, knowledge compendiums are central to the constellation of information around *WoW* (Martin, 2011). Most of the listed types of information resources require the participation of the game community, as knowledge compendiums, forums, YouTube videos and many other resources exist solely because of the creation of information by the community. So even participants who do not ask people directly for help with information needs are still always querying the collective intelligence (Levy, 1997) of the community for information.

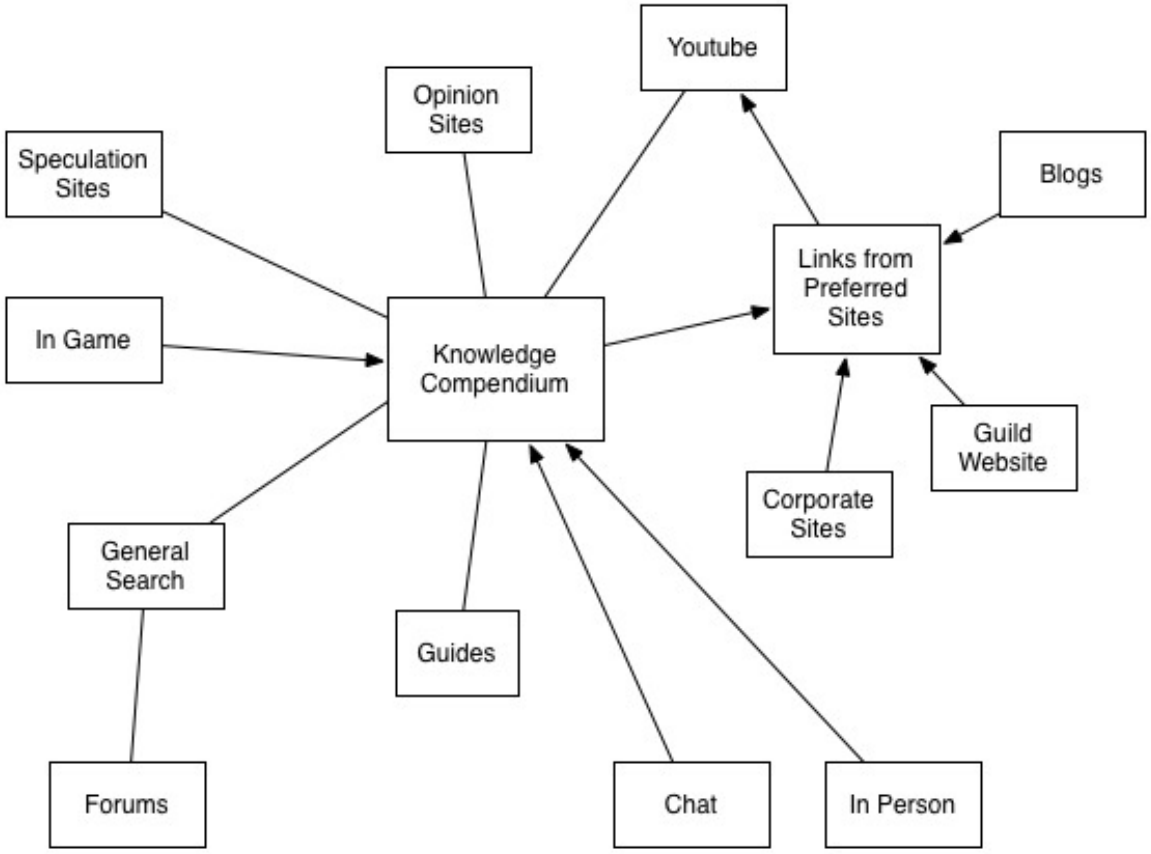

Figure 9: Master Information Horizon Map

As a comparison, Figure 10 shows the connections of *WoW* resources found by TouchGraph Google, an online tool which determines the interconnectedness of websites based on Google's database of related websites. The term "World of Warcraft" was searched and a set of connected websites was returned. Consecutive searches were performed for the websites which had the most connections in the first search. These other sites searched were: Wowwiki, Wowhead, Thottbot, Bosskillers, and Wowarmory. This figure shows the complex and interconnected nature of the constellation of information of *WoW*, which visually reflects the layout of the participants' master

information horizon map.

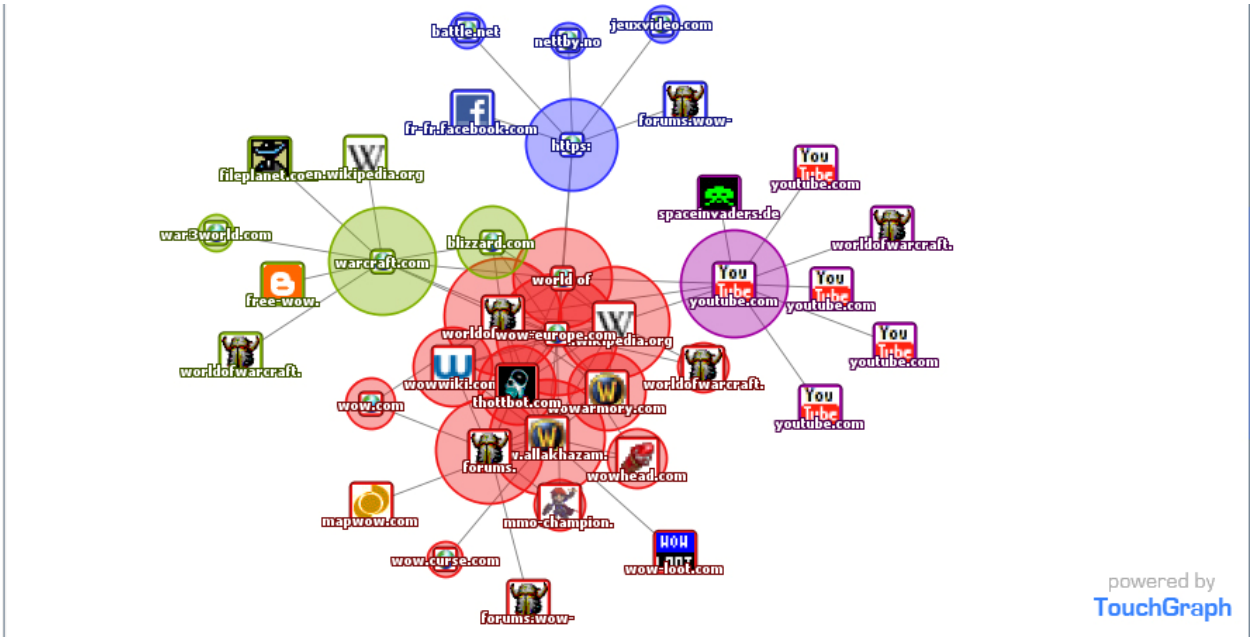

Figure 10: Graph of larger constellation of information

Information and Identity

The variability of the resources included in the map and the multiple processes used demonstrate the individuality that exists around information seeking and interacting with the constellation of information around a game space. These youth are exhibiting identities-in-action (Weber & Mitchell, 2008), with their use of technology serving as a model for identity processes. They create multifaceted identity processes that are constantly in flux, just as their information resources are in flux. For example, Neil lists EJ as his main go to site at the time the interview was conducted, however, now EJ has lost its popularity and Noxxic.com has become the popular and preferred source. Their identity production is bricolage; it is a process rather than being fixed and static. Types of identity

production that have been expressed in the data collection: collectivity and social construction (Weber & Mitchell, 2008; p. 39) can be seen in Noel and his enjoyment of helping others with information needs and all those other participants who rely heavily on knowledge compendiums; convergence (p. 40) can be seen in John's map and identity, and the way that he idolizes his father and ranks him as the top information source; and learning (p. 42), which can be seen in Nick's exploration of the constellation of information through a general search first because he is still learning the information landscape. There are four properties that are not typically present in face-to-face public life (networked public): persistence, searchability, replicability, and invisible audience (boyd, 2008), which are examined next.

Neil prefers the anonymity of resources available on the internet (Wood & Smith, 2001), and chooses to select resources he can access anonymously as first choice, making him the invisible audience of the creators of the product. Again, despite the fact that Neil chooses to search sources rather than ask people because he likes to be anonymous and independent, he is always relying on the collective intelligence of the community to create those resources (Levy, 1997). These actions almost manifest as a psychosocial moratorium (Erikson, 1968; Gee, 2003), suspending belief to feel that he is more isolated than it is truly possible to be in these digital information settings. Although all these participants collectively identify (Jenkins, 2008) as gamers and *WoW* players, their more fine grained identity varies depending on their experience level and play style. "Persons develop more or less conscious conceptions of themselves as actors in socially and culturally constructed worlds, and these senses of themselves, these identities, to the degree that they are conscious and objectified, permit these persons, through the kinds of semiotic mediation described by Vygotsky, at least a modicum of agency or control over their own behavior" (Holland et al., 1998, p. 40). The web of resources that these participants use reflects their identity within the space: those with more experience use more precise

resources, while those who are less experienced use either broad searches or rely more heavily on people who are in-room with them.

This set of information horizon maps is the first step to exploring the identity of participants in online communities by examining how they situate themselves within the constellation of information available around their affinity space. A larger sample is needed to extrapolate these finding to all youth in this community or the community in general. However, this study offers a range of information identities and illustrates interesting complements and contrasts across players of different levels in the game, varying ages, and differing experiences in school.

CHAPTER THREE:

Individual and Group Practices

Introduction

Information literacy as described in previous chapters has been defined and standardized in myriad ways. Each time it has been redefined, the definitions are remixed and tweaked, with each author adding their own nuances. The consequent problem is that the definitions compete and, as a result, there is a lack of focus in the literature, and instead of moving forward, the field of information literacy stagnates in this constant process of redefinition. In this chapter, an analytic framework and coding scheme are developed based on an aggregation of previous definitions and standards. The data analysis method describes the processes of information literacy in an online affinity space, and refines the analytic framework and coding scheme to create a new description of information literacy. This new detailing of the process of information literacy is based on observation and is descriptive instead prescriptive and normative, unlike previous definitions of information literacy.

Methods and Data Collection

The main method of analysis for this chapter is *a priori* coding based on an analytic framework which is detailed below. In the following section, I describe the initial coding scheme, as well as the emergent coding scheme.

Analytic Framework

When developing this new analytic framework, it was important to establish the starting base since instead of starting from scratch, this framework was built upon the research that has come previously. I specifically avoided basing the analytic framework upon a single definition because then the new framework would have been developed with all the limitations of the original. Consequently, I created an aggregation of information literacy definitions to determine overlap as well as to create a

stronger definition from each contributor. Figure 1 lists each of the major definitions of information literacy described previously, and breaks them down into component parts. The color coding was used to map similarities across definitions and distill them into a single set of terms. The color coding scheme is explained in Figure 2.

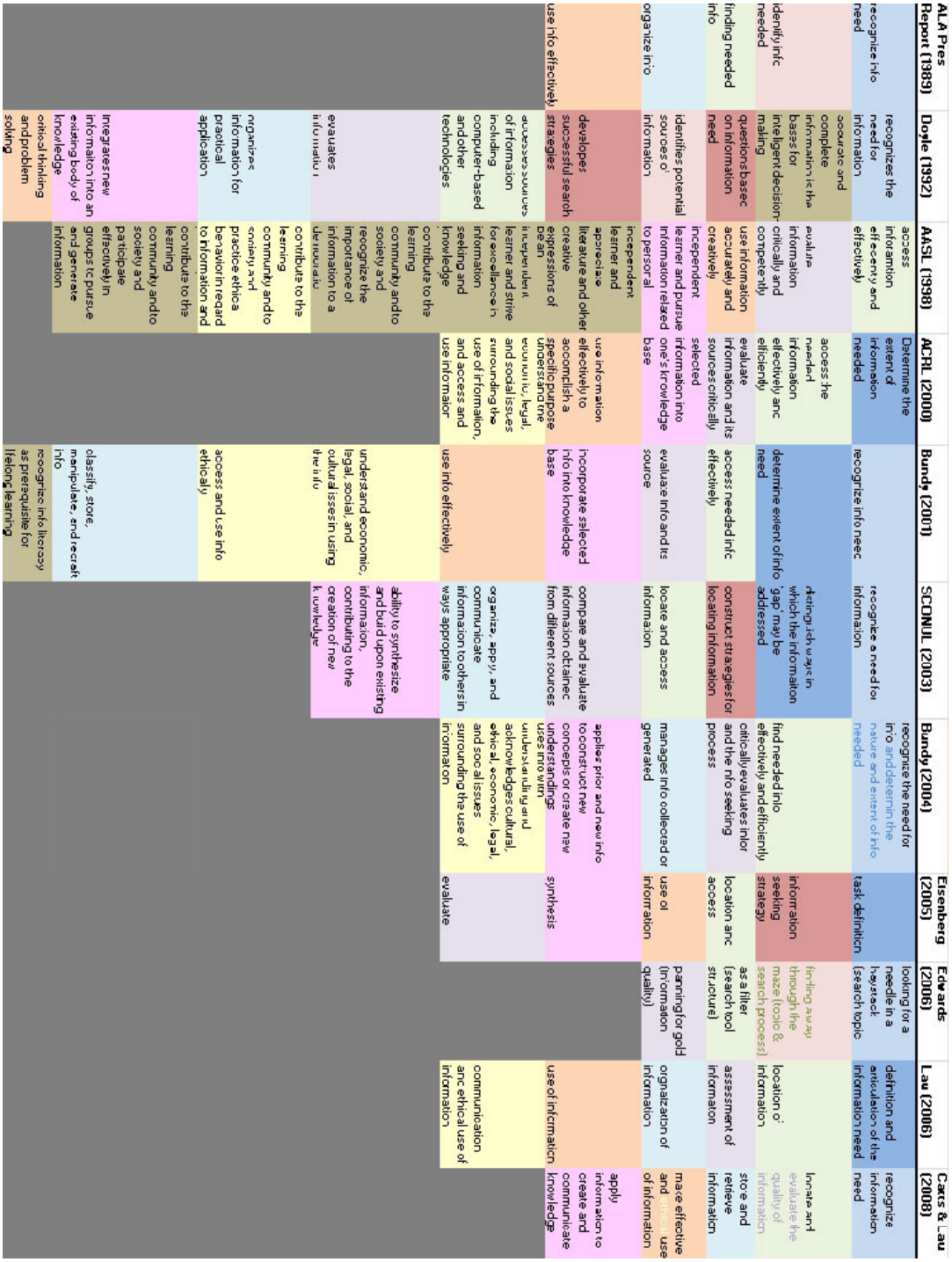

Figure 1: Aggregation of Information Literacy Definitions

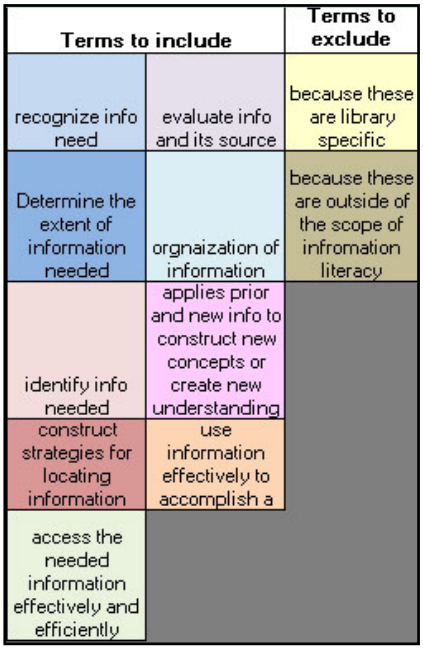

Figure 2: Key to Aggregation of Information Literacy Definitions

From all the components of the definitions and standards examined, I aggregated the analytic framework to include nine terms which were then turned into the coding scheme. The above color coding (Figure 2) can be mapped to the definitions and standards (Figure 1) to see how the many varied terms for similar actions were aggregated. Two types of terms were excluded. Those in light yellow were excluded because they were library specific, and as the field is plagued by the confusion of library instruction with information literacy, information literacy needs to move beyond library specificity. Those in tan were excluded on the basis that they were outside the scope of information literacy, although they are important in other contexts, specifically in situating information literacy to the larger learning community and lifelong learning. A previous comparison was made by Eisenberg (2008) to compare four definitions: Kuhlthau (1993), Eisenberg and Berkowitz (1990), AASL [American Association of School Librarians] (1998), and ACRL [Association of College and Research Libraries] (2000). Enough similarities exist between this comparison and my aggregation to support this step in my methods.

In traditional information literacy definitions and standards (illustrated in Figure 3 – unless otherwise indicated all figures were created by the author), information literacy is described as a linear and solitary process. However, in affinity spaces with synchronous and asynchronous communication, peer-produced resources, and frequently changing content, these spaces are neither linear nor solitary and, unsurprisingly, the traditional models do not work. Instead these spaces are complex and social, so a non-linear analytic framework is more appropriate for the digital age.

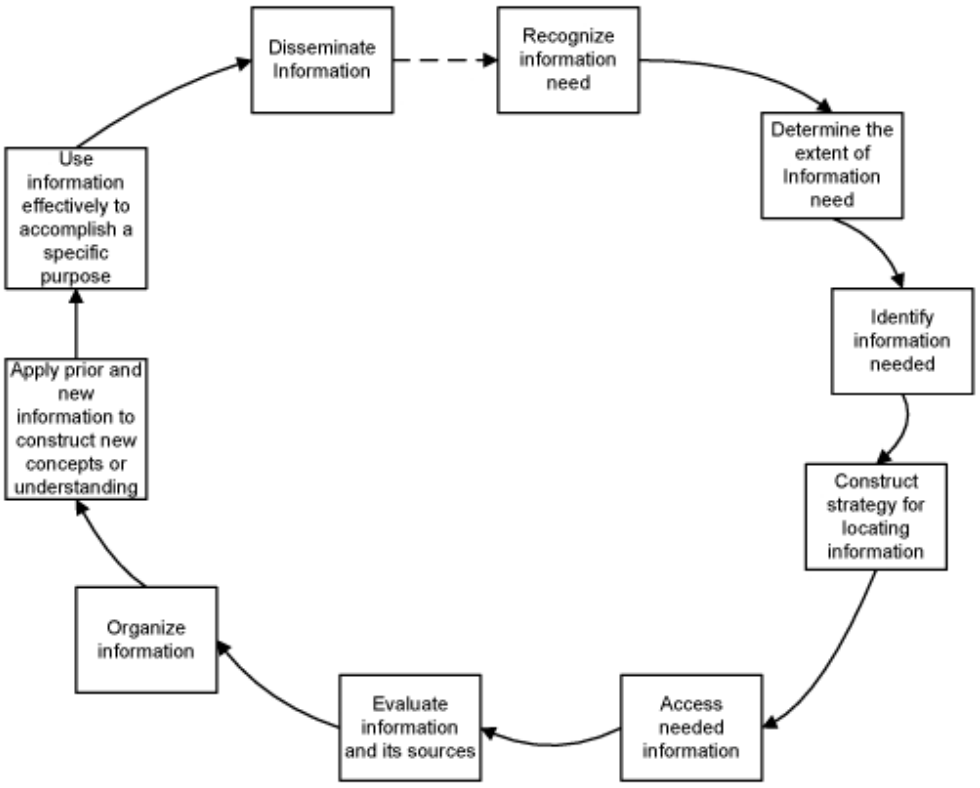

Figure 3: Standard Model

There is a dotted line between dissemination and recognizing an information need to signify that the definitions and standards allow that sometimes one cycle does not fill the information need so therefore the process must be started again. Eisenberg (2008) offered Figure 4 as a visualization of his Big6 model of information literacy as a feedback process, which was designed to account for an issue concerning the standard model (Figure 3). In Eisenberg's model, unlike many others, an allowance is made for feedback from the process to influence the information seeker to go back to previous stages. However, it only allows forward motion to occur one stage at a time, maintaining a linear progression. The standard model offers neither option, emphasizing the linear nature of its foundational definitions and standards.

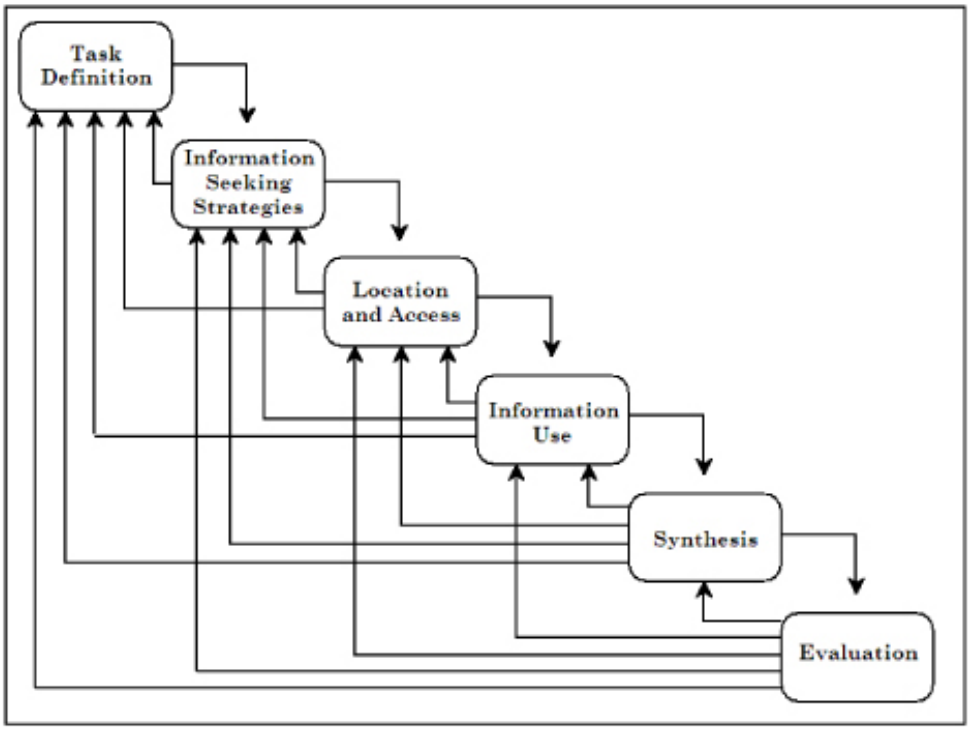

Figure 4: The Big6 as a feedback process (Eisenberg, 2008)

Another way to visualize this process is to break the concepts laid out in Figure 3 into groups. If information literacy is viewed as a process these could be thought of as phases. The three phases are strategy, finding, and creation, and are illustrated in Figure 5. Note that recognizing the information need is placed outside of the phases because without the original recognition of the need for information, none of the rest of the process would occur. A dotted line was again used to indicate the potential of the process restarting when the information seeker has reached the end of the cycle but determined that information is still needed, either because the information found was not sufficient or another information need arose from fulfilling the first.

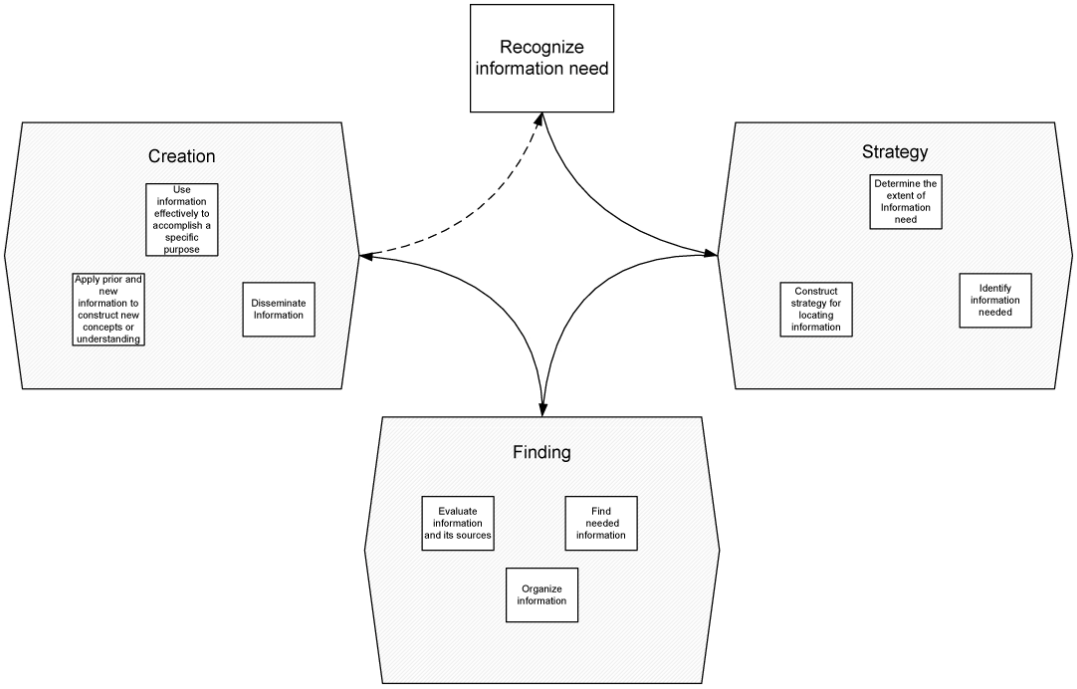

Figure 5: Standard Information Literacy Phases

The standard model is limited in several ways: it generally presumes a forward linear motion of information literacy through the initiation of information seeking, it presumes dissemination as the end

product, and it privileges information literacy as implemented in work or school situations. This section outlines a modification to the standard model that allows for multiple paths, and is shown in Figure 6. This visualization represents the ability of the information seeker to move forward and backward in the model at any point (with all lines having arrows at both ends). It also allows for the information seeker to skip stages. Adding a process to the model where the information seeker can skip stages is important for the flexibility of the model. An information seeker may not need to go through a process that requires so much scrutiny for every piece of information she seeks. For example, needing to know the next day's weather may merely include going to a weather source and reading; it most likely will not include scrutinizing the meteorological conditions that created the general weather forecast.

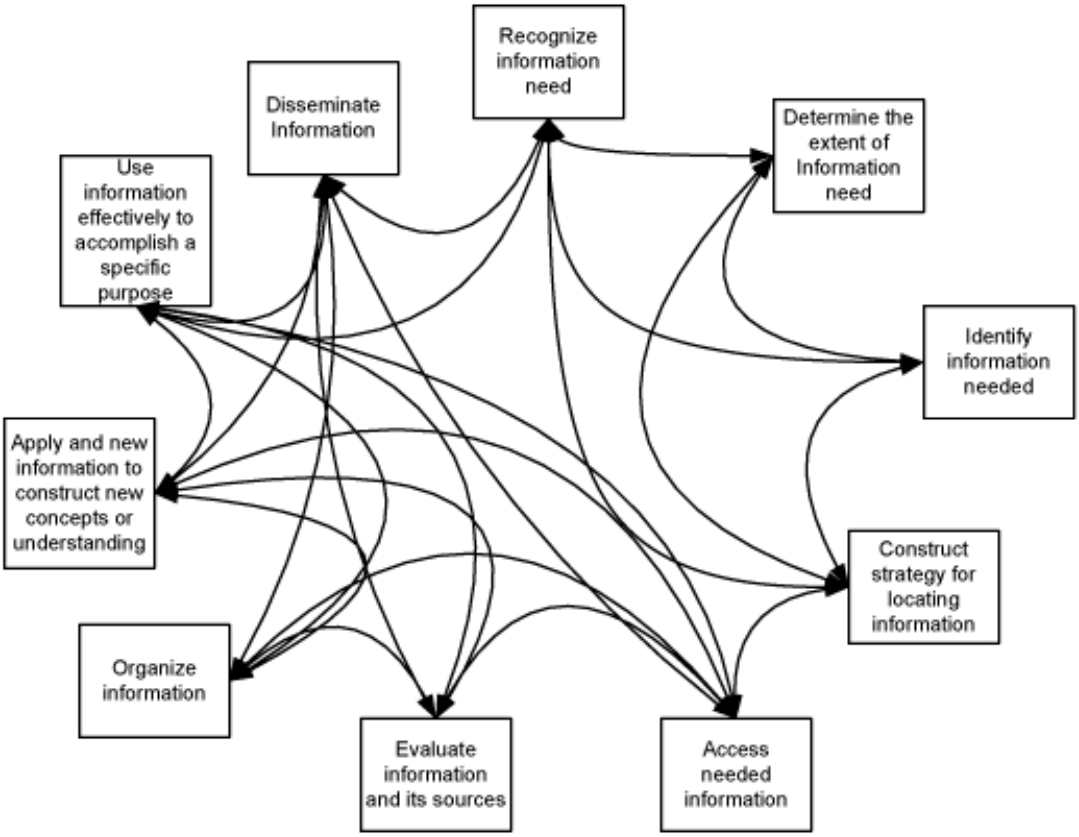

Figure 6: Modification of the Standard Model

A phase model for this modified standard model is illustrated in Figure 7. This model still emphasizes the phases of strategy, finding, and creation but it allows for multidirectional movement between the phases. The modified model is more closely related to what actually takes place in information literacy situations (Martin & Steinkuehler, 2010) but it still ends with the dissemination of information and still represents a fairly orderly process.

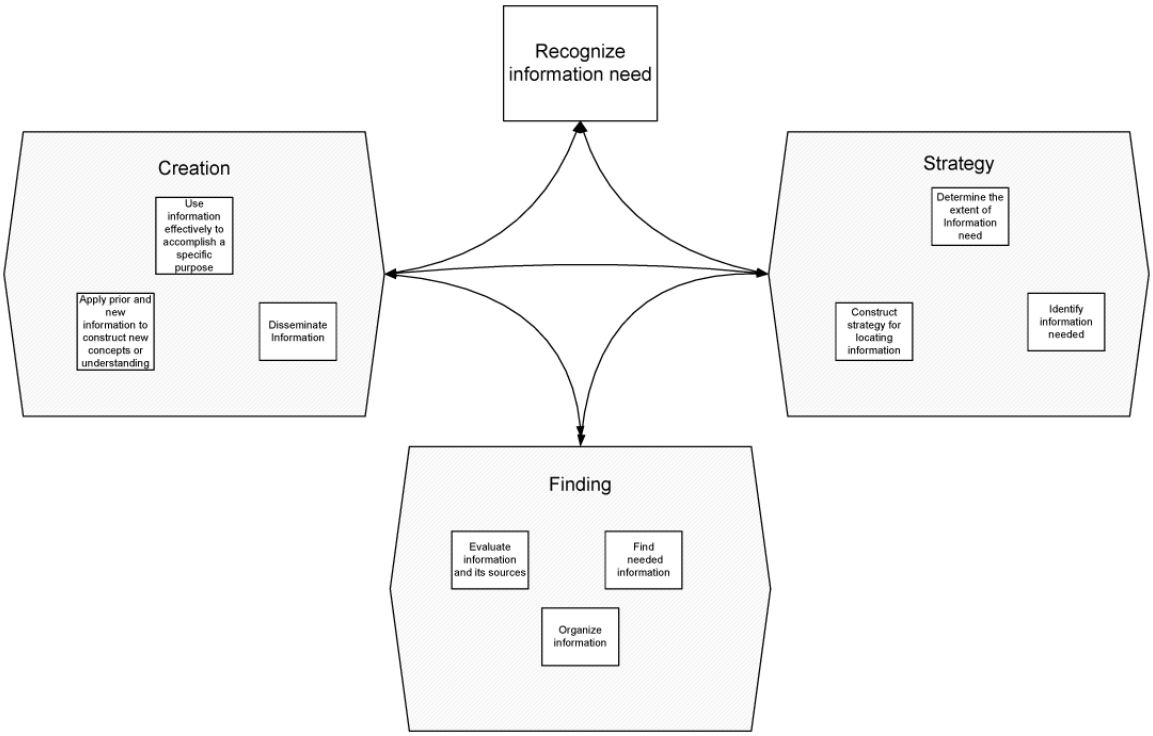

Figure 7: Modification of Standard Information Literacy Phases

In *Collective information literacy in massively multiplayer online games* (Martin & Steinkuehler, 2010), new patterns of information literacy were shown, using terms from Catts and Lau (2008) to code

in-game chat logs from *World of Warcraft.* From these coded chat logs, patterns of information literacy emerge that illustrate different types of interactions between players in the game. The patterns from simplest to most complex were named *call and response*, *call and refer*, *call and avalanche*, *simultaneous not sequential*, and *fluid*. Fluid is an example of the complexity that can occur in information seeking, and adds another element to be considered, in that it happens in the complex information sphere of an online affinity space (Gee, 2004). The fluid pattern (see Figure 8) represents the interplay between the elements of the process and the interaction of people in the space together. The striking aspect of this model is that disseminating information has moved to the middle due to the fact that dissemination happens both from other people in the space and by the information seeker herself.

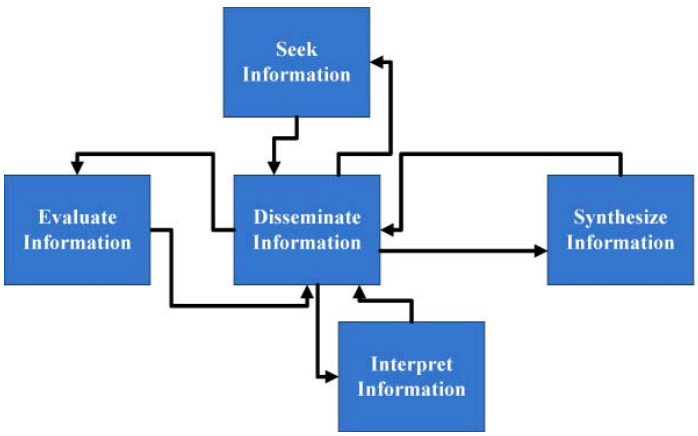

Figure 8: 'Fluid' pattern of information literacy (Martin & Steinkuehler, 2010)

Building on the patterns illustrated by Martin and Steinkuehler (2010), a new model of information literacy is proposed here (see Figure 9). The major differences in this model are that it shows the complexity that can occur during information seeking, it can take collective and collaborative information literacy practices into account, and it shifts the focus of the information literacy model from

ending with disseminate to ending with using information for a specific purpose, that is to satisfy the person's information need. The form of this information in the end will vary, depending on what the information is being used for and how fine-grained the information needs to be, which the information seeker—if information literate—will be able to determine what type and how much information is sufficient. The shift from 'disseminate' to 'use' is an important distinction especially if the information literacy model is to be used outside of work and school situations. There will be situations that arise that do not require the dissemination of information to others, such as looking something up for curiosity, looking up information to do something for one's self, or possibly looking up information that is of a personal nature. For example, if a player is interested in looking for information about another character class and looks it up themselves, they may not disseminate that information to anyone else, it is purely for their own interest. Changing the focus to 'use of the information' allows the model to be used for all types, patterns, and situations of information literacy, and removes the constraint of information literacy hinging on the dissemination of information to others as a method of being able to label an individual information literate. Previous models generally ended with dissemination because they were designed to be used in educational settings and expected that a paper or other educational artifact would be created.

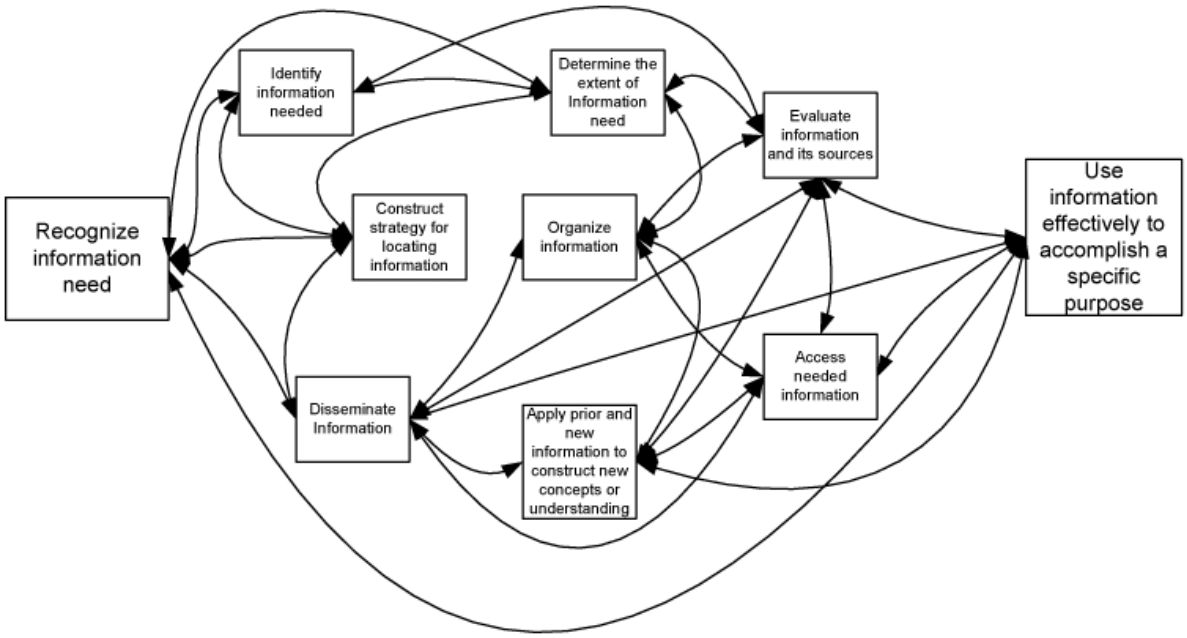

Figure 9: New Information Literacy Model

The change in the model also necessitates a change in phases of information literacy, which can be seen in Figure 10.

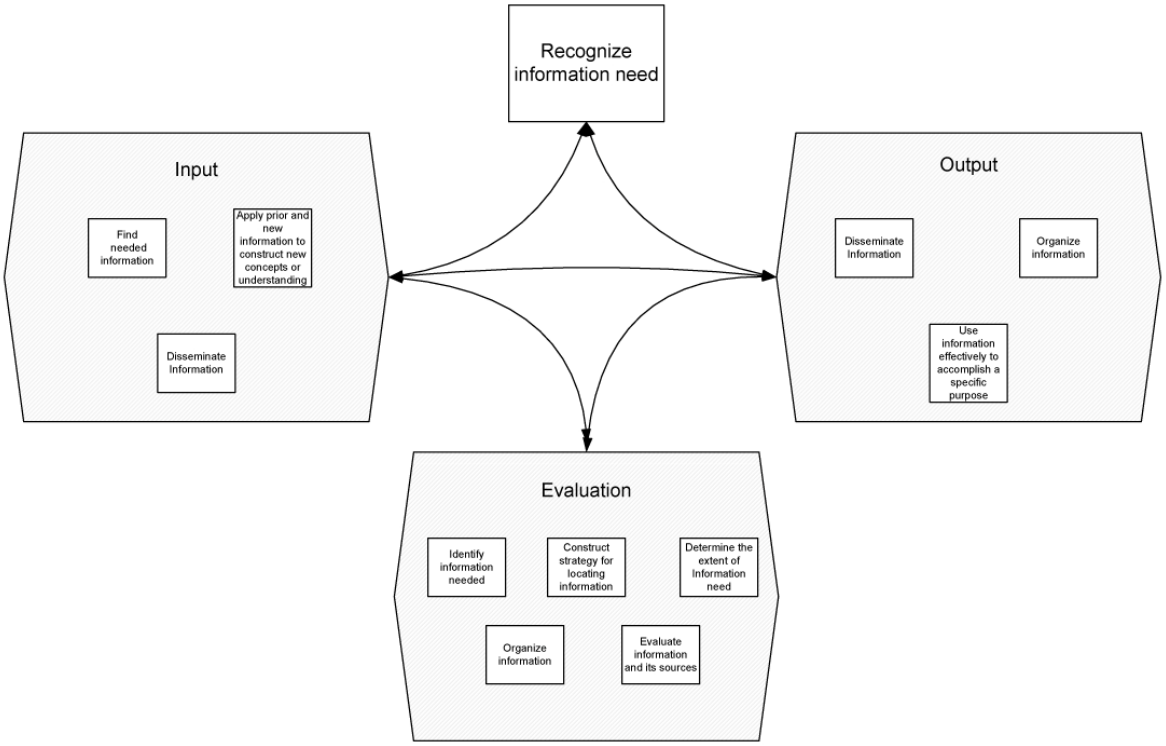

Figure 10: New Information Literacy Phases.

The new phase model divides the phases of information literacy up conceptually, instead of by process position. The input phase contains any parts of the information literacy process where the information seeker receives information: finding needed information, applying prior and new information to construct new concepts of understandings, and disseminating information. The output phase is the opposite, containing the parts of information literacy where an output could be expected from the information seeker: disseminating information, organizing information, and using information effectively to accomplish a specific purpose. The evaluation phase contains most of the traditional parts of information literacy because it is a cognitively evaluative process: identify information needed, construct a strategy for locating the information, determine the extent of the information, evaluate the

information and its sources, and organize information. The division of information literacy by the processes in which the intellectual work is undertaken represents information literacy as a cognitive process instead of a skills-based system that essentially lays out a checklist.

This final model can also be visualized so that the connections between the stages are clearer. In Figure 11 a representation of the stages using different geometric shapes based on the number of connections each stage has to the other stages illustrates these connections more clearly. As is apparent from the figure, no stage shares less than four connections to other stages. Figure 10 is more explanatory in its simplicity, while Figure 11 is included to emphasize the actual complexity of information literacy.

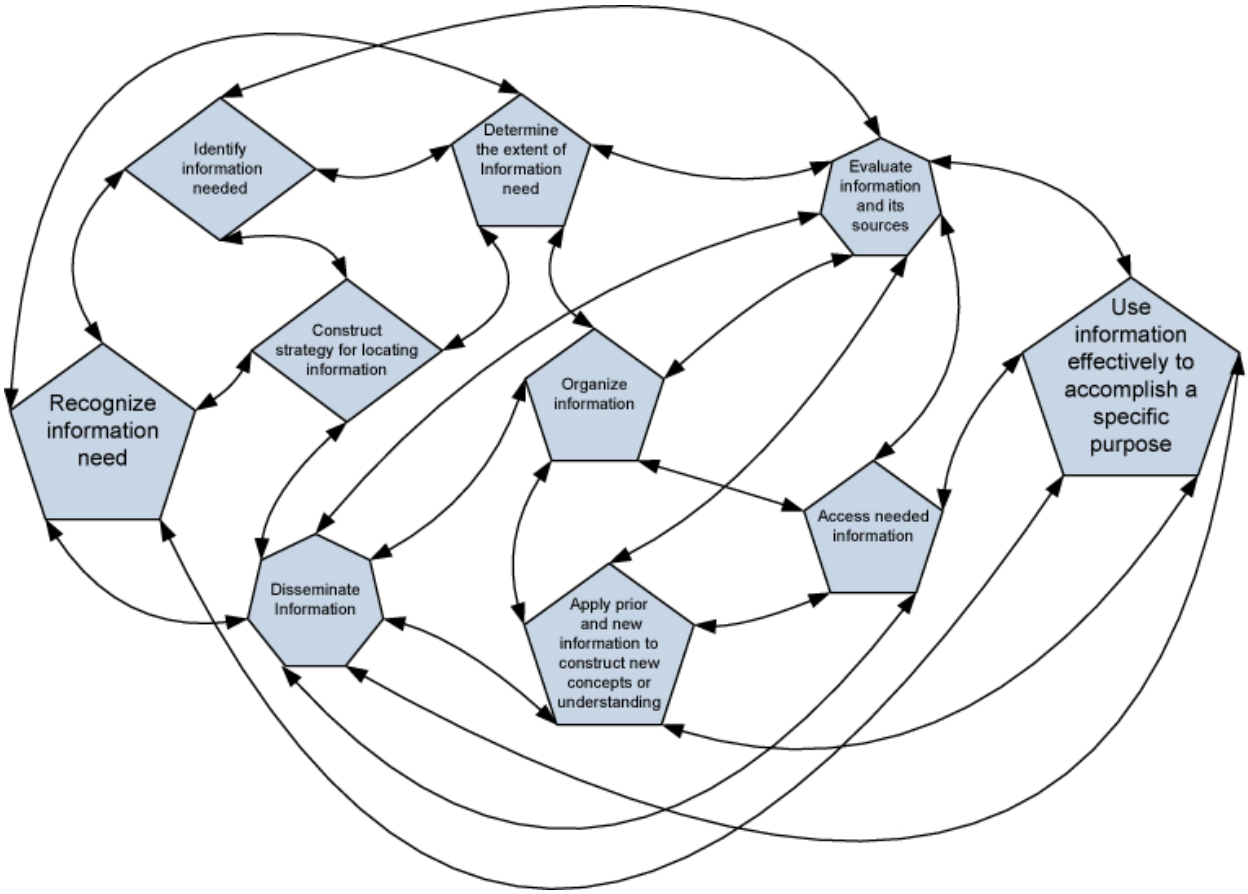

Figure 11: Revisualization of the New Information Literacy Model

Data Collection and Analysis

This section describes the application of this analytic framework by using it as an a priori coding scheme. The data collected and analysis methods are described below.

Data Collection

Data for this study was collected from two different sources: chat logs from within the massively multiplayer game *World of Warcraft* (*WoW*), and the *WoW* Reddit forum. First, the chat logs from within *WoW* were collected during part of a two year afterschool lab with boys age 13-18. These chat logs

contain both chat from the afterschool lab guild members and chat from the virtual community at large. Second, three weeks of forum posts were collected from the *WoW* Reddit forum – a social news forum, chosen because they occurred just before a major expansion to the game which increased the activity in the community around *WoW*. *WoW*'s community is always actively engaged in producing resources and answering forum questions but at a time like this, the community's energy shifts to new levels, not yet examined from an information literacy perspective.

Coding

For this study, coding was selected as the most appropriate data analysis method, with both *a priori* and emergent coding processes applied to the data set (Saldana, 2009; Chi, 1997). The unit of analysis for this coding scheme was *turn of talk*, as a smaller unit of analysis was not necessary to identify *process*. A *turn of talk* in both types of data collected is defined as each time a person begins to speak. The chat logs included 11,232 turns of talk and the forums included 1,074 turns of talk. All data was put into the qualitative analysis software NVIVO for ease of coding. The *a priori* coding scheme described in Table 1 was developed from the framework which was laid out above in Figure 3.

Code	Definition
Recognize information need	To recognize needed information for a particular problem
Identify information needed	To identity information and resources that are necessary to fulfill the information need
Construct strategy	To construct a strategy in order to locate and access needed information to fulfill the information need
Determine extent of need	To determine the extent of information needed to fulfill the information need
Organize information	To organize retrieved resources and information for later use
Disseminate information	To disseminate information to others who have an information need or as a way of sharing results of the information literacy process

Construct new concepts	To apply prior and new information to construct new concepts or understanding
Evaluate information and source	To evaluate information both for its applicability to fulfill the information need and the reliability of the source itself
Access needed information	To access needed information
Use information effectively	To use information effectively to fulfill the information need

Table 1: *A Priori* Codes

This coding scheme was applied to the entire set of chat and chat logs. After the data was coded, it was analyzed for patterns and then quantified using analytic description[1]. Analytic description is an analysis method to illustrate transforming qualitative data into numbers and coupling that with qualitative description. A secondary coder coded both the chat log and forum data to achieve interrater reliability. The interrater reliability for the chat log data was 99% and the interrater reliability for the forum data was 98%, there were both for 10% of the total data set.

Findings

Just as Martin and Steinkuehler (2010) found, this study verified and extended their findings, demonstrating that information literacy is a collective and collaborative process. Once again, the individuals who had questions were not always the only ones to evaluate the information presented to them by others. Community members jumped into conversations whenever they felt they had information to contribute or comments to share. So every time that information was sought, the possibility existed for multiple community members to become involved. The findings of the two data types will be presented based on their type of exchange, synchronous (chat data) and asynchronous (forum data), with examples and analyses of each context and then a combined discussion.

[1] Analytic description is a method of analysis that Constance Steinkuehler uses to describe her analysis method when presenting her work and was suggested to me by her. The term does not appear in any of her publications to date, so this footnote is being used as a method of citation.

Synchronous Information Literacy

In-game chat is a quick means of communication. Social norms generally dictate that any turn of talk should not be over three lines and generally questions are not more than one line. These questions are short and often answered with one or more quick answers from one or more community members. Below is an example from the chat logs between two people that had a conversation in Party chat – which is a chat channel limited to people in the same game group, typically ranging from 2-5 players. This party chat consisted of only these two players, who were working together as a pair. The chat log is annotated with the codes in red, and all creative spelling is original.

> Hatha: What are the perks of frost? Recognize Information Need
> Junos: Its a lotta burt dmg atm, and u can kite mobs with snares Disseminate Information
> Hatha: burt?
> Junos: burst*
> Junos: Whenever anything is frozen u get a 50% increased crit chance Disseminate Information
> Hatha: Would you say it's better than fire? Determine Extent of Need
> Junos: Plus u get the water elemental, and with new new trees free insta cast fireballs Disseminate Information
> Junos: For leveling yes Disseminate Information
> Junos: Fire is better for raw power once u have gear but it is not mana efficient Disseminate Information
> Hatha: At my current level, fire is better lol. But, whatever lol Construct New Concepts
> Hatha: I speced frost, because my prior mage was fire. Disseminate Information
> Junos: Lol
> Junos: Play what we like, they are both good Disseminate Information
> Junos: Fire has a lot better AoE, frost is hard as hell to kill Disseminate Information

In this example, Hatha recognizes an information need, asking about the frost specialization. Junos disseminates information. Hatha then clarifies the question by determining the extent of information, which results in more dissemination of information by Junos. Hatha constructs a new concept and disseminates information about her own experience, followed by Junos disseminating more information. The amount of information provided and the code types seen in the example are typical of

the information literacy process in chat logs (see Figure 12). Recognize information need (41%) and disseminate information (51%) were by far the most frequently co-occurring information literacy processes for this data set. These patterns would be supported by Martin and Steinkuehler's (2010) findings for patters of information literacy. As can be seen in Figure 12, most codes account for less than 5% of the total or were not coded at all. This is reflective of the fast pace of conversation with in-game communication, driven by the fact that most people are engaged in in-game activities at the same time as they are chatting.

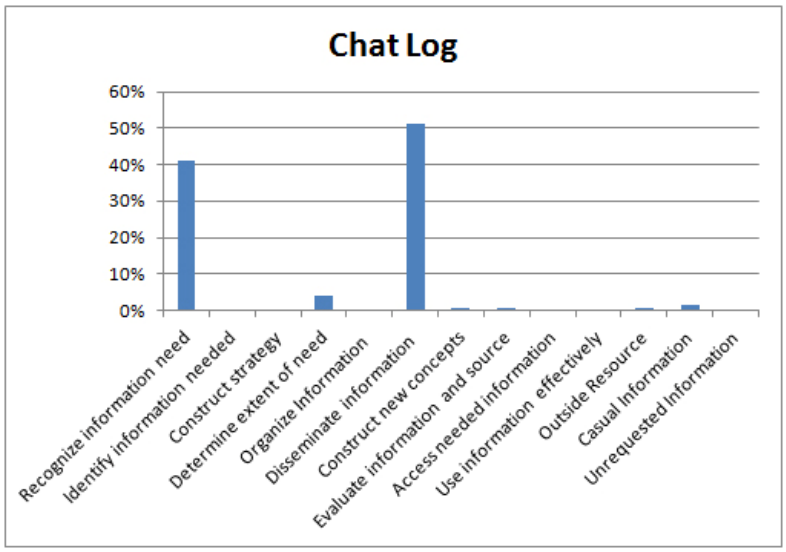

Figure 12: Chat Log Code Frequencies

Emergent coding for this process was minimal. However, there was a need to add two new codes for the chat log data: Outside Resource and Casual Information. *Outside Resource* was developed through coding the in-game chat logs, as when the answer to a question is too long or complicated to explain in chat, players may be directed by their peers to find outside resources. *Casual Information* was also developed out of coding the chat logs. In conversations between people who knew each other — in

person or in game—a form of information exchange would sometimes occur that is information seeking without a real need, conducted more for the purpose of conversation.

Asynchronous Information Literacy

As can be seen in Figure 13, the number of information literacy processes used in the forums is much larger than in chat logs. *Disseminate Information* accounts for 61% of coded posts, while *Recognize Information need* is only 9%. This is in stark contrast to the coding for the chat log coding (51% and 41%, respectively). The difference is that in forums there are usually only a couple of questions per thread, but with much more dissemination of information and negotiation between community members because of the allowance of asynchronous time which gives the community the opportunity to give more detailed answers. *Evaluation of Information* is much higher (13%) than in chat logs (1%), which stems from the fact that discussion in forums can be lengthier and more detailed, with the asynchronous context allowing for more time to give responses and negotiate appropriate responses.

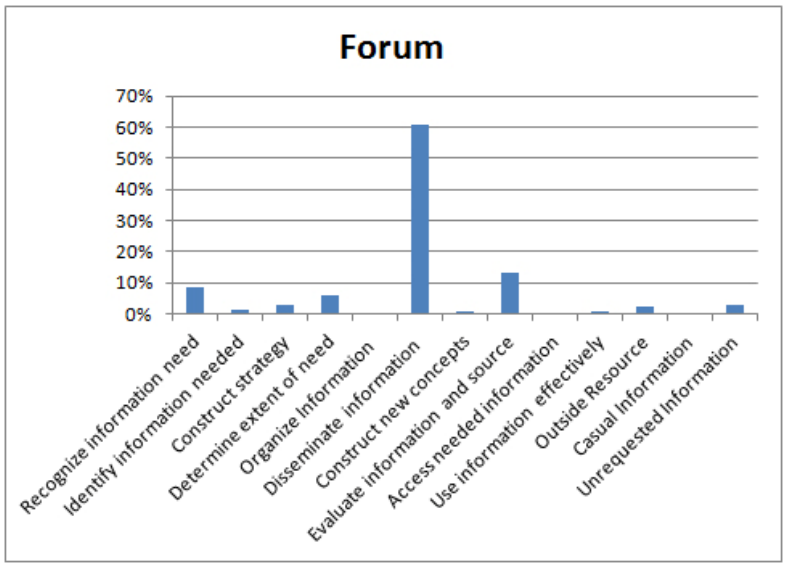

Figure 13: Forum Code Frequencies

The final emergent code, which developed from coding the forum post data, is *Unrequested Information*. Occasionally, a participant would specify their information need but when other community members suggested a specific form of information, the information seeker would reject the suggestions and state that he was not interested in that particular type or source of information. As can be seen by Figures 12 and 13, these emergent codes did not show up often and are consequently not included in the new information literacy framework, but they do note interesting practices worth mentioning here.

An example of recognition of a need for information in a forum context is shown below. The question comes with a considerable amount of explanation, which is much different than the chat log example given earlier. In this situation, where the communication is asynchronous, the in-depth nature of the question helps the community give precise and tailored answers.

> "Sorry for the noobish question. I do know the basics. But I'm wondering, are druids supposed to be at a disadvantage tanking packs of mobs? My normal rotation for packs of 4+ is demo roar, swipe, lacerate, maul, switch targets, lacerate, swipe, maul, taunt if necessary, repeat. If things get out of hand I'll pop a challenging roar or a Berserk.
> Now the way I normally tank is assuming focus fire from the DPS. But AOEs and spells like chain lightning seem to be all the rage these days. How do I hold pack aggro in groups with unfocused DPS? Right now I'm doing a lot of target switching and I don'tthink that's right. Should I be telling my DPS to avoid AOEs and multi-target attacks until I get some aggro? I know I'm running low-level dungeons but I'd like to tank in Cata and I don't want to pick up any bad habits.
> tl;dr halp i r not good with bare ('''\ º_º /''')?? [sic]"Recognize Information Need, Determine the Extent of Information, Disseminating Information, and Construct Strategy for Location

Below is a single response out of the many given to this detailed question:

> "Your question demonstrates that u r good with baer; you're asking all the right questions and demonstrating knowledge of a pretty good rotation.
> This link is a little outdated (because 4.0.3a has nerfed bears a bit from where they were in 4.0.1), but I think it gives an excellent overview of the state of bear tanking right now. As for my view, I think you are perceiving a change in the game dynamics that was partially introduced in

4.0.1, and which has not yet come to fruition because we're not running Cataclysm content yet. You're running Wrath content with the wrong toolbox. I think there are three answers to your post:

1. Cataclysm is supposed to change tanking styles dramatically. As you said, AOE was "all the rage" in Wrath. DPS haven't had to focus fire in a long time, and they certainly aren't going to do it in these last waning days. Everyone (including Blizzard blue posters) swears that this has changed in Cataclysm, and that we will be moving to a system where crowd control and focus fire are absolutely necessary. That is why Blizzard deliberately nerfed tanks' AOE abilities in 4.0.1 -- to *force* the entire group into the more-complicated system, and to bring an end to the AOE fest that Wrath has become. It is annoying in Wrath content, but that is a temporary condition.
2. Swipe. Swipe was nerfed in 4.0.1 to give it a 6 second cooldown and prevent the common swipe-spam; it was recently nerfed yet again so that it even less damage. It's an adequate tool, but we're expected to be using all our tools to hold AOE threat. Remember, we're not supposed to be AOE tanking anymore, and the new swipe reflects that.
3. Thrash. We're missing a key tool. Bear AOE is currently balanced (it seems to me) around the "thrash" AOE talent, but you only learn it at 81. I think that our AOE abilities should improve in Cata once we learn the talent. Right now, I can hold threat on a group of mobs (using more or less the system that you describe), but it seems like I have a weaker toolbox than other tanks I run with. It's definitely a lot harder (thank goodness) than the days of "swipe spam." I am hoping that Thrash evens out the toolbox so that AOE is doable but not quite such a chore.

Hang in there. You're dealing with bored DPSers right now, and a transitional period. In a few levels (and a few days), bear tanking will change significantly, and the game will catch up to where you are. [sic]"Disseminating Information, Outside Resource

Discussion

From what has been seen in the previous sections, the practices of individuals and groups in the community demonstrate expressing a need for information, helping others with that need, and evaluating the information being presented, which offers an illustration of the process of information literacy for the digital age, especially in affinity spaces. As can be seen in Table 3, *Organize Information* and *Access Needed Information* have both been eliminated because they either did not show up in the data or only did so at a very low frequency. *Identify Information Needed* was wrapped into *Determine the Extent of Need*. These were combined because through coding, *Identify Information Needed* was

found to function as a subset of *Determine the Extent of Need*, in that in order for someone to determine the extent of their information need they also have to have an idea of what type of information they are looking for. This new coding scheme offers a descriptive model based on actual *in situ* information literacy practices, and are in turn reflected back to adjust the information literacy analytic framework, which you can see in an updated form in Figure 17 below.

Code	Definition
Recognize information need	To recognize needed information for a particular problem
Construct strategy	To construct a strategy in order to locate and access needed information to fulfill the information need
Determine extent of need	To determine the extent of information and the resources needed to fulfill the information need
Disseminate information	To disseminate information to others who have an information need or as a way of sharing results of the information literacy process
Construct new concepts	To apply prior and new information to construct new concepts or understanding
Evaluate information and source	To evaluate information both for its applicability to fulfill the information need and the reliability of the source itself
Use information effectively	To use information effectively to fulfill the information need

Table 2: New Information Literacy Coding Scheme

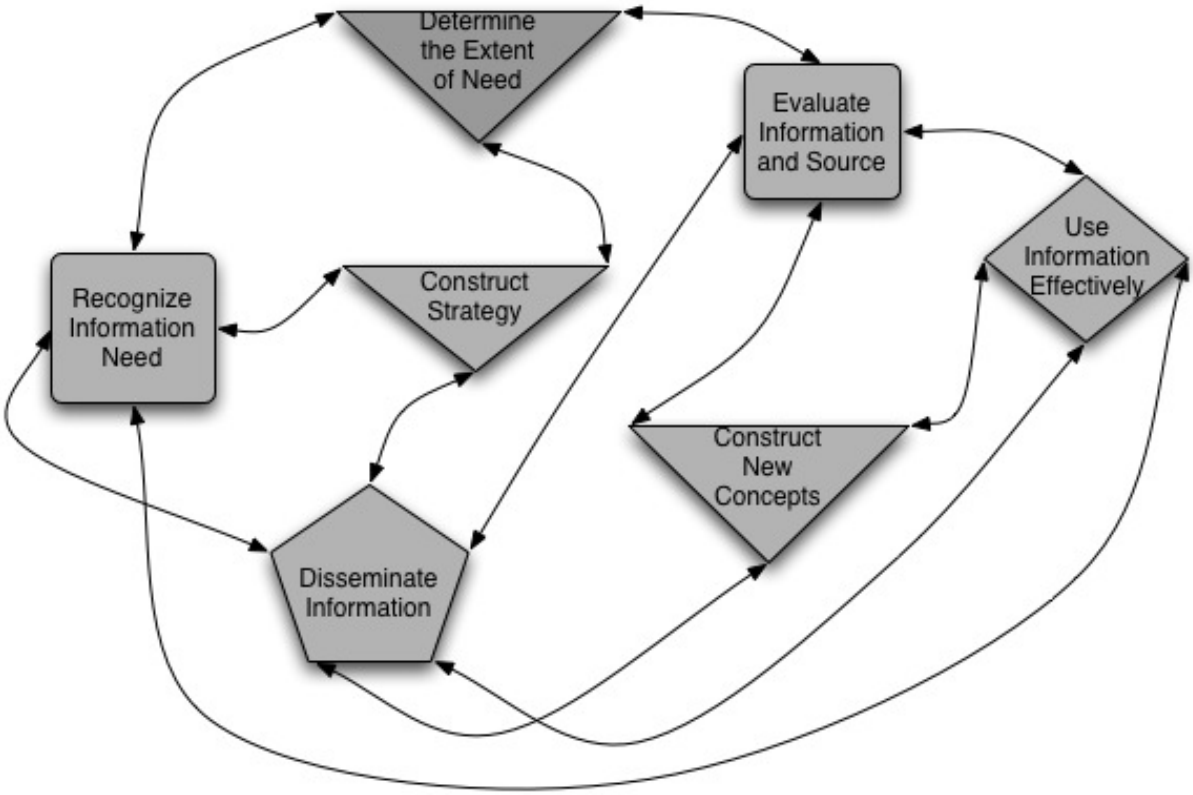

Figure 17: New Information Literacy Analytic Framework

My data does not capture elements of information literacy that do not leave a visible trace in these contexts. For example, the forum data does not include information on whether the participants used other websites, classified that information as poor, and then returned to this site. Consequently, my codes only include information seeking practices that are communicated in text. However, this does not mean that the practices are not taking place just that they do not leave visual evidence in this format.

Conclusion

From the literature review and the development of the analytic framework it is easy—and unfortunate—to see the linearity of the traditional models. Those models were prescriptive, and based solely on what professionals felt information literacy *should* be. However, these traditional linear

models offer limitations that do not accurately capture the visible practices that information seekers engage in within contemporary information environments. This new model offers a look at *authentic* information literacy practice. This model is flexible, non-linear, and designed to function in contemporary information environments like affinity spaces. Next steps for this research would to show that the more flexible model that describes what individuals in these spaces actually do is as high of quality as the linear model, which is prescriptive under the assumption that it's better than the naturalistic model.

CHAPTER FOUR:

Collective Intelligence & Information Literacy

Literacies and literacy practices around online affinity spaces function at multiple levels. There are practices employed by individuals, practices used at the group level, and eventually, practices used at the level of a greater collective intelligence. The collective intelligence of communities with shared interest-driven activities like those around video games or hobbies like knitting offer a great information source for those who participate in the community who need information or who are getting to know the community. This system of recognition of skills and abilities is prevalent in virtual worlds where a person's knowledge of the game and the affinity space, as well as their ability to share it with others, is an important way to be recognized as a master. Pierre Levy (1997), the father of collective intelligence, felt that games were not a good place for collective intelligence because he saw MUDs (Multi-User Dungeons) as a lesser form of "collectively secreted shared memory" (Levy, 1998), creating a map of interests of the changing community. Levy felt that the community around games was not rich enough to support collective intelligence. However, at the time of his research he was looking at online gaming in its infancy, and therefore his theory does not necessarily account for the complex literacy practices of modern game communities.

Participatory culture (Jenkins, 2009) is one way to illustrate practices that are seen in game communities. The literature on participatory culture is well established, and the literature review has already established that game communities are affinity spaces with participatory cultures (Chen, 2011; Martin, 2011; Steinkuehler & Duncan, 2009). However, participatory culture has not yet been used to operationalize collective intelligence to facilitate observing collective intelligence practices. The object of

this chapter is to demonstrate the participatory culture of the *WoW* community uses collective intelligences.

Collective Intelligence

Levy (1997) focused on the potential importance of the resources of a network of people, prioritizing the context of online communities. These resources may be the most useful goal of a social group, especially the development of connections between the cognitive abilities within a structure of collective intelligence. This view of human intellectual capacities and information communication technology is not to replace people with machines or to promote a cybernetic intelligence—instead it is to encourage the development and use of communities of intelligence, of groups of people's social and intellectual potential.

Collective intelligence, as defined by Levy (1997), "is a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skill" (13). Collective intelligence, although counting on the intelligence of the group, also relies on apprenticeship in the intellectual community, meaning that every time a query is made of the affinity space and information is returned, one participant has taken on the role of the apprentice or learner and one or more have taken on the role of the mentor. This sharing of information creates a "circuit of exchange" and cultivates a "sociability of knowledge" (11). The purpose of collective intelligence is "the mutual recognition and enrichment of individuals rather than the cult fetishized or hypostatized communities" (13). Collective intelligence is based on growth and development of individuals, not an amalgamation process where the thoughts and intelligence of all individuals are melted down into a

molten mixture where no individual is distinguishable. The transition is from *cogito* (I think) to *cogitamus* (we think); it is an awakening of many thinking for themselves.

For Levy (1997) the ideas of economy and human labor are inextricably linked to collective intelligence. He posited that individuals and microcorporations will play a major role in economic activity in the future. Levy also supported the notion that the abilities of people should be supported and encouraged whether or not the production creates commodities that are part of the economic system. With this change in what is considered important, human economy should, according to Levy, force the move to singularization as opposed to particularlization, which means that the work should be specialized to the person and not just about fitting people into existing categories which may be a poor fit for the individual. Credentialing, certification, and other forms of recognition of skill are deficient at recognizing skills of non-credentialed people and recognizing equivalency across institutions (Levy, 1998). Data stored in the virtual world can be broken down to its basic parts of zeros and ones, making them indistinguishable from each other. This is very much like the way humans are coded by certificates for accomplishments. Levy advocated for a knowledge tree to assess people's skills, which would give a more accurate, fine-grained, and detailed estimate of what a person's skills are; he also believed this method would be a recognition of skills completely disconnected from a preconceived hierarchy of knowledge. However, semantically, in my interpretation being a knowledge tree instead of a knowledge *web* still implies a hierarchical order. In addition to credentialing processes, work has also been affected by the digital age. Work has become a continual process of learning, transmitting skills, and producing knowledge (Levy, 2001, 137). Working in the digital age is a process of learning new technology, reskilling, and finding new information to deal with change; in short, a process of information literacy as was discussed in chapter one.

Levy (1997) distinguished collective intelligence from any sort of singular intelligence by pointing out that collectivity does not equal solidity or uniformity, and is not mono-thought. Instead, the larger the number of intellects that one person is involved with, the larger the pool of knowledge to which that person has access. These collective intellects develop ever-changing languages and construct virtual worlds and cyberspaces (139) for the creation and navigation of knowledge (118). The collective intellect is always working within a shifting and changing information universe. The structure of the information universe is not an *a priori* structure but instead is developed and changed by the collective intellect itself.

Virtual worlds were a major focus of Levy (1997) as a place to see collective intelligence at work. He stated that, "virtual worlds will thus emanate collective intellects and depend for their existence on the human communities from which they arise" (100). The creation of new tools will be needed to create environments for "cooperative parallel processing of problems" (61). These tools need to allow for the navigation and retrieval of information, as well as for communication and the creation of networks and relationships amongst people who share an interest in similar activities or have similar skills. Information around virtual worlds forms with no boundaries or order, but instead develops in a space that is continuous in all directions. A user in a virtual world is not limited by the position of their avatar in the world in terms of access to information but instead has access to all the information in the world, even if some information is not intellectually or conceptually understandable at the time (Levy 2001).

Collective intelligence privileges the idea of virtual, and sets virtual in opposition to real, which I feel is a false opposition. Yet, Levy (1998) felt that virtual versus real is a false comparison, instead the comparison should be between virtual and actual, which are two different ways of being, with

actualization starting with a problem and moving to a solution, and virtualization starting with a solution and moving to a problem (27). Here Levy is changing the comparison to two types of thinking as opposed to the stark comparison between the "real world" and "virtual interactions". Levy viewed this virtualization as a transformation or extension of the actual world. He clarified this position by using the process of *reading* which included "arranging, selecting, diagramming, constructing a semantic network, and integrating acquired ideas with memory" (63) and then viewing reading through a lens of hypertext within digital technology, which virtualized the process.

Not everyone thinks that the progress of this digital communication is positive or worthwhile. For dissenting opinions, Lanier (2010) and Keen (2008) are two of the loudest voices. Their views are those of catastrophe and alarm, complaining that their world and all other peoples' very way of life are in jeopardy because of the effects of the collective actions of people online and the general effect of modern digital technology. Lanier (2010), for example, referred to people who supported Creative Commons as "digital Maoists" (16). Andrew Keen (2008) opened his book by stating the our cultural standards and moral values are at stake, as well as our traditional institutions, by which he means publishers of books, television shows, movies, etc. (7), because of weblogs, social networking, and virtual worlds. Keen feels that the lack of traditional institutions and authorities destroys reliability of information and therefore feels that social media is destroying the quality of information.

Levy (1998) pointed out some issues of collective intelligence, mainly that the theory could be interpreted that people as a group are always more intelligent and creative than individuals, but he did not encourage the theory being used in this way. Instead, like all other decisions people make, collective decisions can produce positive and negative outcomes. Levy also felt that collective intelligence should not be used to distribute knowledge of all types to everyone in equal amounts such that each person

has the same amount of art and science knowledge, for example, but instead to recognize the vast nature of human skills and abilities and to appreciate this diversity as a part of the culture of human knowledge.

Levy did not think that video games could cause the emergence of collective intelligence because they are determined by fixed rules, whereas what he termed as virtual worlds are a new representation of the complexity of human life, and consequently rich enough for collective intelligence. At the time Levy wrote MUDs were the online game; Levy (1998) saw this as a lesser form of "collectively secreted shared memory", creating more of a map of interests of the changing affinity space. However, Levy did not explore the collective intelligence that happens in the information universe around games, especially massively multiplayer online games. I hypothesize that such spaces are rich enough to necessitate emergent collective intelligence, and to that end, I have developed a new lens that is more attenuated to the interactions that occur around such games. Here is a checklist of seven of the most important characteristics of Levy's theory of *collective intelligence* which occur in MMOs.

- Participation – *there has to be active participation from the community*
- Interested individuals – *those participating in the community must be interested in the topic*
- Online community – *the community must be online*
- Distributed intelligence – *multiple people sharing information*
- Constantly enhanced – *the information available is constantly improved*
- Coordinated in real time – *participants in the community can interact in real time*

- Growth and development of individuals – *each participant has the opportunity to develop their expertise within the topic*

This list will be revisited later in the chapter as it is operationalized and used to analyze the data.

Participatory Culture and Collective Intelligence

A participatory culture is one in which the focus is moved from the individual to the community (Jenkins, 2009). It has low barriers to artistic expression and civic engagement, with strong support for creating and sharing one's creations with others. Participatory cultures also display some type of information mentorship whereby what is known by the most experienced is passed along to novices. In such cultures participants believe that their contributions matter and feel some degree of social connection with on another (7). Without participatory culture there is no contribution by individuals, and therefore the distributed network of people that creates a collective intelligence does not come to fruition. Consequently, I posit that participatory culture is a necessary ingredient for the creation of collective intelligence, and an appropriate way to operationalize Levy's theory of collective intelligence.

Collective intelligence provides an all-encompassing view of the intellectual interactions of the group. Through participatory culture, collective intelligence is a way to examine what goes on in these groups. The role of online communities and online affinity spaces in learning from the perspective of participatory culture is that these spaces are the underlying foundation around which collective intelligence happens. Learning happens in the form of community discussions and information sharing, while the collective intelligence produces a solution to a problem or an answer to a question. The culture is of individuals working together to create information and distributing it using their combined intellect and experience to solve problems.

This effect of collective intelligence mobilizing people of an array of skills and a common interest can be seen in many communities on the web outside of virtual worlds. Jenkins (2009) explored the knowledge community around *Survivor*, a reality television show, as the affinity space used a collective intelligence approach to determine which contestant would be the winner of the show before the final episode aired, or where the next season is being filmed. A collective intelligence is held together by the dynamic and social process of acquiring knowledge, which allows for continuous participation and the reaffirming of social ties. This is a different approach than that of the expert paradigm described by Peter Walsh per Jenkins. An expert paradigm creates an exterior and an interior with people either being in or out, with established rules about how information can be accessed the information, and the experts have been credentialed through some process that gives them the status of master. Collective intelligences, on the other hand, are open for everyone to contribute, have no stated order or method for information access, and allow for the demonstration of knowledge to be up to the individual (53-54).

Jenkins (2009) saw collective intelligence function in what he calls convergence culture, or the space where different types of media, digital and traditional alike, meet and mingle. This is a space where activities like “spoiling” the *Survivor* season take place. Through these activities, people, including school-aged children, learn to navigate sophisticated knowledge cultures that include skills not always successfully taught in school. To fully participate in a convergence culture, a person needs five skills: (1) ability to pool knowledge with others in a collaborative environment, (2) ability to make connections across scattered pieces of information, (3) ability to share and compare value systems by evaluating ethical dramas, (4) ability to express your interpretations and feelings toward popular fiction through your own folk culture, and (5) ability to circulate what you create via the Internet to share with others (185). These skills, which bring together both information literacy and critical thinking skills, can be used

to ends other than those of pop culture. They can create a critical citizen and raise civic engagement for the people who are interested, utilize collective intelligence to parse information, organize, and produce actionable activities. An example of this would be the alternative reality group *Collective Detective* which outlined the following steps for analyzing data for government corruption: (1) research into sources of information, (2) research within sources, (3) research to see what kind of correlations can be drawn, and (4) conducting secondary research to help tie together the connections that were found (244). Through activities of interest and choice, people are developing and using abilities, many of which are information literacy practices such as being able to evaluate, determine trust, argue against, disseminate and utilize collective knowledge, that are vital for lifelong learning, engaged civic participation, and a general ability to navigate the vast information universe.

Jenkins (2006) also studied the phenomenon of participation through the activities of fan fiction communities, which, like communities around video games and other online collaborative spaces, have been devalued and considered intellectual waste lands, often times mocked and ridiculed for the activities that take place there. These fan cultures are driven by interest and desire for greater depth and breadth of a story, and there is often an intensity displayed by those who participate, as well as vast input of time and labor put into the uncompensated activity of developing stories. The participation of fans allows for the creation of participatory culture, and has developed because of new widely available technology and tools, as well as the increasing interest in DIY ("do it yourself") media production. These communities define their participants by affinity for a topic or method of participation. They offer a new information space with many changing forms of recontextualization, as well as a new collective intelligence, which is a conglomerate of ideas and information provided by the varied participants of the

affinity space with their many diverse specialties. Such a collective intelligence creates a greater information source and greater knowledge than any one participant could offer individually.

In summary, collective intelligence is intellect pooled across groups of people to solve problems and create new information. In the digital age, the connectedness of individuals through digital communications and the instantaneous nature of those connections create a ready platform upon which collective intelligence can flourish. Collective intelligence can be seen as every individual being culture, not a part of the culture but the culture itself. The individual, although vastly important for input and reasoning abilities, is, at the same time, more inconsequential than in any of the previous theories and methods. The individual is only a part of the larger whole and the functioning of that larger whole is what is of interest. Participatory culture is a necessary ingredient for the creation of collective intelligence. A participatory culture is one in which the focus is removed from the individual to the community, affinity space, or collective (Jenkins, 2009). Participation is essential to collective intelligence; in order for collective intelligence to be achieved, the participation of many interested individuals is required.

Collective Intelligence Operationalized

The theory of participatory culture was used in order to operationalize collective intelligence. Below is a modified checklist based upon the list provided in the collective intelligence section (mapping codes to Levy's characteristics are noted in brackets).

- Low barriers to participation – *there has to be active participation from the community* [Participation]

- All levels of expertise can participate – *anyone with interest can participate in the community without being an expert* [Participation]
- Interested individuals – *those participating in the community must be interested in the topic* [Interested individuals]
- Online community – *the community must be online* [Online community]
- Distributed intelligence – *multiple people sharing information* [Distributed intelligence]
- Constantly enhanced – *the information available is constantly improved* [Constantly enhanced]
- Coordinated in real time – *participants in the community can interact in real time* [Coordinated in real time]
- Growth and development of individuals – *each participant has the opportunity to develop their expertise within the topic* [Growth and development of individuals]
- Information mentorship/apprenticeship – *mentoring and apprenticeship amongst these participants around the exchange of information* [Growth and development of individuals; Interested individuals]
- Social process of acquiring knowledge – *there is an opportunity for social interaction between members of the community to gather information* [Growth and development of individuals; Participation]

The reason I choose to operationalize collective intelligence is because Levy's explanation of collective intelligence is theoretical. Operationalizing and coding is important for demonstrating this theory in data. Jenkins' participatory culture both provides support for application and a more modern viewpoint of technology, so may be more aligned with actual community practices.

Methods

This study explores the research question: Does collective intelligence happen in these affinity spaces? The data was collected purposively from the Reddit *WoW* forums (http://www.reddit.com/r/wow/). Reddit is a large collection of online forums covering a range of topics from video games to current events to cooking. This space was selected because it is a very active forum for discussing *WoW* in general, has low barriers to participation, allows participants to have any level of expertise, is composed of interested individuals as the forum must be intentionally sought out, and is online. Furthermore, participants can communicate in real time, although the context also affords asynchronous participation and information seeking. The threads collected were specifically selected because they were posted in the three weeks prior to the release of *Cataclysm*, the third of *WoW*'s expansion packs, but after the major patch released to prepare for Cataclysm. This chunk of time was chosen because the expansion pack would change a majority of the areas within the game, revise large amounts of game content, and add a completely new area with new content. The reason that this is important is that most resources around *WoW* are peer-produced and the community uses collective intelligence in order to solve problems and propagate information for the resources. Consequently, the timing of data collection insures that the community is actively improving the information space, as major changes to the game have just been made.. A total of 42 threads with 1,074 posts were collected and analyzed.

Analysis

To determine the effectiveness of the collective intelligence of this community, qualitative coding (Saladana, 2009) was employed using a coding scheme specifically to determine the types of

interactions in each post. The coding scheme for this analysis was developed not only to whether the responses from the community were accurate within a given post, but also to identify the other types of communication within posts.

Code	Definition
Question	A request for help, information, or opinion.
Correct Responses	A response that was deemed correct by the community and cross-checked by me on an established community created game wiki.
Incorrect Answer Responses	A response that was deemed incorrect by the community and cross-checked on an established community created game wiki.
Agreement Responses	A response of agreement that does not add new information to the discussion.
Acknowledgement Responses	A response that recognizes another response but does not necessarily agree.
Subversive Responses	A response that is intentionally negative or demeaning toward another participant on the forum or a response that is intentionally antagonistic. The response may or may not add new information to the discussion.
Superfluous Responses	A response that was given that had nothing to do with the discussion, though it may be good information.

Table 1: Collective Intelligence Coding Scheme

The coding scheme was applied across all 42 threads using single posts as the units of analysis. The determination of correct and incorrect answers were based on the consensus of the collective intelligence on the forums, as well as checking against the collective peer-produced information available on wowwiki.com (if data analysis was happening currently, wowpedia.org would be chosen because it is the current preferred knowledge compendium for the *WoW* community).

Correct responses were coded most frequently, at 68%, as Figure 1 demonstrates. Below are two correct answers that build on one another responding to the statement, “Just tried healing for the first time…now I think it should be a mandatory experience.”

> Respondent 1: Difficulty healing is inverse to the skill of the group.
> Sometimes the prot warrior is stacking Int while using a 2 hander and sometimes you get an insane prot pally who does so much self healing that you switch to your DPS off spec for fun.
> Respondent 2:Wow, you were down voted for that? -have an upvote
> That is best way to explain healing difficulty. I see it every time I queue, exactly how you put it. Assuming that the healer is geared for the content and knows how to play their choice of class, not counting instance mechanics, healing difficulty entirely relies on the choices made by the other members of the party. Choices dictated by experience and knowledge or lack thereof.
> To give an anecdotal example that proves the reasoning. (Playing a 46 priest)
> Had a pally doing exactly as you said, healing himself and not over-pulling. Even when he did pull huge groups, I was given a heads-up and afterwords time was taken to mana-up. The run was smooth and I barely had to drop below 80% mana.
> Inversely, I got into a group shortly after for the same instance with a paladin who felt it would be a good idea to consistently pull more mobs then he could hold aggro on. Keeping us constantly in battle, not allowing any time to replenish mana. I was able to keep him, and the group alive riding on little to no mana. A break in the action came as he rushed onward to find the next group, I got from 5% mana to 15%, he pulled 3 groups of enemies with fear and poly-morphing abilities. Upon arrival, I got off a PW:S and was quickly sheep'd. The tank got feared around a corner, pulling another group and subsequently dieing before I could reach him. [sic]

Questions are only about 10% of the total data coded, which means that there are nearly seven correct responses for each question. Below is a an example of a unit coded as a question:

> You didn’t find Freya and Mimiron more challenging? [sic]

Incorrect responses were less than half a percent of the total; these were incorrect responses given by members of the community that were both corrected by the community and uncorrected.

> Incorrect Statement: Yep, Wow is awesome. It’s like a happy country with 15 million people spread into two parties across several provinces that only deal with each other in dungeons and battles. [sic]

> Correction: Except there aren't any servers that have even close to 15 million people playing on them, but…yes…a lot of people! [sic]

Less than half of one percent is a small error rate for over 1,000 posts. However, if there were 68% correct responses, less than half of one percent incorrect responses, and 10% questions, what makes up the rest of the posts? The other roughly 21.5% is made up of other forms of communication that do not necessarily provide new information for the community.

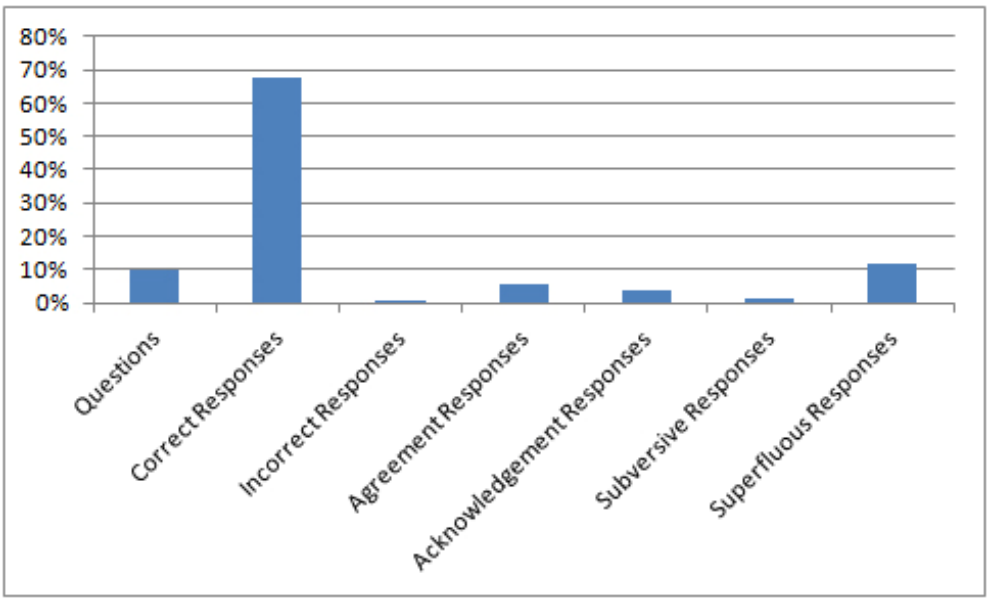

Figure 1: Percentage of Total Posts

Agreement responses (6%) and acknowledgement responses (4%) are basic communication actions between members of the community. Despite the fact that these may seem inconsequential, they actually play an important part of the collective intelligence, as agreement responses are used to build consensus amongst the community.

> I agree. I was originally going to say something like blink depending on how it worked but flight form would be so much better.

Agreement responses can also be used to give particular answers more weight—that is, to mark answers that are considered by the community to be most relevant. Acknowledgement responses function slightly differently. They are used as a way to mark that a person has accepted the answer given from someone in the community.

> I just copied from a mouseover macro forum post ages ago, it still works so I never bothered looking for updates, thanks :) [sic]

They can also be used as a way to politely disagree with someone in the community.

> 'Queue for some battlegrounds.' Sadly, I'm on a very poor BG battlegroup. Also – there is no feedback as to how well I'm doing. [sic]

Subversive responses make up one percent of posts. This may seem insignificant but subversive responses pose a very big challenge to the community. If the community cannot tell when someone is being subversive it can test the collective intelligence of the community.

> if you dont know what to do now, maybe you should just leave the internets. [sic]

Subversive responses can be negative and demeaning.

> You can go walk out onto the highway and auto-attack a bus now.

Subversive responses can also be comments that are intended to derail the conversation, usually made by trolls, those who make intentionally inflammatory remarks.

> Healing (and probably tanking too) is one of those things you do for idealistic reasons…like insta-queuing ;)

Superfluous responses can come in many forms and they produce a lot of conversation on the forums. The problem is that the superfluous responses can pull a discussion completely off track.

> Well, and the occasional jaunt over to /r/jailbait or /r/gonewild… WHAT, WHO ME?

However, useful information can be conveyed in this superfluous talk even though it is off topic.

> Don't forget modifiers! You can keybind Q, Shift-Q, Ctrl-Q, Alt-Q, Ctrl-Shift-Q, Alt –Shift-Q …. etc etc I've got all my spells bound around WASD. Can't PVP otherwise. I even wrote an addon to maintain them. My mouse does nothing but manipulate the camera and select specific targets. [sic]

The challenge to those using these community resources is deciding what is useful to the question at hand, what is useful information for a specific question, and is just white noise.

Results

The data corpus shows evidence of all of the items from the new checklist of Levy's collective intelligence characteristics operationalized through the lens of participatory culture. The environment of the affinity space supports low barriers to participation, allows participants to have any level of expertise, is composed of interested individuals, as the forum must be intentionally sought out, and is online. The space also allows for participants to communicate in real-time. Although the forum was asynchronous, information was given in real-time, and no censorship occurred between the people asking the questions and those answering them. The participants can share information using the distributed intelligence of the community. The information was continuously enhanced by those participating in the forums, providing a high percentage of correct answers and support for correct answers in the form of agreement.

Finally, the three items remaining on the checklist (i.e., social process of acquiring knowledge, growth and development of individuals, and information mentorship/apprenticeship) also exist in the examined community, as evidenced by the data provided previously. The growth and development of individuals in the community is not necessarily obvious without study. The communal nature of these

spaces creates a atmosphere where often times growth and development are tied to mentorship and apprenticeship. As seen above, people asked detailed questions about strategy and process that were answered in detail by the community, and the individual asking for information often acknowledged the information given and asked follow up questions. Then after employing the information, the asker would come back to the discussion thread and report back to the group the outcome of the trial. These situations are perfect examples of information mentorship and apprenticeship, which can be seen throughout the data. The information is sought by someone who has a recognized information need, and is assisted by someone of greater expertise in that particular area. The follow-up questions asked for clarification and the continuing flow of information strengthens the mentor(s)-apprentice bond.

Building on the previous checklist items it may seem redundant to say that this space does have a social process of acquiring knowledge, but beyond the social aspects just mentioned, the coded data demonstrate the social nature of knowledge acquisition. The frequency of codes used on the data illustrate both the social nature of asking and answering questions and the exchanges around information that are more community relevant, like acknowledging and agreeing mixed with statements that have been made for superfluous or subversive reasons which really serve a social (potentially positive or negative) purpose.

Conclusion

The collective intelligence of the participatory cultures of affinity spaces offers benefits and challenges for the community. Overall, the effectiveness of the collective intelligence is high, offering a very consistent rate of correct answers generally corroborated by multiple answers that offer varying levels of intricacy and sophistication. Challenges to the community are offered through the

determination of what is misinformation, what is misleading information, and what is off topic information. However, with the help of the collective intelligence of the community, members of the community can navigate these pitfalls and distractions. Levy (1998) was wrong about collective intelligence in game communities. His lens on these communities may have been appropriate at the time he originally wrote about collective intelligence, but the way these communities function currently demonstrates that they are centers for collective intelligence. New nomads, the roamers of digital spaces, require faster change than traditional institutions and lenses can keep up with, just like the creation and recreation of information spaces around virtual worlds.

CONCLUSION

In this dissertation I explored the following research question: What are the forms of information literacy practices engaged by participants in by an online affinity space? Specifically:

SubRQ 1. How do players situate themselves within the constellation of information available around their affinity space? [Chapter 2]

SubRQ 2.How are information literacy processes practiced in the community? [Chapter 3]

SubRQ 3. Does collective intelligence happen in these affinity spaces? [Chapter 4]

In Chapter 1, I established a base of literature from which the research was developed, by bridging boundaries between fields of research, in this case information literacy and digital media and learning. In Chapter 2, my research had participants in the affinity space examine their own practices, and found connections between expertise, play style, and resource use. In Chapter 3, I applied the analytic framework developed from the literature, identifying the practices and processes actually used in the space. In Chapter 4, my research operationalized Levy's collective intelligence through the lens of participatory culture, and found that the communities that emerge around MMOs like WoW do indeed demonstrate the crucial elements of collective intelligence.

Delimitations and Limitations

This study is bounded by the fact that it is only dealing with sources of information in and around the massively multiplayer online game *WoW*. The methods used for data collection and analysis in this study could be easily and effectively implemented into research on any affinity space. As mentioned previously, *WoW* has been chosen to illuminate what information literacy looks like online,

because of the game's population size and longevity. However, this study does possess some limitations. One limitation of this study is that because of the qualitative nature of the study methodology and the variety of population sizes for the different methods, it is not generalizable to other populations in the quantitative sense of *generalizability*. In other words, my results, like results from most qualitative studies are not generalizable to every member of every affinity group but instead give an overview of practices that do take place in these spaces.

Another limitation is the result of an intentional methodological direction: this study does not only deeply analyze individuals nor study the actions of the populations at the level of large scale patterns. Instead, the study reaches a compromise between depth and breadth, using methods that study both specific individuals as well as the population at large. To solve the depth and breadth issues, two more studies would need to be completed. First, a study that focused in depth on the information literacy practices of a few individuals for a specified time period, framing the study as an ethnographic study or possibly a case study. The second study would have to focus on the group level; it could possibly look at a much larger number of randomly sampled of forum posts and chat logs in order to examine large scale aggregate patterns.

Conclusion

This study offers a hitherto unseen look into information literacy practices in a natural and leisure setting. The significance of this work, beyond studying information literacy in a new setting, is that it identifies the visible information literacy processes of community using frameworks developed from the literature but grounded in data. From this study emerged modifications and corrections to the frameworks which included both subtraction, addition, and consolidation of terms. The final framework is a part of this larger model of information literacy, and will help to develop a predictive model of

information literacy processes of participants in affinity spaces and beyond. The more affinity spaces which are studied, the more stable the model will become, until eventually it will be a powerful predictive model that can approximate outcomes when parameters are changed. This model is different from previous models of information literacy, primarily because it moves away from a linear model and towards a more flexible model with an emphasis on individual practice.

The dissertation as a whole looks at information literacy practices from the individual to the collective intelligence of the community. It illustrates that at any level these affinity spaces encourage collaborative information literacy practices. The individuals through information horizon maps orient themselves toward the information and community available depending on play style and level of expertise. The use of community created resources like knowledge compendiums and the use of the collective intelligence of the community through forums and chat logs traces the individual and their contact with the group. The group interactions of the chat logs and forums demonstrate the information literacy practices used between members of the community. Then the collective intelligence of the community underlines the accuracy of answers given in the community created resources.

Consequently, a major implication of this study is that it does not present information literacy as a scarcity model. It is based on the assumption that information literacy practices are enacted by people all the time. This goes against the Clive Thompson's (2011) assertion that people but especially kids cannot search. Additionally, behind this study lies a key assumption: that people can have individualized information literacy practices that they use to help them successfully fulfill their information needs. This change in perspective is a complete departure from the traditional perspective that everyone needs to be taught to utilize the same strict structure of information literacy.

Through the sub research questions, different forms of information literacy practice within an online affinity space were explored. The sub research questions demonstrated how participants saw themselves situated amongst the information available to them, and how their play style affected their disposition toward resources. The sub research questions also illuminated the practices of the community through both synchronous and asynchronous communication. Together, the three sub research questions helped to illuminate the forms information literacy takes in an online affinity space, as well as to fill a crucial gap in information literacy on what types of practices are engaged in by participants in these online communities.

In this dissertation, I have explored the ecology of information literacy in an affinity space, moving from individual disposition toward information resources to the collective intelligence of a community. Information literacy is more than a set of skills or abilities. It is the practices individuals use, and how those individuals situate themselves towards the information available to them. However, it is also the practices of groups of people in a community that encompass cultural norms, Discourses, and implemented practices. In short, information literacy is a way of being in the world.

The “way of being” perspective offered by information literacy influences life on many levels. It makes lifelong learning attainable by making information attainable. It enhances people’s sociality by participating in conversations around information sharing, like on forum posts, and allows people to be part of a collective intelligence sharing in the distributed intelligence of a community. In this dissertation, I have developed a multifaceted picture of information literacy as it happens in natural contexts that can be extended flexibly to various contexts and information goals.

REFERENCES

Introduction

Agosto, D. E., & Hughes-Hassell, S. (2005). People, places, and questions: An investigation of the everyday life information-seeking behaviors of urban young adults. *Library & Information Science Research, 27*(2), 141-163.

American Association of School Librarians (AASL). (1998). *Information literacy standards for student learning: Standards and indicators.* Chicago, IL: ALA. Retrieved from http://www.ala.org/ala/mgrps/divs/aasl/aaslarchive/pubsarchive/informationpower/InformationLiteracyStandards_final.pdf

American College Research Libraries (ACRL). (2000). *Information literacy competency standards for higher education.* Chicago, IL: American Library Association. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/standards/standards.pdf

Black, R. W. (2007a). Fan fiction writing and the construction of space. *e-Learning, 4* (4), 384-397.

Black, R. W. (2007b). Digital design: English language learners and reader reviews in online fiction. In C. Lankshear and M. Knobel (Eds.), *New Literacies Sampler* (pp. 115-136). New York: Peter Lang.

Black, R. W. (2008). *Adolescents and online fan fiction.* New York: Peter Lang.

Black, R. W., & Steinkuehler, C. (2009). Literacy in virtual worlds. In L. Christenbury, R. Bomer, & P. Smagorinsky (Eds.), *Handbook of adolescent literacy research* (pp. 271–286). New York: Guilford.

Gee, J. P. (2004). *Situated language and learning.* New York: Routledge.

Lam, W. S. E. (2009). Literacy and learning across transnational online spaces. *E-Learning, 6*(4), 303-324.

Jenkins, H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century.* Cambridge, MA: MIT Press.

Levy, P. (1997). *Collective intelligence: Mankind's emerging world in cyberspace.* Cambridge, MA: Perseus.

Levy, P. (2001/1997). *Cyberculture.* Minneapolis, MN: University of Minnesota Press.

Manning, R. (1965, August). Hemmingway in Cuba. *The Atlantic Monthly.* Retrieved from http://www.theatlantic.com/past/docs/issues/65aug/6508manning.htm

Martin, C. & Steinkuehler, C. (2010). Collective information literacy in massively multiplayer online games. *eLearning and Digital Media, 7*(4), 355-365.

Rheingold, H. (2011). Crap detection 101. *SFGate*. Available at http://blog.sfgate.com/rheingold/2009/06/30/crap-detection-101/

Savolainen, R. (2008). *Everyday information practices: A social phenomenological perspective.* Lanham, MD: Scarecrow Press.

Sonnenwald, D. (1999). Evolving perspectives of human information behavior: Contexts, situations, social networks, and information horizons. In T. Wilson and D. Allen (Eds.), *Exploring the contexts of information behavior* (pp. 176-190). London: Taylor Graham.

Steinkuehler, C. (2005). The new third place: Massively multiplayer online gaming in American youth culture. *Journal of Research in Teacher Education, 3*, 16-33.

Steinkuehler, C., & Duncan, S. (2009). Informal scientific reasoning in online virtual worlds. *Journal of Science Education & Technology.* DOI: 10.1007/s10956-008-9120-8.

Steinkuehler, C. & Williams, C. (2009) Math as narrative in *World of Warcraft* forum discussions. *The International Journal of Learning and Media, 1*(3). DOI:10.1162/ijlm_a_00028

Chapter One

Agosto, D. E., & Hughes-Hassell, S. (2005). People, places, and questions: An investigation of the everyday life information-seeking behaviors of urban young adults. *Library & Information Science Research, 27*(2), 141-163.

American Library Association (ALA) Presidential Committee of Information Literacy. (1989). *Final Report* (ED 316074). Chicago, IL: Author. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/presidential.cfm

American Association of School Librarians (AASL). (1998). *Information literacy standards for student learning: Standards and indicators.* Chicago, IL: ALA. Retrieved from http://www.ala.org/ala/mgrps/divs/aasl/aaslarchive/pubsarchive/informationpower/InformationLiteracyStandards_final.pdf

Barab, S., Arica, A., & Jackson, C. (2005). Eat your vegetables and do your homework: A design-based investigation of enjoyment and meaning in learning. *Educational Technology, 45*(1), 15-21.

Barab, S., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. *Educational Technology Research and Development, 53*(1), 86-107.

Bates, M. J. (1989). Design of browsing and berrypicking techniques for the online search interface. *Online Review, 13*(5), 407-424.

Bawden, D. (2001). Progress in documentation – Information and digital literacies: A review of concepts. *Journal of Documentation, 57*(2), 218-259.

Bilal, D. (2002). Children's use of the Yahooligans! Web search engine. III. Cognitive and physical behaviors on fully self-generated search tasks. *Journal of the American Society for Information Science and Technology, 53*(13), 1170-1183.

Black, R. W., & Steinkuehler, C. (2009). Literacy in virtual worlds. In L. Christenbury, R. Bomer, & P. Smagorinsky (Eds.), *Handbook of adolescent literacy research* (pp. 271–286). New York: Guilford.

Bowker, G. C., & Star, S. L. (1999). *Sorting things out.* Cambridge, MA: MIT Press.

Bruce, C. (1997). *Seven faces of information literacy.* Adelaide, Australia: Auslib Press.

Bruce, C. (2004). *Information literacy as a catalyst for educational change: A background paper.* White paper prepared for UNESCO. Retrieved from http://eprints.qut.edu.au/4977/

Bundy, A. (2001, February). *For a clever country: Information literacy diffusion in the 21st century.* Paper presented at the Australian Library and Information Association, State Library of Victoria. Retrieved from http://ura.unisa.edu.au/R/-?func=dbin-jump-full&object_id=unisa28841

Bundy, A. (2004). *Australian and New Zealand information literacy framework: Principles, standards, and practices.* Adelaide: Australian and New Zealand Institute for Information Literacy.

Bush, G. (2006). Envisioning information literacy standard 10. *Knowledge Quest, 34*(5), 10-13.

Campbell, S. (2008). Defining information literacy in the 21st century. In J. Lau (Ed.), *Information literacy: International perspectives* (pp. 17-26). Muchen: K.G. Saur.

Candy, P. (2002). *Lifelong learning and information literacy*. White paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for the use at the Information Literacy Meeting of Experts, Prague, The Czech Republic.

Catts, R., & Lau, J. (2008). *Towards information literacy indicators.* Paris: UNESCO.

Chelton, M. K., & Cool, C. (2004). *Youth information-seeking behavior: Theories, models, and issues.* Lanham, MD: Scarecrow Press.

Chen, M. (2011). *Leet Noobs: The Life and Death of an Expert Player Group in World of Warcraft* (New Literacies and Digital Epistemologies). New York: Peter Lang Publishing.

Clausen, H. (1997). Internet information literacy: Some basic considerations. *Libri, 47*, 25-34.

Davies, J. (2009). 'Affinities and Beyond! Developing Ways of Seeing in Online Spaces,' *E-Learning*, 3:2, p. 217, DOI:10.2304/elea.2006.3.2.217.

Dervin, B. (2003). Information as non-sense; information as sense: The communication technology connection. In B. Dervin & L. Foreman-Wernet (Eds.), *Sense-making methodology reader: Selected writings or Brenda Dervin* (pp. 293-308). Cresskill, NJ: Hampton Press.

Dewey, J. (1916). *Democracy and education.* New York: Macmillan.

Doyle, C. (1992). *Outcome measures for information literacy within the National Education Goals of 1990 (ERIC ED351033).* Retrieved from http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED351033&ERICExtSearch_SearchType_0=no&accno=ED351033

Edwards, S. (2006). *Panning for gold: Information literacy and the new lenses model.* Adelaide: Auslib Press.

Eisenberg, M. & Berkowitz, R. (1990). *Information problem solving: The big six skills approach to library and information skills instruction.* Norwood, NJ: Ablex.

Ellis, D. (1993). Modeling the information-seeking patterns of academic researchers: A grounded theory approach. *Library Quarterly, 63*(4), 469-486.

Ellis, D., Cox, D., & Hall, K. (1993). Comparison of the information seeking patterns of researchers in the physical and social sciences. *Journal of Documentation, 49*(4), 356-369.

Foster, J. (2006). Collaborative information seeking and retrieval. In B. Cronin (Ed.), *Annual review of information science and technology* (pp. 329-356). Medford, NJ: Information Today.

Gee, J. P. (2004). *Situated language and learning.* New York: Routledge.

Gee, J. P. (2005a). Semiotic social spaces and affinity spaces: From *The Age of Mythology* to today's schools. In D. Barton & K. Tusting (Eds.) *Beyond communities of practice: Language, power, and social context* (pp. 214-232). New York: Cambridge University Press.

Gee, J. P. (2005b). *An introduction to discourse analysis: Theory and method* (2nd ed.). New York: Routledge.

Gee, J. P. (2008). *Social linguistics and literacies: Ideology in discourses* (3rd ed.). New York: Routledge.

Gee, J., Hull, G., & Lankshear, C. (1996.) *The new work order: Behind the language of the new capitalism.* Boulder, CO: Westview.

Greeno, J. G., & Moore, J. L. (1993). Situativity and symbols: Response to Vera and Simon. *Cognitive Science, 17*, 49-59.

Hagel, J., Brown, J. S., & Davison, L. (2010). *The power of pull: How small moves, smartly made, can set big things in motion.* New York: Basic Books.

Heinström, J. (2006). Broad exploration of precise specificity: Two basic information seeking patterns among students. *Journal of the American Society of Information Science and Technology (JASIST), 57*(11), 1440-1450.

Hjørland, B. (2000). Information seeking behavior: What should a general theory look like? *The New Review of Information Behavior Research: Studies of Information Seeking in Context, 1*(1), 19-33.

James, K. (2006). Six degrees of information seeking: Stanley Milgram and the small world of the library. *Journal of Academic Librarianship, 32*(5), 527-533.

Jenkins, H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century.* Cambridge, MA: MIT Press.

Ketelhut, D. J. (2007). The impact of student self-efficacy on scientific inquiry skills: An exploratory investigation in River City, a multi-user virtual environment. *Journal of Science Education and Technology, 16*(1), 99-111.

Ketelhut, D. J., Dede, C., Clarke, J., Nelson, B., & Bowman, C. (2007). Studying situated learning in a multi-user virtual environment. In E. Baker, J. Dickieson, W. Wulfeck, & H. O'Neil (Eds.), *Assessment of problem solving using simulations.* Mahwah, NJ: Lawrence Erlbaum Associates.

Knobel, M. & Lankshear, C. (2007). *A new literacies sampler.* New York: Peter Lang.

Krikelas, J. (1983). Information-seeking behavior: patterns and concepts. *Drexel Library Quarterly, 19*(2), 5-20.

Kuhlthau, C. (1993). *Seeking meaning: A process to library and information services.* Norwood, NJ: Ablex.

Lamplan, M., & Star, S. L. (2009). *Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life.* Ithaca, NY: Cornell University Press.

Lankshear, C., & Knobel, M. (2007). Researching new literacies: Web 2.0 practices and insider perspectives. *e-Learning, 4*(3), 224-240.

Large, A., Nesset, V., & Beheshti, J. (2008). Children as information seekers: What researchers tell us. *New Review of Children's Literature and Librarianship, 14*(2), 121-140.

Latrobe, K., & Havener, W. M. (1997, Winter). The information-seeking behavior of high school honor students: An exploratory study. *Journal of Youth Services in Libraries, 10*, 188-200.

Lau, J. (2006). *Guidelines on information literacy for lifelong learning.* Retrieved from http://archive.ifla.org/VII/s42/pub/IL-Guidelines2006.pdf

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

Leu, D. J., Coiro, J., Castek, J., Hartman, D. K., Henry, L. A., & Reinking, D (2001). Research on instruction and assessment in the new literacies of online reading comprehension. In C. C. Block, S. Parris, & P. Afflerbach (Eds.), *Comprehension instruction: Research-based best practices* (pp. 321-346). New York: Guilford Press.

Leu, D. J. & Zawilinski, L. (2007). The new literacies of online reading comprehension. *Reading Online, 43*(1), 1-8.

Levy, P. (1997). *Collective intelligence: Mankind's emerging world in cyberspace.* Cambridge, MA: Perseus.

Levy, P. (2001/1997). *Cyberculture.* Minneapolis, MN: University of Minnesota Press.

Lowe, C. A., & Eisenberg, M. B. (2005). Big6™ skills for information literacy. *Theories of information behavior* (pp. 63-68). Medford, NJ: Information Today.

Mackey, T. P. & Jacobson, T. E. (2011). Reframing information literacy as a metaliteracy. *College & Research Libraries, 72*(1), 62-78.

Malaby, T. (2006). Parlaying value: Capital in and beyond virtual worlds. *Games and Culture, 1*(2), 141-162.

Martin, C. & Steinkuehler, C. (2010). Collective information literacy in massively multiplayer online games. *eLearning and Digital Media, 7*(4), 355-365.

Maybee, C. (2006). Undergraduate perceptions of information use: The basis for creating user-centered student information literacy instruction. *The Journal of Academic Librarianship, 32*(1), 79-85.

Obama, B. (2009). *National information literacy awareness month, 2009*. Washington, DC: Office of the President. Retrieved from http://www.whitehouse.gov/the_press_office/presidential-proclamation-national-information-literacy-awareness-month/

Owusu-Ansah, E. K. (2003). Information literacy and the academic library: A critical look at a concept and the controversies surrounding it. *The Journal of Academic Librarianship, 29*(4), 219-230.

Partnership for 21st Century Skills. (2009). P21 framework definitions. Retrieved from http://www.p21.org/documents/P21_Framework_Definitions.pdf

Rader, H. (1995). Information literacy and the undergraduate curriculum. *Library Trends, 44*(2), 270-278.

Rheingold, H. (2011). Crap detection 101. *SFGate*. Available at http://blog.sfgate.com/rheingold/2009/06/30/crap-detection-101/

Savolainen, R. (2008). *Everyday information practices: A social phenomenological perspective.* Lanham, MD: Scarecrow Press.

Shirky, C. (2009). *Here comes everybody: The power of organizing without organization.* New York: Penguin.

Society of College, National and University Libraries (SCONUL). (2003). *Information skills in higher education: A SCONUL position paper.* Retrieved from http://www.sconul.ac.uk/groups/information_literacy/papers/Seven_pillars.html

Solomon, P. (2002). Discovering information in context. *Annual review of information science and technology (v. 36)* (pp. 229-264). Medford, NJ: Information Today.

Spink, A., Ozmutlu, H. C., & Ozmutlu, S. (2002). Multitasking information seeking and searching processes. *Journal of the American Society of Information Science and Technology (JASIST), 53*(8), 639-652.

Steinkuehler, C. (2007). Massively multiplayer online gaming as a constellation of literacy practices. *eLearning, 4*(3) 297-318.

Steinkuehler, C. A. (2008). Cognition and literacy in massively multiplayer online games. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of Research on New Literacies,* (pp. 611-634). Mahwah NJ: Erlbaum.

Steinkuehler, C. & Duncan, S. (2009). Scientific habits of mind in virtual worlds. *Journal of Science Education & Technology, 17*(6), 530-543. DOI: 10.1007/s10956-008-9120-8.

Steinkuehler, C., & King, B. (2009). Digital literacies for the disengaged: Creating after school contexts to support boys' game-based literacy skills. *On the Horizon, 17*(1), 47-59.

Steinkuehler, C., Black, R., & Clinton, K. (2005). Researching literacy as tool, place, and way of being. *Reading Research Quarterly, 40*(1), 95-100.

Tapscott, D., & Williams, A. D. (2006). *Wikinomics: How mass collaboration changes everything.* New York: Penguin.

Thomas, D., & Brown, J. S. (2007). The play of imagination: Extending the literary mind. *Games and Culture, 2*(2), 149-172.

Thomas, D., & Brown, J. S. (2009). Why virtual worlds can matter. *International Journal of Learning and Media, 1*(1), 37-49.

Thompson, C. (2011, November 1). Clive Thompson on why kids can't search. *Wired* http://www.wired.com/magazine/2011/11/st_thompson_searchresults/

VanLeer, L. (2006). Interactive gaming vs. library tutorials for information literacy: A resource guide. *Indiana Libraries, 25*(4), 52-55.

Ward, D. (2006). Revisioning information literacy for lifelong meaning. *Journal of Academic - Librarianship, 32*(4), 396-402.

Webber, S., & Johnston, B. (2000). Conceptions of information literacy: New perspectives and implications. *Journal of Information Science, 26*(6), 381-397.

Williams, D. (2006). Groups and goblins: The social and civic impact of an online game. *Journal of Broadcasting & Electronic Media, 50*(4), 651-670.

Williamson, K. (1998). Discovered by chance: The role of incidental information acquisition in an ecological model of information use. *Library & Information Science Research, 20*(1), 23-40.

Zurkowski, P. (1974). *The information service environment relations and priorities. Related paper no. 5.* Washington, DC: National Commission on Library and Information Science.

Chapter Two

boyd, d. (2008). Why youth <3 social network sites: The role of networked publics in teenage social life (pp. 119-42). In David Buckingham (Ed.) *Youth, identity, and digital media.* Cambridge, MA: MIT Press.

Erickson, E. H, (1950). *Childhood and society.* New York: Norton.

Erickson, E. H. (1968). *Identity: Youth and crisis.* New York: Norton.

Gee, J. (2003). *What videogames have to teach us about learning and literacy.* New York: Palgrave Macmillan.

Holland, D., Lachicotte, W., Skinner, D., & Cain, C. (1998). *Identity and agency in cultural worlds.* Cambridge, MA: Harvard University Press.

Jenkins, R. (2008). *Social identity* (3rd ed.). New York: Routledge.

Levy, P. (1997). *Collective intelligence: Mankind's emerging world in cyberspace.* Cambridge, MA: Perseus.

Martin, C. (2011). An information literacy perspective on learning and new media. *On the Horizon*, *19*(4), 268-275. doi:10.1108/10748121111179394.

Rigby, S. & Ryan, R. M. (2011). *Glued to games: How video games draw us in and hold us spellbound.* Santa Barbara, CA: ABC-CLIO.

Savolainen, R., & Kari, J. (2004). Placing the Internet in information source horizons: A study of information seeking by Internet users in the context of self-development. *Library & Information Science Research, 26*(4), 415-433.

Sonnenwald, D. (1999). Evolving perspectives of human information behavior: Contexts, situations, social networks, and information horizons. In T. Wilson and D. Allen (Eds.), *Exploring the contexts of information behavior* (pp. 176-190). London: Taylor Graham.

Sonnenwald, D. (2005). Information horizons. In K. Fisher, S. Erdelez, and L. Mckechnie (Eds.), *Theories of information behavior* (pp. 191-197). Medford, NJ: Information Today.

Sonnenwald, D., Wildemith, B., & Harm, G. (2001). A research method using the concept of information horizons: An example from a story of lower socio-economic students' information seeking behaviour. *New Review of Information Behavior Research, 2*, 65-86.

Steinkuehler, C. A. (2004). Learning in massively multiplayer online games. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the Sixth International Conference of the Learning Sciences* (pp.521–528). Mahwah, NJ: Erlbaum.

Turkle, S. (1995). *Life on the screen: Identity in the age of the internet.* New York: Simon &Schuster.

Weber, S. & Mitchell, C. (2008). Imaging, keyboarding, and posting identities: Young people and new media technologies (pp. 25-47). In David Buckingham (Ed.) *Youth, identity, and digital media.* Cambridge, MA: MIT Press.

Wood, M. J. & Smith, A. F. (2001). *Online communication: Linking technology, identity, & culture.* Mahwah, NJ: Lawrence Erlbaum.

Yee, N. (2006). The demographics, motivations, and derived experiences of users of massively-multiplayer online graphical environments. *PRESENCE: Teleoperators and Virtual Environments, 15*, 309-329.

Chapter 3

American Association of School Librarians (AASL). (1998). *Information literacy standards for student learning: Standards and indicators.* Chicago, IL: ALA. Retrieved from http://www.ala.org/ala/mgrps/divs/aasl/aaslarchive/pubsarchive/informationpower/InformationLiteracyStandards_final.pdf

American College Research Libraries (ACRL). (2000). *Information literacy competency standards for higher education.* Chicago, IL: American Library Association. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/standards/standards.pdf

Catts, R., & Lau, J. (2008). *Towards information literacy indicators.* Paris: UNESCO.

Chi, M. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *The Journal of Learning Sciences, 6*(3), 271-315.

Eisenberg, M. B. (2008). Information literacy: Essential skills for the information age. *Journal of Library & Information Technology, 28*(2), 39-47.

Eisenberg, M. & Berkowitz, R. (1990). *Information problem-solving: The big six skills approach to library & information skills instruction.* Norwood, NJ: Ablex.

Gee, J. P. (2004). *Situated language and learning.* New York: Routledge.

Kuhlthau, C. (1993). *Seeking meaning: A process to library and information services.* Norwood, NJ: Ablex.

Martin, C., & Steinkuehler, C. (2010). Collective information literacy in massively multiplayer online games. *E-Learning and Digital Media, 7*(4), 355-365.

Saldana, J. (2009). *The coding manual for qualitative researchers.* London: Sage.

Chapter 4

Chen, M. (2011). *Leet Noobs: The Life and Death of an Expert Player Group in World of Warcraft* (New Literacies and Digital Epistemologies). New York: Peter Lang Publishing.

Jenkins, H. (2006). *Fans, bloggers, and gamers: Exploring participatory culture.* New York: New York University Press.

Jenkins, H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century.* Cambridge, MA: MIT Press.

Keen, A. (2008). *The cult of the amateur: How blogs, MySpace, YouTube, and the rest of today's user-generated media are destroying our economy, our culture, and our values.* New York: Doubleday.

Lanier, J. (2010). *You are not a gadget: A manifesto.* New York: Alfred A. Knopf.

Levy, P. (1997). *Collective intelligence: Mankind's emerging world in cyberspace.* Cambridge, MA: Perseus.

Levy, P. (1998). *Becoming virtual: Reality in the digital age.* New York: Plenum Trade.

Levy, P. (2001/1997). *Cyberculture.* Minneapolis, MN: University of Minnesota Press.

Martin, C. (2011). An information literacy perspective on learning and new media. *On the Horizon*, *19*(4), 268-275. doi:10.1108/10748121111179394.

Saldana, J. (2009). *The coding manual for qualitative researchers.* London: Sage.

Steinkuehler, C. & Duncan, S. (2009). Scientific habits of mind in virtual worlds. *Journal of Science Education & Technology, 17*(6), 530-543. DOI: 10.1007/s10956-008-9120-8.

Conclusion

Thompson, C. (2011, November 1). Clive Thompson on why kids can't search. *Wired* http://www.wired.com/magazine/2011/11/st_thompson_searchresults/