A Case Study of the Use of the Game *Minecraft* and Its Affinity Spaces for Information Literacy Development in Teen Gamers

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Thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
in partial fulfillment of the requirements
for the degree of Masters of Information Studies (MIS)

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Abstract

Research shows that teens (Generation Z) are not as information literate as required to function effectively in an information society. Yet many teens are gamers and succeed at game-related tasks that require information literacy skills. This thesis examines the potential that the online game *Minecraft*, and one of its related affinity spaces, may have in the development of information literacy skills in teens. This case study unfolded in three phases: a video game analysis of *Minecraft*, a discussion forum analysis and an interpretive report of interviews with eight teen gamers. Findings suggest that *Minecraft*’s design induces players to seek out game related information in affinity spaces, select appropriate sources, evaluate the information shared by fellow gamers and decide what best satisfies their information need. Further research could determine whether the specific information literacy skills in this gaming context can be generalized to other gaming environments and to non-gaming contexts.

*Keywords:* information literacy, teens, adolescents, video games
Resumé

La recherche démontre que la génération Z n’a pas assez de compétences informationnelles pour fonctionner d’une manière suffisante dans une société de l’information. L’objectif de cette recherche est de démontrer le potentiel du jeu en ligne Minecraft et un espace de discussion en ligne à promouvoir le développement des compétences informationnelles des adolescents. L’étude s’est déroulée en trois phases: une analyse du jeu vidéo Minecraft, une analyse d’un forum de discussion et un rapport d’interprétation d’entrevues. Les résultats suggèrent que la conception de Minecraft amène le joueur à rechercher des informations dans les espaces de discussion dédiés, à sélectionner des ressources appropriées, à évaluer l’information partagée par les autres joueurs de jeux vidéos, et de déterminer la meilleure information pour répondre à leurs besoins. Des recherches plus approfondies pourraient déterminer si les compétences informationnelles développées dans ce contexte sont transférables à d’autres environnements reliés ou pas aux jeux vidéos.

Mots Clés : compétence informationnelle, adolescents, jeux vidéos
Acknowledgements

Many people have supported me through this research process. I would first like to thank and acknowledge Professor Claire Dormann and Professor André Vellino. Professor Vellino’s fresh perspective, attention to detail and ability to challenge me on every point has made me a better researcher. You truly stepped up to the plate. Professor Dormann has been a wealth of knowledge, a pillar of support and a good friend. She never stopped challenging me and never settled for anything less than excellence. Together you brought out the best in me.

I am very grateful to the eight individuals I interviewed without whom my research would be incomplete. Their insight and experience has left an impression on me. Special thank you also goes to Caitlin Horrall for her input, help and friendship.

There are many family and friends who have helped throughout this process for which I will always be thankful. But in particular, my love and gratitude goes to my husband Mike for his unwavering support, superb debating skills, never ending patience and for picking up the slack (I owe you many dinners). To my children, Sarah, Naomi and Nathan thank you for your patience and understanding when I could not always be available. Thank you to Sarah and Naomi for your extra help and support. Special thanks goes to Nate, gamer extraordinaire, for pointing out on a regular basis how great gaming is. And lastly to my parents, Clive and Marion Bebbington, for always believing in me and for instilling in me a love for learning.
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Chapter 1 Introduction and overview

1.1 Information Literacy of Generation Z Teens

Information overload is a ubiquitous problem in the 21st Century that has personal, social and economic implications, given the counter-intuitive quantities of available information and the information literacy skills of the Canadian public. Knowing how to find the information one needs, where to find it, how to assess the quality of information and how to use it effectively are essential survival skills. Some would argue that information literacy is now even a basic human right (Sturges & Gastinger, 2010, United Nations Education, Scientific and Cultural Organization [UNESCO], International Federation of Library Associations and Institutions [IFLA] and National Forum on Information Literacy [NFIL], 2006).

Barnes, Marateo and Ferris (2007) state that while NetGeners or Generation Z (the first generation to have grown up completely digitally, born either in the late 1990’s or early 2000’s) demonstrate strong technology skills, they are lacking in information literacy and critical thinking skills. The findings of Beck and Wade’s (2006) investigation of Generation Z, suggest that members of this generation do not have a clear grasp of how the Internet works or of how to evaluate the information they find. Despite years of government initiatives and educational reform, research continues to suggest that high school graduates lack the information literacy skills required to function at a post-secondary or work place level (Beheshti 2012; Comstock, 2012, Julien & Hoffman, 2008). This phenomenon, however, is by no means specific to Canada; studies from the United States and Australia indicate similar findings (Duke & Asher, 2011; Salisbury & Karasmanis, 2011; Kilic, 2010).
To date, most adolescent information literacy studies tended to look at formal learning environments such as those found at school, college and university for information literacy issues (Meyers, 2011; Nicholas, Huntington, Jamali & Fieldhouse, 2009; Salisbury & Karasmanis 2011; Smith, Given, Julien, Ouellette & DeLong, 2013). For example, Smith et al., (2013) investigated high school students’ information literacy levels versus those required at the post secondary level. While provincial education programs throughout Canada recognize the importance of certain information literacy skills (e.g. Reading for the purpose of interpretation or communicating new knowledge effectively), Julien and Barker (2009) suggest that there is a disparity between present information literacy curriculum expectations and student’s information literacy skills.

What if information literacy skills were recognized not only by formal education methods but also in the contexts in which they are used? The technological revolution has provided students with numerous ways to access information and to develop new aptitudes. It seems plausible, therefore, that there are other environments in which students have opportunities to learn or practice information literacy skills. Moline (2009) suggests that a disparity remains between the learning potential that can be found in formal and informal environments.

One such environment that has shown the potential for learning is video games (Aarseth, 2003). Video games are virtual environments that 90% of Canadians aged 6-17 engage in every week (Entertainment Software Association of Canada [ESAC], 2012). Yet studies examining which skills or knowledge may be acquired through informal video gameplay remains limited (Foster, 2009; Lee, as cited by Spires, Lee & Lester, 2008; Squire, 2004). Buttressing this view, Jenkins (as cited by Bowers, 2011) claims that the process that gamers engage in during gameplay and how they relate to the realities that they have
constructed within remains insufficiently researched. Others have shown that games do provide opportunities for learning by letting players think, talk and read (Adams, 2009; Gee, 2007; Shaffer, Squire, Halverson & Gee, 2004; Squire & Steinkuehler, 2005; Steinkuehler, 2010) all key components of information literacy.

The information literacy education potential of games depends, in part, on their affinity spaces defined as “online informal learning environments whose structure allows users to create and share knowledge or seek information around a common theme or topic e.g.: discussion forums” (based on Gee, 2004). They are virtual environments, related and not related to specific games that have only begun to be researched. Only a limited number of studies have examined the potential of their educational use (Alrushiedat, 2011; Hemmi, Bayne & Land, 2009; Machin-Mastromatteo, 2012).

1.2 Research Questions

I believe that, despite the concerns that current research indicates about teens and their lack of information literacy skills (Beheshti, 2012; Salisbury & Karasmanis, 2011), teen gamers may be developing information literacy skills in informal environments such as gaming. This study analyzes Minecraft, a massive multiplayer online (MMO) video game (Minecraft) that is very popular with teens, as well as performs a discourse analysis of Minecraft discussion forum exchanges and through a narrative analysis of interviews with a small group of teen Minecraft gamers.

Minecraft is a sandbox game. It enables players to roam freely through virtual worlds. It was chosen as the focus of study for three specific reasons. First its design elements encourage players to seek information (both about the game and how to play it) outside of the game itself. According to Nass, Taubert and Zolotykh (2014) the video game Legend of Zelda takes place in a virtual world with many items to be found and used by the player in
order to move successfully through the game. This element of game design, also found in Minecraft, pushes players to search for sources and knowledge in a manner that emulates typical research strategies (Nass et al., 2014). Second, Minecraft has many active and vibrant affinity spaces including discussion forums, video demonstrations, tutorials, and blogs. It also has its own wiki developed by fans and moderated by the developers. The largest and official forum on Minecraft (Minecraft.net) has over 2.5 million members and over 24 million posts and is the one used in this study. Lastly, from an educational perspective, this relatively non-violent game is already being used in some school communities for subject specific purposes.

This thesis asks **Does Minecraft and its affinity spaces support the development of information literacy in teens and if so, how?** The three sub-research questions that helped to answer this overarching question are:

RQ 1: What information literacy skills are needed to play Minecraft?

RQ 2: What information literacy skills do participants demonstrate while engaging with a Minecraft affinity space?

RQ 3: What information literacy skills do Minecraft teen gamers draw upon when playing the game and participating in its affinity spaces?

### 1.3 Methodology

This thesis was conducted as an interpretive qualitative case study. A qualitative approach is suitable for research attempting to answer what, how or why certain events occur within a specific context (Joubish, Khurram, Ahmed, Fatima & Haider, 2011; Schrire, 2006). This thesis attempts to identify the information literacy skills that are needed to play Minecraft, how these skills are demonstrated in an associated affinity space and how they are being practiced by teen gamers while playing. As long as there is the subjective element of
human perception, the observed phenomena need to be not only measured but also interpreted (Schrire, 2006). Interpretation allows for context and meaning to emerge from multiple perspectives. The interpretive framework underpinning this thesis is rooted in a constructivist ontology, which posits that learning is a three dimensional process, incorporating cognitive, emotional and social efforts (Illeris, as cited by Machin-Mastromatteo, 2012).

An embedded case study was undertaken in three phases with a different unit of analysis in each phase: the Minecraft game itself, a discussion forum for the game and the interviews of teen gamers. The focus in each phase was information literacy. First, an analysis of the video game Minecraft was done in order to see if the game itself supported the development of information literacy. Second, an analysis of the interactions in a Minecraft discussion forum was performed to see which, if any, information literacy skills were demonstrated; and third a narrative analysis of interviews was conducted with eight teen gamers to investigate which information literacy skills they drew upon during gameplay.

The game analysis in Phase 1 was based on a framework developed by Consalvo & Dutton (2006). Given the lack of a solid corpus of research pertaining to how information literacy is acquired in gaming environments, the methodological tools used on Phase 2 were inspired by Grounded Theory. The information gathered in the final phase was interpreted using narrative analysis. In the concluding portion of the thesis the findings from each phase are brought together to propose a framework for understanding the information literacy practices of the teen Minecraft gamers in the research sample.

1.4 Reflexivity and Role as Researcher

A reflexivity statement is meant to reveal the researcher’s interests, experience and biases towards the subject under study. I presently am working as an information literacy
specialist, as a developer of information literacy tools, trainer and educator. Having been raised in a home that fostered a love of reading and high academic standards and having worked in both public and school libraries at various levels for over ten years, I have developed a lifelong love for reading and learning. I believe that information literacy plays a pivotal role in seeking new knowledge and that the opportunity to seek new knowledge should be afforded to everyone. I bring to this study both an interest and experience in information literacy, video games, and education. My initial interest in conducting this study stemmed from my awareness that teens were not applying information literacy skills adequately towards the end of high school and questioned what could be done to rectify the problem. Since the results of this study could have implications in the direction of my work, I made every endeavour to gather unbiased data throughout all three phases of this study. I made efforts to put aside my role as an information literacy specialist so as to gather the most reliable information possible. The methods used including: ensuring appropriate samples were used, relying on more than one source and type of data and providing clear methods for data collection, collecting and analyzing concurrently, and using a second coder all contribute towards efforts to be as reflexive and trustworthy as possible.

1.5 Scope and Limitation

This unfunded Masters level research focuses only on one specific game, Minecraft and only one discussion forum. Given the age and experience criteria established for interview participation, only a limited number of game players (8) were available for this study. Due to the small sample size of players and the analysis of only one game as well as the qualitative nature of this study, it is not possible to generalize these findings neither to the teen population at large, nor to all video games in general.
1.6 Outline

This thesis is divided into six chapters: Chapter 1 (this chapter) discusses the research problem and the history leading up to the research problem. It also presents the research questions to be answered. Chapter 2 provides context by exploring the literature that focuses on various elements of the research problem. Chapter 3 presents the methodology and analysis of the Minecraft video game. Chapter 4 presents the methodology and findings of the analysis of discussion forum. Chapter 5 presents the methodology and interview findings. Chapter 6 provides a summary of the results and conclusions, as well the answers to the research question and provides possibilities for future investigation.
Chapter 2 Literature Review

2.1 Introduction

The literature examined in this chapter is situated at the intersection of education, video game studies and library and information studies. While there is a considerable amount of current research on information literacy, investigations of how it is manifested in more informal environments such as video games is limited. This chapter begins with an overview of Generation Z and in particular, teen gamers’ characteristics and behaviours, and continues with definitions for information literacy as well as research on information seeking behaviour. The discussion concludes with a summary of the relation between learning, video games, affinity spaces and information literacy.

2.2 Teen Gamers, Learning and Information Literacy

Generation Z is defined as the demographic born after the late 1990s’s or early 2000’s who are, therefore, within the age range of adolescence (12-17 years old) or young adulthood (18-20 years old) (Statistics Canada, 2012). This cohort is characterized as being highly connected, having used technology for most of their lives. Members of Generation Z spend a large portion of their day engaged with technology, socializing primarily through video games, social media and affinity spaces such as YouTube. These adolescents spend a significant amount of their time participating online in a variety of activities from creating original content to socializing with peers, often using more than one device simultaneously (Beheshti, 2012). According to the Entertainment Software Association of Canada (ESA), 90% of Canadian teens (13-17) are gamers, with 54% of these teens playing games every day, making it plausible to suggest that a large proponent of Generation Z are therefore
gamers to some degree (ESA, 2012). Teen gamers engage in a variety of game genres; according to Moline (2009), video game designs are integrating an increasing variety of genres into one game, for example, a first person shooter game may incorporate elements of a role-playing or puzzle-solving game.

The evolution of electronic media has impacted how younger generations learn and socialize (Foster, 2009; Jenkins, 2006). Generation Z is a demographic with very different educational and informational needs and expectations than previous generations. According to Lee, Lau, Carbo & Gendina (2013), today’s youth is faced with technological and information issues related to the web, big data, cloud computing, smart phones and other continuous technological advances with which previous generations did not have to contend. A recent report conducted by the Pew Internet Research Center (2013) states that 74% of teens 12-17 are mobile Internet users and use their mobile device as their primary access to information online. Another recent report claims the number one site for Canadian teens (12-17) to visit is YouTube (MediaSmarts, 2014).

In a study conducted by J.R. Shaffer (2012), out of 180 teen gamers surveyed, 53% were casual gamers with a preference for online games where there were opportunities for collaboration and communication. A majority of those surveyed (85%) communicated with others online while playing while 72% stated that they played collaboratively with others in the same room. These teen gamers stated that they preferred playing online because of the opportunities to meet new people, the competition, escapism and collaborative play (J.R. Shaffer, 2012). J.R. Shaffer (2012) discovered that by using online communication tools, teen gamers were making efforts to fulfill their social and learning needs; they were engaging with others, both new acquaintances and established friends, as well as learning new strategies.
It is often argued that despite possessing strong technology skills, Generation Z does not demonstrate the information literacy skills needed at post secondary work or academic levels (Beheshti 2012; Duke & Asher, 2011; Julien & Hoffman, 2008; Salisbury & Karasmanis, 2011). Large (as cited by Beheshti, 2012) suggests in his literature review that this youngest generation struggles with information seeking; they have trouble “selecting appropriate search terms, move too quickly through the web pages while spending little time reading the materials, and have difficulty judging the relevance of the retrieved pages.” (p. 55).

Koh (2011), in her mixed-methods (content analysis and interviews) study, found that youth engage with information in a variety of ways: “seeking, gathering, managing, circulating, using, and creating” (p. 96). This demographic also engages in two additional and unique behaviours in regards to information: squirreling (downloading, copying/pasting etc.) and remixing (Koh, 2011). Koh (2011) also suggests that the information seeking behaviour of teens is dynamic; they interact with information as opposed to simply consume or use it.

Moline (2009) in her study of teen gamers and their perceptions of their ability to learn, found that teens were most satisfied with their learning within the context of video games when the problem solving it was self-regulated and self-solved. In her interview analysis of eight teen gamers Moline (2009), suggests that teens may demonstrate inadequate information literacy skills because gamers learn to trust the information fed to them within the game, and have therefore transferred that sense of trust, without questioning the validity or origin of the information, to other situations.

J.R. Shaffer (2012) also noted that teens were taking the time to create new content and share information online in a variety of ways from posting in discussion forums to
blogging or creating videos. Harlan, Bruce and Lupton (2012), in their interview analysis and observations of online exchanges of seven teens as online content creators, found that teens engaged in key information literacy practices, some of which were considerably different from those of previous generations. These particular teens engaged in three main information literacy activities: gathering, thinking and creating. Within each activity they participated in a variety actions, for example, while gathering information they would engage in serendipitous encountering, direct browsing and direct searching, prioritizing people and online communities as their primary source for information (Harlan et al., 2012). While thinking, this sample of teens evaluated the information based on the popularity or reputation of the information provider and the usefulness of the information (Harlan et al., 2012).

Generation Z, the teens of today, are highly engaged with technology; it is synonymous with daily life. Teens are active participants while online, acting not merely as observers or consumers as seen in previous generations. A significant number of teens play video games regularly and participate on online affinity spaces; they use these online activities as a means of fulfilling their social and learning needs. This generation has demonstrated different educational and information needs, while also confronted with issues such as information and technology overload. Despite their apparent comfort with technology, teens do not demonstrate adequate information literacy skills, particularly in formal learning environments such as school. Yet they do demonstrate elements of information literacy in sometimes-unique ways while engaged in game play or while participating in online communities. While demonstrating the ability to search, evaluate and use information within game environments, these skills are manifested in ways not seen by previous generations, for example, in their desire to hoard and remix information.
2.3 Information Literacy

Paul Zurkowski first used the term information literacy in 1974 at the U.S. National Commission on Libraries and Information Science. He states that those who are information literate have acquired skills and techniques enabling them to use information and information tools to help them find solutions to their information needs (NFIL, 2012). Since the 1970’s numerous information literacy definitions and standards have been published. In 1989, the American Library Association recognized information literacy as a key element of information science defining it as follows: “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” (American Library Association [ALA], 1989, p.19).

The Association of College and Research Librarians (ACRL) (2000) expanded on the ALA’s definition in their publication Information Literacy Competency Standards for Higher Education, providing performance indicators and learning outcomes for evaluating information literacy competencies. The ACRL (2000) standards state that an information literate person should be able to:

- 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)
Although an ACRL task force is currently revising these standards, they remain the primary reference tool for information literacy assessment in academic institutions and are used as a basis for information literacy assessment LIS literature.

In 1999, the UK-based Society of College, National and University Libraries (SCONUL) developed a theoretical model, the Seven Pillars of Information Literacy which situates information literacy skills on a scale from simple to complex and puts the information seeker on a progression line from novice to expert. This model was updated in 2011 to define information literacy in terms of the abilities to

(i) Identify a personal need for information
(ii) Assess one’s current knowledge and identify gaps
(iii) Develop strategies for locating information
(iv) Compare and evaluate information
(v) Apply the knowledge gained

In 2003, the Canadian Association of School Libraries (CASL) published *Achieving Information Literacy*, a comprehensive guideline with measurable outcomes to support school library information literacy programs. The CASL (2003) defines an information literate citizen as one who:

- Works independently and collaboratively to solve problems
- Analyses information critically in all its formats and in all media contexts
- Applies information strategically to solve personal and social problems
- Makes decisions based on accurate and current information
- Uses information and communication technologies
- Respects information sources and diverse perspectives
- Honours intellectual property and privacy rights
- Appreciates the aesthetic qualities of various creative and scientific expressions
- Communicates effectively and expressively using a variety of information and media formats. (p. 5)

Information literacy research and published standards have been criticized for being too academically focused and having little context in the real world. Martin (2012) states that information literacy should be looked upon as a skill that demands critical thinking, collaboration and communication beyond the world of academics. Campbell (2008) recommends that the definition and understanding of information literacy be widened to incorporate new and evolving information environments.

Information literacy skills are more often than not, referred to as skills as opposed to competencies. According to Machin-Mastromatteo (2012), a competency implies that there is only way to do something, whereas a skill suggests that there are many ways to achieve the same goal. Bruce (2008) states that information literacy is used to learn; it is a process that occurs within a specific context, when information is needed. Information literacy complements the life long process of learning; it is the experience of using information in order to learn.

The concept of information literacy has been used and refined by library, academic and education associations for over forty years. At the core of this concept is how effectively and efficiently one can locate information, evaluate and subsequently use it. Some recent research suggests that the acquisition of information literacy skills must extend beyond the classroom and be understood as a lifelong skill that is required for learning in many contexts,
besides formal learning settings. This thesis follows up on this suggestion and shows how this skill applies in the context of gaming.

2.4 Information Seeking Behaviour

According to Timmers and Glas (2010), information seeking is a central component of information literacy. Wildemuth and Case (2010) argue that it is a dynamic process and evolves over time. There are many factors that have an effect on information seeking behaviour. For example, an initial query may uncover information that changes what information is sought. Furthermore, the information found could change how the information will be used (Wildemuth & Case, 2010).

Dervin’s (1998) Theory of Sense-Making attempts to explain information seeking behaviour, by positing that information seeking is a process used to help us make sense of our world. The key concept behind Sense-Making is the notion of knowledge gaps or cognitive dissonance as a human condition that we encounter and which prevents one from moving forward in a given situation (Dervin, 1998). This stimulates individuals, as information seekers, to bridge the gap between what one already knows and what one needs to know to make sense of the present situation (Dervin, 1998).

Key elements in this process are the situation, the gap and uses. The information seeker’s context is the situation. It refers to one’s experience, prior knowledge, barriers and habits that influence the ability to make sense of a particular knowledge gap (Reinhard & Dervin, 2011). The gap is the lack of information or understanding that prevents an individual from moving forward (Reinhard & Dervin, 2011). This deprivation of information may cause feelings of confusion or frustration and drive one to seek resources
that can potentially help to fill the information gap which, in turn, affects one’s emotional state. As new information is applied the gap closes, thus eliminating feelings of frustration and confusion thereby allowing the individual to move forward (Reinhard & Dervin, 2011).

Research suggests that young adults and children prefer seeking information to satisfy self-imposed needs as opposed to those imposed by someone else such as a teacher (Large & Beheshti, 2000; Large, Niset & Beheshti, 2008). Cole et al., (2013) analyzed the information literacy habits of 44 middle school students and found that when seeking information they rely on teachers, parents and siblings and, to a lesser extent, friends. They also observed that their subjects had difficulty formulating a thesis statement, which they interpreted as being indicative of a lack of the deeper critical thinking skills required during the information seeking process (Cole et al., 2013). Other complementary research has also found that high school graduates struggle both with defining their information needs and finding the resources they require. Smith et al., (2013), for instance, administered a standard information literacy test to 103 Canadian graduating students and found that only 19% were able to achieve a mark of proficiency.

In their review of literature pertaining to information literacy models and information seeking behaviour, Shenton and Hay-Gibson (2012) highlight the disparity between established information literacy models and the research conducted on information seeking behaviour. They suggest that more often than not these two subjects are studied in isolation, even though their findings complement each other. They suggest that models of information literacy and frameworks for information seeking behaviour can coexist in a manner that helps each camp to increase its understanding of the information literacy process. Nesset (2013) suggests that a new information literacy model should take into account both
information seeking behaviour and desired information literacy learning outcomes. This, she argues, would make educators more aware of the strengths and weaknesses of their students as information seekers, and assist them in adjusting their approaches to information literacy education.

For the purposes of this thesis a definition of information literacy was developed that combines the core elements from the standard definitions discussed above while recognizing that information literacy skills now increasingly manifest themselves in a digital society. I define information literacy as:

_The ability to know when there is a need for information, to be able to identify, locate, evaluate, and then use that information effectively to make informed decisions as well as to gain, create and share new knowledge._

2.5 Learning, Information Literacy and Video Games

Many video games have the potential to enable learning by integrating critical thinking with social interaction and technologies while having individuals participate in something they care about (Gee, 2007). Some video games are ideal to study as user-centered, inquiry-based learning environments that are interwoven with challenging real-world contexts (e.g. The Sims). Jenkins, Clinton, Purushotma, Robison & Weigel (2009) have shown that video games are not always fun, with their challenges often mimicking the challenges experienced at school or work. Students engage in the learning process when they learn by doing in virtual game worlds by controlling their own interactions and learning (Allison, Miller, Getchell, Oliver & Morrey, 2009). It is during these challenges that skills and strategies are developed in order to succeed. Squire (2006), for example, argues that video games may have a greater effect on learning than some of the more traditional methods used in the classroom. Echoing this position, Felicia’s (2011) review of the literature pertaining to digital games and learning suggests that educational, commercial and
customizable video games provide more effective learning opportunities than the traditional classroom. The findings from the studies reviewed suggest that this is due to the increased engagement, skills and attitude exhibited by player towards the topic covered in the game environment. Papastergiou’s (2009) study of digital game-based learning in high school computer science education also points to gamers being more focused and disciplined when playing video games for learning purposes than when engaging with general online learning environments. Abrams (2009) investigated three underachieving high school students and found that when they played video games related to their history lesson, they were much more engaged and able to understand and retain historical concepts introduced in the game. Moline (2009), in her analysis of eight teen gamers and their self-efficacy, found that gamers’ beliefs in their ability to learn while playing games is mitigated by experiencing meaningful interactions, a variety of challenges, just in time scaffolding and opportunities for learning. Despite moments of failure, which were expected, these particular teens demonstrated perseverance and continued to work towards the goals set forth in the game. Moline (2009) found that gamers often reached out to other sources in the face of failure.

In Situated Learning Theory, video games are understood as places where participants actively and willingly engage in learning, debate and clarify ideas through discussion, share information and solve problems (Gee, 2007). Squire (2006) suggests that persistent Massive Multiplayer Online Games (MMOGs) are where collaboration and communication are most evident. He observed gamers describing their gaming experiences as social; whether through discussions with friends, participation in affinity groups or commenting on videos on YouTube. He goes on to note that it is rare to find a gamer that plays completely by himself (Johnson, 2005, Kuo as cited in Squire, 2006).
Video games played for educational purposes encourage collaboration and communication when the main authority (i.e. the teacher) is removed from the situation (Watson, Mong & Harris, 2011) For example, Watson et al., (2011) observed high school students from four classes interacting and solving problems with each other and other communities while playing the game *Making History* for their Social Studies course. The level of their engagement with the historical events covered increased significantly as evidenced by the subsequent conversations about the game and World War II that continued to take place outside the classroom.

Squire (2004) investigated whether simulation games could be used in humanities classes for educational purposes. Three case studies were conducted using the simulation game *Civilization III*\(^1\): one in a class of 18 high school students, an after school program with 5 students and then another in a class of 12 students. He found that students developed conceptual understandings of historical elements covered in the game, which led him to posit that playing simulation games such as *Civilization III* allows for historical events to be reconceptualised from narrative events to interactive processes of interrelated phenomena to be experienced by the students.

Following up on Squire’s research, Lee (as cited by Spires et al., 2008) investigated the learning that transpired in a small (12 student) high school history class that played *Civilization III* together. This simulation game is typically played alone but in this case the teacher encouraged collaboration by having students discuss their decision-making, procedures and progress during game play. Lee (as cited by Spires et al., 2008) surmised that

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\(^1\) *Civilization III* is the third version of a strategy-based video game where players must build an empire starting in 3000 BC and continuing to the modern day period. Players must strategize in order to sustain and expand their empire including building armies and infrastructures, negotiating war and peace with other civilizations, promote culture, education and technological advancement while ensuring happy productive citizens.
students were able to make considerable advancements within the game that demonstrated their understanding of how a civilization evolves (e.g. some students developed the wheel while others created an alphabet and code of laws). Lee (as cited by Spires et al., 2008) proposed that these advancements were due to the collaboration, communication, and teacher-guided class-based decision making opportunities that help them direct their learning and gain knowledge at a higher rate specifically because of the teacher/student collaboration and communication.

Using a mixed methods approach, Foster (2009) investigated how and what twenty-six 11-year-old students learned while playing a simulation type video game (*Roller Coaster Tycoon 3*). He discovered that preteen students valued learning social studies and economics in a gaming environment, despite their having initially stated that video games were not useful for learning school material. The students in his sample acquired new knowledge and information literacy skills that they then applied in new contexts. His results suggest that learning through video game play is possible but complex, as well as being contingent on the type of player and nature of the game.

In his analysis of *Farmville* and *Elder Scrolls V: Skyrim* (both considered sandbox games), Pulos (2013) found that each game design “promotes a reciprocal and dependent relationship between objects and the meanings they offer players because objects require the player to engage with them and the player is dependent on the game design to recognize and this object use” (p. 194). He further suggests,

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2 *Elder Scrolls V: Skyrim* is a complex action/role playing game where the player is taken on a variety of quests and develops their character as part of a larger plot to slay a dragon that wants to destroy the world. Skyrim is also considered a sandbox game because the player is allowed to at any point ignore the storyline and explore the virtual world at will.
Because players have to invest their efforts into the systems that allow for competitive position taking to occur, they therefore learn that the systems of legitimation, such as higher education or even logic based thinking, are what gives them access to progress and define what social success means (p.206).

Video games may also have other benefits for students, both academically and personally. Upon analyzing 67 grade 10 Canadian students for motivation when playing two different types of video games, an instructional video game and a commercial video game, Westrom and Shaban (as cited in Hsu & Wang, 2010) found that interchanging elements challenge, curiosity, control and fantasy regularly can influence students’ motivation to learn, improve educational achievement and potentially complement traditional learning. In their longitudinal survey analysis of over 1400 adolescents, Adachi and Willoughby (2013), found that increased strategic video game play frequency predicted higher problem solving skills, which, in turn, predicted higher academic achievement.

Lee-Leugner (2013), in her ethnographic case study of three Minecraft gamers for the agentic potential afforded by their gameplay, found that the participants engaged in meaningful activities and developed competencies in learning and socialization. Findings of this study also suggest that through gameplay, these gamers developed skills that enabled them to become more active members in the virtual worlds in which they interacted (Lee-Leugner, 2013). Lee-Leugner (2013) also proposes that these meaningful experiences and newly developed skills can sometimes be applied to other contexts.

Some video games incorporate various elements of information literacy skills such as including the need to find information in order to advance, or opportunities to use or share new information in order to advancement or help others to advance (Adams, 2009; Squire & Steinkuehler, 2005). In such games, players must figure out what their information needs are,
which tools to use to satisfy them, and decide on what actions to take with that information to accomplish their objective within the game. Gumulak and Webber (2011) state that gamers are multitaskers; they are: “…creating maps, dealing with resources, designing strategies, building, discussing and writing. The gamers have to discriminate between information sources to solve problems“ (p. 243). The 28 teen gamers interviewed in Gumulak and Webber’s study reported often using multiple avenues to find the information they required, such as returning to a previous part in a game, looking in a book, using Google or forums or asking a friend. According to Gumulak and Webber (2011), young gamers demonstrate the ability to recognize a gap in their knowledge, to seek information using a variety of resources and to apply what they learn in a virtual environment. However the students interviewed did not equate these actions with information literacy.

Schiller (2008) suggests that the video game Portal offers many elements of information literacy instruction. It is a hybrid game containing elements of both a first person shooter and a puzzle solving game and is designed to keep players engaged and motivated in the face of some very complicated tasks. Portal also relies on trial and error techniques favoured by the youngest generation. Schiller (2008) identifies this game as an ideal learning environment that information literacy instructors should look to for inspiration in instructional design.

According to Gee (2007), good video games offer challenges that require the seeking, evaluating and use of information. They also require a certain amount of experimentation,

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3 Portal is a first person puzzle video game that consists of a series of puzzles that the player must solved by using a portal gun to teleport their character and other objects between two flat plains. Creative use of the portals increases as the puzzle becomes more complicated. The physics of the game are unique, allowing for speed to be maintained while travelling between chambers. The game is set at the Aperture Science Enrichment Center and the player is guided by an artificial intelligence named GLaDOS.
problem solving and collaboration (Squire, 2008). Games seemingly offer an ideal forum for learning information literacy skills because they allow students to learn new skills and to locate new information in a just in time fashion: information is only provided when it is needed, creating a direct association with the information and the task at hand. This allows the student to frame their information needs within a specific context and to give that information meaning. To this end, D.W. Shaffer (2008) states that epistemic video games in particular contribute to learning by allowing players to develop as a character and advance through the game by engaging in an embedded community of practice.

Martin (2012) states that we should not differentiate between an imposed information quest (work- or school-based) and an authentic (play-based) information quest. Both stem from similar information literacy skills in so far as they each require the ability to search for the best information from the most appropriate source. Martin (2012) interviewed eight teenaged World of Warcraft (WoW) players in order to evaluate their game-related information seeking strategies. She found that experienced players relied on a wide array of online resources and people for information. By contrast, those with less experience limited their online search to a few resources, relying more heavily on the people with whom they were playing.

Nass et al., (2014) analyzed a variety of information literacy games (games designed specifically for the purpose of teaching information literacy skills) in an effort to discover or design a game to support library-related information literacy education. Their research findings suggest that information literacy game design incorporates small puzzles or problem solving elements in order for players to be able to focus on some of, but not all, the elements of information literacy.
A number of studies (Felicia, 2011; Lee, as cited by Spires et al., 2008; Squire, 2006, 2008) have shown how video games enable learning, primarily by offering opportunities for critical thinking and social interactions while engaged with technology, possibly more effectively than the traditional classroom. Players learn by doing, and develop skills and strategies as they take on new challenges that are often similar to those found in real life. Additional research has demonstrated that video games may support academic achievement while also increasing a players’ confidence in their ability to learn and their acceptance of failure as a part of the learning process. Gamers often multitask and will use a variety of devices, resources strategies to find information; they will also employ trial and error methods in order verify the information. Information needs, whether academic or game based, both stem from the same need for accurate and appropriate information and the ability to find it.

2.6 Information Literacy and Affinity Spaces

An affinity space is an online informal learning space that allows users to create and share knowledge or seek information around a common theme or topic (based on Gee, 2004). They can be *synchronous*, where conversations or the sharing of information happens immediately in real time, such as a live chat, or *asynchronous*, where conversations and resources are created, stored, edited and checked by the community, such as wikis, discussion forums, blogs, and video sharing sites such as YouTube. Gee (2007) states that affinity spaces are rich in data and offer opportunities where new “questions about classroom learning” can be asked or even old questions can be asked “in new ways” (p. 90). They are community environments that gamers often rely upon to obtain information about formal play strategies, or to solicit opinions and obtain feedback on something they have done or
created. Lammers, Kurwood & Magnifico (2012) show that affinity spaces provide abundant opportunities to analyze informal learning activities, especially literacy.

Schrire (2006) maintains that affinity spaces provide occasions for collaborative learning exchanges that are conversational in nature. When gamers are challenged to solve problems as a group, they learn to socialize and adapt through communication and collaboration allowing for social skills development (Huang, Yang, Huang & Hsiao, 2010). When collaborating and communicating, players develop social skills and shared meanings, leading to a community with shared values (Shaffer et al., 2004). It is these shared values and common interests that motivate participants to continue interacting with affinity spaces (Silius et al., 2013).

The socialization that occurs in affinity spaces is an important element that supports a collaborative learning environment, which is any space, online or not, that supports individuals working together towards common goals through discussion, reflection and exchange (Kim, 2013). Collaborative learning is rooted in the premise that when individuals converge as a group to exchange information and experiences, knowledge can be created (Mitnik, as cited in Kim, 2013). According to Lammers et al., (2012), affinity spaces are community environments where motivation and creation are reinforced. Participants, who find the content in these spaces to be useful, tend to use the available resources and inform others about them (Silius et al. 2013). The relationships that develop among participants in these environments can be the mainspring behind learning through collective information sharing, assessment, feedback, debate and consensus (Barnes et al., 2007; Gee 2004). It follows, therefore, that affinity spaces provide ample opportunities for participants to practise their information literacy skills, particularly information seeking and knowledge creation (Steinkuehler 2008).
There are two aspects of affinity spaces that are indicative of the presence of information literacy skills: 1. The use of a specialized language, which it is necessary to know when searching for information; and 2. The existence of shared knowledge, which is essential for locating information (Gee as cited in Martin, 2012). According to Martin (2012), interest-driven communities formulate a collective intelligence that is a wealth of information to anyone seeking information about the given topic. She writes, “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” (Martin, 2012, p. 94).

This collective intelligence, she claims, fosters collective information literacy practices. In her analysis of a World of Warcraft related discussion forum she found that information literacy is often a collaborative and collective activity, where communities of people primarily help each other with their information needs through information sharing and evaluation. In an earlier 2011 work, Martin found that Second Life and World of Warcraft are dependant on information literacy abilities in order to be played well. Without sufficient information literacy skills, a player may not be able to identify when information is needed, where to find it or how to determine what information would be most effective (Martin, 2011).

Affinity spaces are an ideal venue for studying information literacy because they are informal environments that are both natural and enclosed (Steinkuehler, 2007). They are also ideal for observing people of all ages interacting online through the seeking and sharing of information. Without requisite information literacy skills, the large amounts of information being created in these affinity spaces risk becoming worthless: Given that affinity spaces for games are environments of choice for teens to obtain information, it seems plausible that
these venues also become a training ground for the development of teens’ information literacy skills.

Affinity spaces are informal learning spaces in which users participate by creating and sharing information, ideas, opinions and feedback. They are relied on by gamers for many reasons, from learning new strategies to sharing knowledge. Participants of affinity spaces can be found collaborating, communicating, and socializing. Participating in affinity spaces provides opportunities for the development of information literacy. Affinity spaces allow participants to collect, share, evaluate, and deliberate about information with other likeminded individuals. Some research suggests that, together, these likeminded individuals evolve into communities of practice where participants work together to fulfill their information and social needs, leading to a collective intelligence.

2.7 Conclusion

Information literacy is a life long skill, necessary in today’s information-overloaded society; it is the experience of acquiring information for the purpose of learning. Various definitions of information literacy have surfaced from a diverse number of institutions and associations (e.g. ALA, ACRL, SCONUL) as guidelines for learning and assessment. These same information literacy standards have been criticized for being too narrow, too academically focused and for not taking into account the rapidly evolving information environments of today (Campbell, 2008; Martin, 2012). According to Dervin’s theory of sense making, the information seeking process occurs when there is a gap in knowledge that needs to be filled. Moline (2009) suggests that more research needs to be done on the potential of learning in informal and formal learning environments. As well, Nesset (2013) suggests that further research is required to bridges the gap between information literacy models and information seeking behaviour.
Research continues to suggest that Generation Z are not demonstrating the information literacy skills required in formal learning environments such as high school (Beheshti 2012; Duke & Asher, 2011). Generation Z is a highly engaged, technology driven generation that actively participates in the online world playing games and partaking in online communities. Video games facilitate learning by providing opportunities for critical thinking, skills and strategy development, communication, collaboration, and trial and error (Felicia, 2011; Gee, 2007; Squire, 2006). Gamers learn by doing, which gives them control over their learning experiences and increases their understanding and retention (Allison et al., 2009). As gamers recognize the need for game related information, they often reach out to game related affinity spaces. These online communities are places where members can reach out to fellow gamers to seek information, share knowledge, collaborate, debate and assess (Barnes et al., 2007, Gee 2004). Martin (2012) suggests that these informal learning environments develop into communities of practice that are ripe for information literacy development. In turn, these communities develop a collective intelligence and engage in collaborative information literacy practices (Martin, 2011, 2012).

Even though teens struggle to demonstrate these information literacy skills in academic settings, this thesis proposes that some teens, specifically teen gamers, are developing and applying these skills in other, less formal contexts, such a video game environments. This thesis investigates whether the online game Minecraft and a related affinity space, as an informal learning environment could support the development and practice of information literacy skills by examining 1. What information literacy skills are required to play and 2. Which ones are being demonstrated in a Minecraft discussion forum. This thesis also examines 3. The information literacy experiences of eight teen Minecraft
players to learn what information literacy skills are being used and how they are being used during game play.
Chapter 3  Phase 1 Game Analysis

3.1 Purpose of the Study and Rationale

The purpose of this thesis is to examine the potential that Minecraft and one of its related affinity spaces may have in the development and practice of information literacy skills in teens. While not necessarily looking for any one skill in particular, this study looks at what information literacy are needed to play and are then potentially used in the related affinity space and by teen gamers. According to Aarseth (2003), analyzing a video game for its educational possibilities requires looking at the entire game environment. Hmelo-Silver (2003) also advises against simplifying the analysis of a multifaceted intellectual phenomenon. As mentioned in chapters one and two, the case study approach employed in this thesis aims to answer, for a particular instance of an online game, which information literacy skills are fostered by the game environment and how these skills are manifested in the game play of a small sample of teen players.

Following the approach in Yin (2009), more than one source of evidence was used in an effort to gain a comprehensive understanding of information literacy skills needed and used by teenaged Minecraft players. Three elements of the Minecraft gaming environment were investigated: the game, the affinity space and the gamer. This comprised of an analysis of the video game, an analysis of threads in a discussion forum and a narrative analysis of interviews with a sample of eight teen players. These interviews provided an opportunity to explore in greater detail the information literacy skills of a select group of teen gamers in order to complement the findings of both the game and discussion forum analysis. In accordance with the Tri-Council Policy Statement: Ethical Conduct of Research involving
humans, the research project was submitted for approval by, and received approval from, the University of Ottawa Human Research Ethics Board (Appendix A).

Due to the small sample used for the discussion forum analysis and the limited number of interviewees, any hypotheses generated about the information literacy acquisition of game-playing teens will need to be corroborated by further study of alternate games with a larger, random sampling of information exchanges and a greater number of interviews with gamers. The discussion in this chapter focuses on the game analysis. The materials presented in chapter 4 and 5 focus on affinity spaces and gamers respectively.

3.2 Phase 1: Video Game Play Analysis

According to Schiller (2008), the ability to competently discuss a video game requires understanding the game from the perspective of the player. The most effective way to do so is to play the game repeatedly. Aarseth, (2003) and Consalvo and Dutton (2006) suggest that it is vital that researchers both play the game and gain a comprehensive understanding of the entire game environment. For the purposes of this research exercise I played Minecraft 2-3 times per week over a four-month period. I played the same game between 1-2 hours each time. During or after the game, I recorded my observations in a journal-like format.

The game analysis was done using a framework set out by Consalvo and Dutton (2006). Chess (2009) used this framework to analyze different videos games geared towards women while looking at the themes of play and productivity. More recently, this framework was used by Glas (2010) to analyze the MMO World of Warcraft as part of a larger study of the developer’s need for game design control and the player’s desire to modify the game.

Consalvo and Dutton provide a framework for critical video game analysis that focuses on four aspects of games which they claim encompass the most relevant parts of a
video game implicated in play: “(1) object inventory, (2) interface study, (3) interaction map and (4) game play log” (2006, para. 9). Object inventory refers to the objects that can be found in a game and indicates how players can interact with each of them. Examining the object inventory can provide insight into the style and design of games as well some of the strategies and skills required by gamers (Consalvo & Dutton, 2006).

Creating an interaction map involves examining how gamers can interact with non-object elements of the game (Consalvo & Dutton, 2006). It reveals information about the ways in which gamers relate with other characters, be they controlled by other gamers or non-player characters. Of particular interest in this context is how interactions change over time, as well as the limitations and variability of interactivity between the various characters. These interactions are indicative of how a game flows and its narrative or conceptual implications (Consalvo & Dutton, 2006).

Interface design includes any design component that helps or informs players about the game (Consalvo & Dutton, 2006). Examining this facet of games is important because it can provide understanding about what information is readily available and what is a challenge to learn. Analyzing the interface design can inform the consequences of decisions made by the player (Consalvo & Dutton, 2006). The game play log is an analysis of the game as a whole. It considers the overall “look and feel” of a game for “emerging situations or behaviours” (Consalvo & Dutton, 2006, para. 33).

My objective was to develop an understanding of Minecraft and to assess the types of information literacy skills needed to play the game. The analysis conducted in this phase of the research was guided by the question:

*RQ 1: What information literacy skills are needed to play Minecraft?*
The discussion in the remainder of this chapter is separated into three parts. The first section consists of an analysis of *Minecraft* using Consalvo and Dutton’s (2006) framework (Object Inventory, Interface Design, Interaction Map, and Gameplay Log). The second elaborates further on the information literacy skills that may be needed to play *Minecraft*. The third section offers a summary of the conclusions drawn from the observations emerging from the analysis.

*Minecraft* is a sandbox game that requires players to gather and manipulate various blocks in order to create their own world. These blocks consist of a variety of resources and tools needed to engage in the virtual world. While the game appears to be rather Lego-like and possibly unsophisticated, it is in fact a complex game requiring thought and skill. *Minecraft* can be played on any console, computer or portable device, although the mobile versions offer fewer options. The game can be played in two main modes: *survival* and *creative*. In survival mode, players are challenged to collect tools used to gather, construct or cultivate resources while fighting hostile monsters. Staying alive also requires that players manage their health and hunger. In creative mode players are not required to maintain their health or eat, nor are the monsters able to kill them. In creative mode each player’s inventory is continuously full and, typically, his time is spent focused on creating. What is created is limited only by the player’s knowledge and creativity; anything from a simple house to the complete recreation of Ancient Rome can be built. Players can play on their own or in multiplayer mode where they interact with other players online. Images from the game can be found in Appendix G.

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4 A sandbox game is one where there is no preset narrative, rules or objectives embedded in the game design. The player establishes the goals and objectives. The game is typically dynamic and non-linear in design. Another example of a sandbox game is *The Sims*. 
Minecraft is an elaborate, complex game that requires players to process a great deal of information. It also provides ample opportunity for creativity. However, succeeding in one’s creative endeavours is contingent on being informed about the various elements of the game. This, in turn, requires an understanding of one’s information needs, as well as the capacity to seek out and evaluate information. Verification of the information obtained can be performed in the game through trial, practice, and often failure. Minecraft is a player-driven game wherein the player controls his path, establishes his own objectives and then acquires the missing information and performs the actions required to meet them.

3.2.1 Minecraft Analysis: Object Inventory

In Minecraft, objects are central to the game. Although they are not necessary to advance in the game, objects have a purpose within the game and are often interdependent with other objects (e.g. gunpowder is necessary to create TNT). For example, carrots, which cannot be farmed by seed, are found in the game when zombies drop them. A carrot can be consumed to decrease hunger, used in combination with a stick to steer a pig, and be altered into a golden carrot to be used in potions. Learning how objects function within the game is a crucial form of complex knowledge that requires some information seeking if the game is to be played effectively.

The object inventory is a comprehensive list of all the objects available in Minecraft and other gaming environments. This list provides information on the role and purpose of objects within that game. It also helps by situating the value of objects in the game vis-à-vis non-player characters, real players and interactions.

The Minecraft object inventory was recorded as a table in an excel file. Each object was listed and described as per the categories found in the template in Table 3.1 (e.g. general
description, uses etc.). The items were then divided into larger categories based on the objects main purpose (e.g. food, armour etc.)

<table>
<thead>
<tr>
<th>Table 3.1 Object Inventory Template</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Example: Cobblestone</td>
</tr>
</tbody>
</table>

The objects found in *Minecraft* can be divided into nine categories: material, food, tools, potions, information, weapons, transportation, armour and decorative. A summative review of the nine categories is presented in Table 3.2.
Object inventory items categorized as materials are primarily used for building, farming and crafting. Indeed, the materials used for building, farming and crafting drive the game. These objects are the foundation that makes all creations possible regardless of the mode being played. Food is the second most important item as it is essential for survival in

<table>
<thead>
<tr>
<th>Object Inventory</th>
<th>Use</th>
<th>Acquire/Interaction</th>
<th>Necessity</th>
<th>Additional Info/Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong> (150+)</td>
<td>Building Crafting Brewing Farming</td>
<td>Found Destroyed Crafted Killed for Traded</td>
<td>Essential for game play even in creative mode - basis of whole game</td>
<td>Some items have one use and other multiple uses</td>
</tr>
<tr>
<td>e.g.: stone, wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Food</strong> (20+)</td>
<td>Survival</td>
<td>Found Produced Farmed</td>
<td>Essential except in Creative</td>
<td>Some foods need to be combined (e.g.: wheat) to be edible</td>
</tr>
<tr>
<td>e.g.: wheat, pumpkin, chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tools</strong> (13)</td>
<td>Digging Mining Gathering Collecting</td>
<td>Crafted</td>
<td>Not necessary but speeds up game play when right tools are used</td>
<td>Some tools are generic and can work on many objects while others are specific to an object</td>
</tr>
<tr>
<td>e.g.: pickaxe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Potions</strong> (160+)</td>
<td>Create special effects</td>
<td>Brewed</td>
<td>Enhances game play and makes some things possible (e.g. enderdragon killing)</td>
<td>Positive and Negative effects potions</td>
</tr>
<tr>
<td>e.g.: speed, strength</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Information</strong> (6)</td>
<td>Inform</td>
<td>Crafted</td>
<td>Depending on situation can be essential info or merely info to help</td>
<td></td>
</tr>
<tr>
<td>e.g.: map, compass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weapons</strong> (3)</td>
<td>Defending Killing</td>
<td>Crafted Worn</td>
<td></td>
<td>Items have varying degrees of strength and durability</td>
</tr>
<tr>
<td>e.g.: sword</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Armour</strong> (4)</td>
<td>Defending</td>
<td>Crafted</td>
<td>Not necessary in Creative very beneficial in other modes</td>
<td>Durability and resilience based on materials used</td>
</tr>
<tr>
<td>e.g.: helmet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transport</strong> (4)</td>
<td>Transport</td>
<td>Crafted Tamed (if animal)</td>
<td>Enhances game play/creativity</td>
<td>Needed to enter other worlds</td>
</tr>
<tr>
<td>e.g.: minecart</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Decoration</strong> (2)</td>
<td>None</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
every mode except creative mode. All the other items listed in Table 3.2 enhance the gaming experience but are not necessary to gameplay. In other words, player creativity determines the necessity of these other materials.

The items categorized as information, although few, have additional attributes that make them valuable, particularly when playing with others. For example, a book and quill, together, allow players to write in a virtual book. Gamers can document information by recording their explorations, instructions, directions and the things they have learned. Once complete the book can be signed, saved and left in the virtual world for others to read. This facilitates the sharing of information in asynchronous gameplay by allowing players to share information they think others may require. Similarly, signs can be placed throughout the virtual world with instructions or directions for other players.

Given the large number of objects available one is unlikely to remember each item and its function. Moreover, relying only on one’s prior knowledge about certain items (e.g. that sand can be used for farming) may not be sufficient in some situations. Without actively seeking additional information, a player may not learn about the additional functions of items (e.g. that sand can also be used for crafting TNT). Learning about the various objects requires information seeking outside Minecraft itself whether from fellow gamers or in online affinity spaces such as the Minecraft Wiki, various discussion forums and YouTube. Minecraft does provide ample opportunity for players to practice or apply their new information. This can help players validate the information they find.

3.2.2 Minecraft Analysis: Interaction Map

Players set their own goals in Minecraft. Interactions with other players only occur when a player chooses to play in multiplayer mode. Although objects are the central component of the game, Minecraft’s second most important feature is its mobiles (mobs) or
non-playing characters. Players have the ability to interact with all mobs. How one interacts with them has direct implications for how the game proceeds. An Interaction Map analysis is an examination of the possible interactions that one player can have with others and/or other non-playing characters (NPC). Observing the interaction map enables one to examine potential interactions available to players, the choices offered to players, and the amount of control they have in driving the game. The interaction map for this thesis was recorded in a table format using excel as per the template shown in Table 3.3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Limited vs. Non-limited</th>
<th>Change Over Time</th>
<th>Range of Interaction</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Villagers</td>
<td>Passive, have various professions</td>
<td>Player can control a village by spawning villagers, but can't control anything else</td>
<td>Child - adult</td>
<td>Can trade with them based on profession, limited social capabilities</td>
<td>Important for trading, don’t attack, prone to attack</td>
</tr>
</tbody>
</table>

A summative review of the mobs found in *Minecraft* is offered in Table 3.4.
Table 3.4 Review of *Minecraft* Mobs (Mobiles)

<table>
<thead>
<tr>
<th>MOBS</th>
<th>Interaction</th>
<th>Use</th>
<th>Additional Features/Info</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passive</strong></td>
<td>Completely controlled by player</td>
<td>Food Source, Secondary Resource dropped when killed, Trading</td>
<td>Can trade with villagers</td>
</tr>
<tr>
<td>(10) e.g.:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pigs, chicken, cow, horses, ocelot, sheep, bat, mooshroom, squid, villagers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neutral</strong></td>
<td>Mostly controlled by player- wild but can be tamed</td>
<td>Defense, Resources dropped when killed</td>
<td>Can be used to protect villages/crops and for transport</td>
</tr>
<tr>
<td>(3) e.g.:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wolves, cave spiders, endermen, spider, zombie pigman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hostile</strong></td>
<td>Forced interaction by attack</td>
<td>Highly valuable resources dropped when killed</td>
<td>Most are neutral during the day and hostile at night Killing enderdragon (hardest challenge in the game) results in regeneration of the game. Neutral in Creative mode</td>
</tr>
<tr>
<td>(14) e.g.:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>zombies, creepers, blaze, ghast, magma cube, skeleton, silverfish, spider jockey, witch, slime, wither, skeleton, zombie villager, chicken jockey 2 boss hostile mobs: enderdragon, wither</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As can be seen from the material in Table 3.4, there are three types of mobs. Neither passive nor neutral mobs forcefully engage with players. Hostile mobs, on the other hand, force interactions by attacking.

There is no way to converse with mobs in *Minecraft*. Interaction is purely of a physical nature, for example: feeding chickens, taming wolves, trading with villagers or attacking zombies. The only type of mob capable of social interaction is “villagers”, who are a passive mob. They “socialize” by nodding their heads and emitting small sounds to other villagers or players. Depending on how the player reacts to these characters, the villager can like or dislike the player. This has implications for game players, particularly when it comes to trading. Mobs are susceptible to the game environment in the same manner as players. For
example, both mobs and players can be burned by fire. Likewise, passive mobs and players are both susceptible to attack by hostile mobs.

There are two main “boss” hostile mobs: the Ender Dragon and the Wither. Learning about a hostile mob before an attack is advantageous for players because each mob has a different mode of attack and different strengths and weaknesses. Defending oneself against their attacks require players to have a well planned out counter-attack strategy because these two mobs are very difficult to defeat, and, if playing in survival mode, a player risks losing everything. Correspondingly, once either of these two mobs is killed the game comes to an end.

Survival is essential in every mode except creative mode. Becoming informed about how mobs can help or hinder survival is beneficial (e.g. If a passive or neutral mob is killed, it will immediately drop an item (e.g. chicken-feathers) that can be collected for later use by the player). No indications are provided in the game about how a passive mob may trade or how hostile mobs react when attacked. Therefore, learning this on the spot may be detrimental to a player’s survival in the game. For instance, protecting oneself from some hostile mobs requires that the player have a specific weapon or armour. This can be learned through experience - and possible death - or it can be learned beforehand, thereby increasing one’s chances of survival in the game. It is important for players to learn how to manage these interactions in order to improve their ability to play (Pulos, 2013). The best method for doing so entails leaving the game environment and seeking information from the associated affinity spaces or consulting fellow players.

3.2.3  Minecraft Analysis: Interface Study and Game Play Log

When playing Minecraft the onscreen display provides information about the state of the player in a very simplified form. There can be up to 8 different information bars visible
during game play. A health bar uses hearts as the symbol, a hunger bar uses drumsticks, an experience level number and a hot bar displays the items recently selected or that the player is holding. The hot bar, however, is not a list of the complete inventory owned by a player. When the player is riding an animal, the animal’s health is displayed as well. When the player is wearing armour, the armour’s condition is displayed in a bar above the health bar. When in water, an oxygen bar is displayed above the hunger bar so that the player knows how much time is available to remain underwater. This information remains visible to the player at all times. In creative mode these bars of information are hidden since they are unnecessary when the player is invulnerable and does not need to eat. When a player is in multiplayer mode, a chat bar showing the last few lines of text also is visible. Up to 8 different information bars can be visible during game play. In the computer version a cross hair on the screen shows what the player is pointing at.

An Interface Study is an examination of the design elements that provide the player with information (Consalvo & Dutton, 2006). The information provided usually consists of player status information (e.g. health, energy etc.), typically displayed onscreen during play. This “information space” is known as the Heads-Up Display (HUD). It has been a central part of video game interfaces for years, with their use and design having been taken from the HUD’s used in modern aircraft (Wilson, 2006). See Figures 3.1 and 3.2 for different examples of the Minecraft HUD: one from a computer screen and one from an iPad screen. For this thesis the Interface Design examination was done in a journal format included as part of a game play log consisting of data collected from the recorded observations made during the initial two-month period.
Figure 3.1 The *Minecraft* Heads Up Display (HUD) on iPad

Figure 3.2 The *Minecraft* Heads Up Display (HUD) on computer
The HUD plays an essential role in informing the player, but leaves the decision-making in his/her hands. This onscreen information also provides an opportunity to experiment, by learning how different things may work. For example, a player can try fighting with or without armour or with a specific type of armour to learn how much damage can be withstood.

Whether knowledge is acquired through play or sought in the adjoining affinity spaces, new information is constantly being required. Even with available online resources, one must take the time to look for information, (for example the Minecraft Wiki [2013] has over 3100 articles) and then return to the game to apply it. This demand for information demonstrates the value of playing in multiplayer mode, especially with people of various levels of experience who can support and collaborate with the other players.

The reliance that Minecraft players must place on external information resources affords them opportunities to employ and develop information literacy skills. The need to go outside Minecraft to find information in order to play suggests that there are gamers experiencing knowledge gaps, and possibly frustration or confusion about the game. These teen players are making attempts to be informed in order to close the knowledge gap and alleviate the feeling of frustration or confusion (Reinhard & Dervin, 2011).

Regular opportunities to develop and practice information literacy skills are vital to their becoming innate and subsequently useful for bridging knowledge gaps (Tripp, 2011). The amount of information in affinity spaces as well as the number of players contributing information to them in various forms can be overwhelming. Yet such a large quantity of available information also provides opportunities for each player to assess that information. For example, when a gamer decides that she needs information about how to make a tool, she must seek out this information. Often finding a variety of answers, she must then assess
which answer provides her with enough reliable details to be successful. Similarly, if a player needs to know how to best defeat a zombie, and her request for information has many replies, her final decision involves many factors. Determining which information best meets her needs is based on what weapons she has, her gaming skills, and whether or not she has friends helping. This is a complex process involving critical thinking skills. As players become better informed about the various elements found in the game they also learn that the impact of their actions is influenced by their body of knowledge (Pulos, 2013).

As mentioned in section 3.2.1, *Minecraft* allows players to record information in a virtual book that can be left behind for other players’ reference. This gives players the option of sharing their knowledge and developing a reputation as resourceful, experienced and reliable players. Additionally, signs can be placed throughout the *Minecraft* world for other players to refer to for small pieces of information, usually directions or simple instructions.

### 3.3 Conclusion

During the first phase of the research my attention focused on the design features of *Minecraft* in the hope of identifying some of the information literacy skills that are required to play the game. With almost 500 items (blocks, tools, potions etc.) from which to choose in the Object Inventory, players need to be informed about the purpose and function of these objects. The *Interaction Map* indicates that there are numerous non-playing characters or mobs with different characteristics and benefits to the player. The adolescent gamers can learn about these interactions through trial and error, which could be fruitful when playing in creative mode or interacting with non-hostile mobs. However, all players may risk their lives in survival mode, particularly if they are trying to learn about a hostile mob. The *Interface Design* keeps each player informed throughout the game and allows the player to assess the displayed information to make gameplay decisions.
What information literacy skills are needed to play *Minecraft*? Referring to the definition of information literacy established in chapter 2, *Minecraft* gamers must be able to recognize when they need information, know where to best locate the information whether that be from within the game, from other players or outside the game in related game resources. Players must be able to assess the information that they find, decide if they should try to use it, and possibly risk their character’s life in the process.

This analysis suggests that *Minecraft* is a complex game whose design makes it difficult to navigate the game beyond simple movements if no further information is sought about how to play. Once basic movements are learned, excelling in the game and remaining continuously challenged requires the learning of additional information that can be obtained from external online affinity spaces. The *Minecraft* game environment offers opportunities for information to be used within the game to enhance the learning experience. Once a player has found information outside the game, he/she can verify its efficacy by applying the information within the game. It seems plausible to conclude that the design features of *Minecraft* do support some level of information literacy by incorporating elements of information seeking, evaluation and sharing as core features of game play.
Chapter 4 Phase 2: Discussion Forum Analysis

Teens engage with one another online via discussion forums, social networks and online communities (Lee-Leugner, 2013; J.R. Shaffer, 2012). These affinity spaces are integral components of the Minecraft experience since they provide virtual areas where gamers can ask for, search for and share information about the game, its objects and gameplay strategy. This chapter consists of an explanation of the analysis procedures and findings conducted on a sampling from a Minecraft discussion forum.

4.1 Overview

The purpose of the second phase of the study was to identify the information literacy skills that Minecraft players demonstrate when using an online gaming discussion forum. An analysis of threads harvested from the official discussion forum for Minecraft (http://www.minecraftforum.net/), which is also the largest Minecraft forum, was conducted. The guiding research question was:

*RQ 2: What information literacy skills do participants demonstrate while engaging with a Minecraft affinity space?*

The analysis of this affinity space incorporated methods derived from grounded theory including systematic and collective procedures for data collection and coding using constant comparison (Charmaz, 2006). Anderson (2008) used grounded theory methods to analyze potential learning outcomes in an elementary science class using the Quest Atlantis video game. Cook (2008) also used grounded theory to explore the critical thinking skills development of middle school students using online discussion forums.

A total of 20 discussion threads dated from August 2011 and June 2013 were collected and coded.
<table>
<thead>
<tr>
<th>Thread Number/Title</th>
<th>Number of replies</th>
<th>Number of participants (including the information seeker)</th>
<th>Time Span</th>
<th>Request Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. &quot;Official&quot; Mining Strategies?</td>
<td>27</td>
<td>22</td>
<td>4 days</td>
<td>Strategic</td>
</tr>
<tr>
<td>2. What’s the most useless item in Minecraft?</td>
<td>77</td>
<td>72</td>
<td>15 days</td>
<td>Opinion</td>
</tr>
<tr>
<td>3. Remove Enchantments?</td>
<td>17</td>
<td>16</td>
<td>10 months</td>
<td>Strategic</td>
</tr>
<tr>
<td>4. Can’t craft fireworks?</td>
<td>6</td>
<td>7</td>
<td>6 months 6 days</td>
<td>Strategic</td>
</tr>
<tr>
<td>5. Noob question: How did they die?</td>
<td>15</td>
<td>10</td>
<td>1 month</td>
<td>Strategic</td>
</tr>
<tr>
<td>6. How do YOU find your diamonds?</td>
<td>17</td>
<td>16</td>
<td>1 day</td>
<td>Strategic</td>
</tr>
<tr>
<td>7. Major FPS drop from 60-around 9 randomly. HELP!</td>
<td>25</td>
<td>7</td>
<td>13 days</td>
<td>Technical</td>
</tr>
<tr>
<td>8. What causes Omen edited maps to become corrupt?</td>
<td>7</td>
<td>6</td>
<td>&lt; day</td>
<td>Technical</td>
</tr>
<tr>
<td>9. Question about enchanting books</td>
<td>9</td>
<td>6</td>
<td>&lt; day</td>
<td>Strategic</td>
</tr>
<tr>
<td>10. How do I paste in books, chat etc.?</td>
<td>6</td>
<td>6</td>
<td>1 year 2 months</td>
<td>Technical</td>
</tr>
<tr>
<td>11. Living in THE END! Is it possible?</td>
<td>22</td>
<td>20</td>
<td>1 month 10 days</td>
<td>Strategic</td>
</tr>
<tr>
<td>12. What mob do you hate?</td>
<td>37</td>
<td>38</td>
<td>2 days</td>
<td>Opinion</td>
</tr>
<tr>
<td>13. HELP! Can't join a single server on vanilla minecraft, on tekkit, on anything!</td>
<td>11</td>
<td>7</td>
<td>&lt; day</td>
<td>Technical</td>
</tr>
<tr>
<td>14. What to do with…</td>
<td>5</td>
<td>4</td>
<td>&lt; day</td>
<td>Strategic</td>
</tr>
<tr>
<td>15. Any program to help design builds in minecraft?</td>
<td>7</td>
<td>7</td>
<td>&lt; day</td>
<td>Strategic</td>
</tr>
<tr>
<td>16. How far do hostile mobs have to fall to be one hit kill?</td>
<td>28</td>
<td>22</td>
<td>1 year two weeks</td>
<td>Strategic</td>
</tr>
<tr>
<td>17. How to make mobs not turn invisible?</td>
<td>12</td>
<td>8</td>
<td>&lt; day</td>
<td>Strategic</td>
</tr>
<tr>
<td>18. In Lava Half-Heart Game Closed. How Can I Save Myself?</td>
<td>26</td>
<td>25</td>
<td>1 day</td>
<td>Strategic</td>
</tr>
<tr>
<td>19. SMP Pranks?</td>
<td>246</td>
<td>217</td>
<td>1 year 7 months</td>
<td>Opinion</td>
</tr>
<tr>
<td>20. Help! My arm, chests, all creatures and several objects are black!</td>
<td>11</td>
<td>11</td>
<td>1 day</td>
<td>Technical</td>
</tr>
</tbody>
</table>
This process started with open coding where the units of the discussion thread were assigned codes (e.g. *Defining an information need*). I then identified categories (axial coding) based on the information literacy skill that was demonstrated in individual messages in the discussion thread. These codes were then assembled into three categories and further analysed in relation to the definition of information literacy that guides this study to identify the relationships and connections between the codes and categories. This enabled me to explore emerging patterns of repeated information literacy behaviour as well as indications of the emotions expressed by discussion forum participants.

Bowers (2011) used a similar technique to investigate the complex relationships that exist between former athletes’ sports identities and sports video games. As each new code was added, constant comparisons were made to previously coded material to ensure that it was put into the most appropriate category. Some data was shifted or broken into smaller units and a new more appropriate code was applied that more accurately described an element of information literacy or related behaviour. For example, the initial code for the following discussion thread sample “…So what DO YOU do with your *TNT overflow*?” was *Defining an information need*. In the second round of coding this portion of the discussion thread was given an additional code of *Strategic (gameplay) information need*. This was done in order to further clarify the type of information being requested and to later see what implications the type of information request had on replies and subsequent information literacy behaviours exhibited in the forum.

Using this technique allowed for a certain degree of flexibility in the fine-tuning of codes and categories. The author of this thesis performed the first round of coding: open coding. A portion of the un-coded discussion threads was given to a second coder (a fellow student volunteer) to code as well, to test for the correctness of the author’s coding. Both
sets of codes were used as input to the second round of coding, which was performed collaboratively between the author, the second coder and Prof. Dormann. This was done in order to further control for the possibility of researcher bias (Kolb, 2012).

In order to obtain information-rich data in an efficient way the sample of discussions was collected by using purposive sampling. While this sampling technique may contribute towards internal validity if the sample is measured correctly, external validity can only be achieved if the sample is representative of the area to which it belongs. Because of the non-probability methods inherent with purposive sampling, it is important recognize that it may produce bias (Bogdan & Biklen, 2006; Topp, Barker and Degenhardt (2004).

In looking at the Minecraft affinity space, the initial sampling criteria contained one element: the discussion conversation thread had to start with a request for information, help or feedback. Having observed some threads with few or no responses early in the data collection process, the need to introduce a second criterion was immediately apparent. The second criterion introduced the requirement that there be a minimum of three replies. Upon completion of the initial phase of open coding, categories began to emerge. I noticed that there was insufficient data with regards to information evaluation when compared to the data pertaining to information seeking and sharing. Consequently, I continued to collect threads and assign codes.

The coding for this phase of the research used password protected cloud-based qualitative coding software developed by the University of Alberta; Saturateapp.com (http://www.saturateapp.com). This software allows for the collecting, copying and pasting of discussion threads for coding and categorization. Both the initial request for information in the discussion thread and the subsequent replies were coded according to the process
outlined above. Appendix E contains samples from the initial coding and categorization on SaturateApp.com.

4.2 Affinity Spaces Analysis

Each of the 20 discussion threads to which codes were assigned started with an initial request for information. Taken together, 20 threads received a total of 610 replies from a total of 510 participants. On average each thread contained 30 replies posted by an average of 25.5 participants.

Within this sample three types of requests were identified: opinion based information requests - a request for the opinions of others as opposed to a how-to or technical type of question \((n=3)\); technical information requests - seeking information on the technical workings of Minecraft, the device being used, operating system etc. \((n=5)\); and strategic/gameplay information requests - seeking information directly related to Minecraft and/or how to play \((n=12)\). The time frames of the discussions varied based on the conversation. In four out of the twenty threads, the initial information seeker did not contribute to the discussion beyond the initial information request. Two of these threads started with an opinion based information request. The other two started from a strategic based information request. Three of four of the replies with no information seeker participation were some of the longer threads in the sample with 76, 37 and 26 replies respectively. The average duration of a discussion threads in the sample was 98.75 days with the shortest being half a day and the longest being 14 months. Opinion-based discussions generally were found to continue for a considerably longer time period contain many more replies than their technical and strategic counterparts. It seems plausible that this may be due to the finite number of possible solutions available for a strategic or technical problem.
In the remaining 16 discussion threads, the original information seeker replied and conversed with the other discussion thread participants. Of these, the initial information seeker contributed an average 3.25 postings to the thread. The average number of times the initial information seeker replied to his/her discussion thread based on the type of information requested was as follows: strategic request: 2.2 times, opinion request: 1.3 times and a technical request: 8.2 times. More often than not the initial information seeker was the dominant contributor to the threads in the sample this was particularly so for technical or strategic game play information requests. This may be indicative of the need for strategic and technical information to be more accurate than opinion, which is likely to have fewer direct implications for the information seeker’s gameplay. Only 10 discussion threads were identified in which any one participant contributed more than one message. The average number of postings in these instances was 2.4.

A total of 1477 codes were assigned to the 20 discussion threads based on the information literacy activity identified within the threads. Using the process described above, I identified a total of 34 codes. Based on the behaviours and activities indicated by the codes identified from the analysis of the Minecraft design, three main categories emerged from the grouping of codes: Information Seeking, Information Sharing and Information Evaluation. The 34 codes were then assembled in accordance with the three main information literacy categories. In order to minimize the likelihood of applying any preconceived notions of information literacy to the codes or categories, the codes were organized into groups of similar or related behaviours.

Of the 610 messages comprising the 20 threads, 11 codes belonging to the category Information Seeking were applied 179 times, 10 codes belonging to the category Information Sharing were applied in 1033 instances and 13 codes belonging to the Information
Evaluation category were applied 265 times. A summary of these codes and their applications is provided in Appendix D. Figure 4.1 shows the percentage of applications of codes by the information literacy skill identified. The remainder of this chapter focuses on the findings associated with three categories that emerged from the coding process.

Figure 4.1 Information literacy categories by percentage

4.3 Category: Information Seeking

Recognizing when one needs information is an essential part of information literacy. The codes assigned to the category Information Seeking were concerned with the information-finding process that one embarks upon when searching for information. One personal information request from one participant to another that was discarded because it was not information literacy related. Additionally, in one particular case, a participant repeatedly used the text “help”, in an effort to keep the discussion thread current. He or she offered no additional information concerning the information need. Therefore, after the
initial *Defining an information need* code was applied to this thread; the remaining “help”
texts were codes as *Request for help*. A complete table of all the codes, frequencies and
percentages for *Information Seeking* can be found in Table 4.2.

<table>
<thead>
<tr>
<th>Table 4.2 Discussion Forum Analysis: Summary of Code Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Codes</strong></td>
</tr>
<tr>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Providing context</td>
</tr>
<tr>
<td>Defining an information need</td>
</tr>
<tr>
<td>Providing further context</td>
</tr>
<tr>
<td>Strategic information need</td>
</tr>
<tr>
<td>Validating information need</td>
</tr>
<tr>
<td>Drawing on prior knowledge</td>
</tr>
<tr>
<td>Request for help</td>
</tr>
<tr>
<td>Asking for more information</td>
</tr>
<tr>
<td>Technical information need</td>
</tr>
<tr>
<td>Opinion based information need</td>
</tr>
<tr>
<td>Stating what information is not wanted</td>
</tr>
</tbody>
</table>

The code *Providing context* was applied in cases where the information seeker
provided context or a subsequent explanation of what information was exactly needed or
wanted to do in response to another forum’s participant’s reply. Fifty-two cases of this were
identified. For example, the following information seeker was looking for ideas to “prank”
his friends. When a reply occurred he refined his information request by providing this
additional context

> *In the server owner so materials aren't a problem. I just wanna get a really pissed reaction or really confused reaction out of them. I'm running craftbukkit so getting plugins wouldn't be a big deal for me. I don't want to have to screw around with backups so everything I do has to be reversible. No fires or killing people where we can't get the items back.* (SMP Pranks?, bigjeep, August, 7, 2011)

The code *Defining an information need* was applied when a participant made a
request for information. Thirty such instances were identified. In each of the 20 discussion
threads, the code “Defining an information need” was applied at least once because each
thread began with the expression of an information need as established in the data collection criteria. As well, ten additional requests for information were made within the collected threads by either the original information seeker or by another participant. For example, one of the discussion threads in the sample was initiated by the following request: “Is there a way to remove enchantments in 1.2.5?” (Remove enchantments?, Andrewdale, June 18, 2013)

In some cases information seekers provided additional information or context when requested of them, or in response to a reply in the thread. Nineteen such instances were identified. Each was coded Providing further context/information. The exchange below taken from “What causes Omen edited maps to become corrupt?” is exemplary:

Initial Request: After finally finishing the basic outline of the head waited till the server saved again closed it all out went to open Omen again and it now it won't open it created a new default map that replaced the other. Anyone got any ideas of what went wrong? (What causes Omen edited maps to become corrupt?, coradon, October 20, 2012)

Reply #2: “That has happened to me are you closing the server console with ctrl+c?” (What causes Omen edited maps to become corrupt?, chariot, October 20, 2012)

Reply #5 (from initial information seeker): “No I've just been waiting for the server to save then I hit the X in the top right corner. Is there a preferred method to closing it that doesn't cause problems? (I'm an XP user Linux)” (What causes Omen edited maps to become corrupt?, coradon, October 20, 2012)

Among these three codes (Providing context, Defining an information need and Providing further context/information), we can see that the information seeking behaviours found in this sample are iterative and dynamic, in that there is an ongoing exchange between the information seeker and other participants in an effort to get at the root of what the information seeker is precisely looking for. This suggests that communication and collaboration are an integral part of information seeking behaviour in this sampling. It also
suggests that there is an element of critical thinking occurring as participants provide information and add context to their previous response while the information seeker evaluates the responses, as well as refines and articulates his need accordingly.

The code *Strategic information need* was applied 17 times. In addition to initial requests for strategic help that began 12 discussion threads, five other requests for strategic help that were identified within the threads. These five additional requests were related, or similar, to the initial request for information. For example, the initial request: “*Is there a way to remove enchantments in 1.2.5?*” (Remove enchantments?, Andrewdale, June 18, 2013) received the following response: “*i got a bunch of gold armor from skelly's with enchants and want to take the chants off the gold and put it on my diamond armor, but doesn't look like you can...*”(Remove enchantments?, savagedogballs, June 18, 2013).

The code *Drawing on prior knowledge* was applied to cases in which the information seeker provided information such as recalling past experiences or indicating what s/he already knew in relation to the information they were requesting. 12 such instances were identified in the sample. The following example taken from a discussion thread with the subject line SMP pranks” is illustrative of an information seeker explaining what he knows and concluding with his request for ideas for pranks:

> i decided i needed a few jokes to play on some of my friends. i already have played a few jokes including dog kidnapping, screwing around with their doors (changing the orientation so the pressure plate shuts them putting a lever on the base block so the pressure plate doesn't work) making a mountain over their house so they can't find it and afk boxes (putting boxes of stuff around people whenever they go afk. i also got a plugin that lets me disguise as a mob so creeper scares are hilarious so do you guys know any pranks i can play?* (SMP pranks?, bigjeep, August 7, 2011)

Six initiating requests for technical information were coded *Technical information need* with three additional for technical information requests identified within the sampled
discussion threads. The code *Opinion based information need* was applied in three instances. An exemplary request taken from a discussion thread in the sample is the following message: “What do you think is the most useless thing in minecraft? Do not post about something you've never used’ (What’s the most useless thing in minecraft?, Snipe7r, March 13, 2013)

Instances, in which discussion participants responded with an acknowledgement that they either required the same information as the initial request or believed that the request was valid or interesting, were coded as *Validating information need*. This code was applied in 14 cases. When a discussion forum participant requested more information from the information seeker. This was coded as *Asking for more information*; this code application occurred 9 times.

Within this sampling, information seeking behaviour is a dynamic community-driven process, with information being exchanged and shared among multiple participants. Within the context of this sampling, the information sought was largely strategic based, requesting information on how to do various things within the game. While the information seeker may make an initial request, having drawn on prior knowledge, the refinement of the information sought continues as exchanges occur between interested participants. Participants will provide additional context or more information as the information seeker refines and communicates his/her needs. Some participants will validate the information seeker, stating that they are looking for the same or similar information. As participants help information seekers to refine their needs, they are inadvertently helping the information seekers to develop and improve their abilities to define an information need and articulate their knowledge.
4.4 Information Sharing

The category Information Sharing contained codes related to the sharing of information solutions opinions or suggestions pertaining to a Minecraft related query requested by a forum participant. Ten codes were assigned to this category, with a total of 1030 code applications. Having a high number of codes related was expected given that the number of discussion participants sharing information has been show to vary in accordance with the type of information required (Martin, 2012). The average number of replies to information requests in the sample is set out in Table 4.3

<table>
<thead>
<tr>
<th>Information Sharing</th>
<th>Number of Codes</th>
<th>Codes by Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing information/solutions</td>
<td>405</td>
<td>40%</td>
</tr>
<tr>
<td>Expressing opinion</td>
<td>248</td>
<td>24%</td>
</tr>
<tr>
<td>Justifying answer</td>
<td>112</td>
<td>11%</td>
</tr>
<tr>
<td>Sharing of experiential information</td>
<td>91</td>
<td>9%</td>
</tr>
<tr>
<td>Repeating previously mentioned information</td>
<td>49</td>
<td>4.7%</td>
</tr>
<tr>
<td>Offering suggestion</td>
<td>37</td>
<td>3.5%</td>
</tr>
<tr>
<td>Providing examples</td>
<td>33</td>
<td>3%</td>
</tr>
<tr>
<td>Providing a reference</td>
<td>24</td>
<td>2%</td>
</tr>
<tr>
<td>Expanding on another’s reply</td>
<td>21</td>
<td>2%</td>
</tr>
<tr>
<td>Sharing of indirect information</td>
<td>10</td>
<td>1%</td>
</tr>
</tbody>
</table>

This indicates that for this particular sample, a greater number of participants shared their opinions than they shared technical or strategic information.

There were 405 code applications for Providing information/solutions. This code was assigned when information was being shared. With further comparison, it became evident that although information was being shared, the sharing was occurring in different ways (e.g. as a reference, based on experience) and the information being shared was of different types (opinion, reference, an example). Therefore, each code identified as Providing information/solutions was revisited as to how and what was being shared. As a result,
additional codes were applied. The length and complexity of the information shared varied considerably; some replies were short and succinct while others were in-depth instructions or explanations. Some of the reasons for differences in the length of replies were indiscernible from the context of the messages (e.g. whether it was a question of time constraints, lack of information, lack of desire to invest in another player’s game play). The examples below are exemplary of the “Providing information/solutions” code in response to inquiries

> Well, then this comes down to trial and error. Consult the health points detailed in the Minecraft Wiki for each individual mob you want to kill. Now here's the tricky part. You dig a 2x1 hole and you make it deep enough to drop your health down to the damage equivalent of what the hostiles have when you fall unarmoured, without jumping. (Build a ladder in one end of the hole so you can get back up.) Eg. Creepers have 10 hearts, so you want a drop that takes 9.5 hearts. (How far do hostile mobs have to fall to be one hit kill?, AbeTheBlackFox, February 2, 2012)

> “23 blocks to severely damage mobs 24 to kill them” (How far do hostile mobs have to fall to be one hit kill?, CitrusZinus, December 5, 2012)

The large number of Providing information/solutions code suggests that, within this sampling, participants are willing to share their knowledge and help fellow gamers with their information needs. This collaboration and exchange between participants and the information seeker is indicative of the supportive nature of online communities to want to support fellow members in their common interests and goals. This dialogue allows the information seeker to utilize critical thinking skills in order to assess the information shared or questions asked by an information provider in order to refine their information need and provide additional information in order to clarify their need.

The code Expressing opinion was the second most frequently applied code for this skill. Some 248 instances of replies or parts of replies offering an opinion were identified.
Whether a reply was an opinion or “factual” information was difficult to discern. When such cases were identified, referring to the initial information request helped to guide the researcher’s interpretation. For example, a response to the information request “which mob do you hate the most?” in the discussion thread “What mob do you hate?” the information seeker received a reply of: “No other mob as stealthy and dangerous as the creeper.” (What mob do you hate?, Danster5oo, February 24, 2013) While this reply may be interpreted as someone sharing a fact about a hostile mob, it was actually articulated in response to a question soliciting opinions. Therefore, it was interpreted as someone expressing his/her opinion. The sharing of opinions allows people to share their knowledge but only within a certain context whereby they may demonstrate bias, albeit a legitimate one. However, this provides opportunities for participants to assess information and develop an understanding of the concept of bias and be able to make critical judgments knowing that the information may not be fully factual. Information literacy requires an understanding of bias and an ability to recognize it in order to make appropriate decisions about the information that participants have found or received.

The messages in the sample responding to various requests for information were often found to include rationales for the content of the response. Indeed, 112 instances were identified. The code applied in those cases was Justify answer. Three examples of messages for which Justify answer coding was applied are provided below:

(i) Response to Strategic Information Request – I've tried many sorts of mining and to be honest, I have found none is better than the humble branch mine. I actually go down to level 11 and make a tunnel 1x3 blocks high. I do these with 3 solid blocks in between. Very high yield of red stone, coal and iron and diamond. I tried a phoenix mine once, but the efficiency didn't seem quite as good as the old branch mine. Its a less boring way to mine though, what with all the turns etc... ("Official" Mining Strategies?, Rethical, February 21, 2013)

(ii) Response to Opinion Information Request – “Air is most definitely not useless.
Without air blocks (meaning there was a null pointer to the block, but we'll say it didn't crash the game) there would be no monsters spawning.” (What is the most useless item in Minecraft?, Deacon_Blue, March 11, 2013)

(iii) Response to Technical Information Request – “There isn't any reasonable explanation because Omen uses the server's code to save maps. Only thing I think of is you closed Omen too soon and it didn't save properly. Highly unlikely but possible” (What causes Omen edited maps to become corrupt?, Zuriki, October 20, 2012)

A small number of replies (n=33) also included additional information in the form of hyperlinks, videos, images, or referrals to other discussion threads. These messages were coded as Provides examples (for example with images or videos).

The code Providing a reference was applied in the discussion forum 24 instances in which a participant shared information belonging to someone else and gave credit or provided access (primarily via a hyperlink) to the original source. In some cases of the sample (n=5) the participant simply referred to the original source.

After having completed reading a discussion thread, some respondents elaborated on a previous respondents’ reply; 27 such cases were identified in the sample. They were coded as Sharing/Expanding on another’s reply. Building on a previous reply is indicative of not only the collaborative nature of Minecraft but also of the collaboration that can be found in other discussion forums (Barnes et al., 2007; Schrire, 2006). A number of replies (n=49) were repeats of previously mentioned solutions. It was not possible to verify if these repetitious responses were indications of corroboration or failure of the responder to read previous replies in the discussion thread.

Sharing/Expanding on another’s reply belongs to the category “Information Sharing” because participants in this sample share experiential information that they themselves have validated, express opinions about, provide references for and offer examples to support
others’ views. They also provide justifications for the information they provide which requires that they be able to communicate their knowledge. Participants will also help by expanding on another’s reply or expressing an opinion. As opinions are shared, participants must decipher from fact and opinion and make critical judgments about the information shared. Although information sharing has not typically been considered a part of information literacy models discussed in chapter two, information seekers’ increasing reliance on forums and discussion groups to meet information needs may need to be addressed in future models of information literacy.

4.5 Information Evaluation

The category of Information Evaluation encompasses various activities that one might observe when information is being assessed for truth and relevancy. Thirteen codes were allocated to this category; refer to Table 4.4.

<table>
<thead>
<tr>
<th>Information Evaluation</th>
<th>Number of Codes</th>
<th>Codes by Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing information</td>
<td>87</td>
<td>32%</td>
</tr>
<tr>
<td>Discrediting/correcting wrong information</td>
<td>28</td>
<td>10%</td>
</tr>
<tr>
<td>Crediting a good informer</td>
<td>27</td>
<td>9%</td>
</tr>
<tr>
<td>Providing a reference</td>
<td>24</td>
<td>8%</td>
</tr>
<tr>
<td>Questioning Informer/information</td>
<td>22</td>
<td>8%</td>
</tr>
<tr>
<td>Agreeing with a previous reply</td>
<td>17</td>
<td>6%</td>
</tr>
<tr>
<td>Reflecting</td>
<td>12</td>
<td>4%</td>
</tr>
<tr>
<td>Potential use of information</td>
<td>11</td>
<td>4%</td>
</tr>
<tr>
<td>Discrediting bad informer</td>
<td>11</td>
<td>4%</td>
</tr>
<tr>
<td>Stating information is not useful</td>
<td>11</td>
<td>4%</td>
</tr>
<tr>
<td>Stating information is useful</td>
<td>10</td>
<td>4%</td>
</tr>
<tr>
<td>Use of information</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Self correcting</td>
<td>5</td>
<td>2%</td>
</tr>
</tbody>
</table>

Approximately one third of these instances were accounted for by the code *Assessing Information*. This code was applied any time there was an indication that a participant’s reply
was based on previous information found in the discussion thread.

Of the 87 instances for which the code *Assessing information* was applied, 20 pertained to a message posted by the initial information seeker, with the remaining 67 referring to other respondents. The exchanges falling under the code *Evaluating information* exchanges were also revisited to further refine how information was evaluated when additional codes were applied. Evaluating information is an important component of information literacy as it requires elements of critical thinking and reflection on the part of the evaluator and is essential for deciding if information is useful or not. The code *Evaluating information* retains value as an indication of the portion of the reflective or critical skills used in the exchanges.

An additional code *Discrediting/correcting wrong information* was applied 28 times, accounting for 10% of the applied codes in this category. Any reply that made an attempt to discredit or correct previous information had this code applied. The exchange below which took place among 3 participants in the “How to make mobs not turn invisible?” discussion thread is exemplary:

*Initial request:* At a far enough distance mobs turn invisible. Is there a way to turn this off? (Weterman/user_837235, February 23, 2013)
*Reply #1:* They don’t turn invisible they despawn (Crimsolite, February 23, 2013)

*Reply #2 (from initial information seeker) @Reply#1:* No they turn invisible
(Weterman/user_837235, February 23, 2013)

The code *Providing a reference* can be found in both the *Information Seeking* category and the *Information Evaluation* category when a reference to information (i.e. a link to another resource) was shared. The researcher’s assumption was that if a participant chose to share a reference they did so because they had assessed and decided that reference was valuable and relevant to the present information request. The code *Providing a reference* was
applied 24 times.

The code *Agreeing with another’s reply* was applied when a response indicating that the responder agreed with a previous reply was identified in the discussion thread. Seventeen such cases were identified in the sample. For some replies \((n=10)\) it was not obvious if the message was, in fact, someone agreeing with a previous reply or someone simply adding a reply that coincidently agreed with a previous post.

If a reply to a post gave any indication that the responder had used information from a prior post or expressed that he/she was going to use the information, the assumption was that the responder, having made an initial assessment, felt that the information was adequate enough for further trial and validation. For such a case the code *Potential use of information* was applied. Only 10 such cases were identified in the sample. Only 6 instances were identified in which information was actually used. For those, the code *Use of information* was applied.

Similarly, some replies stated that the information from another reply was either useful or not useful without providing any indication of use. The assumption, here, was that if a reply indicated that the information was useful or not useful, the information had already been assessed. Ten such instances were identified and coded as *Stating information is useful*. In 11 instances information was identified as not useful.

From the number of applications of *Discrediting or correcting wrong information* and *Evaluating information* in the category *Information Evaluation*, we can deduce that a significant portion of the participants is critically assessing the information being shared on the discussion forum. Participants do not hesitate to discredit incorrect information, or reveal a bad informer. They display discriminatory behavior and in so doing allow for others to learn what information is valuable or not. This behavior may make other participants wary of
sharing incorrect information and will hopefully encourage all gamers to validate their information before sharing it. This supports the online community as adolescent participants learn from one another, not just what information is correct. Moreover, they learn to collaboratively regulate and solve not only information queries but also the social issues of an online community.

4.6 Conclusion

The sample of discussion threads analyzed for this thesis offers evidence of the use of three broad categories of information literacy skills (Seeking, exchange and evaluation). Participants in this sample made requests for three different types of information: opinion, technical and strategic. Strategic information requests outnumbered opinion and technical requests by at least a factor of two, suggesting that game-play objectives appear to be a significant motivation for information requests. Evidence of collaboration was also observed during instances of respondents evaluating each other’s comments. This indicates a willingness to support and help fellow members of the community by not only sharing knowledge but also by investing time to ensure its accuracy. This collaboration continued when respondents shared whether or not the information was useful, when in fact they used the information, and whether that use contributed to their success or failure within the game. Within the sample, a larger number of people shared opinions than those who shared technical or strategic-based information. This suggests that perhaps participants are more motivated to share information. No data was gathered that might explain this observation.

Communication and collaboration are integral parts of information seeking behavior. The ongoing exchange between the information seeker and participants is a dynamic process that presents opportunities for information literacy skills to manifest and develop. The information seeker and provider refine their needs and knowledge while drawing on prior
knowledge, providing context and enabling critical thinking skills. Participants readily share their knowledge and expertise in a variety of ways, in an effort to support fellow gamers in the online community. Recognizing bias and evaluating information for fact or opinion may be done when an opinion is requested and offered. Throughout the process, the evaluation of information is occurring in a collaborative fashion where participants critically evaluate another’s response and convey disagreement with a participant. The practice and development of information literacy and social skills, such as communication, collaboration, critical thinking, and the seeking, sharing, evaluating and using of information is facilitated by the collective efforts to learn about Minecraft and to regulate the information shared by others in the discussion forum.
Chapter 5 Phase 3: Interview Findings

5.1 Overview

The purpose of the third phase of the thesis was to investigate the extent to which eight teenage Minecraft players apply their information literacy skills during gameplay. Since it was not possible to corroborate the age of the participants in the Minecraft forum discussion threads sampled, additional gameplay-related data was gathered by interviewing eight teen gamers about their information literacy experiences in the process of game play. The interviews added a personal dimension to the thesis. They provided an opportunity to explore the personal accounts of a specific demographic of Minecraft players and to hear their accounts as gamers, affinity space participants and information seekers.

A convenience sample of eight teen Minecraft players was recruited for interviews. A convenience sampling entails subjects being selected based on the judgements of the researcher (Farrokhi & Mahmoudi-Hamidabad, 2012). This technique has been used in pilot studies conducted on information literacy in both LIS and education (Aiani, 2008; Cannon, 2007). While this particular technique allows for the gathering of rich detailed information, there is a possibility that the sampling may not represent an entire population. Therefore, findings cannot be generalized to the greater demographic (Aiani, 2008).

Participants were recruited with a flyer posted in the researcher’s local community center and municipal library (Please see Appendix B for recruitment flyer). Criteria for acceptance to be interviewed included:

1. Being between the ages of 13-17
2. Having played Minecraft for the past year
3. A native understanding of the English language since the interviews were conducted in English.

A date and time to meet was arranged. The interviews were conducted at the local municipal library in a study room and interviews lasted approximately 30 minutes.

The interviews were conducted in a semi-structured format. Bernard (as cited by Cohen & Crabtree, 2006) states that a semi-structured format is best when there will be only one interview. The questions were designed as prompts for the interviewees to discuss their experiences and practices with information literacy. More specifically, the discussion focused on their information seeking and evaluation practices while playing Minecraft. Interviewees were also encouraged to discuss their participation in affinity spaces related to Minecraft (Discussion forums, YouTube, Wikis). Follow-up questions were used only when necessary, for example, to obtain clarification on the original answer (See Appendix C for the Interview Guide). Given the age of the interviewees, an age-appropriate, less formal language was used in order to develop a rapport with them and maintain a sense of comfort, understanding and engagement.

All of the interview participants were required to read and sign a consent form as well as have the form signed by a parent or guardian. Each interviewee was assigned a number code linking the interview transcript to the participant. When reporting on the findings from the interviews, the researcher used this number code in order to maintain anonymity of each participant. The interviews were audio recorded and then transcribed. Both audio files and the transcribed documents were saved onto an USB key that will be stored in one of the researcher’s supervisor’s office as per protocol set out by the Canadian Tri-Council Policy Statement and the University of Ottawa Research Ethics Board. Given the small sample size, these findings are not generalizable. A narrative analysis involves examining textual data for
unifying themes and patterning relationships that occur over the recount of events (Josselson, 2011). Hence, the narrative analysis of the teens’ *Minecraft* stories offers important details about the players’ experiences (Chase as cited in Stock, 2008). This method has been used by Stock (2008) to examine the information literacy development among college students. Similarly Moline (2009) interviewed teen gamers using this technique to assess their perceptions of learning. Seven of the eight participants were male and one was female. I made every effort to have a proper gender balance among participants but these were the only eight teens that agreed to participate in this study.

The interviews were recorded, transcribed and analyzed based on a process explained by Josselson (2011). The analysis began with an initial overall reading of each interview transcript to examine how the narrative unfolds in each interview and to identify the general themes that emerge (Josselson, 2011). Next, it was important to return to each interview and examine the sections that contained more meaning and additional sub plots and to place them in context with the general themes (Josselson, 2011). Multiple readings of each interview were conducted. Connections between themes and patterns were extrapolated in relation to game-events, information behaviours and emotional responses that occurred during game play. All extrapolations and notes were recorded by hand on the interview transcripts.

Once notes were made about the information literacy behaviours that emerged, they were assigned to a partitioned version of the established information literacy definition found in Chapter 2. The participant’s stories are summarized and can be found in Appendix F. The information literacy elements that arose in all of the interviews were:

- Recognize an information need
- Identify information source
• Locate information source
• Evaluate information
• Use information

5.2 General Gameplay

Of the eight teens interviewed, six played *Minecraft* in creative mode only; one played in survival mode and one played in both. Three of the interviewees played *Minecraft* most often with others either in close physical proximity or in multiplayer mode. Two others reported most often playing on their own and the remaining three claimed to switch back and forth from single to multiplayer (or playing with friends close by). There was no purposeful attempt to identify which device they used to play *Minecraft*.

5.3.1 Information Literacy Themes: Recognizes an Information Need

All eight interviewees were able to recognize when they had an information need during gameplay, and were able to provide an example of when this occurred. For example, participant 101 mentioned that when he was a beginner player he needed information about the ingredients necessary to make a pickaxe and a shield, stating “*Ok ummmm well at first when you want to make a like ummmm a pickaxe or a shield you need to get this and this ingredients and I had no idea where to find these ingredients*”

Participant 104 reported once having wanted information about how to create a secret door. In addition to recognizing that he needed more information to succeed, he used his prior knowledge of the subject to help refine his need. In his words,

...*when I tried to make um like a secret door kind of thing in my house and that was like really complicated because you need like a bunch of different things but I only play on survival so well first of all getting it was difficult, but then um actually how the mechanics work in Minecraft are pretty neat like you would need to have a lever*
and then it would need to be attached to red stone and then you need to sort of make a trail around and then have it touch what you want moved. So I had no idea how to do that and one of the things is that you need to have it in one of the corners of the room so that the walls just pulls out.

This comment demonstrates his knowing that there was a method for building a secret door and that specific components of the door would need to be built in a certain way in order to create a triggering mechanism that opened the door open upon activation. However, he also knew that he did not know how to accomplish this task. Participant 104 refined his lack of information with his prior knowledge that the secret door had to be placed in a corner in order to work. He also recognized that he had to learn how to successfully build the mechanism so that the trigger, when touched, would open the secret door.

5.3.2 Information Literacy Themes: Identify and Locate Information Sources

All eight interviewees were able to identify and locate information sources that helped them satisfy their Minecraft-related information needs. They reported using a variety of on- and off-line sources to find information about Minecraft. The sources identified and used by the interviewees are shown in Figures 5.1 and 5.2.
As shown in Figure 5.1, the three most commonly used resources used by these eight gamers for Minecraft-related information are: the Minecraft Wiki, YouTube and Discussion Forums. Six interviewees reported relying on both the Minecraft Wiki and YouTube to help satisfy their information needs. Five interviewees reported that they also searched a discussion forum for Minecraft information. Three interviewees stated that they called on friends or a family member to help with their information needs. Two said that they went to Google to find the information they were looking for. One interviewee mentioned that he discovered the Minecraft Wiki via Google and now uses the Wiki as an information resource. Interestingly, three out of eight teens also mentioned that they watched Minecraft videos on YouTube in their spare time as entertainment. In order to find new and interesting things that other Minecraft gamers were doing and that they might want to try in the future.
The data presented in Figure 5.2 reveals that seven interviewees rely on multiple information sources when playing *Minecraft*, while five use three or more information sources. Based upon the interviewees’ comments, it was not clear whether one or more sources are consulted regularly. An Interviewee (102) reported that when confronted with an information need, he would first ask other gamers with whom he was playing online, then he would move on to other resources such as YouTube or the *Minecraft* Wiki if the response was not sufficiently quick or adequate:

...first would um I would ask people in the game first, and if there’s no answer back to it or if it’s not precise or not getting enough like feedback on it then I’ll go on YouTube, and I’ll just type it in what I’m trying to find and it gives you like a whole video of some guy trying to do it for you. Or if that doesn’t work still, there’s *Minecraft* Wiki.

Five of eight teen interviewees mentioned relying on specific *Minecraft*-focused information sources such as a *Minecraft* specific YouTube Channel, a *Minecraft* server’s discussion forum and a specific *Minecraft* map creator’s discussion threads. For example, participant 107 mentioned that he referred to a specific YouTube Channel to find the information he was seeking and if he could not find it there he would look at other YouTube videos.

**5.3.3 Information Literacy Themes: Evaluate Information**

Although all interviewees were able to describe how they assessed information and how they decided whether it was what they needed, the process of evaluating information appeared to differ for each interviewee. For example, interviewee 108 reported looking up information in the *Minecraft* Wiki and subsequently verifying it on a discussion forum to ensure its accuracy before using it. Interviewee 102, on the other hand, claimed to filter
through videos, deciding if they were useful by looking first at the YouTube video’s star rating and reviews.

Three subthemes emerged from the interviews with regard to information evaluation: trial and error, humour and trust. (See Figure 5.3)

![Figure 5.3. Emergent subthemes for information evaluation](image)

Five of the eight interviewees reported using a *trial and error* process once they had narrowed down the information they believed best met their needs. In the words of Interviewee 104,

*Umm, I’ll normally look at the different answers and whichever seems most logical, I’ll pick that one and I’ll try it and if it doesn’t work then I go back and find something else that makes more sense until it works.*

None the less, each interviewee had a different approach or method for experimenting with new information. Interviewee 105 described a process demonstrating somewhat more sophisticated information literacy skills than her counterparts in the interview sample. It
involved her structuring the possible solutions into a sort of list of most suggested solutions, which she then confirmed through trial and error. She described the process as follows:

Well I read them all pretty much and then I like, I kind of just sum it all up so like kind of do umm, I guess do a survey kind of thing and you choose whatever ones that are the same like the most that are the same. Uh, I completely forget the word! Oh my God! Like, the most answered, like whatever thing came up the most in the 600 answers I would probably do that one. And then if that one wouldn’t work I would do like the second one that was brought up the most.

Interviewee 105’s information evaluation actions demonstrated a belief that a greater degree of consensus among players may indicate a more successful solution or more accurate information. Two teens that played in survival mode did not mention using a trial and error method when evaluating information. Participant 103 mentioned looking up how-to videos outside game play but within game specific apps. He used what he learned: “And then so when I needed it, I remembered like sort of how to make it but I also went online to see exactly how and then my friend would show me so ...and then I made my trap door.”. This shows that Participant 103 needed to be informed prior to attempting to perform a specific action in Survival mode because remaining alive is a priority. Participant 106 stated that he relied on the Minecraft Wiki and used the information directly.

For some interviewees, the criteria for the evaluation of information extended beyond its usefulness to include how it was presented. Three of the eight interviewees reported that entertainment and humour influenced their assessment of information. Interviewee 107, for example, mentioned that his preference for certain Minecraft specific YouTube channels was, “Oh, just because the people that do it are funny.” When asked about his YouTube channel preference Interviewee 101 stated:
...because it’s nice...they’ll be building and then talking in the background about doing it...they’ll be showing the actual game and they’ll be talking in the back so that’s really nice but there’s some videos where they’re just building and you don’t hear anything, it’s not as interesting or it’s fun to watch when they have a friend and they’re both talking how to do it and that’s more interesting so...

The preference for resources that are entertaining or humorous did not detract from the need to have accurate information. That being said, the desire for humour was important enough among three of the interviewees that reliable and humorous information sources were a regular “go to” source of information.

The notion of trust was a third theme that emerged from the information evaluation portion of the interviews. In Minecraft, false information can potentially end one’s life; at the same time, some actions within the game require accuracy (e.g. a recipe to make bread), and other things do not (e.g. building a house). When asked how they would know if the information they found was true, three interviewees stated that they could not understand why someone from within the community would share false information or waste another gamer’s time. According to Interviewee 106, “I trust the people playing and putting up this information would just be telling the truth instead of putting up some random thing and waste like 5 minutes of your time.” The awareness of the need for trust in fellow teen gamers motivations is evident in this comment. Echoing this view, Interviewee 105 stated “I like taking information and suggestions from other people because they’ve experienced it and they like know the best ways of doing stuff and they can explain it well sense they play so I just feel like its easier”.

5.3.4 Information Literacy Themes: Information Use

Seven of the eight interviewees made specific mention of using the information they found for their Minecraft-related information need. Interviewee 101, for instance, recounted
how despite having come across information that was not completely accurate, he was still able to achieve his objective with the information. Interviewee 102 stated that after finding a particular YouTube video to suit a particular need, he used it for building. Interview 103 described how he first browsed the Wiki, looked at videos and downloads, played with an app for fun, then applied the newly acquired information to his game. Interviewee 104 found the most appropriate information, tried it out, and if it did not work he returned to searching for a different answer. His use of information is directly linked to his evaluation process.

Interviewees 105, 106 and 107 and 108, on the other hand, reported using a more direct approach. Interviewee 105 returned to the game after choosing the most popular response to her problem and using that information first. When using the Minecraft Wiki to find information about how to make an object, Interviewee 106 returned to the game and made the object. Interviewee 107 discussed how he found information about how to create a TNT cannon on YouTube, returned to the game and made the cannon. Interviewee 108 mentioned that once he had found the maps he wanted to download, he did so, and then used them. When the interviewees found a resource that they preferred and continued to rely on, there appeared to be less of an evaluation process occurring once the preference had been established. Whether the preference is due to a sense of reliability, trustworthiness, entertainment factors or a combination thereof was not queried.

5.4 Conclusion

The participants in this study demonstrated unique ways of recognizing a need for information, identifying and locating information sources and using and evaluating the validity of information. At the same time, their behaviours did share some similarities. All eight interviewees were able to formulate an information request. A majority of those
interviewed relied on the *Minecraft* Wiki, discussion forums and YouTube to help with their *Minecraft*-related information needs. All eight relied on at least two information sources.

All interviewees articulated a process for evaluating information. Most commonalities occurred in how such evaluations were performed, such as employing a trial and error process as part of their evaluating (and using) of information. The notion of trust and humour also appeared to play a role in the evaluation of information for this particular sampling of teen gamers albeit to a lesser extent. The trial and error approach to evaluation creates a crossover interaction between information evaluation and information use, wherein the interviewees reported first finding information then trying it and, if successful, continuing on with their game.

The information literacy practiced by these teen gamers while playing *Minecraft* appears to be a dynamic process, in that the integral elements of seeking information both online and offline and the collaborative sharing and evaluation of information occurred both asynchronously and synchronously. As well, a number of the teens interviewed engaged in a process in which information was used to experiment with the game. This allowed for the evaluation and use of information to occur simultaneously.

In regards to the definition of information literacy established in chapter two, the eight teen gamers interviewed demonstrated various information literacy skills (e.g. recognizing an information need). They recognized when they were missing knowledge to complete an objective while playing *Minecraft*. Some of the teens interviewed were able to articulate clearly what knowledge they had and what information they were missing. The interviewees were able to identify valuable sources of information and knew where to locate them. They recognized that knowledge could be found not only in the *Minecraft* communities online, but also within their friends, family and fellow gamers. They often used
multiple resources to find as much information as possible within a time frame that was acceptable to them. The evaluation of information rarely occurred in a mutually exclusive, linear fashion, in so much as the teens spoke about using a variety of techniques to assess the information they found or were given. The participants were discerning in their choice of sources, often using more than one to corroborate the information that they found in each source. Once reliable sources of information, particularly online, were established, they became the sources to which the gamers returned when confronted with other information needs.

Evaluating information occurred in a variety of ways, from using the rating system incorporated with the resource to verifying the information with another source. Not only were accuracy and quality of information important to some interviewed but entertaining and/or humour were also part of the decision-making criteria. This occurred so frequently that some interviewees who recognized resources as being accurate and also entertaining returned to these ones regularly. There also appears to be a sense of trust felt by the interviewees towards fellow gamers to help and not hinder their fellow gamers.

Locating, assessing and using information appeared to be a dynamic process, occurring integrally. Assessing became a part of the decision making process about where to go for the information. Once located, the assessment process often involved trying the information to see if it worked for each participant’s particular situation. Collaboration was often an integral part of this process as well. Interviewees mentioned working with fellow gamers (friends and/or family, online or offline) to find solutions in order to move forward in the game.
Chapter 6 Summary and Conclusions

6.1 Overview

The following definition of information literacy given in chapter 2 served as the guiding definition for this study: *The ability to know when there is a need for information, to be able to identify, locate, evaluate, and then use that information effectively to make informed decisions as well as to gain, create and share new knowledge.*

The purpose of this thesis study was to investigate the potential for information literacy skills development in the *Minecraft* gaming environment. This chapter will summarize the findings of this research as well as suggest possible directions and implications for practice and future research.

This study was framed around the following research question(s):

**Does Minecraft and its affinity spaces support the development of information literacy in teens and if so, how?**

RQ 1: What information literacy skills are needed to play *Minecraft*?

RQ 2: What information literacy skills do participants demonstrate while engaging with a *Minecraft* affinity space?

RQ 3: What information literacy skills do *Minecraft* teen gamers draw upon when participating in the game and participating in its affinity spaces?

The video game analysis was employed in an effort to answer the first research question. *Minecraft* comprises many design features that require reading, and critical thinking. The HUD, information objects and interactions with other objects or non-playing characters that occur in the game require a player be able to read and assess the information and activities in the game in order to make decisions about his/her actions. This supports the
research consensus that video games require literacy and critical thinking skills in order to advance in game play (Adams, 2009; Gee, 2007; Shaffer et al., 2004).

Due to the myriad of objects and non-playing characters and their characteristics, *Minecraft* also requires that players seek information on gameplay from external sources, compelling them to inquire about various aspects of the game in online spaces such as the *Minecraft* Wiki, discussion forums or other affinity spaces. Gee (2007) suggests that a good video game offers opportunities to seek, find and use information. *Minecraft* is somewhat distinctive in that the game itself does not necessarily provide the information needed; the player often has to look at online and offline sources for the information.

Due to the sandbox nature of the game, information needs only emerge as a consequence of the objectives set forth by the player. Moline (2009) suggests that player regulated information needs create ideal learning opportunities due self-regulation and self-solving of the information need. When information needs are self-imposed, they have greater meaning to the information seeker who is more invested and motivated to find the required information and this subsequently increases the opportunity for amalgamation of the new information. Squire’s (2008) research also suggests that the need to learn a new skill and to find information only occurs when the players has new goals and the desire to advance, in a just in time fashion, creating a stronger connection between what is being learned and the task at hand than if the information/skill was learned at a time when it was not needed. *Minecraft* provides opportunities for goals to be established by the player and for information to be searched when needed.

*Minecraft* also permits multiple players to play simultaneously in the same virtual world, thereby enabling the possibility of collaborative information seeking, sharing, learning and game play. Game-specific tools also allow players to share information
asynchronously for example, by leaving behind information on a sign or in a book. Communication and collaboration are often manifested in Massive Multiplayer Online Games, enabling players to work collaboratively to learn skills, assimilate information, find solutions to problems and ultimately achieve their game play goals (Squire, 2006).

_Minecraft_’s game design encourages the acquisition of new knowledge, and the impact of applying that new knowledge becomes evident to the players as they use it to achieve their goals. _Minecraft_’s design encourages its players to:

- Assess the information accessible to them during gameplay in order to make decisions
- Recognize a need for information and identify information gaps
- Identify what sources will provide the information needed (whether within the game, online or offline)
- Locate and assess the information needed either alone or collaboratively
- Apply the new information and assess the results

An analysis of a sample of discussion threads taken from the Minecraft forum served as a basis for answering the second research question. The sheer number of people using the Minecraft forum supports Moline’s (2009) suggestion that gamers are turning to online sources when seeking information or solutions to game related problems. The analysis showed that participants in the discussion forum exhibited a number of information literacy skills including: recognizing information need, information seeking, using a variety of information resources, sharing information, and the evaluation and use of information. This would appear to support Steinkuehler’s (2008) suggestion that there are many opportunities for information literacy skills to be practiced in affinity spaces. The analysis highlighted
three different types of information requests in which information seekers requested information, describing what they needed and the context in which it was needed. The number of replies varied considerably and appeared to be related to the type of information request. Some participants shared resources by providing hyperlinks, images, and videos. Gumulak and Webber (2011) found similar results when they interviewed twenty-eight teen gamers:

As well as recognising when they needed information, participants in this study were able to identify where the gap in their knowledge lay, identify how they might bridge the gap, adopt searching and browsing strategies to find what they wanted (using the three dimensional world of the game, other people, web search engines, and a variety of textual sources) and then apply the information to solve their problem so that they could get “unstuck”. (p. 250)

Within the sample, the evaluation of information appeared to be a collaborative process, with different forum participants often indicating whether the posted information was correct or not, providing alternative solutions, correcting wrong information and corroborating good information. Research has shown that participants in affinity spaces, particularly discussion forums, develop collaboration and critical thinking skills while solving problems (Huang et al., 2010; Schrire, 2006). The sampling of Minecraft forum participants also appeared to demonstrate an ability to converse, advise and support one another while solving information problems for fellow gamers. Some online communities where participants assist other members with their information needs (by sharing information and by debating and evaluating information) develop social ties, common values and a shared knowledge, allowing for a collective intelligence to emerge (Martin, 2012).

The analysis of the discussion forum discussions suggests that information literacy skills were being used within the sample of exchanges. The information literacy skills demonstrated in the discussion forum analysis were:
• Defining an information query, including context, while drawing on prior knowledge
• Sharing information of information/solutions, including references, opinion, feedback including justification for the answer provided
• Collaboratively, assessing information, providing justification for the assessment, debating responses, correcting incorrect information and indication if a solution or information is accurate and useful or not.

The information gathered from interviews with 8 teen gamers served as a basis for addressing the third research question. The interview data suggest that the participant teens applied information literacy skills while playing Minecraft and engaging in the affinity spaces related to the game. Although it is important not to generalize the findings from this convenience sample, the interviewees described their ability to recognize a Minecraft-specific information need, locate possible solutions in a variety of acceptable resources, evaluate the information and apply it to the game. The interviewees were all able to identify an information gap as per Dervin’s Information Seeking Theory, made efforts to close the gap and advance in their game play. The majority of interviewees reported a preference for playing with other people either virtually or in person, thus allowing for any information seeking process to be engaged in collaboratively. This is indicative of J.R. Shaffer’s (2012) findings that teen gamers prefer online games that incorporate elements of collaboration and communication.

The interviewees also reportedly relied mostly on YouTube videos, asynchronous discussion forums and the Minecraft Wiki to fulfill their information needs. Their choice of information sources is in line with Harlan et al.’s (2012) findings that teens prefer people
and online communities when searching for information. The teens interviewed also explained that they relied on more than one information source when looking for *Minecraft* information. Martin (2012) found that *World of Warcraft* affinity space participants demonstrated various levels of information literacy while engaging in in-game chats and discussion forums. Her study revealed that, in the *WoW* affinity spaces, participants demonstrated: a need for information, help locating information, sharing and evaluation of information. The fact that each participant demonstrated these skills in an individualized manner suggests that there is more than one way to be information literate.

All interviewees gave different explanations for how they evaluated information. Nonetheless, three subthemes emerged from the interviews: trial and error, humour and trust. A majority of interviewees (5/8) employed a trial and error process, where they tried the solution out in the game, allowing for the integration of both the evaluation and use of information into one activity. Trial and error in gameplay allows for the development of an expertise as well as a comprehensive understanding of one’s interactions and their implications. Observed also in *Elder Scrolls V: Skyrim* gamers, trial and error allows for risk and failure which in turn precipitates critical thinking, inductive reasoning and the formulation of conclusions (Poulos, 2013). The same number of interviewees (3/8) indicated that their preferred resources needed to be reasonably correct as well as engaging, fun or humorous. Less than half the interviewees in this study (3/8) said that they trusted fellow gamers to provide them with correct information. Developing a sense of trust in the reliability of information delivered in a game may hinder information literacy if players transfer this sense of trust to other information seeking situations (Moline, 2009). Alternatively, after having experienced the consequences of using inaccurate information, it
is possible that gamers may attempt to use their critical thinking skills when searching for information, and therefore develops more stringent information evaluation criteria.

In the final phase of this study, interviewees described the information literacy skills they employed while interacting with the *Minecraft* game environment (game and affinity spaces). These skills consisted of:

- Defining an information need and providing context to clarify the information need
- Identifying the sources that would offer the information they needed
- Assessing the information for accuracy as well as for its presentation value (entertaining/humorous), often collaboratively.

Taken together the answers to these questions show that 1. Information literacy skills are required to play Minecraft including recognizing an information need, seeking, locating, sharing, verifying and using the information; 2. Minecraft forum participants demonstrate various elements of information literacy such as requesting information, sharing information and evaluating information; 3. Teen gamers who play Minecraft and engage in its related affinity spaces demonstrate some common information literacy skills but express them differently.

Playing *Minecraft* in conjunction with its affinity spaces has the necessary ingredients to be an environment for developing information literacy including having the gamer use/practice the following skills:

- Information Seeking
  - Defining an information need
  - Providing context about an information need
- Information Sharing
  - Sharing of experiential (validated) information
  - Sharing of examples and references
  - Sharing of knowledge

- Information Evaluation
  - Assessing information for truth (collaboratively)
  - Using trial and error for validation of information
  - Correcting/Validating information
  - Applying information

*Minecraft* and its affinity spaces also contain the elements necessary to motivate players to seek information, by infusing the need to find information within its design. From the vantage point of Dervin’s Information Seeking Theory, *Minecraft* creates ideal information seeking environments for players to develop their information literacy by creating opportunities for knowledge gaps to occur, thus motivating players to seek information in order to close these gaps.

*Minecraft* qualifies as a game with learning potential when it is assessed with the learning and literacy criteria for games in Gee (2007) because it requires that players seek, evaluate and use knowledge throughout the game. In line with the findings of Felicia (2011), Lee (as cited by Spires et al., 2008) and Squire (2006, 2008), critical thinking and social interaction is needed in order to excel in the *Minecraft* game environment (game and affinity spaces). As per Adams (2009) and Squire and Steinkheuler (2005), the game environment also compels players to use information by sharing knowledge that they have evaluated as valuable in an effort to help others advance in the game. As the players engage in the
Minecraft affinity spaces, seeking evaluating and sharing information, they are helping the community to build knowledge, and evolve into a community of practice (Nass et al., 2014).

The answer to the overarching research question: Does Minecraft and its affinity spaces contribute towards the development of information literacy in teens and if so, how?, is that Minecraft and its affinity spaces support the development of information literacy skills by creating opportunities for players to seek, evaluate, share and use new information about play strategy. Whether these information literacy skills are transferable to other contexts are questions for further research.

Two questions arise from this research in relation to the development of information literacy in teens:

1. Do the current information literacy standards and assessments used in education and academic settings reflect the information literacy skills required by teens in this information rich and collaborative society? Information sharing in particular is not indicated as a component of information literacy even though it may be indicative of the experience and evaluation that is often a component of information sharing. As well, communication and collaboration are not recognized as components of information literacy (see Chapter 2 for ACRL and SCONUL standards, whereas CASL does briefly mention collaboration) when in fact these skills are necessary for affinity space participants to seek information, evaluate and use information by sharing their knowledge.

2. Is there any essential difference between the information literacy skills required for an academic purpose and for an authentic purpose (e.g. a self initiated inquiry driven by a Minecraft game objective)? Martin (2012) suggests that the information literacy skills needed for both situations are one in the same. All information seekers are
seeking the most appropriate resources to find the best information. Furthermore, as educational and academic environments delve into the world of affinity spaces and social media, teens need to have the information literacy skills to succeed in every type of learning situation. If a consensus can be agreed upon that information literacy skills are universal across various environments, the question that arises is: Given that students are not demonstrating these skills in educational environments but are in informal contexts such as gaming, how can we help with the transfer of these skills among information seeking situations?

6.2 Limitations

While this thesis contributes to LIS research in information literacy and gaming, the study has some limitations. This section outlines the limitations of this study and suggests further studies that would advance these findings.

While a case study offered the opportunity for thick descriptions, the results are limited in that they cannot be generalized. But they do offer insight into how one particular game may be able to facilitate information literacy development. Now that we have evidence that *Minecraft* may facilitate information literacy we can look more closely at how affinity spaces can support their development.

While the interviewees offered a rich variety of data, because of the limited participation, these findings cannot be generalized to the greater teen demographic. Conducting larger wide scale studies on *Minecraft* and its potential as well as on a larger group of *Minecraft* teen gamers would help to generalize results.

6.3 Opportunities for Further Investigation

This study has laid a foundation for further research on *Minecraft* and its affinity spaces as a potential learning environment for information literacy. This study suggests that
collaborative sandbox games like *Minecraft* and their affinity spaces have the potential to support the learning of information literacy skills of teens in general. A longitudinal study that assessed the information literacy competencies of a sample of teens both before and after a period of *Minecraft* play and affinity space engagements could ascertain the educational effects of such game play and information seeking in affinity spaces. To determine the extent of this effect, the ideal would be to compare the information literacy assessments of *Minecraft* game players with a control group who would not have been exposed to a similar gaming experience, as measured by a standard information literacy test such as SAILS (Kent State University, 2014). Another study could be also undertaken that investigates *Minecraft* and an affinity space (a closed one for the class) within the classroom as a complementary tool for information literacy instruction.

These studies would help to improve our understanding of information literacy development and guide those implicated in information literacy. All of these research questions indicate that there is still much research to be done on adolescents, information literacy development and video games.

### 6.4 Final Thoughts

Numerous studies suggest that high school graduates have not developed the information literacy skills required at either the post secondary level or in the workplace. This study has laid the foundation for further investigations into the information literacy skills being practiced by *Minecraft* teen gamers and whether *Minecraft* is a viable virtual space for information literacy development. *Minecraft* is appreciated for its sandbox design, leaving players in charge of their own destiny, allowing them to establish their own goals and how they go about achieving them, whether collaboratively or individually. By compelling gamers to seek information on game play from other players and online affinity
spaces, information literacy is an integral part of the game design. A vibrant community of Minecraft gamers is already exchanging knowledge with fellow gamers on and offline.

Learning how this young generation of gamers interacts and learns with technology and develops their information literacy is beneficial to librarians so that they can learn how to approach information literacy instruction and best meet the needs of their clients. As librarians we need to continue to investigate technology and tools that students are using to satisfy their information needs. It would be in our best interest to continue to research this demographic and the information literacy skills they are developing - just not through the traditional means that we have come to expect. Dervin (1998) states, “The switch is subtle but important. The question is not how can we reach them, but how can we change ourselves to be useful to them.” (p.42). We owe it to them to at least try.
References


Appendix A: Ethics Approval

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Université d’Ottawa  
University of Ottawa  
Office of Research Ethics and Integrity  
Ethics Approval Notice  
Social Science and Humanities REB

<table>
<thead>
<tr>
<th>Principal Investigator / Supervisor / Co-investigator(s) / Student(s)</th>
<th>Role</th>
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<tbody>
<tr>
<td>Andrea Valino</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Claire Doremann</td>
<td>Co-Supervisor</td>
</tr>
<tr>
<td>Sandra Bobbington</td>
<td>Student Researcher</td>
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File Number: 04-13-15

Type of Project: Masters Thesis

Title: Visual Genas and Their Affinity Spaces: A Holistic Approach to Genas and Information Literacy

Approval Date (mm/dd/yyyy) | Expiry Date (mm/dd/yyyy) | Approval Type |
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<td>05/15/2014</td>
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(In: Approval, I: Approval for initial stage only)

Special Conditions / Comments:

N/A
This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement and other applicable laws and regulations in Ontario, has examined and approved the application for ethical approval for the above named research project as of the Ethics Approval Date indicated for the period above and subject to the conditions listed the section above entitled “Special Conditions / Comments”.

During the course of the study the protocol may not be modified without prior written approval from the REB except when necessary to remove subjects from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the study (e.g. changes of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, information/consent documentation, and/or recruitment documentation, should be submitted to this office for approval using the "Modification to research project" form available at: http://www.research.ualberta.ca/ethics/consent.html.

Please submit an annual status report to the Ethics Office four weeks before the above-referenced expiry date to either close the file or request a renewal of ethics approval. This document can be found at: http://www.research.ualberta.ca/ethics/consent.html.

If you have any questions, please do not hesitate to contact the Ethics Office at extension [redacted] or by e-mail at: ethics@ualberta.ca.

Signature:

Protocol Officer for Ethics in Research
For Barbara Graves, Chair of the Social Sciences and Humanities REB
Appendix B: Recruitment Flyer

**DO YOU LIKE TO PLAY MINECRAFT?**

Seeking teens aged 13-17, who have played Minecraft for at least 12 months, to participate in an interview for a study conducted by Sandra Bebbington, graduate student, School of Information Studies, University of Ottawa.

**Time required:** 45-60 minutes  
**Compensation:** 15$ itunes gift card  
**Location:** St Lazare Municipal Library

Participation will be on a first come/first serve basis

Participants will be contacted by May 15, 2013 to set up an interview date/time

The interviews will conducted in English

If you wish to participate please contact Sandra Bebbington

**Contact Information**

Sandra Bebbington  
(Contact Information Removed)

---

**Principal Investigator:** Sandra Bebbington  
**Supervisor:** Dr Andre Vellino  
**Co-supervisor:** Dr Claire Dormann  
School of Information Studies, University of Ottawa
Appendix C Interview Guide

The purpose of the study is to understand the role video games and their affinity spaces (discussion forums) play in the learning and reinforcement of information literacy skills.

I will ask leading but semi-structured questions during the interview to draw out the participant’s experiences. Depending on participant’s answers, follow-up questions may or may not be asked or maybe subject to modification. They will be reminded that there are no right or wrong answers.

1 Demographics:

Gender: F  M
Age: 13 14 15 16 17

Game playing:

Approximately how long have you been playing Minecraft?

In what mode do you most often play Minecraft?
Creative  Survival  Hard Core  Adventure

Do you more often play by yourself or with other players?

2 Information Literacy in Games

While playing Minecraft, you may have come across moments where you did not know what to do. In other words, for example you may have needed to find information on how to proceed in the game, or wanted an opinion or feedback on something you created, or were unsure how to do something technically (for example: switching between modes)

Please try to think of one example where this occurred:

Please try to describe in as much details as possible what kind of information you were looking for, how did you go about finding the information and what did you do once you found your answer.

Follow up: (for clarification if needed)

Can you please explain what is was you needed help with or information you wanted?

When you found some answers, how did you decide which answer was best?

What did you do with the information?

3 Information Literacy and Discussion Forums

Do you use or participate in Minecraft discussion forums? You Tube videos? Other?
If yes, *for what purpose?*

Can you give me one example (repeat if Minecraft related)

3.1 Follow-up

Have you ever posted a query? What did you did with the answers?

Only if they used the forum for information seeking:

*When reading the various discussion threads how did you decide the information was useful or not?*

*Did you use the information you found?*

*Did you receive any feedback from one of your posts?*

*Have you ever responded to a post?*

4 Information Literacy outside of gaming

Have you used discussion forums or You Tube videos to find information about something outside of gaming? It could have been some information you were looking for school or personal reasons

*Can you give me an example?*

*Can you please explain what you did to find the information?*

4.1 Follow up questions (For clarification if not answered in explanation)

*What info were you looking for?*

*How did you decide that the information was good or what you wanted?*

*Did you use the information you found?*

5 Comments

Comments, questions concerns, anything else you would like to add
Appendix D: Discussion Forum Analysis: Summary of Code Frequencies

<table>
<thead>
<tr>
<th>Information Seeking</th>
<th>Number of Codes</th>
<th>Information Sharing</th>
<th>Number of Codes</th>
<th>Information Evaluation</th>
<th>Number of Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stating what information is not wanted or needed</td>
<td>1</td>
<td>Sharing of indirect information</td>
<td>10</td>
<td>Self correcting</td>
<td>5</td>
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<tr>
<td>Opinion information need</td>
<td>3</td>
<td>Sharing/expanding on another’s reply</td>
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<td>Use of information</td>
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<td>Technical information need</td>
<td>8</td>
<td>Provides references</td>
<td>24</td>
<td>Stating information is useful</td>
<td>10</td>
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<tr>
<td>Asking for more information</td>
<td>9</td>
<td>Provides examples</td>
<td>33</td>
<td>Stating information is not useful</td>
<td>11</td>
</tr>
<tr>
<td>Request for help</td>
<td>10</td>
<td>Offers suggestions</td>
<td>37</td>
<td>Discrediting bad informer</td>
<td>11</td>
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<tr>
<td>Drawing on prior knowledge</td>
<td>12</td>
<td>Repeating previously mentioned information</td>
<td>49</td>
<td>Potential use of information</td>
<td>11</td>
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<tr>
<td>Validating information need</td>
<td>14</td>
<td>Justifying answer</td>
<td>112</td>
<td>Reflection</td>
<td>12</td>
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<td>Strategic information need</td>
<td>20</td>
<td>Sharing of experiential information</td>
<td>91</td>
<td>Agreeing with a previous response</td>
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<td>Providing further context/info</td>
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<td>Expressing opinion</td>
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<td>Questioning informer/information</td>
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<td>Defining an information need</td>
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<td>Sharing of information/solution</td>
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<td>Provides a reference</td>
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<td>45</td>
<td></td>
<td></td>
<td>Crediting a good informer</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Discrediting or correcting wrong information</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Evaluating information</td>
<td>87</td>
</tr>
<tr>
<td>TOTALS</td>
<td>176</td>
<td>1030</td>
<td></td>
<td></td>
<td>271</td>
</tr>
</tbody>
</table>
Appendix E: Samples from SaturateApp of Discussion Forum Analysis Codes and Categories

<table>
<thead>
<tr>
<th>Code</th>
<th>Selection</th>
<th>Other Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>agreeing with previous response</td>
<td>agreeing with previous response</td>
<td>evaluating information, expressing opinion, sharing of information/solutions</td>
</tr>
<tr>
<td>also dead bush.</td>
<td>also dead bush.</td>
<td>sharing of information/solutions, evaluating information, expressing opinion</td>
</tr>
<tr>
<td>agreeing with previous response</td>
<td>agreeing with previous response</td>
<td>evaluating information, expressing opinion, sharing of information/solutions</td>
</tr>
<tr>
<td>also dead bush.</td>
<td>also dead bush.</td>
<td>sharing of information/solutions, evaluating information, expressing opinion</td>
</tr>
<tr>
<td>agreeing with previous response</td>
<td>agreeing with previous response</td>
<td>evaluating information, expressing opinion, sharing of information/solutions</td>
</tr>
<tr>
<td>also dead bush.</td>
<td>also dead bush.</td>
<td>sharing of information/solutions, evaluating information, expressing opinion</td>
</tr>
<tr>
<td>agreeing with previous response</td>
<td>agreeing with previous response</td>
<td>evaluating information, expressing opinion, sharing of information/solutions</td>
</tr>
<tr>
<td>also dead bush.</td>
<td>also dead bush.</td>
<td>sharing of information/solutions, evaluating information, expressing opinion</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>Were you able to turn this off?</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>So how do you find your diamonds?</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>Are the Testifying zombies naturally spawning?</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>But which mob do you hate the most?</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>Is there a preferred method to closing?</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>I'm making a hostile mob system, but I can't save my life.</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>I can't seem to find my house in survival.</td>
<td>Information Seeking</td>
</tr>
<tr>
<td>Defining an Information Need</td>
<td>I updated minecrafter to the latest version.</td>
<td>Information Seeking</td>
</tr>
</tbody>
</table>

### Discrediting Bad Informer

<p>| Defining an Information Need | Them noobs, right? As you said on the | Information Evaluation | Asking for more information, reflection, evaluating information |
| Defining an Information Need | Dog is definitely not useless. | Information Evaluation | Evaluating information |
| Defining an Information Need | Everyone knows | Information Evaluation | Evaluating information, sarcasm |
| Defining an Information Need | So don't be lazy. | Information Evaluation |
| Defining an Information Need | Everyone is gonna be mad. | Information Evaluation | Evaluating information, expressing opinion |
| Defining an Information Need | Did you not read what he said? | Information Evaluation | Discrediting or correcting wrong information |
| Defining an Information Need | THATS HARMFUL NOT HARMLESS | Information Evaluation | Discrediting or correcting wrong information |
| Defining an Information Need | Thats really original man. | Information Evaluation |
| Defining an Information Need | First of all, he's already figured out the | Information Evaluation | Decided not useful |
| Defining an Information Need | You sir are very wrong | Information Evaluation |
| Defining an Information Need | The air | Information Evaluation |
| Defining an Information Need | I got a Diamond Hoe enchanted with | Information Evaluation | Sharing of information, solutions |
| Defining an Information Need | You can | Information Evaluation | Evaluating information |
| Defining an Information Need | Gold is quite ench | Information Evaluation | Evaluating information |
| Defining an Information Need | Using a diamond pick to mine | Information Evaluation |
| Defining an Information Need | Unless you didn't say what you | Information Evaluation |
| Defining an Information Need | That would be too OP, all | Information Evaluation |
| Defining an Information Need | You broke the rules. | Information Evaluation | Evaluating information, expressing opinion |
| Defining an Information Need | Did you not read what he said? | Information Evaluation | Discrediting bad informer |
| Defining an Information Need | You can't mind bedrock... | Information Evaluation |
| Defining an Information Need | Friend on a server did. (Probably a plug | Information Evaluation |</p>
<table>
<thead>
<tr>
<th>Evaluating Information</th>
<th>Text</th>
<th>Type</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluating information</td>
<td>AWWWWWW best idea ever...</td>
<td>Information Evaluation</td>
<td>Enthusiasm</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>posted...and the first two possibly on this same page?</td>
<td>Information Evaluation</td>
<td>Expressing opinion</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>DEF the second one.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Above me is a good one but I don't know if thats 'harm'.</td>
<td>Information Evaluation</td>
<td>Expressing opinion</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>oh my f**g rets. And not just you but literally the last one</td>
<td>Information Evaluation</td>
<td>Expressing opinion, discrediting or correcting</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Damn someone beat me...</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Gets em every time.</td>
<td>Information Evaluation</td>
<td>Sharing of experiential information</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Brilliant!</td>
<td>Information Evaluation</td>
<td>Crediting a good informer</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Lol fantastic,</td>
<td>Information Evaluation</td>
<td>Enthusiasm</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>I've done all of these except #5</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Best. Plan. EVER.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>works quite often.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>I've tested it many times, although you need redstone</td>
<td>Information Evaluation</td>
<td>Sharing of experiential information</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>^ Genius.</td>
<td>Information Evaluation</td>
<td>Crediting a good informer</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Made me lol when I finally clued in to the source of the problem.</td>
<td>Information Evaluation</td>
<td>Expressing opinion</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>That was much less fun. If I ever find out who did that,</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>took some work hiding it all from the guards but I did.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Can't believe I didn't figure that out</td>
<td>Information Evaluation</td>
<td>Expressing opinion</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>meedit is pretty good for big stuff:</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Minecraft seems to work well for simple 2D layouts, and</td>
<td>Information Evaluation</td>
<td>Sharing of information/solutions</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>i do definately have 64 bit java.</td>
<td>Information Evaluation</td>
<td>Decided not useful</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>but ok i allocated less ram and that did nothing... and I did.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Okay so none of those options worked.</td>
<td>Information Evaluation</td>
<td>Decided not useful</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>That's great and all, but I dont have an nvidia graphics card</td>
<td>Information Evaluation</td>
<td>Decided not useful</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Changing every setting to high or low doesn't do anything.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>No, I'm positive it isn't overheating, it feels cool, and</td>
<td>Information Evaluation</td>
<td>Decided not useful</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>Also, at above, I don't think sand/gravel generators work</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>They don't, well I'm pretty sure the don't</td>
<td>Information Evaluation</td>
<td>Agreeing with a previous response</td>
</tr>
<tr>
<td>Evaluating information</td>
<td>these are my iri friends. im not going to grief their shit.</td>
<td>Information Evaluation</td>
<td></td>
</tr>
<tr>
<td>Evaluating information</td>
<td>i know its only a game # but i dont find blunt destroy</td>
<td>Information Evaluation</td>
<td>Decided not useful</td>
</tr>
</tbody>
</table>
Appendix F: Interview Summaries

Participant 101

Participant 101 is a 16-year-old male. Participant 101 has been playing *Minecraft* for 1.5 years and indicated that he played in spurts. When he did play it would be for many hours at a time. He usually played in Creative Mode and began by playing on his own and then as his experience increased he started playing with others. He has one particular friend that he plays with the most. As an inexperienced player, when he wanted to build something on *Minecraft*, he would spend a lot of time trying to figure it out. But then he discovered the *Minecraft* Wiki, which he claims helped him out. Even so, after playing for a year and a half, he mentioned that he had recently spent many hours playing with a friend trying to dig himself up and out of a cave. Given his experience, Participant 101 does not use the Wiki as often anymore but still refers to it when he is interested in finding something specific.

Participant 101 plays with an open laptop so that he can seek information while playing (he typically plays on a console). Participant 101 was able to articulate his information needs clearly explaining one information need he had was how to build a portal. He gets annoyed when he sometimes finds and uses incorrect information from sources that he expects to be reliable, such as the Wiki. The partially correct information combined with perseverance and continued trial and error would often get the task accomplished. He stated “…sometimes they weren’t as precise but did like help me, it pretty much guided me but didn’t tell me exactly.” Trial and error involved trying out a solution and if it didn’t work returning to the Wiki or YouTube to find other potential solutions. This process is how he most often would discover if information were correct or not and then proceeds with using it.

Participant 101 spoke enthusiastically about the process of finding information by watching YouTube videos on *Minecraft* created by other players. Participant 101 has commented on some interesting *Minecraft* videos on YouTube. When he was inspired and curious, he also asked the creator how they made something and how long it took. He then used the information found on the video as well as the instructions from the creator in his own game play, but claimed some projects can take a very long time to complete due to their complexity. He admitted that he has never uploaded anything or requested information himself; he described himself as not having the skills necessary or the time to do so. He said he prefers watching other people’s videos: “…I’m not really good with uploading it all (laughing)...so I have no idea it’s just so much fun to watch but I’m not really one to do it myself.” There are some videos that he will watch over and over again in order to learn how to do something.

According to Participant 101, there are a variety of YouTube channels dedicated to providing answers to questions on different topics; one of his preferred channels for *Minecraft* information is Smoshgames. He also mentioned other YouTube speciality channels or video creators he enjoys e.g. Neil Degrasse Tyson, Bill Nye. Various experts in those disciplines post YouTube videos that answer these questions and when Participant 101 was looking for answers not related to *Minecraft*, he would consult these specific channels to get answers. When asked what it is he prefers about these channels he said: “because it’s nice…they’ll be building and then talking in the background about doing it….they’ll be showing the actual game and they’ll be talking in the back so that’s really nice but there’s
some game videos where they just building and you don’t hear anything, it’s not as interesting or it’s fun to watch when they have them and a friend and their both talking how to do it and that’s more interesting so…”

Participant 102

Participant 102 is a male 15-year-old who has been playing Minecraft for over two years. He most often plays in Creative Mode and with other players. When in need of an answer to a question on how to play or how to construct something in Minecraft, Participant 102 asks the friends that he is playing with first. If their answer is inadequate or not given within a certain amount of time then he will turn to YouTube next. He discussed one information need where he was looking how to craft an item. Participant 102 decides if a video is worth looking at by initially checking out the first few reviews and its star rating. He will then watch a video he has chosen for the first few minutes to further decide if the content is adequate. He then tries out the information in the game. If he cannot find a video with an answer that meets his needs then he tries the Minecraft Wiki as a last resort. While Participant 102 mentioned that he does not rely on Minecraft.net as a general information reference he said that he sometimes uses the discussion forums found on specific servers (related to specific Minecraft worlds) when he is seeking information but stipulated that his priority is to find the information as fast as possible so that he can return to the game and use the newly acquired information. He also mentioned that he doesn’t usually leave a reply or comment because he is more concerned with getting back to the game and applying the newly learned information.

When in need of information not related to Minecraft or gaming, Participant 102 described how he relies on discussion forums for other information seeking sessions such as when he is trying to find a solution to a problem with his phone. He may not always find the exact answer but will test out the solution provided the comments are positive. If the comments are negative then he will continue with his search for a solution.

When asked what he likes most about Minecraft he stated “I think it like opens the door for creativity” “Yeah! You just go in blind and you just do whatever you want! And it’s like whoa!”

Participant 103

Participant 103 is a 15-year-old avid gamer who has been playing Minecraft for two years now. He almost always plays in Survival Mode and clearly stated that Creative Mode does not offer him enough of a challenge. Participant 103 uses mods regularly (Mods are game modification downloads that other players create that can be used to add or remove elements or alter game play. For example: There is a mod available to modify the avatar Steve, change his clothes, how he looks etc.). In fact he claims playing in Creative is “not playing a game it’s just messing around and doing whatever.” Participant 103 prefers playing with his friends but will play on his own as well.

When in need of information such as how to build a trap door, Participant 103 relies on the Wiki or apps (can be found on tablets). Participant 103 uses Minecraft specific apps that offer how-to videos and opportunities for contributing as well. While playing he would use what he read “And then so when I needed it, I remembered like sort of how to make it but
I also went online to see exactly how and then my friend would show me so ...and then I made my trap door.” He did mention that he also relies on friends for help if he can’t remember how to do something exactly. Participant 103 mentioned that he regularly browses through and watches Minecraft videos or read the Minecraft Wiki in his spare time for fun. He said that he likes to “be informed and know everything” for fun. Then at some point later on, he will sometimes try to replicate what he saw being done or built in the video.

Because Participant 103 uses a lot of mods he relies heavily on the discussion forums related to those mods. He said the forums are the easiest and fastest way to get the information he needs. Participant 103 also goes directly to the mod creator’s discussion page where he finds all the information he needs about that mod as well as links to YouTube videos that he uses to assess if the mod is in fact one he wants to download. When asked how he felt about the reliability of the information he was using, Participant 103 could not understand why another gamer would share information that was not useful “Well obviously if it’s just a gamer commenting then I have no idea if its right or wrong. But I’m assuming that if they’re going to waste their time saying something, it might as well be true.” He stated that by looking at one creator’s page, his instructions, videos, hyperlinks, he learned that there are many ways of knowing if the information is right or not.

Participant 103 has never posted a question himself on the discussion forums, claiming that he needs the information right away and does not want to wait for a reply, especially because he plays in Survival Mode (where time is of the essence) and that he would simply forget that he had posted anything.

Outside of Minecraft, when seeking information, Participant 103 relies on YouTube videos for the information he needs. He peruses the top 3-4 videos and assesses which one provides the best explanation. Participant 103 is another one who is happy to find the best possible video and use it as a guideline to figure out how to do something. He said “Well, normally I would just go through like the top 3 or 4, and then like I would see which one I find has the better design or whatever and then I would just use that one as a guideline but normally if it works in the video cause their showing you and if it works after that then it should work for you, right? It should have the exact same results.”

**Participant 104**

Participant 104 is a 15-year-old male who has been playing Minecraft for a year and most often plays with one particular friend in Creative Mode. When trying to figure out how to do something on Minecraft, Participant 104 and his friend try to figure out how to do it themselves without any outside help. This would sometimes take hours. After exhausting their knowledge on the subject they would turn to the Internet to find the information they needed. He was able to explain that they would often need to find information on how to build certain objects. Their first choice is YouTube and then the forums to find answers to their information needs. When assessing the value of the discussion thread replies or videos, they apply a trial and error practice based on which videos or thread replies were most logical. When a solution seemed most consistent with their understanding of the game or what seemed most logical, they tried it out. If it worked they would continue using that information. If it didn’t work they returned to their search results and tried another one. Creating an account and participating in the discussion forum or replying to YouTube videos is not a priority for Participant 104; who said it is too much effort and too time consuming. In
discussing his use of the discussion forum, when participant 104 did not know what it was called, he referred to it as “the question thing where people ask questions and a bunch of people respond…”

Outside of Minecraft, Participant 104 uses discussion forums for his information needs. He tries to locate information that closest meets his need and that is most relevant. He explains, “I mean you can kind of base, like you could look at the different answers and already find out well these are not what I am looking for and then you have the ones that you are maybe looking for and the ones you’re not sure about and from there I guess it’s really whatever suits whatever I need.”

**Participant 105**

Participant 105 was the only female participant interviewed. She is 16, an avid gamer who has played Minecraft for 2 years. She most often plays in Creative Mode by herself. Participant 105 explained when trying to figure out what she needs to build things in Minecraft she begins by seeking out help from her older brother, who introduced her to the Minecraft Wiki. Participant 105 continues to use the Wiki regularly and has a laptop open to the Wiki at all times during her game play (on a console).

She likes the Wiki because fellow gamers created it. When asked about her feelings on the reliability of the Wiki she stated “I don’t! I kind of just take a chance cause it’s people- cause if someone is just trying to mess with everyone then I mean um like they don’t really do that with Minecraft its actually people that want to play” Essentially she did not believe that gamers act maliciously, that there is no advantage to them in sharing false information. She said that she likes using the information she finds from other people because “I like taking information and suggestions from other people because they’ve experienced it and they like know the best ways of doing stuff and they can explain it well sense they play so I just feel like its easier.”

Participant 105 also uses the Minecraft discussion forum to find solutions or answers to questions she has about the game. She would filter the answers and then continue with a trial and error process when assessing information. She goes through a process of reading all the responses and based on the common responses, she would decide which solution she would try first “I would read them all pretty much and then I just sum it all up so kind of do ummm..I guess a survey kind of thing and you choose whatever ones that are the same like the most that are the most in 600 answers I would probably do that one…. And then if that one wouldn’t work I would do like the second one that was brought up the most.” Participant 105 has never posted a question as she says she has always found the answers from other gamers’ queries, but stated if she could not find the answer she would definitely ask. She then returns to the game, tries the information out and continues with her gameplay.

Participant 105’s information seeking behaviour outside of Minecraft-related questions focused on asking experts to meet her information needs in discussion forums. “I’m not really sure what I want to do later on in my life… I found someone who is a video game designer (online), I asked him and he told me what I would need to be like where he is and stuff. And then other people talked too, like other gamers, people who wanted to do it. So it was kind of like a huge discussion of just like the same kind of people.”
Participant 106

Participant 106 is a 16-year-old gamer who has been playing *Minecraft* by himself for a year, most often in Creative Mode. As a beginner player, he most often looked for information on how to build various items. When needing information on *Minecraft* he initially used Google to begin his search until he discovered the *Minecraft* Wiki. He said the Wiki provides him with all the information he needs. He did not know that fellow gamers developed the wiki but when asked about the reliability of it, he felt it was no less a reliable source. His response was “I trust the people playing and putting up this information would just be telling the truth instead of putting up some random thing and waste like 5 minutes of your time.”

Participant 106 mentioned that he did not use any of the *Minecraft* discussion forums, nor did he mention using YouTube or other websites when needing information on *Minecraft*.

For non-*Minecraft* related information seeking, Participant 106 uses discussion forums to seek out the answer to an information need. He mentioned that after he finds the answer to his question he verifies it by checking on a regular site to see if the information is correct. “I remember for a homework assignment, I was looking for info and the only one that really had answers was this kind of discussion forum about the subject. So, I read through and I found some information that sounded like it would help, but to double check I just looked up that part and then once I found out it was true I used it.”

Participant 107

Participant 107 is a 16 year-old male who has been playing *Minecraft* for close to three years. He had been playing lately alone in Creative Mode but admits that it is much more fun it is to play with others. Participant 107 provided the example of when he wanted to learn how to build something specific such as a cannon. He prefers YouTube and finds a video that would answer his question; he stated the information is easy to find.

He relies on a few specific YouTube channels that he has discovered and believes them to be reliable. He will often watch more than one video and decide which one best meets his needs. When as asked what helps him decide which video is best he stated “just um how well they explain it and how well they go through the explanation. It is important to him that the video not only explains things well but is also entertaining; when asked why he prefers the channels he said “just because the people that do it are funny”

For his information needs outside of gaming, participant 107 relies on YouTube for sports information; particularly for sports strategies, learning new moves etc. He also relies on YouTube for school projects. He often looks up other people’s projects for information, ideas and inspiration, as well as indicators about what should not be included. He also takes some bits of information from various videos and then verifies the information on other sites “Um I kind of just took a bit from each of them but I was also looking on Google and stuff so I would kind of see which information would come up more often I would take those”
Participant 108

Participant 108 is a male 15-year-old. He is another avid gamer who has been playing Minecraft for over a year; he most often plays by himself in Survival Mode. Participant 108 refers to both the discussion forums and the Wiki when seeking help or information on Minecraft. He often seeks out specific user-created maps. He uses the Minecraft forum for downloading particular fan-made maps that can be played (player created worlds). Participant 108 will sometimes play in Creative Mode when he is creating maps himself. He also uses the Wiki when he needs help with more simple game-related issues such as building a bow and arrow.

Participant 108 invests a lot of time in trying new things that he has learned in either the discussion forum or the Wiki. He often compares and flips between the two when trying to figure out something about the game. When there is a multitude of answers he writes them all down and tries them out to see which one works best. This trial and error method allows him to see which solutions work best in a given situation and he continues with his gameplay.

While participant 108 has never posted a query on a discussion forum or YouTube, he has uploaded some of his completed maps or has shared a partial mapped out area of another world on a community-sharing site. Participant 108 also shared that he regularly watches specific YouTube Channels (Let’s Play) that post new videos regularly on Minecraft. He often watches these videos as a form of entertainment while also learning new things about the game. When asked why he prefers these players’ videos in particular, he said “They’re a lot more fun to watch, you know and they’re pretty creative too.”

When participant 108 needs information not related to Minecraft he usually begins with a search of the Wikipedia to get to get an overview of a topic as a starting point for further research. After pinpointing information that needs further research he opens numerous tabs and consults a variety of websites cross-comparing the relevant information. He said “I was doing a project on cocaine and its effects and I researched all of its addictive effects and um, I think I went on 5-6 different websites. And the ones that were repeated on like all the websites, -like the details of the drugs- that were repeated, I would use as like definitive knowledge because it’s been repeated.”
Appendix G: Images from Minecraft

Flying above world – Creative Mode

Inside a library – Creative Mode

Outside of library – Creative Mode

Outside exploring – Survival Mode iPad

Cave Mining – Survival Mode iPad

Farming – Creative Mode iPad