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This study examines how users of the immersive virtual environment World of Warcraft look for information to meet in-world information needs and particularly whether the ability of users to see and interact with other in-world users has impacted their information-seeking habits. Sixteen participants were interviewed about what information they sought, what sources they used, and why.

While participants' purposeful information seeking was fairly similar to that found in other studies of everyday life or online information seeking, World of Warcraft allowed participants to incidentally acquire information when other players noticed that a participant seemed to lack some information and volunteered it. Furthermore, although in online text-based communities, a community member must choose to share information for participants to acquire it, in World of Warcraft, participants can sometimes gain observing other players even if those players did not consciously intend to provide information.

Headings:

Virtual reality

World of Warcraft (Web site)

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Internet games

Information retrieval / Social aspects

INFORMATION SEEKING IN WORLD OF WARCRAFT

by
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Introduction

With over 11 million subscribers as of October 2008, World of Warcraft is one of the most popular immersive virtual environments online today. Immersive virtual environments include massively multi-player online role-playing games (MMORPGs) such as World of Warcraft, Everquest, Warhammer, and others, as well as unstructured virtual environments such as Second Life. What makes these worlds different from traditional computer games is the presence of other players, represented by three-dimensional avatars, in the same world. When players have an information need in-world, they have the option of leaving the world to consult information sources outside or looking for the information in-world, often by asking other players or observing them to see what they do. To date, few standardized information resources have been built into these virtual worlds and the widespread use of these environments raises the question: Has the ability to interact with other users within the world impacted World of Warcraft users' information-seeking behavior?

World of Warcraft is a high-fantasy MMORPG. Players complete quests, kill various hostile creatures (mobs), team up to work through dungeons, and, when their characters reach the highest levels, form larger groups to defeat tougher bosses in raids. Players can also create or join a guild. Guilds have their own chat channel and will often organize groups for dungeons and raids. Players create characters from several different races (e.g. elf, human, dwarf, orc, troll) divided between two sides: Alliance and Horde. They can customize their character's appearance and choose a class, which determines

what abilities their characters will have, and select up to two additional professions (e.g. alchemy, leatherworking, or enchanting). Players can have more than one character.

However, Alliance characters can only communicate with other Alliance characters, not Horde characters, and vice-versa. Furthermore, the subscribers are divided over multiple “realms” or servers. Characters can only communicate with other characters on their server, but players can have characters on several servers.

There are four different kinds of servers, all of which lend themselves to different types of player interaction. On Player-versus-Player (PvP) servers, players on opposing sides are expected to attack each other whenever they encounter one another. On Player-versus-Environment (PvE, also called Normal) servers, players have the option of flagging for PvP, which allows other characters to attack them and lets them in turn attack other characters who are flagged. However, players cannot attack or be attacked by non-flagged players. On role-playing (RP) servers, players are supposed to stay in character at all times (though in practice, this is not always the case) and may develop story lines themselves outside of the general story designed by Blizzard for the quests. Players may develop backstories for their characters and interact with other players' characters, either helping or hindering them, based on what they feel their character would do. Finally, RP-PvP servers combine role-playing and player-versus-player.

Players have a number of ways of communicating with each other and gaining information. Blizzard provides forums at <http://www.worldofwarcraft.com>, and players have created numerous websites, forums, wikis, and other resources. Players can use these sites to share information with one another about where certain NPCs (non-player characters, which can be characters who will help a player's character or who the player's

character must fight) or items are located, the best way to defeat certain bosses, and what loot different characters drop (what items you receive for killing a certain character).

In this respect, World of Warcraft is very similar to many other video or online games. Players stuck at a certain point in a video game can turn to the computer and search for tips or detailed walkthroughs, written by players who have already beaten the game, to figure out what to do next. Online games and virtual communities may have ways of communicating with other players (such as message boards or mail systems) as well as player-created outside resources.

What makes World of Warcraft and similar virtual environments different is that players can also see and communicate with each other in-world. Players can ask questions on a chat channel viewed by all players on the entire server, all players in the same area, players in their guild or party, or through private messages (“whispers”) to a single player. Chat can be text- or voice-based. Furthermore, players can observe the characters of other players and can work together with them. Thus, a player in World of Warcraft who is stuck at a certain point not only has the option of leaving World of Warcraft to consult an external resource online or in the real world but might also ask a higher-level player for help, watch other players in the area to see what they do or where they go, or ask some of the other players who seem to be working on the same task if they want to group, sharing their information and abilities with one another.

The purpose of this study is to examine how, if at all, players use these capabilities to observe, communicate with, and be assisted by other players to find information, focusing on three main research questions. First, to what extent do users in World of Warcraft use resources in that world for information seeking? Do players use

each other as information-seeking resources in-world, or do they still prefer to check an outside resource? Second, what kinds of information do users seek in-world? Do questions tend to be fairly short and specific, such as “Where is X located?”, or do they attempt to find answers to more open-ended questions, “What is the best way to do X?” Finally, how do users seek information within World of Warcraft? Do players attempt to observe or work with others or do they primarily ask questions via chat? For questions they ask using chat, which channels do they prefer? Do players whisper privately to a particular user or throw out their question for anyone on the server to answer?

Background

Several researchers have looked at how people look for information in everyday life. Savolainen found that respondents preferred sources that were readily available and easily accessible (Savolainen, 1995). Julien and Michels found similar results as well (Julien & Michels, 2004). Savolainen also found that respondents tended to prefer informal sources and personal communication (Savolainen, 1995).

In a later study focused specifically on source preference, Savolainen found that participants used sources in five main groups. Participants naturally tended to group their sources into three zones of importance, which also corresponded with the zones used in Savolainen's conceptual model: most important, of secondary important, and of marginal importance. Human sources were the most preferred type of source in the first two zones because they could provide filtered, easy, and quick access to information, could interact with the person seeking information to clarify issues, and may have dealt with a similar problem before. Respondents also cited human sources as a source of ideas and described what Savolainen calls “information by proxy,” in which a human source monitors other sources of information and lets the seeker know if anything is discovered. In addition, participants sometimes did initial research on a topic, such as looking at different computer models to decide which one to purchase, using other types of sources and then consulted human sources for feedback before making the final decision.

The other groups of sources that participants mentioned were printed materials, networked sources (i.e. the internet), organizational sources, and other sources. Printed

sources were valued for their ability to provide factual information and were used for both orienting information and problem-specific information and placed fairly evenly in all three zones. Networked sources were valued for the amount of information that was available and the speed which it could be accessed and updated. Respondents also indicated that they preferred networked sources because they could easily compare different sources and access different viewpoints. Organizational sources and other sources were preferred less often. Overall, respondents most often preferred sources based on the content of information, followed by the availability and accessibility of information, and usually started with a human or internet source (Savolainen, 2008).

The internet is an increasingly popular information source, largely for its convenience and immediate availability. Lee studied information seeking among undergraduate students and found that convenience was an important consideration when choosing information. Twelve of the fifteen students in the study used internet sources, usually found through Google keyword searches. Lee noted that respondents tended to rely on a limited number of sources and search strategies and were unaware of other potentially useful ones and they they preferred sources that were easy to use and could be accessed immediately (Lee, 2008).

Similarly, Saiti and Prokopiadoub, looking at post-graduate students, found that 77.3 percent of respondents selected the internet over the library as their primary information source for four main reasons: information is of relatively good quality and up-to-date, information can be accessed easily, information can be retrieved at any time, and information can be accessed and retrieved quickly (Saiti & Prokopiadou, 2008). Although Mill, when looking at sources cited in undergraduate papers, found that

traditional literature was cited much more often than general web resources, Mill also found that that 75 percent of the journals cited were available electronically. Likewise, the papers Mill examined cited a greater number of older journals than a similar, older study. Mill speculates that this is because older journals can now be accessed electronically rather than only in print or microform (Mill, 2008).

Internet sources and online information seeking in particular have been studied by a number of researchers. Tombros, Ruthven, and Jose studied how a web page's features affected people's perception of its usefulness and how that perception changed as the search progressed. Text was the most important category to subjects over all, and the two features most often used to determine if a document was useful based on that feature alone, content and appearance of user's query terms, both fell under this category. However, which features were most important to users depended in part on what kind of task they were doing (Tombros, Ruthven, & Jose, 2005).

Byron and Young examined whether traditional information-seeking behavior patterns (the stages of Kuhlau's information search process model) occurred in a virtual learning environment. They found that the students did exhibit the stages of traditional information seeking regardless of their level of computer skill (Byron & Young, 2000). Kelly looked at context in online information seeking by doctoral students and found that their information-seeking behaviors changed based on the stage of the information-seeking process they were in, the type of task, the topic and knowledge they had about the topic, and whether they had previously searched for this information. Participants often needed to use both the task and the topic to describe their information need and they sometimes indicated different levels of familiarity for each. For instance, they may be

very familiar with the task of finding information or shopping online but less familiar with the specific subject or online clothing store (Kelly, 2006a; Kelly, 2006b).

Choo et al. studied how knowledge workers used the internet to look for information. They adapted other information seeking or viewing models to model behavioral modes and moves of online information seeking. Information seeking modes reported by their study participants could be divided into four complementary information-seeking modes: undirected viewing, conditioned viewing, informal search, and formal search (Choo, Detlor, & Turnbull, 2000).

Belkin discusses how people in need of information may not know exactly what they are looking for and thus will not be able to identify “salient characteristics of potentially useful information objects.” However, most information retrieval systems require them to do so. Belkin suggests that using some form of relevance feedback in an information retrieval system might assist people in finding useful information objects (Belkin, 2000). Poremba also observes, “A typical web search can be time-consuming and ineffectual. To get to the information you actually need, you have to know the exact words in order to bring up the right results (or wade through masses of results).” Like Belkin, she proposes making changes to the information retrieval system. Poremba suggests using dynamic navigation so that users can refine their request and get an overview of the content of a site (Poremba, 2008). Belkin and Poremba both attempt to suggest ways that an information retrieval system could interact with users to clarify the user's information need—one of the advantages to human sources named by participants in Savolenien's study. When users do not know exactly what they are looking for or do not realize they have an information need, online information seeking can be difficult.

People do not find all of their information through queries posed to a particular resource. One form of information seeking discussed by several researchers is incidental information acquisition. Heinström defines this form of information acquisition as “acquiring (useful or interesting) information while not consciously looking for it.” This requires the ability to recognize useful information when it is encountered and enough basic topical knowledge and motivation to process the information once encountered (Heinström, 2006).

Studies of incidental information acquisition build on that of Erdelez's work on information encountering, which she discusses as an important part of browsing and information seeking. Information encountering can be related to a specific problem, or it can be interest-related, in which case it addresses a general interest or concern of the encounterer. Erdelez found that respondents had different perceptions of information encountering. Super-encounterers reported often experiencing information encountering and relied on it as part of their information behavior. Encounterers reported often experiencing information-encountering but did not see it as connected to their information-seeking behavior. Occasional encounterers experienced information-encountering now and then but merely saw it as lucky. Finally, nonencounterers reported seldom, if ever, encountering information without searching for it. Erdelez argued that information encountering “can provide information users with information that is as useful and applicable as information acquired by directed and focused information seeking” (Erdelez, 1997).

Williamson looked at incidental information acquisition among a group of seniors. Participants primarily used human sources to gather information. Friends and family

were the most frequently used source of information for both purposeful information seeking and incidental acquisition. A phone call to catch up with a family or friend often led to one of the parties learning other information, such as a new treatment for migraines, as the conversation progressed. In some cases, such as the availability of a Senior Card, the person who acquired the information incidentally did not know there was a gap in his knowledge until she encountered the new information (Williamson, 1998). Heinström examined how personality characteristics affected one's tendency to discover information serendipitously (Heinström, 2006).

Burnett examined how everyday life information seeking and incidental information acquisition occur online in virtual communities and developed a typology for behaviors in virtual communities. Behaviors can be non-interactive, in which a person “lurks” in the community, reading at least some parts of the texts created by other members but never posting in return. The lurker still gathers information from the texts read. Lurking is somewhat different from silently listening to a face-to-face conversation because the lurker is invisible. Interactive behaviors can be hostile or collaborative/positive. Hostile behaviors are various forms of “verbal violence,” which include flaming (insulting ad-hominem attacks), trolling (posts whose sole intent is to anger other community members), spamming (unsolicited “junk mail” posts, although those posts can occasionally provide needed information), and in the most extreme examples, cyber-rape.

Collaborative or positive behaviors, on the other hand, can be information-oriented or not-information oriented. Not-information-oriented behaviors include making “small talk” with other members, engaging in language games or other types of play, and

providing emotional support to members. Community members also share information through information-oriented behaviors. These include announcements, queries, and occasionally directed group projects, such as a fundraiser or letter-writing campaign. Queries can be directed to the whole group or to a particular member within the group, and answers may be the information itself or pointers to resources that can provide the information. Members may also disagree with one another about the answer. Burnett finds that “much of the information activity taking place within virtual communities can be considered incidental information gathering” because other community members who did not post the original query may still learn from the ensuing discussion (Burnett, 2000). Burnett and Buerkle later applied Burnett's typology to compare two different Usenet support groups. They found that nearly 60 percent of Group A's posts were information-related, while only 36 percent of Group B's were. Online communities, even ones with fairly similar stated purposes, can vary widely in the amount of information their members share (Burnett & Buerkle, 2004).

Although these studies have focused on text-based virtual communities, recent research has also looked at various forms of communication and information behaviors in immersive virtual environments. In his study of how users would tag a particular place in Second Life and how those terms corresponded to the terms chosen by the place owners, Taylor also examined how users in Second Life found information. The most popular methods were asking in-world friends, selected by 93 percent of respondents, using the in-world search engine, selected by 90 percent of respondents, and asking other avatars, selected by 86 percent.

Antonijevic studied nonverbal communication performed by avatars in Second

Life and found that user-defined nonverbal communications, such as the position of an avatar and its distance from other avatars, could improve interaction. On the other hand, predefined nonverbal communications that are performed automatically by the system, such as changing an avatar's pose if the user is idle, are less successful because it is difficult for others to tell what the communication is supposed to mean. Antonijevic concludes, "Nonverbal communication in online settings thus becomes an increasingly relevant research topic, which reveals not just a transition between two types of online communication, but also—and more importantly—a transition between two types of online experience" (Antonijevic, 2008).

Blascovich found that classic social influence effects, such as social facilitation/inhabitation and conformity, could be replicated in a virtual environment (Blascovich, 2002). Likewise, Slater and Steed found that people do "respond strongly" to other people's avatars as people, although, because of the lack of emotional response and gestures in the avatars studied, the response was not as strong as it was when the participants met in real life. Nevertheless, in one experiment, a group of actors who had not met outside of the virtual environment were able to develop rapport with each other and the director and rehearse a short play to perform outside of the environment (Slater & Steed, 2002).

Some researchers have considered the potential for immersive virtual environments in other areas. Haycock and Kemp looked at how San Jose University's School of Library and Information Science used Second Life to conduct two graduate-level library and information science classes. The students surveyed reported enjoying using Second Life as a learning setting for distance education. However, they found that

Second Life did not support all forms of communication. Second Life offered no support for long documents or asynchronous message threads, so students disagreed that writing in Second Life should be the only writing required for a class (Haycock & Kemp, 2008). In another study of immersive virtual environments' potential, Kock considered how Second Life and World of Warcraft could be used for e-collaboration and e-commerce for real-world activities. Kock found that World of Warcraft had limited e-collaboration and e-commerce potential due to its structured environment but that it could possibly be used as a stimulation environment. For instance, a virtual plague that spread in-world mimicked the way real plagues are spread (Kock, 2008).

Other researchers have looked at how users work together and learn from each other in immersive virtual environments. Brown and Bell examined collaborative play in the immersive virtual environment *There* and found that *There* allowed users to share activities together. Many of these activities were created by the users themselves rather than the game designers (Brown & Bell,). Nardi and Harris also looked at collaborative play, this time in World of Warcraft. They found various forms of collaboration between both strangers and friends, which they divided into three groups: communities, knots, and pairwise collaborations between friends. Communities are long-term groups with common ties and social interactions. In World of Warcraft, these collaborations occurred in guilds. Communities in World of Warcraft also foster collaborative, non-information-oriented behavior. Nardi and Harris found that “most of the sociable non-game-related chat takes place in the guild channel.”

Knots are “unique groups that form to complete a task of relatively short duration.” Players collaborated in the very short-term to buff one another, assist a

struggling player, escort a lower-level player through a dangerous area, answer questions asked on one of the general chat channels, or trade items. Players also formed more structured short-term collaborations than they formed parties to complete a certain quest or work through an instance or raid. They found each other by using the “Looking for Group” tool provided by Blizzard, asking people they see in the same area, or whispering to players they may have worked with before. Players also joined teams to fight another team of players on a battleground. In addition, players sometimes formed knots to collaborate in activities that were not part of the structured game. Nardi and Harris refer to these as “random acts of fun” and include using emotes (set nonverbal communications players can choose to have their characters perform) to dance together (sometimes first stripping avatars down to their underwear), riding in circles to show off a special effect, forming a conga line, and luring a dragon into one of the capital cities.

Finally, pairs of friends may collaborate by chatting, seeking and giving advice, sending each other items, and grouping together. Furthermore, players used World of Warcraft to play with offline friends and family or as a topic of offline conversation. Participants indicated that various forms of collaboration increased the fun they had while playing the game and also allowed them to learn from other players. Nearly all players in Nardi and Harris's study used the chat channels to seek information and learned what other classes could do and how to adjust their strategies while in groups. Players also collaborated outside World of Warcraft through the creation and use of websites, forums, and mods. The outside resources extend the “ethos of helping and asking for help” that collaboration within the game fosters (B. Nardi & Harris, 2006).

Nardi, Ly, and Harris later looked specifically at one form of collaboration,

learning conversations through chat. Learning in World of Warcraft often occurs in the “zone of proximal development” in which learner takes on a challenge and uses resources from a teacher or peers to accomplish it. Much of the information gathered through chat conversation was fact-finding, usually accomplished through simple question-answer exchanges. However, in the conversation, a player may provide additional information that the questioner did not know she did not know. For instance, a player may ask if anyone else in his guild can use a particular item. In the example Nardi, Ly, and Harris give, a player offered up the item Volatile Rum. However, another player volunteered that the questioner should sell the rum at the Auction House instead because it could be used to make another item and was therefore fairly valuable.

Learning conversations can also cover tactics and strategy. In combat, one player may offer feedback on how another player could improve. In one of Nardi, Ly, and Harris's examples, one player told another in his group to use a particular ability. The player used certain conventions, such as adding “lol” at the end of the statement, to indicate that the suggestions were meant in a friendly tone. In situations where neither player has experience, players sometimes worked together to figure something out, such as where an NPC needed for a quest can be found. Each person's contributions built on the other's. Finally, conversations that begin as simple fact-finding queries can lead into other forms of learning conversations such as a discussion about moral values and ethos in a particular situation (B. A. Nardi, Ly, & Harris, 2007).

Although players learn from each other through collaboration, Ducheneaut et al. found that they do not spend that much time in groups at first. Ducheneaut et al. looked at data collected directly from the game itself and found that despite structures designed

to encourage players to group, such as giving classes complementary abilities and creating quests and instances that are too difficult for one player to complete on his own, players spent a large amount of time soloing until they reach the upper levels. They found a strong increase in grouping after level 55. (At the time of the study, 60 was the highest level a character could reach, although this has since increased to 80).

Ducheneaut et al. write, “One player summarized this situation nicely by saying that WoW's subscribers tend to be 'alone together:' they play *surrounded by* others instead of *playing with* them.” Whether or not players were members of a guild also affected how often they worked with other players. They found that between the levels of 41 and 60, characters in a guild were part of a group 43 percent more often than characters who were not in one (Ducheneaut, Yee, Nickell, & Moore, 2006).

Methodology

For this study, semi-structured qualitative interviews were used to investigate how players sought information in World of Warcraft. Subjects were recruited through an e-mail sent to all students, staff, and faculty at the University of North Carolina at Chapel Hill who had opted to receive mass e-mails. To participate, subjects had to have leveled at least one character to level ten. The minimum experience level was intentionally set low so that new players could participate. Reaching level ten requires a player to have completed several quests, killed mobs, learned new abilities, and, often, to have traveled to at least one new town, so even players at that level would have had many opportunities to seek information. Players interested in participating were asked to visit a webpage that gave more information about the study (see Appendix A) and then to provide a name and e-mail address so that they could be contacted to schedule an interview.

Response to the initial e-mail was strong. Within about fourteen hours, thirty-seven players had volunteered. At this point, because the original target sample size was no more than twenty, no further volunteers were accepted. As was expected, not all potential participants who initially volunteered chose to continue with the study. From the thirty-seven initial volunteers, eighteen interviews were scheduled and sixteen interviews conducted. Interviews took place in-person in private study rooms in the university campus libraries and lasted around fifteen minutes. Interviews were recorded on audio cassette. To protect subjects' privacy, recordings were kept only long enough for a de-identified transcript to be made.

In interviews, subjects were first asked a few questions about the amount of time they spent playing, how long they had played, and what kind of server they were on. Participants were next asked to recall the last time they could think of in which they were in World of Warcraft and looked for information. Once participants had described their information need and how they went about finding information, they were asked questions about how often they looked for information, what kinds of information they looked for in and out of world and what sources they used, and how they determined where they would seek information for an information need. Finally, if participants had not already mentioned it, they were asked whether they ever gathered information from observing other players.

The sixteen participants had been playing World of Warcraft for a mean of 2.64 years and a median of 2.75 years. The least amount of time a participant had played was six months and the greatest was five years, although that participant, as with two of the three participants who had been playing for four years, indicated that sie had stopped playing for brief periods during that time. Twelve participants (75 percent) played on PvE servers, five participants (41.67 percent) played on PvP servers, and five participants (41.67 percent) played on RP servers. (Six participants had characters on more than one type of server). Time spent in-world currently ranged from 3 to 35 hours a week, with a mean of 12.09 hours and median of 9 hours.¹ However, six participants indicated that they played more hours per week at other times, either during summer and winter breaks or in the past.

¹ When participants indicated their hours per week as a range, the mean was used.

Results

Participants reported seeking information often in World of Warcraft. Ten of the respondents indicated that information seeking was a constant part of World of Warcraft, reporting that they look for information “Every time I'm on,” “All the time,” “Almost constantly,” or even, “I look for information on the game more often than I play it.” Three other respondents gave estimates that indicated that they sought information on a regular basis: “once or twice every half hour that I play,” “10-15 times a week” [from a participant who estimated she spent five hours a week in-world], “a couple times an hour [...] if I had to say a number, I'd probably say three times an hour or so.” Taken together, 81.25 percent of the respondents reported looking for information frequently.

Of the remaining three participants who reported less frequent information seeking, one suggested that she still sought information fairly often, “maybe like at most once a play session. Like I usually try and do it myself and try to figure it out and it's only when I get frustrated that I'll look for stuff.” Another participant reported looking for information on a regular basis, though less often than other participants, “probably like 2 to 3 times a week right now.” Only one participant indicated that looking for information was an uncommon occurrence. “I rarely look for things unless I'm looking [...] like when I'm sitting in my, you know, Google phone or something, just killing time, looking for stuff for fun but not while I'm actively looking for something.” This participant, who had been playing World of Warcraft for 3.5 years, indicated that she looked for information more often when she first started. However, participants with the

same or greater years experience were among those reporting constant information seeking.

Participants reported a variety of information needs. Responses were sorted into fourteen categories:

- Locations: where things were located, which included NPCs, quest objectives, vendors in cities, and certain items.
- Boss/Dungeon Strategies: recommended tactics and strategies to successfully clear a dungeon or defeat a raid boss
- General Strategies: ways to play effectively, including what abilities are available to different classes and where to put talent points
- Upcoming Changes: patch notes, rumors, and other information about upcoming changes in World of Warcraft
- Gear: which item is better to wear and how other players have chosen to gear their characters
- Profession Info: information about professions, such as what recipes are available and what items are needed for them
- Events: things that are happening in World of Warcraft, including both worldwide events and events for the participant's community, such as a raid planned by a guild
- Achievements: information about the achievements that can be earned in World of Warcraft
- Lore/Story: information about the world and storylines within World of Warcraft
- Loot: what items drop from which mobs and their drop rates (percentage of times

an item is among the loot when the mob is killed)

- Looking for Group: information about other players interested in forming a group
- Buying/Selling Items: information about what items are available for sale and for how much an item can be sold
- Damage: how much damage a player did (usually to a raid boss) in a fight
- Other Players' Personalities: information about what other players are like
- Quick Reference (not otherwise specified)

By far the most common type of information need was locations. Only one participant did not include it among the types of information sought. The next most common information need was general strategies, reported by 56.25 percent of participants. Gear and profession information were each reported by 31.25 percent of participants, and boss/dungeon strategies and buying/selling items were each reported by 25 percent of the participants. Three participants each (18.75 percent) mentioned upcoming changes, events, loot, and looking for groups. Only one participant each reported information needs in lore/story, achievements, damage, and quick reference (not otherwise specified).

When faced with an information need, participants have the option of looking for the information using a resource in-world or leaving World of Warcraft to look for the information elsewhere. Most participants do both. Fifteen out of sixteen participants (93.75 percent) named at least one in-game resource they used, and fifteen out of sixteen participants named at least one out-of-game resource they used as well. The one participant who could not think of any times sie looked for information without leaving World of Warcraft explained that sie always looked for information by entering search

terms into Google. “Because it's just the way I gather information in general. It's just the first thing I do when[...] go to the internet. Go to Google. Type in something. Start clicking until I find what I need.” The one participant who reported not ever leaving World of Warcraft to look for information elsewhere explained, “I used to before I got mods installed. Now you can get most of it right there in the game.”

When asked how they went about looking for information to meet the last information need they could think of, 50 percent of participants used at least one in-world source. In all of these cases, an in-world source was the first information source. For 50 percent of the information seeking that began with an in-world source, the participant used in-world sources exclusively. (Two participants needed only one source to satisfy their information need). Four participants could not think of a specific information need but described their usual information-seeking process for a type of information they were likely to look for (i.e. “First I would go to X, and if I couldn't find the information there, I would go to Y”). If their responses are not included, 41.67 percent of participants used at least one in-world source, and in 60 percent of those cases, used in-world sources exclusively.

For participants who could recall how they went about searching for specific information, information searches involved a mean of 2.08 sources, a median of 2 sources, and a mode of 1 source. There was no significant difference between starting in-world and starting out-of-world, although the mean number of sources for in-world (2) was slightly smaller than the mean number of sources for out-of-world (2.14), and the mode for in-world (1) was smaller than the mode for out-of-world (2). Looking at the pathways described by all participants, 50 percent of the participants who spent fewer

than the median hours in-world and 50 percent of the participants who spent greater than the median hours in-world used an in-world source. However, only 37.5 percent of participants with fewer than the median years experience used an in-world source while 62.5 percent of participants with greater than the median years experience did. Even so, this is based only on the most recent information need participants could recall, and information sources used vary depending on the type of information need.

For the two most common types of information needs, both in-world and out-of-world sources were used. Eight participants, or 53.33 percent of those who looked for locations, did so using in-world sources. The same number of participants looked for locations using out-of-world sources. Four participants used both types of sources. For general strategies, more participants used in-world information than left the world. Two-thirds of the participants who listed a general information need looked for information using an in-world source, while only 55.56 percent of participants left World of Warcraft to look for the information. Only two participants (22.22 percent of those who looked for information about general strategies) reported using both in-world and outside sources. The only category in which participants used no in-world sources was upcoming changes. For all other categories, at least one participant looked for the information without leaving World of Warcraft. For the categories of damage, buying/selling items, looking for group, other players' personalities, and quick reference (not otherwise specified), participants only used in-world sources. Gear, lore/story, profession information, and achievements were split evenly between in-world and out-of-world sources. For boss/dungeon strategies and loot, more participants left World of Warcraft than used a source in-world, while more participants stayed in-world than left when looking for

information about events.

The information sources participants named were grouped into categories. In-world sources were the game interface (quest log, map, inspect gear and looking for group panels, auction house, NPCs), add-ons, guild and raid chat (text-based chat or voice chat using Ventrillo, Teamspeak, or the built-in voice chat), general chat channels, other players, and observation of other players. Game interface and add-ons are two in-world sources that do not involve getting information directly from other players. Of all in-world sources, observation was the most commonly listed. Eighty percent of participants who looked for information in-world gathered information by observing other players. However, in nearly all cases, participants did not mention observation as a source until they were specifically asked about it.

After observation, the most commonly named in-world source of information was guild chat. Two-thirds of the participants who used at least one in-world resource looked for information through conversations with other guild members. One participant leveled a character to eighty so that she could join a progression guild specifically for the information she could get.

I tried just keeping all of my toons in my own guild with a few friends, just to avoid all the chit-chat, but I found that I wouldn't be privy to discussions and just—I was left out of information by not being in a progression guild. So I went ahead and leveled my mage to 80, joined a progression guild, and then used the information to level up my other toons[...]

Sixty percent of participants included aspects of the game interface as a place they looked for information. Because the game interface is so ubiquitous, it is possible that the number of users who use the quest log, minimap, or other parts of the interface for information is greater than those who reported it. One participant suggested that a

player's class may also affect his use of some of the game interface.

Really, I guess, maybe this might be different for me because of the class I play, because with the different mob tracking options you have as a hunter, I really look to the minimap a lot, I guess. Because it's—you know, there's a lot of information—I've played a couple different classes but it's sort of the one I play most often—it seems like there's a lot of information that you can get on what's, like, in the nearby area, you know, so, just from that, that isn't available to other classes.

After the game interface, the next most commonly named in-world sources were talking to other players and the general chat channels. Although in most cases participants looked for information from these sources by asking a question to a particular player or chat channel, in one instance, a participant described collaborating with other players (whom she also got information from in real life) to find the needed information together. Another participant looked for information on one of the general chat channels, but only by lurking (“usually just watching”), not by asking a question himself because “it's hard to get results by asking questions in that kind of forum.”

The final, and least commonly mentioned, in-world information source was add-ons, listed by 40 percent of participants who looked for information in-world. Participants who used add-ons frequently used multiple add-ons for different forms of information.

When participants left World of Warcraft to seek information elsewhere, the information sources they used were categorized into general reference (sites with information about items, NPCs, and quests), wikis, forums, blogs, online videos, the Armory (a site maintained by Blizzard listing the gear, achievements, and other information about players), search engine, leveling guides (instructions on how to level a character from 1-80, usually by suggesting which quests to do and in what order, sometimes as well as offering general strategies suggestions), websites for a player's

guild, and asking someone in real life.

The most commonly used outside source was general reference. Every participant who left World of Warcraft to look for information in at least one source looked for information at a general reference source, usually Thottbot, Wowhead, or Allahkazam. Forty percent of participants who used outside sources used wikis. All participants who used a wiki named the same one, Wowwiki.

I guess, probably, Wowwiki is the second choice [after a general reference site] because the most helpful thing is what other users have told you, sort of. Because each resource has something that the system kind of does for you and then there's a part like people can type in comments and offer advice and I guess that's really what's most helpful. So it's really the wiki because it's like other people telling you stuff.

Forty percent of participants also listed asking someone in real life as an information source. After wikis and asking someone in real life, the next most commonly used information sources were leveling guides, the Armory, and search engines, each named by 20 percent of the participants. Finally, one participant each named forums, blogs, and the player's guild's website as a source, although another participant indicated that she had used forums in the past.

There was little relationship between the sources used and the years of experience a participant had. However, only participants with fewer years of experience than the median used leveling guides. More participants with years of experience above the median named the game interface as an information source than did those below the median, and of the six participants who used add-ons, four of them had above the median years experience.

There was also little relationship between the sources used and the number of hours participants currently spent in-world, although more participants who spent below

the median number of hours in-world used certain outside sources than did those who spent above the median hours in-world. Four participants who spent fewer than the median number of hours in-world used wikis, while only two participants who spent greater than the median listed them. Likewise, four participants who spent fewer than the median number hours in the world asked someone in real life, while only two participants who spent greater than the median did. Only participants who spent below the median number of hours in world used a search engine, while only participants who spent above the median hours in world used a leveling guide.

When asked why they used the sources they named, the three most commonly given reasons were amount of information (mentioned by 37.5 percent of respondents), ease of use, and usefulness in the past (both mentioned by 31.25 percent of respondents). Other reasons, each given by two users, were availability of images, availability of written directions, that those sources were part of user's general method of gathering information, additional features provided by the source (e.g. the ability to filter search results by certain criteria), and presence of comments from other users. Finally, one user each listed knowledge of how the information was gathered and presence of lore/story as reasons. For the last reason, the participant explained that sie looked for information first in the quest instructions in hir quest log "because that's where the story is."

Users who named both in-world and outside sources in their information seeking were asked how they chose whether to remain in-world or look elsewhere. The most common category of reasons for leaving world were social factors, mentioned by 31.25 percent of participants. These included not wanting to bother other players, feeling shy, or not feeling sociable. One participant explained that the best way to get some kinds of

information was to ask someone in game “except when it comes to quests. Because you don't want to bug other [players].” Another participant explained

So, if I'm playing with my roommate or maybe with another friend that plays, I'll ask them. But if I'm just wandering around and I see random, like Joe Tauren Hunter over there, I won't go, “Hey, Joe Tauren Hunter! [...] How do I get to this place?” Because he would probably, you know, I would just automatically assume that people wouldn't want to tell me and it would be obnoxious.

The perceived sociability of other players, another social factor, was also used by one participant to decide whether to ask other players or look online if hir guild, the participant's first information source, did not know the answer.

If they didn't know, at that point, I might ask in General chat channel, and I might try General chat channel first if I've seen the region's particularly talkative and people are helpful. If just depends. I mean, you wouldn't do it in the Barrens² because it just wouldn't work. [...] If I'm just kind of out in the middle of nowhere and just kind of wanting to be a little bit more solitary, I'd go online.

The next most common reasons, mentioned by 18.75 percent of participants, were that the in-world source was not available or that looking up information elsewhere was faster. Whether the in-world source was available generally meant whether other players were online when the participant had an information need. One participant explained that whether sie asked hir guild first or went straight to an outside general reference site “depends on who's on and whether or not I think I'm going to get an expedient answer from them.” Another participant explained, “Most of the time, I ask in guild first. If someone's on. If no one's on, then of course I'll have to look it up.”

Other users chose not to use in-world information sources because they considered it faster to leave the world and find the information elsewhere because an intermediary had already gathered it and organized it. One participant explained

I want to do things quickly and I don't have enough time to feel like I want to

2 A region in World of Warcraft, notorious in-game for chat featuring silly or hostile interaction

explore the way that they might expect you to intuitively explore the world, but I kind of like that somebody else has already found the answer and I can go look it up and say, “Oh, I need to go visit this vendor and pick up this alchemy recipe” or something like that.

Likewise, another participant said, “I used to ask guild members or whatever all the time, but now I just switch to my browser and I can get all the information I need because someone's already organized it.”

Two participants each (12.75 percent) left World of Warcraft to look for information when they needed more information than was available in-world (i.e. the participant's guild is not able to sufficiently answer hir question). One participant mentioned leaving the world because sie wanted to be able to refer to the information later. Describing why sie went out of the world to get directions, the participant explained, “You can scroll up on your chat log and see what they said but, you know, if they run away and I can't remember how to spell their name, I can't get clarification and I can't take my time with it.”

Because, as described above, several participants used in-world sources unless they had a reason not to (social factors, in-world source not available, or needing additional information), participants gave fewer reasons as to why they would use an in-world source. Three participants listed social factors, such as friendship with other players or feeling sociable, as a reason to remain in-world. One participant explained why hir guild was one of hir first information sources.

Generally, because we're all friends, we all met through the game or we've known each other for years. We've got a few people in our guild that we've known for many, many years. We just get along, help each other out.

Another participant added that “sometimes it's just making conversation.”

Two participants indicated that they used in-world sources because they did not

like to break out of the world while playing. For one participant, this was because sie saw no reason to leave (this was the participant who currently used no outside information sources), while another explained, “Somehow going out of it just kind of takes the mystery away.” One participant reported finding information faster in-world, asking hir guild if sie “just want[ed] a quick response.”

Finally, one participant left the world to look up locations or other factual questions but relied on in-world sources, namely hir guildmates, for questions that relied on human judgment or players with past experience.

More complicated things, typically. Because if it's just a simple, straightforward factual question, then it's usually simpler to just go look it up, but if I want to ask them something about the game, usually it's about some sort of—something where there's some sort of judgment call involved, like, you know, which stat should I put on this, which gear is better than others, although there outside the game resources for that too that I use [...] But things where there's just sort of a judgment call or if you want to ask about how a certain encounter is going to go or whether it's easy or hard or whether a character's ready for it, whether, you know...someone who's sort of been there before. [...]Because it's one thing to, say, read about an encounter, but it's another thing to do it.

Although, as previously mentioned, observing other players was the most-often mentioned in-world information source, most participants did not name it until specifically asked. In many cases, participants did not actively seek information by watching other players. As one participant noted, although sie could think of instances when sie had gotten needed information by watching other players, “It's not something I tend to think of as a strategy.”

There were some exceptions to this. One participant explained that sie used observation, in combination with the combat log (a part of the game interface that records all actions that take place during combat) to learn how to perform a particular role in a raid.

For example, I used to play a warrior. So, the main duty of a warrior is to tank, and I was terrible at it. So I just watched what our guild's main tank would do for a while, and I'd ask him about it. And so, he'd say, "Just watch." So I'd watch, you know, what skills he was using—I'd look in the Combat Log afterwards and it'll show me like what he did to keep aggro—to do his job well.

However, the participant also noted that "it's not as useful, I'd say, as just asking people." The participant did find that gathering information from observation in combination with asking people to be a useful way of learning.

In PvP, I was terrible. So I got my—so I went out with my guild [into the battlegrounds] or whatever, and I just saw what they did. And I'd ask them, you know, "Why are you doing that?" And they'd go, you know, "For such and such reason." And that's the most effective way, or it's the only way, something like that. So that's the best way I knew of.

Another participant mentioned that players were sometimes told to observe a certain player during the raid to get information about the raid strategy.

Sometimes it's simplest to just follow someone else if you don't know, if you're new to it or you don't know exactly what you're going to be doing. Because—and sometimes they'll mark a character with one of the little raid markings or they'll put like a square or something over the guy's head, like "Follow this person and you will not get it by a lava wave and die" or whatever.

Two participants mentioned relying on observation to look for information about what was happening during combat.

I was thinking that this morning, I did a dungeon with two friends, and a friend of mine wasn't keeping track of something he was supposed to be keeping track of; he wasn't going after a particular dragon he was supposed to be taking care of, and so I would have to go and take care of it for him and do it.

Another mentioned observing other players in a battleground to get information about what they were doing and why something happened to you. "And then you see the person you're targeting start casting something back, and all of the sudden you can't do anything because you've been feared or silenced or something like that."

The final form of deliberate information seeking through observation participants

mentioned was trying to look for information about other players. The participant who mentioned looking for this kind of information explained that sie tries to find out whether a player is someone to “stay away from” or someone sie would want to “work with again,” even without speaking to hir. Furthermore, “sometimes you have to look at, okay, is it a child that just came in and ganked your ore, or is it somebody being rude? Because a lot of times, the little ones, they don't understand.”

More often, participants recalled times when, through observation, they gained information they didn't know they needed. The four categories of information participants mentioned were navigation (which direction to go, how to get to a certain spot), objects (what items were available, what certain things were used for), completing tasks (how to accomplish quest objectives, how to maneuver characters a certain way), and general strategies. This type of information was mentioned by 31.25 percent of participants. Of those participants, 80 percent spent ten or more hours in-world, above the median number of hours. One participant explained that sie learned new abilities by observing other players. “And if I know somebody's the same charact—class, and they're doing something I didn't know I could do or didn't know how to do, I've copied them. Found out my little dwarf would go *pshoow*. [Gestures to indicate that hir dwarf can move from one place to another very quickly].”

Another participant observed, “I get information about how other people play the game. Like, other classes, how they work and stuff.” Participants also used observation as a starting point and, once they realized they had an information need, used other information sources as well.

The main example I can think of is when I first started leveling up my DPS warrior, figuring out that I need to stand in back of things all the time to attack.

And what I noticed was that the DPS that I was playing with would always cycle around to the back of the mob and start attacking and it took me a while to be like, “Okay, they're doing that for a reason, and I need to find out why.” So I started going back before I started reading up on why they were doing that. And once I figured it out, that's what I do and that's what I tell other people to do.

After general strategies, the next most common type of information acquired through observation is navigation, mentioned by 25 percent of participants. Of those participants, 75 percent (three of the four participants) had been playing World of Warcraft only for 1.5 years or fewer. One participant explained, “Yeah, I mean, I've been lost and seen somebody go running by and go, 'Oh wait. That's where I need to go. I meant to do that too.’” One participant found that the outside source sie had used to look up the location was not sufficient and benefited from observing other players.

Oh, there was a quest I was doing in Ferelas that involved four different areas and even after I had looked on the internet, the internet had not helped me at all because there are these four things I was supposed to gather stuff from. Some kind of well essence or something. And even though I could see them on the map on Thottbot, that really didn't help me in terms of in-world geography, of how to navigate this one area. And so there was this other two-player group that came through and I watched them go up onto an area that I hadn't even thought I could jump on to get the thing and I'm like “Ah! That's how you do it.”

Completing tasks and objects were each mentioned by three participants. Two participants named both. For both categories, two of the three participants had been playing World of Warcraft for above the median number of years, but two of the three also spent slightly below the median number of hours in-world. One participant described using observation to learn how to kill a particular character (completing a task) and what to do with a portal (object).

If you're killing a specific elite character or something, [then] you can watch the person in front of you do it because you got there after they did, then sometimes that can be really instructive. I [didn't] think—a lot of the sort of transportation-related things I, you know, notice that somebody clicks on a portal or something, like “Oh, that portal clearly goes somewhere. I didn't notice it was there before.”

Four participants (25 percent) reported that they never got information by observing other characters. One of them was the participant who used no in-world sources of information at all, preferring to seek for information to satisfy information needs discovered in World of Warcraft the same way sie sought for other types of information. The other three simply could not think of any times when they gained information by watching other players, although they did, to varying degrees, get information from other players through guild chat or talking to other players. One participant felt it was hard to observe another player and explained, “I can't think of an instance. Unless I went along in a raid and watched how another mage fought or—but I'd be more likely to say, 'What spell rotation are you using?'”

Another participant, who looked for information about other players' personalities through observation, explained why sie did not use observation for other types of information seeking, such as general strategies.

Not really, because I don't do PuG³ groups, so...I don't like PuG groups. So generally if we're running an instance or anything like that, it's all guildies and primarily I'm the highest-ranking priest in our guild, so everybody looks to me to see what to do as a priest, so I don't really have anyone else to look at in our guild. At least not as my priest.

The participant's comments also suggest that other players in hir guild may look for information about general strategies by observing hir.

Participants reported a few other instances of incidental information acquisition. One participant described being in a group with other players when one of the other players let hir know that sie was drawing aggro. Sie then used other sources to learn how to prevent doing that in the future. Another participant got information about gear and

3 PuG stands for “Pick-up Group,” a group made up of players who are not in the same guild and most likely do not know each other

general strategies from his guild not only by asking them questions but also when guild members volunteered information. “Somebody in the guild will say, ‘I was just looking at your hat. You need a different hat. Let me make you one. Get the materials or I’ll make it for you.’” However, most incidental information acquisition occurred through observation, and participants did not really think of it as an information source until they were asked about it.

Discussion

There were three main research questions that this study attempted to explore. First, to what extent do players in World of Warcraft use resources in that world for information-seeking? Do players use each other as information seeking resources in-world, or do they still prefer to check an outside resource? The answer seems to be both. Most players look for information frequently, and when they do so, they look both in and outside of the world, depending on the situation. Players use each other as an information seeking resource in-world, as well as other in-world resources such as the game interface and add-ons. Players may also begin in-world and move outside for more information or find information using an outside source and then gather additional information back inside the world.

The second question was for what kinds of information do users seek in-world? Do questions tend to be fairly short and specific, or do they attempt to find answers to more open-ended questions? The answer again seems to be both. Locations, usually short and specific questions, were the most common type of information sought and were looked for equally in and out of the world. Some participants considered it faster to leave the world to find a specific piece of information or because they wanted to be able to refer to the answer later, while others preferred to use an in-world source such as a mod or guild chat to get specific information without leaving the world. For some of the short specific information users looked for, such as how much damage they had done in a fight or for how much they could sell a particular item, participants named only in-world

sources to answer.

Users also sought information in-world about more open-ended questions, such as general strategies, although slightly more participants used outside sources to do so. In some cases, users sought in-world for open-ended questions but did not use in-world sources exclusively to answer them. For instance, after watching other players and noticing they were attacking from the back, one participant then looked at sources outside the world to better understand why she should do that. For all types of open-ended questions mentioned by participants, at least one participant left the world to look for information either instead of or in addition to looking for information within the world.

In a few cases, participants decided whether or not to use in-world sources depending on the type of question, such as looking up locations outside the world but remaining in-world to ask guild members when human judgment was needed or asking someone in-world unless the information needed was quest-related. Other times, what source participants used depended less on the type of information and more on where they were in-world, who else was online, how sociable they were feeling, and so on.

Finally, this study looked at what resources participants used in-world to answer their questions. Primarily, participants used other players to find information. Of the five most commonly named in-world sources of information, four (observation, guild chat, general chat, and talking to other players) all relied on other players. Only two in-world sources named, the game interface and add-ons, did not directly gather information from other players. Players gathered information both by observing other players and by asking questions via chat. However, when participants recognized an information need and purposely sought information about it (as opposed to acquiring it incidentally), they

most often used text-based chat. More participants mentioned throwing out their question to a group, either the participant's guild or anyone in a region or server, than talking to a particular player, but players gather information both ways.

Other players were also factors in the outside resources chosen. Several participants mentioned using general reference sources because “someone else” had gathered the information for them. The general reference sites named were all resources created by other World of Warcraft players. (However, too much emphasis should not be put on this because only one participant mentioned his knowledge of where the information came from as a reason to use a particular source.) User comments on reference sources, wikis, forums, blogs, and asking people in real life are all other ways that participants gathered information outside the world from other players.

Has the ability to use in-world sources impacted how World of Warcraft players find information? When choosing a source, many of the preference criteria participants named fit with those found by other researchers. Participants valued sources that provided a lot of information and were easy to use. Although not named explicitly as a reason for using a source, participants seemed to prefer sources that were easy to access. When one source was not available immediately, participants switched to a source that was available. Participants also gathered information from human sources online for some of the same reasons participants used human sources in Savolainen's study. Only one source participants named, asking someone in real life, was not an online source, so whether or not participants looked for information on the internet was not an issue.

However, when choosing between in-world and outside sources, other factors came into play, such as whether the player was shy, whether the player expected other

players to be helpful or to perceive the player with a question as obnoxious, or whether the player wanted to engage in social activities, as well as who else was online. Players can lurk on the general chat channels, although only one player specifically mentioned this as a way she looks for information. Players can also lurk on guild chat, but because any guild member can see what other guild members are online (online guild members automatically see the guild channel), the player is not entirely invisible.

Social factors, which were reasons participants gave both for leaving the world and for staying within it, separate information-seeking in World of Warcraft from many forms of online information seeking. Not feeling sociable probably does not discourage users from entering search terms into Google. However, there are numerous online information sources that are not immersive virtual environments to which social factors still apply. Forums, chat rooms, and question services like Yahoo Answers, though sometimes asynchronous, are all other ways users can seek information from others online without depending on the ability to view other users' avatars as in World of Warcraft and other immersive virtual environments.

In this way, information seeking in World of Warcraft is not different from the text-based Usenet communities Burnett studied earlier. As in those communities, players in World of Warcraft can pose a query to the group or to a particular individual, either through a whisper or by asking a fellow guild member in guild chat, as well as gain information incidentally when another community member asks a question or makes an announcement. Burnett's typology, however, does not include another form of collaborative informational behavior, in which one community member recognizes another member's information need, even if the member with the need does not, and

proactively provides the information. Because World of Warcraft allows players to see one another's characters and provides tools, in-world and outside of world, to get more information, one player may notice something about another player's gear or talents and provide them with information.

Where World of Warcraft is also different from other forms of online information seeking is in the ability of players to incidentally gather information by observing other players. Although participants did not think of this as a source of information until they were asked about it specifically, 75 percent (80 percent of those who used at least one in-world source) gathered information at least occasionally by observing. In the text-based Usenet communities, a community member must ask a query or another member deliberately choose to share specific information for other members to benefit from it. For example, on a forum devoted to World of Warcraft (much like the Usenet communities), for members to incidentally acquire information about a raid strategy and answer an information need players did know they had until they learned the strategy, a member must either ask a question about the raid strategy, prompting other members to describe it, or a member must choose for some reason to announce a strategy. Either way, some member must deliberately choose to put the raid strategy into words (or link to a video or some other method of deliberately sharing the information) and provide it for other members with the intent of making that information available.

Within World of Warcraft itself, a participant may acquire information the same way if, for instance, a raid leader reviews the strategy with players before the raid begins. However, players in-world have an additional option that is not available outside the world. They can discover the strategy by watching other players and realizing those

players are doing something different, even if the players being watched are completely unaware that they are providing information. They do not have to choose to share information (although they may do so by intentionally demonstrating something for the benefit of another player) in order to be an information source. This is one way that immersive virtual environment supports players finding information even if they do not know exactly what they are looking for or do not realize they have an information need, as Belkin and Poremba also addressed.

This study was limited in its small sample size, which drew only from people connected to a single university, only a fraction of the total World of Warcraft players. In addition, the questions of this study focused more on purposeful information seeking. Additional research could be done with larger and more diverse samples as well as to look specifically at incidental information seeking through observation and other methods to better understand how observation in an immersive virtual environment offers a participants a way to discover information online that may not be provided in other forms of online information.

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Appendix A

Website Used By Participants to Volunteer for Study

Thank you for your interest in participating in the study Information Seeking in World of Warcraft. At this time, the study has reached the maximum number of participants and cannot take any more volunteers.

IRB Study #09-0158

Title of Study: Information Seeking in World of Warcraft

Principal Investigator: Kelli Monahan

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What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of this research study is to learn about how, if at all, World of Warcraft players use the capabilities to observe, communicate with, and be assisted by other players to look for information within the game world.

Are there any reasons you should not be in this study?

You should not be in this study if you have not played World of Warcraft long enough to have at least one character reach level 10.

How many people will take part in this study?

If you decide to be in this study, you will be one of approximately 20 people in this research study.

How long will your part in this study last?

Your part in this study will last for the time it takes to schedule and complete one interview. The interview itself will take approximately thirty minutes.

What will happen if you take part in the study?

You will be asked to meet with the principal investigator and answer a series of questions about how you look for information within the world of World of Warcraft. Please understand that we are not trying to assess your abilities but rather how people in general gather information in the game.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. You may not benefit personally from being in this research study.

What are the possible risks or discomforts involved from being in this study?

While all efforts will be taken to protect your privacy, if you participate in this study, there is a risk of loss of privacy if your participation or answers become known. There may be uncommon or previously unknown risks. You should report any problems to the researcher.

How will your privacy be protected?

Records will be stored on a password protected computer and e-mail account. Only the principal investigator and the faculty advisor will have access to individually identifiable data. Participants will not be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.

Audio tapes of interviews will be stored in a locked apartment. After tapes have been transcribed, they will be recorded over. Your name will not be included in nor directly linked to the transcript. If you would prefer not to have the interview recorded, you may request that the recorder not be used.

When you sign the physical consent form, you will have the option whether it is or is not okay to record you during the study.

Will you receive anything for being in this study?

You will not receive anything for taking part in this study.

Will it cost you anything to be in this study?

Your costs will include transportation and parking if you must come to the UNC-CH campus to participate in this study.

What if you are a UNC student?

You may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at UNC-Chapel Hill. You will not be offered or receive any special consideration if you take part in this research.

What if you are a UNC employee?

Taking part in this research is not a part of your University duties, and refusing will not affect your job. You will not be offered or receive any special job-related consideration if you take part in this research.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

<http://www.ils.unc.edu/~kmonahan/WoWStudy/signupform.php>