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Mobile virtual worlds

The role of mobile access to virtual gaming worlds

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Abstract

This thesis examines the role of mobile access to virtual worlds in massively multiplayer online role playing games (MMORPG:s). Online gaming worlds have existed for decades, but ever since the smartphone has become more common, new interaction possibilities to these worlds have emerged. We have conducted a literature review to darify existing gaps in the research community regarding mobile virtual worlds. Through this review, we have constructed a research model containing previously established motivation factors for MMORPG:s, interconnected with possible categories of how to improve the game experience with mobile features. An online survey on this topic was sent out to World of Warcraft players and the results show that many aspects of gameplay through mobile access could improve the gaming experience of virtual gaming worlds. The responses showed very mixed feelings about using many game features from the mobile phone, especially those that tie in with real life. An important finding among the results is the strong reluctance among the players to pay extra money for the addition of mobile access to the virtual world, and a low motivation to use synchronous gameplay features via a mobile computing device.

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1 Introduction

1.1 Background

An emerging topic in the field of IS research and popular gaming titles today is the concept of *virtual worlds*. Though the exact definition remains to be settled, Bell (2008, p. 2) defines a virtual world as "*A synchronous, persistent network of people, represented as avatars, facilitated by networked computers*". Virtual worlds can take many shapes and variations (Spence, 2008), for example, some may be driven by game objectives and challenges, while some may be an elaborate tool for social interaction. Since the beginning of the concept, starting with the text-based MUDs (Multi-User Dungeons) in the 1970s, some contemporary virtual worlds have grown very large, currently serving millions of users (Spence, 2008). Perhaps the largest one, World of Warcraft, currently has 12 million subscribers paying a monthly fee of approximately 12 € every month.

Another industry on the rise is the mobile phone industry, which continues to thrive as the amount of active subscriptions for mobile phones worldwide has reached 4 billion (Baudisch & Holz, 2010). In recent years, mobile phones are undergoing significant development, becoming more connected to the Internet and allow for increasingly complex interaction due to larger displays and touch-based input, often accompanied with an unlimited data plan. Commonly referred to as *smartphones*, these sophisticated devices are gaining an increasingly large market share among consumers (comScore, 2011). It is predicted that in the next few years, the smartphones will have surpassed the regular mobile phones in sold units (Huang et al., 2010). With the introduction of App Store and Android Market with hundreds of thousands of available applications each, the software industry has been forced to acknowledge this new mobile computing era. As an example of the economic interest in the industry, analytics estimates the expenditure on mobile advertising to have been US$3.6 billion in 2009 (Mascolo, 2010). Some even believe that mobile phones may become "*the mass computation platform of the future.*" (Baudisch & Holz, 2010)

Simultaneously, virtual worlds have begun to attract the attention of several large, multi-national corporations such as Sony BMG Music Entertainment, Adidas, Toyota and many more. Interest has been shown in the economic behavior of users purchasing goods and services in virtual worlds, a phenomenon called *virtual consumption*. The interest has manifested itself as advertisements and participation in various virtual worlds, mainly through MMORPG:s. (Shelton, 2010)

So far however, *mobile* access to virtual worlds has been hindered by weak interaction tools, as well as weaker hardware compared to the PC desktop, e. g. smaller screens, cumbersome input methods, and limited Internet access. As mobile computing devices have become increasingly advanced, the question arises what role they will have to virtual game worlds. With the adoption of smartphones among consumers, new possibilities for interaction with online virtual worlds are created. Mobile

access to a virtual world could become a *disruptive technology* (Bower & Christensen, 1995) and a prerequisite for a successful next-generation online gaming world (Koivisto & Wenninger, 2005) - indeed, upcoming large scale titles such as Guild Wars 2 has been announced to have mobile access to certain aspects of the game (IGN, 2010).

Many online virtual gaming worlds were created with the traditional computer in mind, requiring a common computer platform, keyboard and mouse, not tailored to be accessed in any way outside the proprietary client. This marks a significant difference against online social networks, where third-party clients can be used, and the standard way of access is to use a web browser.

Some creators of online gaming worlds have begun taking their first careful steps into the mobile world. One recent example of mobile computing interweaved with virtual game worlds is the "World of Warcraft Remote" (Blizzard Entertainment, 2011a), which allows game players to view, buy and sell virtual trade goods in their mobile phone, only existing in the virtual world their game character (a.k.a. "avatar") exists in. Recent updates include additional features such as chat and a schedule view. However, the avatar itself cannot be relocated as with the standard client, and the game world as such remains inaccessible.

By spreading to mobile devices, virtual game worlds are becoming *ubiquitous* and interwoven with our reality in a different way than when accessed merely by the home computer, creating a more tightly integrated relationship between real world user and virtual avatar.

1.2 Research issue

As mobile computing such as smartphones has lately become increasingly advanced, the question arises regarding what role they will have in virtual game worlds. There are a few examples of virtual games existing today as mobile applications, such as the World of Warcraft Remote and clients for Second Life, which let the users interact in a virtual world by using a smartphone. The interaction itself is naturally different from original setups using a mouse and keyboard and the interaction in mobile virtual gaming worlds might seem constrained in a comparison, but since it is "mobile" interwoven with "virtual", new ways of designing games will naturally occur. There are no guidelines regarding how these new games should interact with its potential users, and there is also a lack of research on how existing virtual worlds can leverage mobile technology to broaden their pervasiveness. Our research question is thus as follows;

What role does mobile access have in online virtual gaming worlds?

1.3 Purpose

The purpose of this thesis is to explore the complexities surrounding the phenomenon of using mobile devices to interact with online virtual gaming worlds, potentially enabling vendors to leverage new technology in innovative ways.

1.4 Delimitations

There are many types of specific virtual worlds, one distinction, as we shall see, is the broad definition of gaming vs. socially oriented virtual worlds. We have chosen to focus on virtual *gaming* worlds, commonly known as MMOG:s or MMORPG:s, omitting other variants of virtual worlds. In our data collection we will confine the study to smartphones, excluding smaller computing devices such as tablets and laptops.

2 Literature review

In this chapter we will try to present as complete a picture as possible of the current academic research regarding topics related to our research question. We have identified three major topics in the subject including: mobile computing, virtual worlds, and characteristics that make computer games attractive. The subjects are difficult to define, and therefore we have chosen to conduct a thorough literature review and presentation.

2.1 Mobile computing

In this section we describe the characteristics of mobile computing.

2.1.1 Background

The mobile phone

Recent developments have made the concept "mobile phone" more difficult to define. A mobile phone in its most basic form is a personal communications device for making phone calls, designed to be portable and usable on the go, wirelessly. Ever since the early 1990's the use of mobile phones has increased tremendously and the mobile phone is shaping up to be a cornerstone of our society's communications. According to Baudisch & Holz (2010) as much as 4 billion mobile phones are used today, worldwide. The mobile phone has surpassed the PC in numbers, and soon even the TV (de Souza e Silva, 2006). At the moment, more and more people even discard their original home-bound telephone, relying all together on their individual mobile phone to be their main source of contact. The telephone as a device has become something that is tied to an individual, rather than a household. The device allows for spontaneous, instant communications with any other individual or service independent of location (disregarding lack of signal coverage).

Evolution of the smartphone

Mobile phones have evolved in recent years to what is commonly referred to as "smartphones"; a hand-held small computer device, extendable with additional software applications (commonly known as "apps") available en masse at online stores such as Android Market and App Store. Apps can be created by the hardware vendor, the carrier, or third-party developers. Although no clear distinction between what constitutes a mobile phone or a smartphone exists, generally speaking the smartphone facilitates better data processing and more advanced features, ever increasingly resembling personal computers (Li et al., 2010). The smartphone merges several previous small consumer electronic devices into one, such as the music player, camera, personal organizer, phone, and more. As such, it becomes the nexus of digital mobile technology carried with a person, and over time, arguably, an essential companion in modern day living. In Sweden, approximately every second mobile phone sold in 2010 was a smartphone (Lindqvist Sjöström, 2010). Globally, it is predicted that in a couple of years, the smartphone sales will equal the regular mobile phone in

numbers of sold units (Huang et al., 2010). In fact, some researchers believe that the bulk of personal computing will be conducted on similar devices in the future:

> We need to let go of the notion that the mobile devices are auxiliary devices that we use while on the road. Instead, we need to adopt a model in which the mobile devices are the main computational devices, if not the computational device. (Baudisch & Holz, 2010, p. 41)

Tablet computers

Interestingly, after the smartphones penetrated the mass market, bringing advanced computing mobile where the laptop computer was unpractical, yet another mobile computing device was introduced - *the tablet computer*. The tablet computer is essentially an overgrown smartphone, with a larger physical form factor. Contemporary models typically run on similar or even the same electronics and software as their smartphone equivalents, enabling software compatibility across the platforms, for example the Apple iPad runs iPhone applications (Apple, 2010). Though tablets sometimes have telephone communication capability, arguably, the tablet fills a different role than that of the smartphone. While still being portable, we consider the tablets to not be as easy to carry at all times as a smartphone. Therefore, according to our conceptualization of mobile computing, it does not qualify as directly relevant to our research, but is still worth noticing due to the compatibility with smartphone applications, and its relative portability.

Contemporary mobile computing

Mobile computing is the act and implied possibility of using computer equipment regardless of location. Mobile computing can take many shapes, such as using a laptop computer, mobile phone, tablet computer, or any portable digital computing device in the field. However, the mobile phone stands out in this context, due to the reasonable possibility of carrying it on person at all times. Therefore, when talking about mobile computing in this thesis, it will solely implicate use of the so called smartphone - the only computing device small enough to easily be carried on person at all times. As such, the smartphone is the only contemporary device used on a larger scale that fits in the category.

2.1.2 Characteristics of the smartphone

New possibilities and new challenges

Smartphones have changed the way we can communicate via blogs, e-mail, social-networks as well as our Internet usage and financial transactions. It has broadened the scope of use of the Internet since it enables usage while being mobile. This mobility has sparked a new commerce structure, called m-commerce, enabling mobile gaming, mobile ticketing, mobile messaging, mobile banking, etc. and it has provided the user with broad reach, mobility, ubiquity, convenience, and instant connectivity (Zakiah binti Ayob et al., 2009). Companies developing software and hardware products face new challenges since almost all virtual services offered on the Internet today can be

accessed by smartphones. The challenge is not only within the development of dedicated products but also Internet web pages that sense the connection of a smartphone device. Various forces are competing for larger market shares of the mobile service market and it is unclear whether there will be standardized procedures in integrating mobile services over the Internet or not. (Mascolo, 2010)

Third party applications

In recent years we have seen the rise of online application markets, where any third party can create and offer their applications for download and use. The content on the online markets, Internet platforms and services provided by companies such as Apple and Google is according to Cusumano (2010) the thing consumers currently desire most, and a strongly contributing reason for the fact that Apple went beyond Microsoft in stock market value in May 2010. The two largest online application stores are Apple's App Store, and Google's Android Market, with 350 000 (Muller & Bowcock, 2011) and 150 000 (Kameka, 2011) downloadable applications each, many of them free of charge. The success of these online application markets have made the providers (Apple and Google) into platforms providing users with a myriad of different services, ensuring them a strong position on the global application market. Some of the most influential online platform service providers today are Apple, Google, Nokia, RIM, and Microsoft, although there exist many more (Penttinen et al., 2010).

Camera functionality

Most, if not all, smartphones on the market today have a built in camera for capturing photographs. Combined with the Internet connection of the smartphone and the ability for third-party applications to utilize the camera, new possibilities to share content emerge. For example, when a person encounters an interesting scene while being mobile, a photo can be taken and immediately shared to all of the person's friends via a social network such as Facebook. Another combination of connectivity and the camera is *augmented reality,* where the camera image is immediately placed in the display, updated in real time, but with overlaid information, for example it can be based upon where the user is and where he is pointing the camera to show nearby places of interest.

Sensing the environment

A common feature of the modern smartphone is the sensors included, such as accelerometer, GPS (location sensor), microphone, orientation sensor, and more. This allows the smartphone to consider these factors when interacting with the user, for example, the accelerometer or orientation sensor can be used to control games, or the location can be considered when starting the map application and setting the starting location in the view. The phone can be made aware if you are at home or at work, and chose how to notify you of events based upon that information.

Mobile social computing

"Social computing in general refers to any technologies that involve either explicit or implicit computer mediated communication and interactions among people" (Nan et al., 2010, p.1). In mobile social computing this technology is taken mobile. Major players such as Facebook have made applications for mobile phones, and social networking is one of the fastest growing usage areas of mobile phones (comScore, 2010). Also interesting to note is that today, mobile users spend more time on social networks than desktop users (Mascolo, 2010). Due to the smartphone's sensing capabilities, the social network can interact not only with the person, but the real world surrounding him or her. Theoretically, social networks can be made aware of the user's physical location at all times (disregarding privacy issues). Recent location-based updates for social networking sites are added coordinates (longitude and latitude) for tweets on Twitter, and Facebook Places for Facebook (Mascolo, 2010).

Gaming on smartphones

A mobile game is a video game that can be played using a mobile device such as mobile phones, smartphones, PDA:s, or handheld computers (Liang & Yeh, 2011). Mobile gaming is one of the largest parts of available mobile software applications, as well as an area in which users are well-inclined to pay for the software (Penttinen et al., 2010). According to recent estimations, the rise of the smartphones have had a significant impact on the global mobile gaming market which is expected to increase from $5.4 billion in 2008 to more than $10 billion in 2013. As much as a third of all applications on Apple's App Store are reported to be games, firmly establishing the widespread demand of mobile games worldwide. (Penttinen et al., 2010)

Mobile gaming have in past years received some attention in the research community, often regarding attempts to describe the gaming context (also referred to as space, or environment), which is viewed as a critical moderating factor in consumer behavior research. A reason for this focus is the fact that the main characteristic of mobile gaming is the context of use for mobile games is unknown (Liang & Yeh, 2011).

Another specific difference between the mobile gaming industry and its original stationary counterpart is the somewhat lower market power of the game publisher. This is believed to be due to the fact that many consumers associate games with the mobile phone operators, handset suppliers and application store providers. Because of this development, it has become more common that these actors collaborate more closely than previous hardware and software providers, creating a multiple-firm control. This development has the potential of generating high revenue on a broad scale. (Feijóo et al., 2010)

> (...)mobile games can make intensive use of the competitive advantages of the mobile platform: ubiquity –any time, any place-, the highest level of personalization –but keeping close contact with the social network-, and, looking into the future, context-awareness –location as a current and main example. (Feijóo et al., 2010, p. 1)

2.2 Virtual Worlds

In this part of the literature review, we will elaborate on the basics of the virtual world, what it is and how it works, along with its social implications and patterns of use, in order to later be able to gain an understanding how and why this technology may be made accessible via mobile phones.

2.2.1 Background

When focusing on virtual worlds in computers, we can trace the history of the phenomenon back to the late 1970's, when two computer science undergraduates created the Multi-User Dungeon (MUD) (Bartle, 2010; Bell, 2008). This first virtual world was text-based, and interaction were performed by typing strings to a computer terminal, similar to early text-based games, but with the added depth of multiplayer capabilities and a persistent environment. Today, over 30 years later, there are many commercial virtual worlds, some with millions of users, such as World of Warcraft (WoW) with over 12 million subscribers (Blizzard Entertainment, 2010). Each subscriber has to pay a monthly fee, slightly different depending on the region. The European website for WoW states the fee is 12.99€ per month, with minor subsidies if multiple months are purchased at the same time (Blizzard Entertainment, 2011b). Virtual worlds can thus create tremendous value for the proprietors. Other virtual worlds are free to join, but some objects or features cost extra. Each virtual world has its own set of rules, players, environments and other characteristics. The large variance of how virtual worlds are formed may cause confusion, which leads us on to the description of the term itself.

2.2.2 Characteristics of the Virtual World

The term "virtual world" does not have a single, consistent formal definition in contemporary research (Bell, 2008; Spence, 2008). Many researchers have made attempts at informal definitions while formal definitions are rare (Bell, 2008). However, in the brief essay of Bell (2008) virtual worlds are in defined in a single sentence as:

> A synchronous, persistent network of people, represented as avatars, facilitated by networked computers. (Bell, 2008, p. 2)

We will accept Bell's simple definition and clarify the concepts in a similar way that is done in his essay, weighing in other authors' views, while arguing for additional characteristics. In our literature review, we identified four additional characteristics; *spatiality*, *rule-based*, *implied purpose,* and *multiple representations*.

Synchronous

Actions performed in the virtual world are performed in real time, synchronized across all representations of it (disregarding a very small network delay) (Bartle, 2010; Bell, 2008). The strive is to create representations as consistent as possible, where person A immediately sees the effect of person B's actions in the virtual world.

Persistent

Much like a real world location such as a city, the virtual world is persistent in nature and does not disappear when users exit it or log off, but instead continues to exist and function, and cannot be paused under normal circumstances (Bell, 2008; Bartle, 2010). This is in contrast to a single-player game, where a game can be saved and loaded, paused or restarted, or a session-based multiplayer game where instances of the environment are created temporarily and cease to exist upon the end of the gaming round.

Network of people

The world is *shared* (Bartle, 2010): The virtual world is not tied or restricted to one user; it contains a network of people. People, and the interactions between them, are central to the virtual worlds (Bell, 2008). Each user is connected to the world via a digital device, commonly a personal computer with proprietary software created by the operator of the virtual world.

Avatars

The avatar is a digital representation of a person interacting with the virtual world, not limited to text, but commonly including graphics, or 3D-models with an anthropomorphic appearance (Ducheneaut et al., 2009), a so called "virtual self" (Bartle, 2010). The degree of customization involved differs greatly between virtual worlds and multiple avatars may be associated with one individual (Ducheneaut et al., 2009). The avatar may be seen as an entire "self-representation" in the virtual world where the appearance of the avatar reflects upon psychological aspects associated with the players' self-image. The avatar itself has *agency*, being able to perform actions, in likeness with real world actions, such as running, jumping, fighting, etc. only limited to the players' imaginations and the existing technology (Messinger et al., 2008). Bartle (2010) specifies two types of interactions, *interacting with* (performing actions on objects in the world which yields results played back to the user) and *interacting through* (interacting with other real world players or entities through the virtual world medium). Interacting with the world in different ways will commonly have consequences for the avatar. Often, the avatar is of a fragile nature, vulnerable to attacks or other damage, such as falling long distances. The avatars exist in a persistent world, which means that the virtual world continues even in absence of the avatar. All interaction in the real world is more or less real-time, i.e. social interactions occur in the virtual world without any significant amount of lag. (Bartle, 2010)

Facilitated by networked computers

Though not theoretically required to be facilitated by multiple computers, virtual worlds are indeed commonly accessed from multiple digital devices, most often personal computers, around the world, via the Internet. The networked computers synchronize actions across computers and store the persistent world on at least one of them.

Spatiality

A virtual world includes a *space* for interacting (Bell, 2008) or an *environment* (Bartle, 2010), where distances can be measured, and location is relevant. This characteristic applies to the avatar, which is located in one position within the world.

Rule-based

The virtual world contains rules or constraints that decide what the user can do, how the user can do it, and what the effects will be of the actions. This could be manifested in a physics engine (Bartle, 2010; Kumar et al., 2008) similar to real world physics, or unrealistic rules such as being able to teleport, cast magical spells, etc. The rules are related to and facilitate the *implied purpose*.

Implied purpose

A virtual world has an implied purpose, set by the creator of the world, or possibly by the users of it. A common broad division of purposes by researchers is the game-oriented versus the socially oriented virtual world e.g. (Ducheneaut et al, 2009). Additional purposes could be *simulation* of the real world (such as a map, or alternate reality) or a *computer assisted collaborative space* (Warburton, 2009). The purpose could be open-ended, non-specific, and experimental or otherwise undefined (similar to the meaning of life). Such worlds have been called *metaverses* (Spence, 2008), and are often broadly categorized as having a "social" theme when lacking gaming objectives (Bartle, 2010).

Multiple representations

Virtual worlds are almost always represented in multiple ways simultaneously. Each client, or user, has their own representation, or view of the world. The view will depend on the spatial location of the avatar, the angle on which view is focused, and what information the client receives about what is happening in the vicinity of the avatar. The ideal is that all representations are synchronized fully, but network or hardware delays may cause them to vary slightly. Representations will also differ, even if only slightly, depending on the quality of the hardware the user has, and the settings made in the software. Often, the level of detail can be set to be harmonious with what the user's computer can handle without causing delays in graphic animation.

2.2.3 Social Issues in Virtual Worlds

Much past research focuses on the social aspects and issues of virtual worlds. In this section we will examine some of the key topics found in our literature review regarding social issues in virtual worlds.

Demographics and areas of use

One might incorrectly assume that online game worlds are purely a form of play, catering to younger members of society. However, the average video game player's age in the U.S. is 33 years, and 40% of adults play video games (Williams et al., 2008). In a study of the virtual world and MMORPG EverQuest 2, Williams et al. (2008) finds that the average age is 31 years, and that older players, in fact, spend more time in the virtual world than younger ones. Not only is the average gamer above his/her twenties, but every second MMORPG gamer has a full time job to keep up with, as well as the average 22 hours a week of game play (Yee, 2006a).

Though many virtual worlds are centered on game play mechanics and challenges, virtual worlds can be used for social networking, workplace collaboration, retail sales, virtual tourism, marketing, distance learning and more (Kumar et. al 2008).With this new technology a new economic and social *space* has evolved, whereas before there have only existed the physical "offline" and the online spaces, but now the new so-called *metaverses* have emerged. These are entirely virtual spaces and environments where both social, economic, and leisure activity can take place. These synthetic worlds started out primarily as games such as MMORPG:s, but have recently stretched across additional domains and alternative realities, and in the process, extended our physical and electronic spaces. The users of these metaverses have grown exponentially in recent years, explaining the recent increase of business and social activities in these virtual realities, as well as the increased interest from the academic world. (Bourlakis et al., 2009)

Since the modern day smartphones have given its users a constant access to the Internet, the smartphone have re-shaped the relationship between Internet and the user, making it more dynamic. It is now embedded in every-day life, on-the-go with instant access, and de Souza e Silva (2006) argues that the distinction between digital and physical spaces is no longer valid. Instead he promotes the term *hybrid spaces*. Hybrid spaces are characterized as mobile spaces, accessed by smartphones or tablets constantly connected to the Internet. Because of the constant access, users no longer feel they "enter" the Internet whenever they launch their web browser; the feeling of "always on" is more prominent.

Life and death

What does death mean in a world where everyone is actually immortal? A central part of the virtual gaming world is the concept of health tied to a character. The character will have a number of "hit points", denoting how much damage the character can sustain without dying. When the health level reaches zero, the character will "die", which is usually a result from being hit in combat, falling great heights, or similar harmful effects mimicking real life vulnerabilities. Contrary to real life, death is

usually only temporary. The consequences of dying in-game will vary between the virtual worlds, in some games such as WoW, the character's "spirit" will merely be transported a minute or two away, and is unable to perform actions or interact in the world until the player has run back to his corpse. There are examples of much harsher death penalties such as in EverQuest, where abilities could be removed from the character, in practice forcing the player to spend additional time playing in order to reach the same level as before. In extreme and rare cases, the character death will be permanent; erasing the character and nullifying all time spent playing the character. Higher penalties can be seen as a way of raising the stakes, increasing competitiveness between players, and making combat situations more exciting, instilling a sense of risk and danger in the world. However, it can significantly alter the gaming experience;

> People would sit in front of their computers for hours, waiting for a cleric to come to their zone and rez (resurrect) them, because they knew they'd have to play for days to make up for the massive amount of Xp loss if they didn't bother with the rez. [Female, 39 years old] (Bainbridge, 2010, p.215)

Virtual Capital

Resources in virtual worlds can be worth real money, which has attracted attention in both media and academia. Virtual worlds have attracted economic interest due to their novelty, increasing popularity and potential impact on real economy (Heeks, 2010). A proof of this is "gold farming", a form of labor that involves working in a virtual world game to gather resources that can later be sold for real world currency. In 2008, around 400,000 persons were employed in gold farming (Heeks, 2008). Relating to the cost of wages for the laborers, 85% of these were based in China (Heeks, 2008). Put simply, richer players pay others to play the game for them, perhaps to increase competitive advantage, or eliminate boring or time consuming parts of the game. Another variant of capital in virtual worlds are those found in metaverses such as Project Entropia, where a virtual space station named Crystal Palace Space Station bought for 100,000 U.S. Dollars (Meehan, 2006), sold a few years later for more than three times as much (Joystiq, 2010).

Guilds and social groups

A major part of virtual worlds is the social aspect. MMOG:s can become the primary socialization space for many people (Pisan, 2007). In a study by Yee (2006b), 39.4% of male players and 53.3% of female players felt that their MMORPG friends were as good as or better friends than their real-life friends. In these interactions, subgroup layers are often formed, often known as *guilds*, *tribes*, *clans* or *corporations* (Pisan, 2007). These groupings are persistent and last between sessions, until the member is thrown out by the leader, or until the member chooses to leave. The guild can develop rules or conventions, differentiating it from other groups in the virtual world (Pisan, 2007), and often, admittance to a guild is not trivial to gain, requiring proof of skill or dedication.

Time spent in virtual worlds

Once a player affiliates with a virtual worlds and its' inhabitants, there is a significant chance that a lot of time is going to be spent in it. Previous research has suggested that many users of MMORPGs play excessively (Hussain & Griffiths, 2009). A sense of urgency to complete objectives, obligations to social groups within the virtual world and competition against other players can all be seen as factors leading to some level of 'addiction' to a MMORPG (Hussain & Griffiths, 2009). Pisan (2007) writes that the average MMO player spends 22.5 hours per week in their virtual world, roughly equivalent to half a full time job. Clearly, users are already spending a lot of time in virtual worlds, even though they do not have constant (mobile) access to it.

Studies have shown that a remarkable amount of time in the virtual world of MMORPG:s is spent doing monotonous chores, not unlike the very clerical tasks users spend their entire days doing at work or in the office. The game is by some players even described as a second job with a lot of logistical planning and management up to the point where the game became an obligation, stressful and demanding, rather than fun and relaxing entertainment after work. With this development, video games are changing the nature of work and play, blurring the boundaries between the two. This process is part of the increasingly difficulty of separating our social, economic and political spheres - an important task in order for us to understand the larger trends in our digitally-mediated world. (Yee, 2006c)

Information access

Time spent related to MMOGs can also take the shape of information seeking. In a study from 2006, players spend 3.5 hours on average every week looking for game-related information, and another 3.6 hours posting on discussion forums (Bainbridge, 2010, p. 216). Additionally, players who belonged to guilds, spent another 2.7 hours every week in average in their guild's website and forums, or managing guild related tasks (Bainbridge, 2010, p. 216). Online third-party game websites can contain massive databases detailing items in the game, where to get them, players comments on various phenomena in the game, and so forth (Bainbridge, 2010, p. 217). In fact, the availability of such quick information, has altered the nature of social interactions in some games such as WoW, where asking other players about information that could easily be looked up on a website is frowned upon (Bainbridge, 2010, p. 218), instead of opening up possibilities of chatting, exchanging information and making new friends.

The "Alone together" phenomenon

Many players attribute the social factors of MMORPGs as one of most important aspects of MMORPGs (Ducheneaut et al., 2006; Griffiths & Davies, 2003; Pisan, 2007). However, players are not always involved in direct social interaction with other players. There are many things that can be done alone in the multiplayer world even though other players roam nearby, or can be seen in chat windows and the like, which gives the feeling of being in a world inhabited by people. This creates a feeling of *social presence* (Ducheneaut et al., 2006). Ducheneaut et al. (2006) describes this as being "alone together", where many players can sense and appreciate the presence of others, but not

necessarily interact with them. The other players can also be seen as an audience for the individual's accomplishments.

The reputation game

Ducheneaut et al. (2006) describes MMORPGs as being "in essence reputation games". The player starts with an avatar that can be immediately recognized as not having lots of experience or accomplishments in the game, and gradually evolves into an avatar bejeweled with magical and powerful equipment. The avatar, via its appearance to others, broadcasts the status of the player and rewards him or her with a sense of achievement (Ducheneaut et al., 2006). The immediate ability to judge someone's competence, experience or ability in the game by just looking at them creates some competition in the virtual world and this competitive environment is one of the reasons many players play excessively (Hussain & Griffiths, 2009). The amount of reputation a person has accumulated with an online virtual world affects how loyal that person is to it, with a lower likelihood of departing from the virtual world with higher reputation, as it would take significant effort to achieve new reputation in another world (Chang et al., 2008).

Virtual worlds as models for real world behavior

Recent analyses of social behavior in virtual worlds have been conducted by Szell & Thurner (2010) and their results are claimed to be novel to the research community. According to the authors they have been able, for the first time in history, to analyze social behavior among thousands of individuals by a large scale quantitative approach. Previous studies on social behavior have been limited by biased artificial testing environments, thus providing poor empirical data, as well as the fact that the dynamics of social behavior such as societies, consist of very complex systems and far-reaching social interactions that have been very difficult to map out correctly. By the introduction and dissipation of MMOG:s today however, with their rich virtual environments facilitating a massive amount of socialization and interactions, this mapping has suddenly become possible. By analyzing the actions over a period of three years from an MMOG played by 300 000 people using log files, three types of social interaction was the main focus: friend-, enemy- and communication networks. Whenever possible, a comparison with the findings and other non-virtual social contexts were performed. The conclusion is that virtual worlds actually can serve as a very accurate model for social behavior in a wide variety of human societies. In short, social life in virtual worlds resembles, to a very large extent, the social life in the real world. (Szell & Thurner, 2010)

2.3 Aspects of play in virtual world online games

In order to draw inferences about how mobile technology can be used to access virtual game worlds and how it may be used, we must first understand why people play in these online virtual worlds. In this section, we will summarize the academic literature found describing motivations for play in MMORPGs, game quality, and issues regarding addiction.

2.3.1 Motivations for playing

One of the fascinating aspects of MMORPGs is that they can cater to a wide variety of play styles. Everyone does not play the same way, look the same way, or think the same way in the virtual world, and this fact is indeed one of the things that make MMORPGs interesting for players. Bartle (1996) describes four stereotypical player styles in MUDs, the *Killers, Achievers, Socializers* and *Explorers*. Put them all together in equilibrium, and they create a dynamic environment for the player with complex interactions between the stereotypes. Yee (2006a) finds that these characteristics do not suppress each other; a player can be both social and an achiever, for example. Furthermore, things are not always so simple – there are many underlying motivations for playing.

Research has been done relating to why people play games with components of role playing such as MMORPG:s. Yee (2006a) presents an empirically founded framework for describing motivations for play in MMORPG:s. The quantitative study resulted in identifying three motivation categories: *Achievement, Social* and *Immersion* (Table 2.1), each with several sub-components. These categories were most frequently described as the reasons behind playing MMORPG:s by the respondents.

Table 2.1: Components of motivations for play (Yee, 2006a, p. 2)

Achievement	*Social*	*Immersion*
Advancement: The desire to progress rapidly, gain power, accumulate in-game symbols of wealth or status	**Socializing**: Having an interest in helping and chatting with other players	**Discovery**: Finding and knowing things that most other players don't know about
Mechanics: Having an interest in analyzing the underlying rules and system in order to optimize character performance	**Relationship**: The desire to form long-term meaningful relationship with others	**Role-Playing**: Creating a persona with a background story and interacting with other players to create an improvised story
Competition: The desire to challenge and compete with others	**Teamwork**: Deriving satisfaction from being part of a group effort	**Customization**: Having an interest in customizing the appearance of their character
		Escapism: Using the online environment to relax, escape from real life, avoid real life problems

These factors describe the motivations behind playing MMORPG:s, which have until recently only been available through the stationary PC platform. But are these motivation factors affected in any way when accessing the virtual world of the game through a mobile device? Important to note is that each player has his or her own opinion of which of these activities are most rewarding, or why they are playing. Opinions may also significantly vary across regions, for example when comparing the US to Hong Kong and Taiwan, or across age (PlayOn, 2010).

Although Yee's (2006a) motivation factors for play may be undisputed, several other research studies have found different characteristics for the perceived quality of a game. In short, motivation factors may not cover the entire picture - the structure of different games may prove equally important.

2.3.2 Game quality

Computer games, like other software tools, should theoretically have some sort of quality measure. But the factors deciding on use of computer games is not as simple as determining perceived ease of use and perceived usefulness. Several factors decide how players come to accept games, and we will address them briefly in this section.

Games are primarily designed for relaxation and entertainment, making the need for keeping the player interested paramount. Playability is a term which generally describes the overall user experience while interacting in a game. The concept is associated with fun, usability, responsiveness, satisfaction, fulfillment, engagement and pleasure of playing a game (Cacciaguerra & D'Angelo, 2008; Wong et al., 2010). In recent studies made regarding the motivations for playing, playability linked to "fun" or "entertainful" is no longer necessarily the key elements for the interaction to be successful (Cacciaguerra & D'Angelo, 2008; Yee, 2006c).

Sánchez et al. (2009) have defined quality in use of games as *playability,* which is closely linked to the player's satisfaction. According to the authors, in order to guarantee the best player experience, paramount characteristics of a game's playability have been found to be:

- **Satisfaction.** The satisfaction factor consists of three properties: fun, disappointment, and attractiveness. The game needs to be fun in order for the player to continue playing, not too difficult, and attractive enough to create a relationship between the game and the player.
- **Learnability.** The learnability attribute refers to the players understanding of the game and consists of six different factors: game knowledge, skill, difficulty, frustration, speed, and discovery. Game knowledge refers to the previous knowledge of the game the player has before actual gameplay and the objectives needs to be well understood by the player. Once the objectives are understood, the player uses his/her cognitive skill to complete the objectives. The difficulty of fulfilling the objectives also sets the level of frustration experienced by the player. The speed factor concerns how new concepts are being

introduced and how quick a player assimilates to them. Last, games always have an overall structure with a discovery hierarchy with ordered content.

- **Effectiveness.** The game should be effective in the sense that the time and resources necessary to complete certain objectives should be perceived as meaningful.
- **Immersion.** Immersion can be described as the feeling to be in another world, where the content of that world is well anchored in the perceived real world view. The immersion will be greater if the virtual world is perceived as the real world, and so also the interaction and the player's absorption. In a research conducted by Seah & Cairns (2008) the connection between addictive behavior and immersion is evaluated. The research has shown that the more a immersed a player is, the more addictive behavior will occur.
- **Motivation.** The game should consist of factors which encourage the player to continue playing a game, and there should also be a number of options within each challenge which strengthens the player's curiosity.
- **Emotion.** To attract a player, a game needs to be constructed with aesthetic aspects to satisfy the players' sensory channels. Emotions within games refer to the reaction of a player's involuntary response to particular events.
- **Socialization.** The social dimension in which a player experiences the game is established by interacting with other players, or with the player's own characters inside the game. Many psychological phenomena may be used to understand the properties of socialization when interacting in games, e.g. social perception, group awareness, personal implication, sharing, communication, and interaction (competitive, collaborative, cooperative)

These factors should be considered in every phase of game development, in order guarantee a high quality of playability (Sánchez et al., 2009). Meeting them all on a mobile device can be a significant struggle, especially when relying on synchronously interacting with a complex virtual world.

2.3.2 Addiction

There have been much debate over the phenomenon of addiction to video games, particularly concerning MMORPG:s. In the research community, several investigations have been made to clarify the extent to which gaming addiction is comprised (Yee, 2002; Grüsser et al., 2007).

To be specific, addiction could be conceptualized as "*a recurring behavior that is unhealthy or self-destructive which the individual has difficulty ending*" (Yee, 2002, p. 1). A survey conducted by Yee (2002) indicates that MMORPG addiction is more common than previously anticipated. Many of the responding gamers had troubles sleeping and had tried to quit playing, but failed. A few years later, Grüsser et al. (2007) found that as much as 11.9 percent of the respondents fulfilled the diagnostic criteria for addiction and that special attention should be addressed to players in adolescence, mainly because gaming is such a major part of their leisure activities, much more so than adults.

Two recurring features of MMORPG:s is that they encourage time investment and personal attachment. The intervals between rewards grow exponentially as the game progresses so that in later parts of many games several ours, sometimes days, of playtime have to pass before the player earn another level - a challenge that took only a matter of minutes in the beginning. Personal attachment to the characters (avatars) grows due to the large variety of choices available to them, creating a feeling of personalization. Even though many rewards take a long time to accomplish, because of the immense variety of objects, events, quests, characters, skills etc., the next reward is always around the corner. (Yee, 2002)

Indeed, not all MMORP gamers are addicted to the game they are currently playing, although the results indicate that many players display characteristics connected to addiction. Some individuals are more vulnerable than others, and different players are attracted to different aspects of the game. Several tragic events have even occurred with fatal outcomes, for example, a young Korean boy died after more than 50 hours of consequential gaming (Naughton, 2005).

2.4 Mobile Virtual Worlds

We have previously discussed the rise of the new mobile computing technology such as smartphones, as well as the widespread popularity of virtual worlds. In this section, we present factors that could influence the blend of the two.

2.4.1 Limiting factors of the diffusion of existing MMORPG:s to smartphones

We have identified two main limiting factors of bringing existing virtual worlds to mobile platforms: *technical constraints* and *usability in smartphones*.

Technical constraints

Contemporary smartphones are gaining tremendous processing power, but regular desktop PCs are still superior in computational performance. For the gaming industry, the smartphone has not yet been able to produce as advanced graphical representations as their PC or console counterparts, mostly due to smaller screen sizes as well as hardware and user interface restrictions (Jianmin et al., 2010). This potentially means a lowered *Immersion* (section 2.3.2). Phones are also limited by the battery, once drained of power it will render the phone temporarily useless until recharged. Additionally, they have less data storage capabilities, making it harder to store large amounts of application or game related content on the device. Finally, smartphones such as Android-phones and iPhones are not compatible with software programmed for Windows or Mac based PCs, requiring significant work to be made in order to create mobile versions of existing applications. Most likely owing to these limitations, more advanced virtual worlds such as delivered by the existing MMORPG:s have continued to be immobile in their approach to the user - only existing on the PC or console platforms.

Usability in smartphones

The definition of usability may have different signification depending on what context it is evaluated in. While some take advantage of usability by testing specific design proposals, others might just see usability as an approach within development methodologies. The common goal is, however, to make products easier to use for its end user. (Garrett, 2003)

It is no surprise that the smaller size of hand-held computers such as the smartphone pose problems for interaction designers, diminishing usability and functionality (Desney et al., 2010). At the same time, users expect just as much service and performance from their smartphones as they do from their desktops (Mascolo, 2010). One issue that is prominent for interaction with mobile computing is the fact that users often have their attention split between the screen and whatever else is happening around him/her. Research have shown that users on average interact with the mobile device for a period of 4 to 8 seconds, before the attention has to be re-focused on their real-world activity, thus proving the fact that mobility seriously constrains mobile interaction (Oulasvirta et al., 2005). Both *learnability* and *effectiveness* (section 2.3.2) suffer from inferior interactions and usability.

Thus, mobile computing poses several different challenges that differ from traditional stationary computing (Venkatraman, 2005; Barnard et al., 2007). With different challenges comes the need for new solutions and new uses of computing. The advantages of mobile computing compared to the stationary PC are many and attractive, e.g. a broad range of activities regardless of physical position, but it presents several technological challenges for both hardware and software developers, partly because the location, connectivity and environment or context of the use is unknown. As previously mentioned, the fact that a lot of times the interaction performed in a mobile setting is often secondary to another task, making distinctiveness and clarity important issues to consider (Barnard et al., 2007).

Several critical factors of mobile computing have also been presented by Venkatraman (2005), such as portability, power consumption, computing power, memory space available, user input and display features, bandwidth, and persistency. Among these factors, connectivity and persistency are of greatest importance. Falaki et al. (2010) on the other hand, concludes through their testing of smartphone user behavior that the most important feature should be customization. Their results show that there is a tremendous diversity among users' interaction with the smartphone, much more than among regular mobile phone or laptop users. This is explained by the less computing power of the smartphone, but also because smartphones don not have as rich an application environment. Their findings suggest that trying to create a product that fits the average user may be ineffective for a very large population.

2.4.2 Contemporary implementations

Today, users with Android or iPhone smartphones can download an official application to gain access to several features of the WoW world (Blizzard Entertainment, 2011a). The application will give access to different features depending on if the user is paying an extra associated fee, currently $2.99 USD (Blizzard Entertainment, 2011a), see (Table 2.2). Users can browse in-game auctions of virtual items, and buy or sell items. There is a database of characters (or avatars) and individual characters can be inspected to view what equipment they are wearing and more. There is a discrepancy in which features are available to Android and iOS devices, with the iOS version supporting a few extra features.

Table 2.2: Comparison of iOS and Android features

Feature	**iOS**	**Android**
View characters and their items	Yes	Yes
Search item database and view item details	Yes	Yes
View items in auction house	Yes	Yes
Buy and create auctions	Subscription required	Subscription required
Chat with guild members and see who is online in guild	Subscription required	Subscription required
View calendar and events	Yes	No
View additional character information such as *talents*, *glyphs, achievements, activity feed, professions, reputations* and *arena teams*	Yes	No
Talents calculator	Yes	No
Browse items by category	Yes	No

2.4.3 Enhancing the experience via mobile access

In a qualitative study by Koivisto & Wenninger (2005), six categories of how to improve MMORPG experiences by using mobile access are described. The categories were discussed in focus groups with users and developers, in face to face and online meetings with experienced MMORPG players. The categories identified were *Communication access, Event notifications, Asynchronous gameplay, Synchronous player-to-player interaction, Passive participation* and *Parallel reality*. The categories are described as follows:

Communication Access

Players were positive about using mobile technology to facilitate communication between them. Communications could be done with text or voice, though some players were concerned about using voice communication, as it could break immersion in role-playing.

Event notifications

Event notifications allow the game or other players in the game to notify the user of events unfolding in the virtual world. Interestingly, players were somewhat concerned about how such notifications would affect their real world life, and expressed that some measure of control must be available for how the user is contacted. Game makers seem to acknowledge this; the guild chat feature in the WoW Remote requires separate sign-in, and the up-coming Guild Wars 2 will have easily accessible controls for notifications and availability (IGN, 2010).

Asynchronous gameplay

Due to the usability issues in bringing the complete game to the mobile phone, other game play solutions can be more appropriate. One such solution is to only offer access to actions that can be performed without fine-grained control or high resolution throughput or latency, such as trading of items or *crafting*. Crafting in MMORPGs usually refers to the action of manipulating items, combining or refining them to create player-usable items for sale or personal use. Players in the study mentioned that some aspects of trading will be lost if access to the trading system is done via mobile, such as meeting people in the store, this is definitely the case with the WoW remote. Interestingly, players were positive to performing tasks seen as boring or mundane in game on their mobile phone, consequently increasing the available time for actual gameplay once the player is accessing the full world.

Synchronous player-to-player interaction

As Koivisto & Wenninger (2005, p. 4) puts it, "*The problem with synchronous player-to-player interaction in the MMORPG world is that players who use different platforms for playing the same game need to be equal*". A solution offered is to automate the characters to some extent, assisting them with some level of artificial intelligence. Players were worried that this would automate the game a bit too much. It could however be used for travelling over safe routes, since complex game mechanics such as in fighting are not used.

Passive participation

Passive participation means observing the game world without interacting with it to a larger degree. For example, players could observe events, such as player-vs-player fights or matches, guild raid encounters, or other locations in the game. An example of this happening is the upcoming game Guild Wars 2, which may include maps of areas with real-time markers of non-player character locations (IGN, 2010).

Parallel Reality

In the parallel reality, gaming happens both in the virtual world and in the real world, at the same time. An event or action in one can affect the other. Players were not very eager about weaving these two worlds together, but the younger players were slightly more positive. A feature that was not received very well was that of showing other players in the real world and exposing yourself as a player to them. Players considered the virtual world to be a place where one can take the opportunity to forget about the real world, similar to what was mentioned in Yee's (2006a) framework concerning immersion and escapism (section 2.3).

2.5 Research model

In this section, we will introduce our research model constructed from the literature review. We have chosen to construct our own research model, combining two previous frameworks into a new matrix. Each new cell represents a potential field of application for mobile access to online gaming worlds.

2.5.1 The role matrix

No previous models could be found explaining how mobility can affect utilization of existing large scale virtual worlds, with the sole exception of Koivisto & Wenninger's (2005) tentative exploratory inquiry with a few gamers and developers. Due to this limited extent of academic research available regarding virtual gaming worlds taken mobile, we have found it suitable to construct our own research model to be able to identify potential roles for our research question.

As such, the conceptual model concerning *motivations for playing* by Yee (2006a) and the qualitative research study around *the six categories of how to improve MMORPG experiences using mobile access* by Koivisto & Wenninger (2005) has been composited into a research model for our empirical data collection (Table 2.3). With this approach, the motivations behind playing are matched with the categories of features of mobile computing that may potentially enhance the quality of the gaming experience.

Table 2.3: Factors to improve MMORPG:s in relation to motivations for playing

	Achievement	*Social*	*Immersion*
Asynchronous Gameplay	Asynchronous Gameplay Achievement	Asynchronous Social Gameplay	Immersive Asynchronous Gameplay
Syncronous Gameplay	Synchronous Gameplay Achievement	Synchronous Social Gameplay	Immersive Synchronous Gameplay
Notifications	Achievement Notifications	Social Notifications	Pervasive Immersion
Communication Access	Achievement communication	Social Communication Access	Immersive Communication
Passive Participation	Passive Achievement Participation	Social Passive Participation	Passive Immersive Participation
Parallel Reality	Pervasive Gameplay	Parallel Social Reality	Parallel Immersion

Koivisto & Wenninger's (2005) six categories of how to improve the MMORPG experience using mobile access are shown on the left side of the table and Yee's (2006a) categories of motivation factors for playing on the top. The interconnected terms, which we have constructed, denote activities, events or phenomena within a game that are the product of the items on the left and below. As the terms themselves are rarely self-explanatory, we will briefly address each concept in the following sections. Without embarking on a discourse on our methodology, we consider it worth noticing that we have focused our empirical data collection on players of *World of Warcraft*, and consequently, our concepts are described while wearing the lens of this particular virtual world's gameplay mechanics.

Asynchronous Gameplay Achievement

This refers to in-game tasks that appertain to advancement of the character, but does not require synchronous player-to-player interaction. Trading goods, items, and services is a popular activity in most MMORPG:s. Relating to motivation through Advancement (section 2.3), gaining financial power in the game can be facilitated by a mobile app, e.g. the WoW Remote, which allows trading of in-game items (Blizzard Entertainment, 2011a). The constant access of the mobile device allows the user to frequently check the virtual market, perform administrative tasks to auctions or items and can thus potentially gain a competitive advantage to a user who cannot access these features at all times.

Characters can also learn different professions (WoWWiki, 2011c) that enable them to craft new items, only accessible once you have gained the appropriate skill. Gaining the maximum skill in a profession often takes a long time, and can cost a considerable amount of in-game currency. Crafted items can be traded through the virtual market, or used by the players themselves. Other asynchronous gameplay activities related to achievement includes choosing the characters individual talents, and re-shaping them to fit the current desired style of gameplay. Additionally, re-forging items (WoWWiki, 2011b) allows for customizing item stats, which could also be done without the need for synchronous gameplay.

Players can also use their mobile device to fulfill the *Mechanics* (section 2.3) motivation, to retrieve information about the game in order to optimize their performance. Players have been known to spend time seeking information about or around the game (section 2.2.3 "information access"). Asynchronous gameplay related to *mechanics* include having access to databases with information of all sorts of items in the game; weapons, armor, vehicles, dungeon loot, consumables, or trade goods.

The *Competition* component requires a sort of asynchronous challenge mode, such as turn-based strategy competition modes, or otherwise non-time-critical activity. The auction house could be seen as such a form of competition or gameplay mode, but to our knowledge, no other such activity is supported in the game as of yet. Talents customization and re-forging could also be seen as an indirect form of competition.

Asynchronous Social Gameplay

The social motivation factor in connection to asynchronous gameplay involves for example managing the friends list in the virtual world. Asynchronous communication methods can be used, similar to the e-mail in the real world, and information regarding others' current activity and whereabouts viewed.

Asynchronous social gameplay also involves the teamwork activities not limited to player-to-player synchronous interaction. Through the in-game calendar interface, players can create and invite other players to a variety of events very similar to a regular calendar.

Immersive Asynchronous Gameplay

Asynchronous gameplay concerning immersion can be non-time-critical immersive activities such as avatar customization, map exploration or using other role-playing mechanics e.g. reading lore or fiction about game entities. There are a number of ways that players can customize their characters to their liking, including clothing, item selection, haircuts, skill specialization, and much more. The avatar customization is a big part of personalizing the game to create a stronger personal attachment to the virtual world.

Synchronous Gameplay Achievement

This category refers to synchronous gameplay connected to the achievement motivation factor - much of what is considered by most as "the actual game". The nature of synchronous activities concerning the three subcategories *advancement, mechanics,* and *competition* are sometimes difficult to differ from each other. They include, amongst other things, real-time player-to-player interaction doing quests (performing different tasks for rewards and experience), battle against Non-Player Characters (NPC:s), commonly known as PvE (Player versus Environment), and battle against other players, commonly known as PvP (Player versus Player), all in order to gain assets, skills, reputation or other progress.

Synchronous Social Gameplay

Synchronous social gameplay is the extension of synchronous gameplay where the real-time chat functions offered by the game play an important part, such as playing cooperatively in complex scenarios while communicating. There are a number of different real-time chat channels provided by the game, including a general chat for every player within their current region in the game, a trade chat channel for players interested in trading, chat channels for players within their guild, as well as a chat for every smaller group of players (commonly known as a party) currently involved in an activity together.

Immersive Synchronous Gameplay

Synchronous gameplay activities in connection with the *immersion* motivation factor include discovering new zones in the virtual world while travelling as an avatar. The act of moving around in a large virtual world constructed by thousands of other individuals, cities and environments, adds to the feeling of escapism, role-playing, and ultimately immersion. The feeling of living another life inside another extensive world populated by thousands of other individuals is a major component of the role-playing sensation.

Achievement Notifications

This category involves notifications regarding different character achievements in the game, which could be instantly sent to a player's smartphone. With mobile access, a player would not be forced to go to a stationary PC with the game client installed to be able to follow up on achievements of interest. This includes notifications connected to the *Advancement* aspects of the game, for example when an item is sold on the virtual market, or finished cooldowns (time before an ability can be used again) on items or spells.

Social Notifications

Notifications regarding players social behavior involves instantly delivered notifications from chat or mail, in theory possible directly to the smartphone - much the same way as an SMS service. The smartphone is a very popular device for social activities as described in section 2.1.2, and a feature such as this could easily be argued to be potentially very popular. However, it is still unclear to which extent players would want to be notified of in-game social events while engaged in other real-world activities.

Pervasive Immersion

The virtual world is persistent and exists even when the user is logged out, but events in it do not directly concern the user until he or she logs in again. When bringing the virtual world mobile, the user can be instantly notified of events and may attempt to follow them up instantly. This may create a feeling of being passively but pervasively immersed in the virtual world, having one foot in the real world and one in the virtual world. With constant access to a virtual world through a mobile device such as the smartphone, players could take a major step towards what we call *Pervasive Immersion*; constant immersion to a virtual world facilitated by notifications, regardless of position. This is similar to the hybrid spaces phenomenon described in section 2.2.3.

Achievement Communication

Communication regarding different achievements obtained by a character could comprise of being able to post gameplay advancement on different chat channels. The desire to show off and fortifying a player's reputation (section 2.2.3), challenging, competing or discussing game mechanics with others could be something that players wish to do while being mobile. Communication with other players in the game regarding *Achievement* can take the shape of a tactics discussion, talking about game mechanics with others in order to improve one's gameplay, or "competing" by comparing achievements.

Social Communication Access

Socializing is a common activity in virtual worlds. Smartphones offer effective natural communication tools, both voice and text based. The communication in virtual worlds is not limited to just text - common third-party software tools for voice communication is a recurring feature of MMORP gaming. Providing access to other communication channels of MMORPG:s is easily done - especially through the smartphone - since it only changes communication, and not the story or gameplay mechanics. However, implementing a voice chat in the virtual world could affect the

feeling of immersion in a negative way, for example, constantly listening to people talking in cities may be cumbersome for players. Therefore it may not be suitable for all kinds of chat channels within the game.

Immersive Communication

Communicating in an immersive way includes, but is not limited to, role-playing, talking about the game world and its' lore and talking to virtual world friends in order to escape from a real world situation (e.g. being bored). This feature has a close correlation to social communication access previously presented above. One question regarding this subject is if voice chat will affect the feeling of immersion to the virtual world in a negative or positive way.

Passive Achievement Participation

Not all parts of the game consist of actual gameplay by the players themselves. Some of the achievement motivation concerns the competition aspect. Therefore, a spectating mode could be argued to fill the demand of watching other players play to see how far they have come or how they perform particular tasks. Theoretically, spectating could be implemented in various parts of the game, both PvE and PvP, similarly to watching a sports event via television. A mobile application could also allow users to follow guild progress via a guild chat channel or via news feeds, detailing recent achievements and progressions.

Social Passive Participation

The "alone together" phenomenon is described in section 2.2.3 and shows how active participation in social activities may not be the only thing contributing to the social sensation of a game. Simply being present and watching other players interact contributes to the feeling of social gameplay. As such, merely being able to read chat channels and passively taking part in virtual world socialization could be a requested feature.

Passive Immersive Participation

Passive immersive participation would be a pure mobile spectating mode to the virtual world, without any possibility of actions affecting the world. This would include solely watching other players performing different immersive motivation tasks of the game, without being able to affect them, or your own avatar. For example, players can view character sheets with their equipment, guild names and descriptions, or spectate certain places in the world, such as the main town square, a dungeon, or other areas of interest.

Pervasive Gameplay

Combining gameplay from both the virtual world and the real world has yet to be implemented in the (*WoW*) game. However, creating opportunities for mobile users to affect their virtual world characters by events in the real world is now technically possible due to the smartphone diffusion (section 2.1.2). Combining this technology feature with the motivation factor *Achievement* could, for example manifest itself in being able to trade items with other players in proximity in the real world instead of the virtual. Other possibilities could be using physical objectives to achieve in-game goals such as visiting real world locations in order to unlock an Achievement (WoWWiki, 2011a). This raises questions about how players wish to separate achievements in the real world with the achievements in the virtual world. For example, should real life wealth or resources influence virtual world success?

Parallel Social Reality

Game features that fall into this category would take the merging of the virtual world with the real world to another level. Features such as seeing other players (online with their mobile application) in your close proximity could be perceived as intriguing for some, and an intrusion to personal integrity by others. How can real world relationships tie in to the virtual world social sphere, or vice-versa? Can teamwork be done in the virtual world with real-life friends? Existing virtual worlds may have a long way to go before being able to leverage all these aspects.

Parallel Immersion

Combining parallel reality with the motivation factors of immersion would include features where discoveries or customization have effects in both worlds (real and virtual). For example, two people may meet in real life, start discussing the virtual world, and start comparing their characters, or conducting game tasks together. They may decide to become "friends" in game, adding each other to contact lists and creating bonds in the virtual world. Events and actions in one world would affect the same in the other. In other words, the two realities would become more intertwined.

By having access to both worlds at the same time means being forced to select which one is more important. Players may use the mobile to perform some quick tasks in the virtual world while embarking on other ventures in the real world. For example, a player can watch TV while waiting for friends to come online, instead of spending time waiting at the PC. Also, some tasks may in fact be easier to do via mobile, rather than at the regular client, such as checking if a particular player is online, or if a certain item is for sale on the auction house.

3 Methodology

This chapter will attempt to present a complete picture of the chosen methods for our research study. We will explain our reasons behind the decisions that have been made each in each step of the process. The main focus in this chapter is the data gathering phase, containing an online survey.

3.1 Research approach

3.1.1 Collection method

Koivisto & Wenninger's (2005) conclusions are interesting for the introduction of mobile computing in virtual worlds, but their qualitative approach makes it difficult to generalize from. Because of this, it is our desire to conduct a quantitative research inquiry on the same topic, but adding the motivation factors for playing as a complement to the research model. As Jacobsen (2002) describes it; the *qualitative* research approach is in essence an inductive approach - appropriate for subjects we initially know little about. After the qualitative data has been collected, it is up to the researcher to categorize the new found data into categories and variables connected to each other. The *quantitative* research approach on the other hand, requires the variables to be categorized before the data collection. The quantitative research approach could thus be said to be deductive in nature. A perspicuous view of important themes is a prerequisite for quantitative data collection.

In the quantitative approach the researcher plays a very important role, and could influence the result to a high degree. The researcher defines what's interesting to know, as well as what answering alternatives to be used. It is important for the researcher to know of these potential pitfalls that could influence the results in a negative way, and to the best of his/her abilities, try to avoid them. Only crude statements and variables should be measured, and the linkage between them is up to the researcher to analyze. Due to these limitations, a danger with the quantitative research method is that it can be perceived as superficial. However, the quantitative research approach provides several advantages as well. Since most questions are short and provides only limited alternatives of answers, it is possible to ask the questions to many people using questionnaires and surveys. Also, a quantitative research approach lets the researcher measure relationships more exact than the qualitative approach. The gathered information is easier to structure and to rule what is most common. Quantitative research is better suited for the sum of individual measurements, not the opinion of groups. (Jacobsen, 2002)

The quantitative research method has its foundation in the review of literature, making that particular stage in the process very important. Its main objective is to create a wide knowledge base, which the empirical data collection process is based upon. Most academic articles were found using the library databases from the University of Lund and Google Scholar. These databases are connected to various academic research journals such as the Association of Computing Machinery

(ACM) Digital Library and EBSCOhost. The research model being used as a template for the survey was constructed as a result of our understanding of the current situation in the academic community and our desire to know more on the subject.

3.1.2 Informant selection

An important aspect of selecting a sample is that the survey result given by the sample respondents will reflect the responses of the entire population, had they been asked. The choice of making a sample instead of the whole population is mostly due to convenience reasons - it would in many cases be almost impossible to contact the entire population. It is important to consider the many aspects that can influence the result from any given sample, lest the result will be biased. The act of choosing a sample amongst a population is called a *sample frame*. The collected data is thereafter used when generalizing the findings of a sample back to a population. A sample frame is almost never completely accurate, but the researcher should strive for the endeavor to get as close as possible. (Kalof et al., 2008)

For this research study, MMORPG players who play or have played WoW were our main population group. To be able to locate respondents, we posted our survey in different online MMORPG forums and we also actively emailed the survey to people that we know have experience with WoW. All users who have played WoW were allowed to participate in the study. No specific restrictions in the sampling process were made, other than limiting the age of possible respondents to a minimum of 12 years, since that is the official requirement from PEGI (Pan European Game Information). The forums and communities that we posted the survey in are:

- Battle.net WoW site (Blizzard Entertainment official community)
- MMO-Champion
- PC Gamer (Sweden and U.K.)
- Facebook
- About 800 e-mail addresses known to be current or previous WoW players

We attempted to contact several blogs and news sites focused on WoW, but received no response about publishing our survey. We also had varying success with forums, as surveys were not allowed on many large forums such as WoWHead or Allakhazam/ZAM Network, and contacting the administrators, moderators or owners did not get us any further.

The respondents who participated in the survey were asked to forward the survey to other relevant parties. This sort of sampling is known as *snowball-* or *chain sampling*. The collected amount of samples *n* is not constrained to any specific gender or age group, but the respondents had to be familiar with the MMORPG WoW. Since we have not actively sent the survey to all our respondents, it is impossible for us to know how many people have seen the questions and chosen not to answer.

3.2 Design of the questionnaire

Attempting to apply our model on the characteristics of the MMORPG World of Warcraft, we describe the model components in detail along with how players might access existing or potential future features.

3.2.1 Constructing the questionnaire

The survey was constructed in the software tool Google Docs, creating a questionnaire easily accessible via an URL link that the respondents simply followed in their web browser. The URL to the survey along with a short descriptive text regarding the subject was sent to various recipients as previously described.

Each box in the research model relate to a question in the questionnaire. These questions were formulated in a way in which we asked the respondents to estimate their likely use of different features from the game if it were accessible through an app on their smartphone. The scale used was a five point Likert scale with different measures depending on the question. The questions regarding each activity originate from the overall knowledge of the subject gained from the literature review as well as our own previous experience of WoW.

3.2.2 Relation between questions and research model

In attempting to measure motivations for using the features outlined in the role matrix (section 2.5.1), we have constructed a series of questions, each related to a particular block in the model. The features are displayed in Table 3.1 with their corresponding questions.

Table 3.1: Potential roles and linked questionnaire items

Feature	Question
Asynchronous Gameplay Achievement	Q12. Trading items via Auction House
	Q14. Search information regarding items, quests, locations, etc.
Asynchronous Social Gameplay	Q15. Managing my in-game friend list.
	Q16. Create, edit and view calendar events.
Immersive Asynchronous Gameplay	Q13. Customizing my character's skills, items, and appearance.
Synchronous Gameplay Achievement	Q17. Playing against computer opponents, such as killing monsters or doing quests
	Q18. Player versus Player (PvP) gameplay such as battlegrounds, duels, or arena.
Synchronous Social Gameplay	Q19.Access to the same chat functions as the stationary PC client.
Immersive Synchronous Gameplay	Q20.The ability to use travel routes and transportations to move between zones.
Achievement Notifications	Q21. Getting instant notifications about trading such as auctions sold or won.
Social Notifications	Q22. Notifications about personal messages such as chat or mail
Pervasive Immersion	Q23. Notifications regarding as much as possible in my game
	Q24. Cooldown notifications on items, spells, or abilities, such as trade skill cooldowns.
Achievement Communication	Q25. Chatting about items, quests, and other gameplay goals.
Social Communication Access	Q26. Chatting and socializing in general.
Immersive Communication	Q27. Voice communication features in chat channels or between players.
Passive Achievement Participation	Q28. Viewing other players when they are playing ("spectator/observer mode") for example in raid instances or arenas.
Social Passive Participation	Q29. Reading in-game chat channels such as General City chat or Trade chat without writing in them.
Passive Immersive Participation	Q30. Spectating/observing certain locations in the world such as city capitals or other points of interest.
Pervasive Gameplay	Q31. Seeing other players in the mobile application who are close to me in real life, and letting them see me (for example on a map).
Parallel Social Reality	Q32. Gaining achievements by completing objectives in the real world, such as being at a specific real world location (e.g. moving a certain distance, or visiting a famous building).
Parallel Immersion	Q33. Comparing achievements, items or trade items with people I meet in real life.

Additional Factors

Beyond the factors presented in the research model regarding motivation factors for playing and features for enhancing player experience in MMORPG:s with mobile features, we have identified several other factors that may be influenced by mobile access. It is important to note that these factors are not part of our research model, but could still be considered valuable in the mobile context of virtual worlds.

The questions concerning additional factors outside the research model were formulated as simple statements regarding the respondent's specific attitude towards a statement. The last four questions were open-ended in order to give the respondents the opportunity to explain their attitude towards the subject on a more general level.

Addiction and frequent use

A potentially difficult aspect to measure in a quantitative survey like this is addiction to games. However, it has been discussed intensely in both media and within the research community, generating somewhat different results. In section 2.3.2 we discuss some outcomes presented by researchers.

Introducing mobile access to a potentially addictive activity such as MMORPG:s could have severe ramifications. Having constant access to a virtual world could perhaps increase the presence of addictive behavior such as difficulty in sleeping or even difficulty quitting the game.

Q34. I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages.

Game Quality

Does mobile access to the virtual world actually increase the sense of game quality of the MMORPG? When all is said and done, it may be so that players consider mobile access as a cool extra feature, but not worth paying extra money for, or worth getting involved in at all.

Q35. I want to have as much access to gameplay features as possible on my mobile phone.

Cost

Is additional mobile access worth paying for? The current mobile application available contains both features free of charge, and extra features such as chat and purchase abilities for an extra monthly fee. How far, in terms of money, does the desire for mobility go?

Q36. I would pay extra if necessary to gain access to mobile gameplay or socializing features.

Open questions

In addition to the close-ended questions Q1-Q36, it is important to give the respondents the opportunity to express themselves in their own words regarding circumstances they believe to be important for the subject. This structure corresponds to Jacobsen's (2002) suggestions of how to construct a questionnaire.

Q37. What features would you like to see in the mobile app?
Q38. How to you think mobile access to WoW would affect you and your usage of WoW?
Q39. How do you think mobile access will affect the WoW world?
Q40. What are your general thoughts about mobile access to WoW or other MMORPG:s?

3.3 Data analysis

3.3.1 Data analysis methods

The data collected from the questionnaire was analyzed using the computer software SPSS Statistics. Diagrams and several other calculations of responses such as mean, mode, standard deviation and median were produced and are shown in chapter 4. To analyze correlations between variables, Pearson's correlations were calculated and reviewed.

3.3.2 Response rate

Due to the nature of the distribution method, it was not possible to determine the total amount of individuals who received the survey and therefore not possible to get a number of non-responses. To tackle the issue of non-response bias, we compared the late responses with the early ones, and found no statistically significant difference.

3.3.3 Reliability

Reliability could be defined as the extent to which results and internal methodologies are consistent over time and that the conducted research can be reproduced with the same results (Golafshani, 2003). To strengthen the reliability in our conducted research we have documented our research approach in chapter 3, and our literature review is based on literature mainly from the Lund University Electronic Library (LibHub) and Google Scholar. Throughout our theory chapter we have explained our reasoning behind every chapter and thus used the collected theories when we have constructed our research model. We have combined our research model with Yin's motivations for play (section 2.3) and included our complementary research areas necessary for the research to be reliable.

3.3.4 Validity

The sampling method we have used could be seen as a non-probability sampling, which is described by Jacobsen (2002) as a sampling which deviates from the probability sampling. One risk with this sampling method connected to research validity, is that it can generate a systematically incorrect sample, which means that non-relevant respondents might be included. Therefore, it is not possible to generalize a sample back to the population. One of the methods used within non-probability sampling is *self-selection*, where the users decide by their own if they are suitable for participation (Wright 2005). An obvious limitation with self-selection is that the potential respondents must find the questionnaire by themselves, and another, described by Jacobsen (2002), is that the questionnaire might only attract people which have an interest for the subject, that can cause a polarization effect. This could be both good and bad in our research since we aim our questionnaire to gamers who have knowledge about WoW, but we may attract users who do not represent the average WoW player.

3.4 Ethics

We have not considered any specific ethical aspects since this research is entirely based on an anonymous survey. The survey contains no personal information that could reveal the identity of the participants. The survey is entirely voluntary, and the participants have been informed of the privacy conditions applied. We have not encountered any other ethical aspects regarding the subject of virtual worlds or mobility in concern to our research question.

3.5 Research limitations

Due to the difficult nature of obtaining samples from the entire population of WoW players, we did not receive a completely satisfying number of responses. The research could have benefited from an increased number of respondents. This also affected the sampling method.

4 Empirical result and analysis

In this chapter we will present the result from the survey. Each question and its corresponding response will be briefly discussed. At the end of each subject, a table with statistical frequency values is demonstrated for a more detailed description of the equivalent responses.

4.1 Demographics of respondents

The data collection method used results in the inability to know how many people have received, watched and perhaps partially answered the survey without completing it fully. Also, all questions in the survey were marked as mandatory, except for the last four (#37 - #40), which had an open orientation. Due to this situation, no received responses were incomplete and thus, no submitted responses were rejected.

The survey resulted in 73 answers, of which all were usable. In total, 6 females and 67 males answered the survey. The mean age was 21.72 years, with a standard deviation of 5.1 years (min: 15, max: 40). This means our respondents were slightly younger than the average video gamers' age according to previous studies (section 2.2.3). As much as 92 % of the respondents were male, whereas only 8 % were female. Since we have not found any previous research regarding the overall genus demographics of MMORPG:s, little conclusions can be drawn from this specific finding.

The majority of the respondents in our survey is, or was, playing on the European and North American server realms. This over-representation could be explained by the data collection methods used and described in section 3.2.1. Since the posts with information and directions to the survey were posted in English on Swedish or English speaking forums, players on Asian server realms could have difficulty finding or stumbling upon the survey. European and North American players represents 97 % of the survey's respondents, 77 % and 20 % respectively.

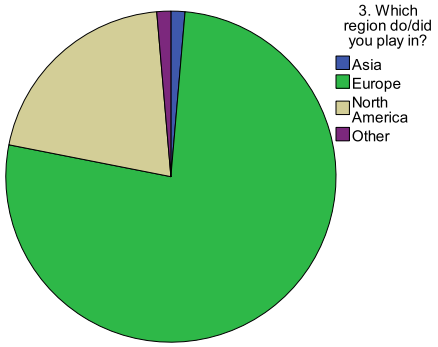

Figure 4.1: Region demographics of respondents

4.2 Gaming behavior

The gaming behaviors of the respondents were investigated shortly through the questions 4, 5, and 6. As shown in Figure 4.2, most of the respondents have been playing WoW for approximately three to four years. Figure 4.3 indicates that previous research stating that the average MMORPG player spend 22.5 hours every week in-game (section 2.2.3), is very close to our own results.

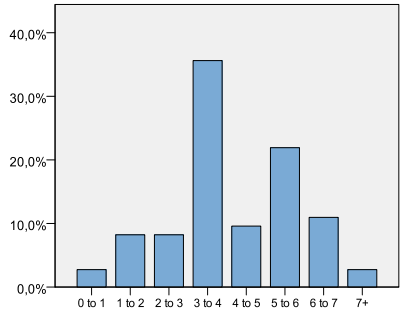

Figure 4.2: Number of years playing WoW

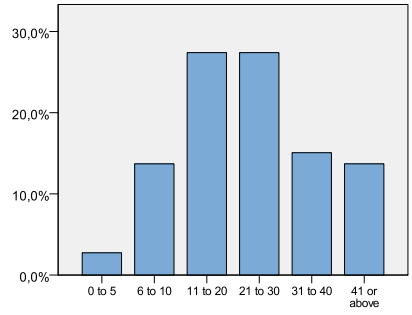

Figure 4.3: Approximate time played per week (hours)

The next question inquired about the time the respondents spent on various activities in the game. Estimation was done on a five-point Likert scale, with "I don't spend any time on this" at the lower end of the scale and "I spend a lot of time on this" in the other. The respondents' estimated time on each activity show the popularity of PvE gameplay on the stationary PC client (Figure 4.4). The responses generated a very high mean of 4,22, and as much as 57,5 % of the respondents selected the highest possible answering alternative. This was the by far most popular activity, as shown by the statistics in the table below.

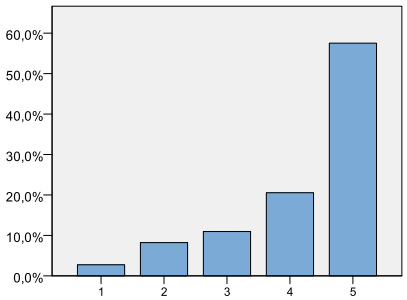

Figure 4.4: Questing, leveling, raiding, dungeons/instances, killing monsters

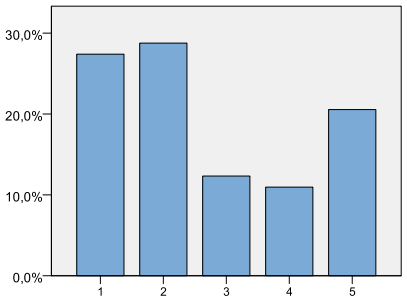

Figure 4.5: Player vs. player combat, battlegrounds, duels, arena

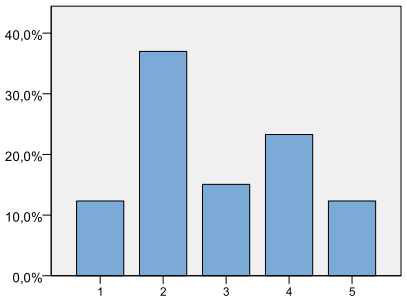

Figure 4.6: Reading and discussing game information, items, strategies

Organizing events was reportedly the least popular activity with a low mean value of 2,3 - features that have been described as "boring clerical work", or a boring necessity.

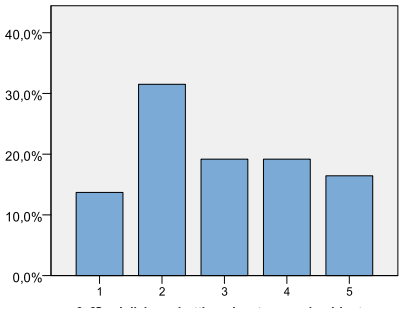

Figure 4.7: Socializing, chatting about general subjects, making friends

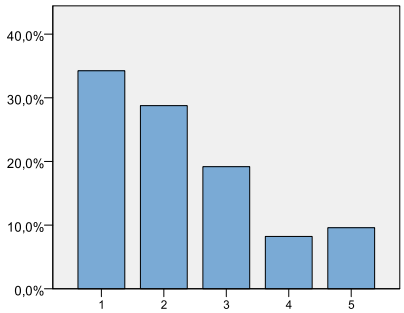

Figure 4.8: Organizing raids, events or other teamwork

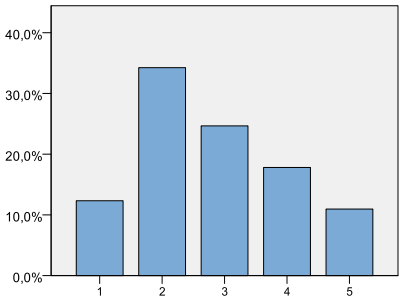

Figure 4.9: Trading items, using the Auction House, using crafting professions

Table 4.1: Game behavior frequencies

No.	Activities	Mean	Median	Mode (percent)	Standard deviation
6	Questing, leveling, raiding, dungeons/instances, killing monsters	4,22	5,00	5 (57,5%)	1,109
7	Player vs. player combat, battlegrounds, duels, arena	2,68	2,00	2 (28,8%)	1,499
8	Reading and discussing game information, items, strategies, etc	2,86	3,00	2 (37%)	1,262
9	Socializing, chatting about general subjects, making friends	2,93	3,00	2 (31,5%)	1,316
10	Organizing raids, events, or other teamwork	2,30	2,00	1 (34,2%)	1,288
11	Trading items, using the Auction House, using crafting professions	2,81	3,00	2 (34,2%)	1,198

4.3 Asynchronous Gameplay

Asynchronous gameplay is a form of strategic gaming where the user is given time to think about his or her actions, and the interaction is carried out over longer periods of time, without the need for low-latency connections and immediate response.

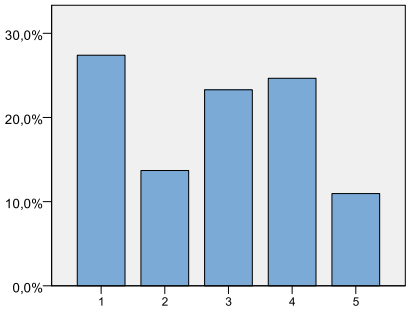

Figure 4.10: Trading items via Auction House

Q12. Trading items via Auction House. This is one of the already existing features supported by the official mobile client. The largest group answered that they would not use the feature at all, but there is a sufficient amount of users who would probably use the feature to some degree, and some, a lot. While a very obvious way of conducting mobile gameplay, it may not be the most desired one.

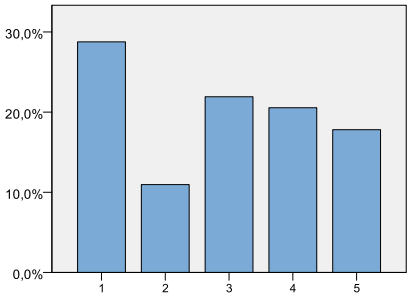

Figure 4.11: Customizing my characters skills, items and appearance

Q13. Customizing my character's skills, items and appearance. As a form of asynchronous gameplay motivated by the Mechanics motivation (section 2.3.1), a player's avatar or character can be customized in several ways. While some, almost a third, most users are interested in managing their character while being mobile. It could potentially be a social activity, asking real life friends for advice and so on.

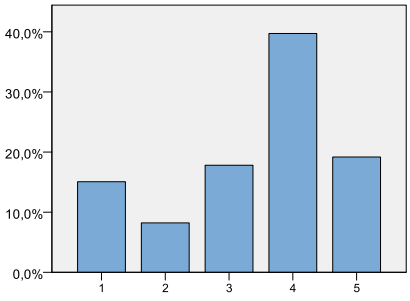

Figure 4.12: Search information regarding items, quests locations etc.

Q14. Search information regarding items, quests locations, etc. A majority answered that information seeking was a feature they would likely use, which confirms previous studies' findings about information seeking as an important activity (section 2.2.3). Information seeking may be induced by the player's own curiosity or due to a discussion in a real world social context.

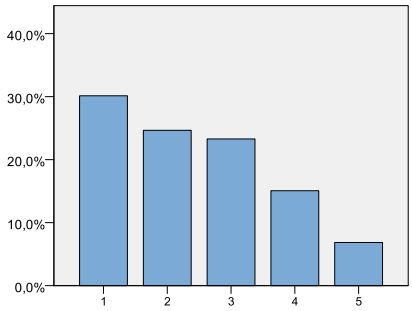

Figure 4.13: Managing my in-game friend list

Q15. Managing my in-game friend list. This question has been stated slightly erroneously, and may have been difficult to understand. In its' current form, it would apply to viewing, adding or removing friends from the player's friend list. Adding new friends as one meets new people in the real world may be useful.

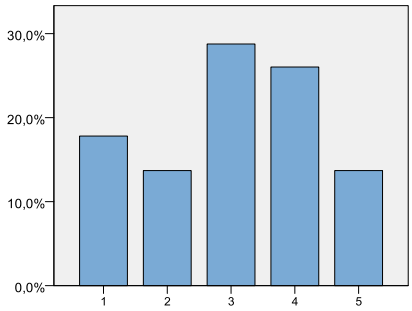

Figure 4.14: Create, edit and view calendar events

Q16. Create, edit and view calendar events. We found some support for planning and organizing activities taken mobile. One respondent suggested that it would be useful to have virtual world events merged in to the user's real world calendar.

Table 4.2: Asynchronous gameplay frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
12	Trading items via Auction House	2,78	3,00	1 (27,4%)	1,377
13	Customizing my character's skills, items and appearance	2,88	3,00	1 (28,8%)	1,481
14	Search information regarding items, quests, locations, etc.	3,40	4,00	4 (39,7%)	1,310
15	Managing my in-game friend list.	2,44	2,00	1 (30,1%)	1,258
16	Create, edit and view calendar events.	3,04	3,00	3 (28,8%)	1,296

4.4 Synchronous Gameplay

Synchronous gameplay is real gaming as most gamers know it. Fast paced action, competition, communication and interaction are all vital parts.

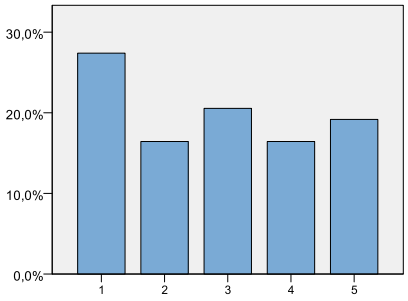

Figure 4.15: Playing against computer opponents, such as killing monsters or doing quests

Q17. Playing against computer opponents, such as killing monsters or doing quests. There were mixed emotions about bringing actual gameplay mobile, with a tendency towards negative replies. This could be due to several factors, such as the amount of focus required to perform the task well, in a real world situation where attention spans are low and the surrounding reality may interfere with gameplay. The gameplay could also be envisioned to be very cumbersome if moved to a mobile interface without changing any of the interaction design or game mechanics. Perhaps a new type of synchronous gameplay would need to be developed that was more suitable for mobile gameplay situations, but that was still a part of the virtual world.

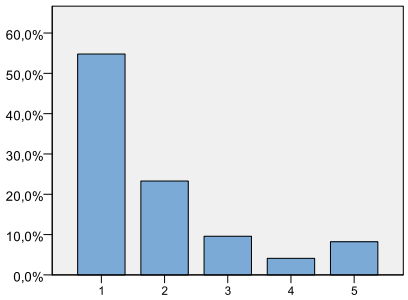

Figure 4.16: Player versus Player (PvP) gameplay, such battlegrounds, duels, or arena

Q18. Player versus Player (PvP) gameplay, such battlegrounds, duels, or arena. This was one of the proposed activities that received very low support. This could be explained by the competitive environment that surrounds such gameplay, and a desire to perform well against other players. This provokes the assumption that players perceive that their gameplay will be less competitive on mobile devices. Again, a custom tailored synchronous gameplay mode for mobile gaming might be required, where mobile players face other mobile players.

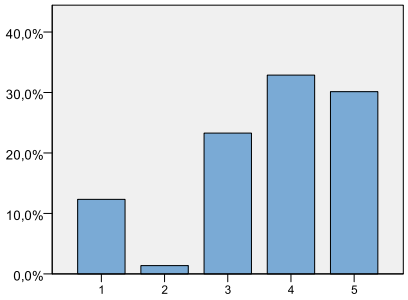

Figure 4.17: *Access to the same chat functions as the stationary PC client*

Q19. Access to the same chat functions as the stationary PC client. A significant majority of respondents are positive to using mobile chat features. This means instant chatting with chat channels, users or a guild, where a conversation is carried out in real-time. This mode of communication requires some amount of focus, and users are, on occasion ready put the real world aside for it.

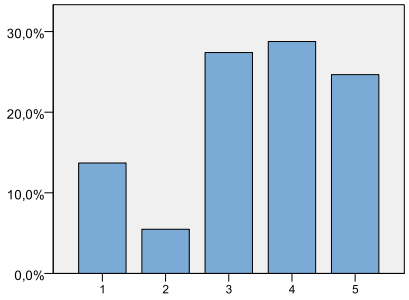

Figure 4.18: The ability to use travel routes and transportations to move between zones

Q20. The ability to use travel routes and transportations to move between zones. Perhaps seen as a boring activity, travel routes in WoW allow the player to move safely between zones. It could be seen as an administrative task, preparing the character for real gameplay when the user gets home.

Table 4.3: Synchronous gameplay frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
17	Playing against computer opponents, such as killing monsters or doing quests	2,84	3,00	1 (27,4%)	1,481
18	Player versus Player (PvP) gameplay, such as battlegrounds, duels or arena	1,88	1,00	1 (54,8%)	1,247
19	Access to the same chat functions as the stationary PC client	3,67	4,00	4 (32,9%)	1,270
20	The ability to use travel routes and transportations to move between zones	3,45	4,00	4 (28,8%)	1,302

4.6 Notifications

Notifications call for the attention of the user when an event in the virtual world has unfolded that is predicted to interest the player, similar to SMS signals.

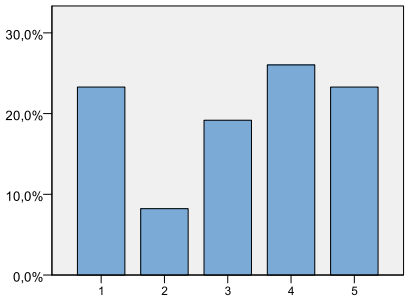

Figure 4.19: Getting instant notifications about trading such as auctions sold or won

Q21. Getting instant notifications about trading such as auctions sold or won. Many users would like to have these notifications about their gameplay, indicating that users are interested in staying up to date about activity in the virtual world, even if it imposes on their focus of the real world.

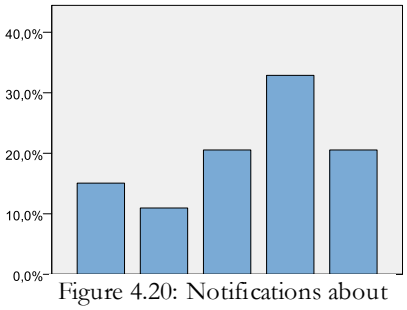

Figure 4.20: Notifications about personal messages such as chat or mail

Q22. Notifications about personal messages such as chat or mail. With marginally higher support than Q21, similarly, users want to get notified when communication events occur.

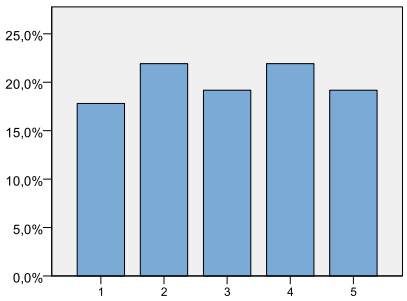

Figure 4.21: Notifications regarding as much as possible in my game

Q23. Notifications regarding as much as possible in my game. Users have varying opinions about getting notifications about as much as possible in the game. The interpretation of the question is open to subjectivity, however. Due to varying taste, users should be given options to receive the notifications they desire.

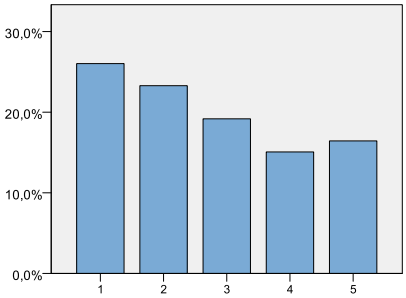

Figure 4.22: Cooldown notifications on items, spells, or abilities, such as trade skill cooldowns

Q24. Cooldown notifications on items, spells, or abilities, such as trade skill cooldowns. Again, customization of notifications will be necessary to cater to different desires, though this form of notification was rated lower than others suggested.

Table 4.4: Notification frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
21	Getting instant notifications about trading such as auctions sold or won]	3,18	3,00	4 (26%)	1,485
22	Notifications about personal messages such as chat or mail.	3,33	4,00	4 (32,9%)	1,334
23	Notifications regarding as much as possible in my game	3,03	3,00	2 & 3 (21,9%)	1,394
24	Cooldown notifications on items, spells or abilities, such as trade skill cooldowns	2,73	3,00	1 (26%)	1,427

4.7 Communication Access

Having Communication Access means being able to talk with other people in the virtual world via the mobile phone.

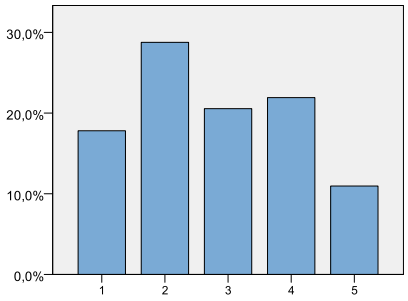

Figure 4.23: Chatting about items, quests, and other gameplay goals

Q25. Chatting about items, quests, and other gameplay goals. While not a feature per-se, chatting about game goals relates to the *Achievement* motivation (section 2.3.1) and could be assisted to some degree, such as showing item names with pop up descriptions in chat.

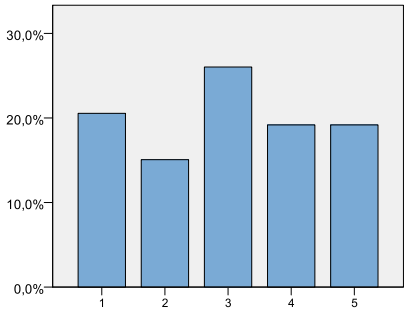

Figure 4.24: Chatting and socializing in general

Q26. Chatting and socializing in general. Only slightly more popular than chatting about game goals, socializing with virtual world friends while on the go is a requested feature of some.

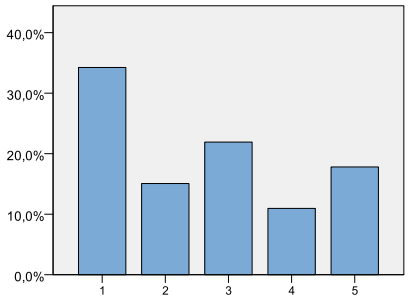

Figure 4.25: Voice communication features in chat channels or between players

Q27. Voice communication features in chat channels or between players. With about half the sample answering that they might, will probably, or would use voice communication features, speaking with virtual world friends with a real life voice is viable for many players. However, with a mode of 1 (I would definitely not use it), this feature is obviously contested among the respondents. A reason for this might be that currently this feature is only available for the players through third-party applications such as Skype or Ventrilo. This enables the players to actively choose which players they wish to be in contact with via voice communication. Inserting voice communication features in the virtual world client might intrude on the players' possibility to choose who they will be in voice contact with.

Table 4.5: Communication access frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
25	Chatting about items, quests, and other gameplay goals.	2,79	3,00	2 (28,8%)	1,280
26	Chatting and socializing in general	3,01	3,00	3 (26%)	1,399
27	Voice communication features in chat channels or between players	2,63	3,00	1 (34,2%)	1,495

4.8 Passive Participation

Passive participation is watching without interacting normally. Since mobile use does not offer as much focus and interaction possibilities for gaming as the regular gaming PC, simply watching others play could be an option.

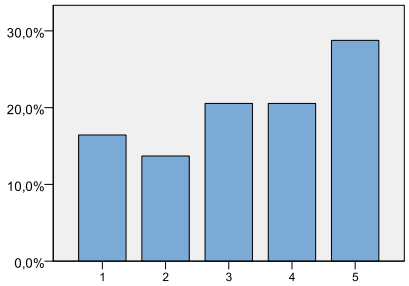

Figure 4.26: Viewing other players when they are playing ("spectator/observer mode") for example in raid instances or arenas

Q28. *Viewing other players when they are playing ("spectator/observer mode") for example in raid instances or arenas.* Players are supportive of this Achievement related form of observing. It is possible to watch others play in the regular client, but not without "being there". A pure form of spectating, similar to watching a football game, would be a new game feature for WoW. The consequence of this is that it could potentially make users overly positive, since they have not actually tried it but would like to try the feature.

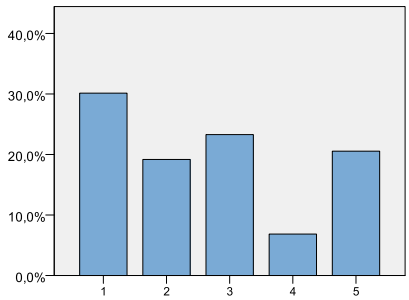

Figure 4.27: Reading in-game chat channels such as General City chat or Trade chat without writing in them

Q29. Reading in-game chat channels such as General City chat or Trade chat without writing in them. This is a form of passive social participation. It was not a very popular feature, but some were still interested in using it. This could both be a social and passive immersive stimulator for users who want to access their virtual world on the go.

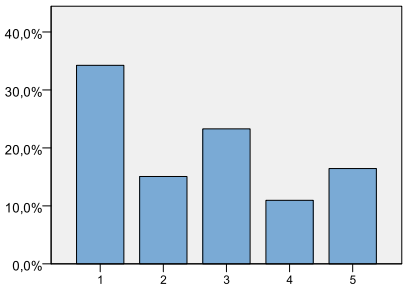

Figure 4.28: Spectating / observing certain locations in the world such as city capitals or other points of interest

Q30. Spectating/observing certain locations in the world such as city capitals or other points of interest. Observing a location in the virtual world could reinforce the feeling of immersion while away from playing, and indeed, a fair amount of respondents answered that they would use such a feature. But with a mode of 1, and 34 % of the respondents answering "I would definitely not use it", this potential feature is not very appreciated amongst many of our respondents. One interpretation of these results could be that to motivate players to watch other players, a competitive activity must take place.

Table 4.6: Passive participation frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
28	Viewing other players when they are playing ("spectator / observer mode") for example in raid instances or arenas]	3,32	3,00	5 (28,8%)	1,442
29	Reading in-game chat channels such as General City chat or Trade chat without writing in them.	2,68	3,00	1 (30,1%)	1,490
30	Spectating/observing certain locations in the world such as city capitals or other points of interest	2,60	3,00	1 (34,2%)	1,470

4.9 Parallel Reality

By and large, the respondents did not favor potential features that bring the virtual world closer to the real world by pervasive features such as interacting with other players in their near proximity.

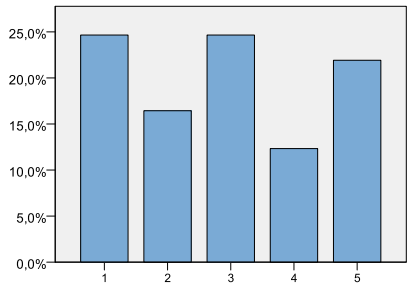

Figure 4.29: Seeing other players in the mobile application who are close to me in real life, and letting them see me

Q31. Seeing other players in the mobile appliation who are close to me in real life, and letting them see me. Taking the virtual world closer to the real world by showing players who are close to each other was something the respondents had difficulty agreeing on. With a mean value of 2,9 and the mode being both 1 and 3, the only conclusion regarding this feature is that the answers were very disseminated. One argument in favor of making the virtual world more ubiquitous was:

> […] it could also provide a more immersive game play experience […] and allow WoW to penetrate into our daily lives like Facebook and email have. We can get phone notifications from a lot of websites now, so it's like we're never truly disconnected from the Internet. Why should WoW be different? (Female, 19. Appendix 4:36)

One respondent elaborated on the subject in more negative terms, saying:

> […] I think this game already steals enough time from people already so I can't really say that making more ways for people to spend their time on it is a good thing. (Male, 26. Appendix 4:9)

Clearly, taking the virtual world to the mobile phone produces strong reactions to what the game experience should and should not encompass. Quite a few respondents bring forth the opinion that the virtual world *should not* be brought mobile, for various reasons.

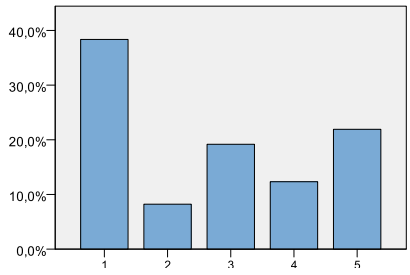

Figure 4.30: Gaining achievements by completing objectives in the real world, such as being at specific real world locations

Q32. Gaining achievements by completing objectives in the real world, such as being at specific real world locations. This potential feature provoked strong negative reactions with almost 40 % of the respondents answering that they would not use it at all. The ability to affect the virtual world by actions or happenings in the real world may be too much interaction between the two. Pervasive gaming in combination with MMORPG still seems to be an undesirable feature. As said in section 2.4.3, this may be something that the younger players may be more benevolent towards.

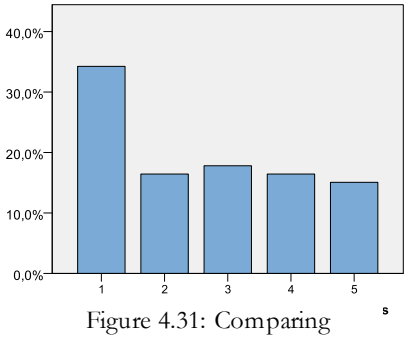

Figure 4.31: Comparing achievements, items or trade items with people I meet in real life

Q33. Comparing achievements, items or trade items with people I meet in real life. As with Q32, this feature was not well received by all even though roughly half of the respondents answered that they might, probably will, or will use such a feature. By taking the virtual world achievements or gameplay features such as trading into real life, the virtual world becomes a stronger real world phenomenon and social subject.

Table 4.7: Parallel reality frequencies

No.	Activity	Mean	Median	Mode (percent)	Standard deviation
31	Seeing other players in the mobile application who are close to me in real life, and letting them see me (for example on a map)	2,90	3,00	1 & 3 (24,7%)	1,474
32	Gaining achievements by completing objectives in the real world, such as being at specific real world locations (e.g. moving a certain distance, or visiting a famous building)	2,71	3,00	1 (38,4%)	1,603
33	Comparing achievements, items or trade items with people I meet in real life	2,62	2,00	1 (34,2%)	1,478

4.10 Additional Factors

The additional factors were investigated both through quantitative and qualitative responses. #34 – #36 are shown in the figures below.

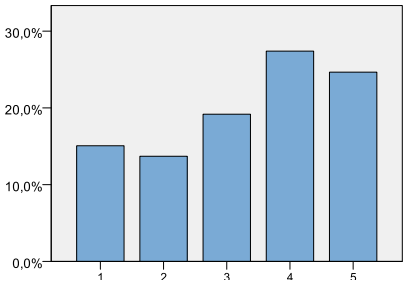

Figure 4.32: I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages

Q34. I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages. The responses to this question prove that most people are willing to let their virtual world social network spill over in to their real world. This is indicated by a relatively high mean of 3,33. Most of the respondents who chose to answer question 37 mentioned that they wanted better chat features, such as a friend and guild chat. As documented in section 2.4.2, the chat feature is an addition that requires a subscription, which means that usage of this feature costs a monthly fee. Four out of six respondents, who requested additional chat features (question 37) would definitely not pay an extra fee for the application. The remaining two respondents would probably not pay extra. Since the chat feature is one out of two features that Blizzard charge their subscribers, our findings indicate that a majority of the respondents do not want to pay for this service.

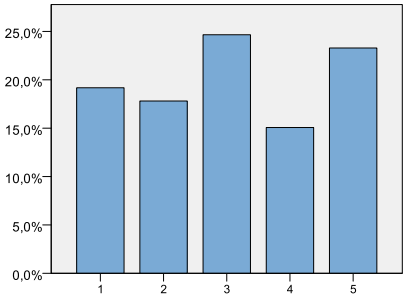

Figure 4.33: I want to have as much access to gameplay features as possible on my mobile phone

Q35. I want to have as much access to gameplay features as possible on my mobile phone. We could not find strong support for the assumption that all or most players want to take their entire gaming experience mobile. While there are definitely players who want to keep playing while mobile, the wide variation of player types found in MMORPG:s means that not everyone will fancy the idea. The question for future developers will be choosing which features to implement and which features should be kept on the stationary client.

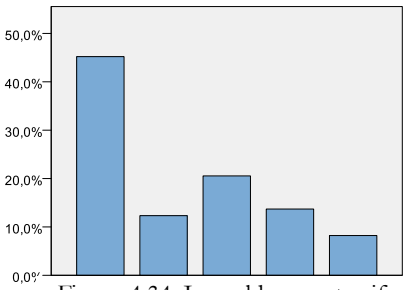

Figure 4.34: I would pay extra if necessary to gain access to mobile gameplay or socializing features

Q36. I would pay extra if necessary to gain access to mobile gameplay or socializing features. While the question leaves the actual amount to pay open for different interpretations, what is important to note here is the overwhelming negative result regarding the opinion of payment. Well over 40 % of the respondents would certainly not pay extra money for mobile functionality to their game. This question also received a very low mean value of 2,27.

Table 4.8: Additional frequencies

No.	Question	Mean	Median	Mode (percent)	Standard deviation
34	I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages.	3,33	4,00	4 (27,4%)	1,385
35	I want to have as much access to gameplay features as possible on my mobile phone	3,05	3,00	3 (24,7%)	1,433
36	I would pay extra if necessary to gain access to mobile gameplay or socializing features.	2,27	2,00	1 (45,2%)	1,377

4.11 Themes found in open comments

The questionnaire included four large text boxes where users could input their opinions freely about four central topics - general thoughts, feature suggestions, how mobile access would affect the game world and how mobile access will affect them.

4.11.1 General thoughts

Roughly every third respondent took their time to fill out the qualitative boxes. The general comment responses included both generally positive outlooks for mobile usage (ten respondents), negative (eight) and neutral/both good and bad (five). Some argued that real life should be real life and should be separated from the game. Reactions ranged all the way from greatly positive to extremely negative, expressed in blasphemous and emotional language, especially the part about adding real life achievements (parallel reality).

4.11.2 Feature suggestions

Features suggested were in many cases covered by the research model and questionnaire, such as information access, voice communication or parallel reality functions. Other ideas advocated the ability to see the guild news feed with items acquired by other players (passive participation), tutorials on how to complete team-play objectives (information access) and interoperability with other applications and systems such as merging calendar events in to the real life calendar system and adding contacts to other communication platforms.

4.11.3 Respondents opinions about how mobile access can affect the virtual world

Most users mentioned that the virtual world would become a more social place (eight respondents). These comments said that the game would probably be more social oriented if available to the mobile phone and suggesting that this would strengthen the social bonds between the players, making them more likely to keep playing the game.

> It will most likely become a more social environment. Wow will be used more as a chat client and guild members/friends will be more likely to keep playing the game. (Male, 35. Appendix 4:44)

Two respondents argued that there would be less reason to log in since communication access was achieved "outside" the real game, and one argued that addiction could actually decrease since regular game log in was not necessary. One feared that the mobile access feature would become a prerequisite for being taken seriously as a skilled player in game. However, most respondents (apart from a few exceptions) suggested that mobile access would benefit the virtual world, making it better.

4.11.4 Respondents opinions about how mobile access can affect the player

Some predicted that they would play the game more (eleven respondents) and three said they would communicate more with in-game friends. One mentioned the fact that seeing if someone was online in the game could be a motivation factor to log in with the regular game client. A few respondents remarked upon the fact that they need a "natural" break from WoW, and that bringing the virtual world mobile would strongly obstruct this pause.

> Your phone should mean you're limited to real life and need a break from WoW. (Male, 24. Appendix 4:11)

4.12 Correlations of mobile usage motivations

Upon inspecting the Pearson correlation coefficients between variables, we noted that there were few significant correlations between the questions related to demographics, how much time was spent with various activities in game (Q1-Q11) and the motivation measurements for using mobile features. The highest correlation among these was between Question 9 and 26 (R = 0,634), how much time was spent socializing and chatting, and how high the motivation was to use socializing and chatting features on mobile access. In other words, people who are social on in the game would like to be able to be social via their mobile phone.

Among the usage motivation measures themselves, persons who responded with a high motivation rating for using trading features on the mobile phone were also likely to answer with a high motivation rating for getting instant notification about trading events (R = 0,733, Q12 and Q21). Many of those who wanted to use socializing and chatting features (Q26) also wanted to use voice communication features (Q27) (R = 0,713). There was also a correlation between Q26 and Q34, indicating that those who intended to use socializing and chatting features in general also wanted friends and guildmates to be able to reach them at all times via their mobile.

However, perhaps the most interesting finding in this is the void of strong correlations. It would be easy to assume that players who play many hours per week would also use mobile features the most – this is not so. The same applies for years of experience in the game.

For a complete matrix of correlations, see (Appendix 1).

5 Discussion

This chapter includes a thorough discussion regarding the general results from the questionnaire in connection to themes presented in the literature review. The discussion is divided into headlines representing various potential roles for mobile access to virtual worlds.

Mobile access as a synchronous gameplay interface

Perhaps the most obvious concern regarding mobile access to online game worlds is whether people desire to play the game from their mobile or not. An interesting fact is the different responses concerning PvE gameplay on the regular versus the mobile client. Stationary synchronous PvE gameplay received a very high result on Q6, in fact 57 % of the respondents claimed to spend most time on this activity. Clearly, usage of the synchronous PvE gameplay on the stationary client is widespread, which is likely because all other activities in the game revolve around the PvE gameplay in some way. Looking at the results from Q17 concerning motivation to use synchronous PvE gameplay on the mobile phone tells a different story. Most respondents answered the lowest possible alternative, saying that they would not use it at all. On the PvP gameplay question (Q18), respondents were even more negative towards gameplay on the mobile phone, more than half said they would not use it, with a mean of 1,88 on the scale from 1 through 5. Clearly, synchronous PvE and PvP gameplay is not a strong motivation factor for playing MMORPG:s on the mobile phone, at least not to the same extent as on the regular stationary PC client. According to our results, synchronous gameplay features desired by the users mostly concern socializing and immersion; both received higher means and mode values. This could be explained in several ways. First, the regular game experience, as seen on a large screen with the appropriate input devices, may not be tempting to attempt on a mobile device with a small screen and poor input, not to mention connectivity issues. Users may simply anticipate that the PvE and PvP gameplay will most likely be problematic on a smartphone. Second, and owing to the previous reason, users may judge that they will perform inadequately while playing with a mobile device, instilling a fear of constantly dying with their character, wasting time and resources, and in the case of competitive PvP gameplay, humiliation or poor recorded results. Third, a user may not wish to devote the required full attention to the game, when other things are happening around them in the real world. In summary, the perceived usefulness of mobile gaming features may inhibit the scores for intended use. Perhaps alternative ways of synchronous gaming need to be developed that use the immersive qualities of the virtual world, but use special mobile gameplay modes. Alternate gaming modes or "mini-games" could successfully increase the amount and variety of content in MMORPGs (Achterbosch et al., 2008) as well as be more suitable to mobile platforms.

Mobile access to asynchronous gameplay features

Even though synchronous gaming features were not desired to a large extent, gameplay can come in a different shape, namely in the asynchronous form. Access to e.g. trading features and organizing events do not mandate the same level of time-critical coordination as synchronous gameplay, and several mini-games could be developed in asynchronous form. Trading items is the most obvious one and is already implemented in the official WoW mobile client, but other strategic gameplay

modes where items, skills or other assets from the same virtual world are used could be made, e.g. crafting skill usage to create and manipulate virtual world items, or even new concepts or gameplay modes not present in the regular client.

Mobile access as a platform for passive participation

Spectating other players both for PvE and PvP purposes, received a high and thus positive result. Parallels could be drawn between this result and the popularity of e-sports, where the video game (such as Star Craft II and Counter Strike) through tournaments is viewed by thousands of spectators, almost like any other sport. A mobile spectating feature could be an entry point for players to a future potential e-sports market. Spectating others may satisfy the *Mechanics* motivation (section 2.3) and could also be a social event, as well as immersive. For proprietors of virtual worlds, the potential gain of having people enjoy watching gameplay in a "sport" where they have a complete monopoly could hardly be exaggerated.

Mobile access enabling access to information seeking

Information seeking has previously been established as an important part of participating in online game worlds (section 2.2.3) and many respondents reported that would use such a feature (Q14). It is an ideal activity when being mobile due to the fact that it requires little commitment of the user, who is often simultaneously occupied with activities in the real world. Information seeking via mobile computing is not an activity necessarily limited to being done when away from the standard game interface or computer, but could also act as a complement when playing. Furthermore, mobile information access about the game may be done in social contexts, e.g. when discussing game mechanics with real world persons. Mobile information seeking about a game can provide for escapism to avoid being bored, and may help players organize themselves and prepare their playing sessions in advance, by enabling players to discern which game oriented goals to prioritize when logging on.

Mobile access as a facilitator of social communication

The social aspects received overall positive remarks. This is not surprising, since the mobile phone in its essential is a social device, built for communication between people. Short chat messages and voice communication are ideal for the mobile phone and people already use these features on a daily basis by SMS and phone calls. Performing these activities with friends from the virtual world is not a particularly large step further, and may prove to be the most important role of mobile access.

Mobile access as a bridge between worlds

Players were in divided camps regarding implementing parallel reality features. Arguably, attempting to bind real world activities in to the virtual world could interfere with immersion, for example, every smartphone has a camera and can instantly send pictures to other people of their current real world activity or surroundings. But having real world situations illustrated in an immersive virtual world may ruin the game experience. Real life issues in relation to game achievement have previously mostly taken the shape of controlling how much time a player can spend in the world, or what languages he or she can communicate with proficiently. But there are other concerns that can be

introduced. Consider the example of gaining achievements by travelling to certain locations, or even being able to use the latest mobile devices. If real-world constraints, such as access to money, are tied to a virtual world, is it truly a separate world? On the other hand, features such as comparing achievements with people in the real world by letting two mobile devices exchange information, could strengthen the virtual world's presence in the real world, without affecting it directly.

Given the recent development of the introduction of different media channels and software in our mobile phones through third party applications (section 2.1.2), the attitude in the responses towards the merging of different spaces (section 2.2.3) into *hybrid spaces* presented us with a somewhat wary picture. Many respondents voiced their explicit concern concerning this phenomenon, saying they are already fed up with all the access points to different spaces available to them twenty-four-seven. The introduction of yet another concern claiming their attention wherever they go was by some perceived as a burden. This burden is by some respondents referred to as the inclination towards a more addictive game, given the fact that the players would never really be disconnected from the game. This would incline them to play more, according to the comments in the qualitative questions, but at the same time, some respondents even claimed that mobile access would probably result in them getting tired of the game faster, and quit playing after a shorter period than if they only played on the stationary PC.

Mobile access as a catalyst of competitive advantage

Another issue to be addressed is in terms of "the reputation game" described in section 2.2.3; the balance between mobility to be a "fun addition" to the otherwise stationary-based game, or a "need-to-have necessity" to be able to play the game to its full potential. Mobile access might indirectly increase a player's reputation within the virtual world, just as any other magical artifact or achievement, insinuating a higher commitment level of the user. Research indicates that higher status means that users stay loyal to the virtual world longer (section 2.2.3) and a higher status from mobile access could induce a longer active time-period for many users. However, even though smartphones are gaining ground in the mobile phone market as described earlier in this thesis, it is not safe to assume that every one of the currently 11 million players of WoW have a smartphone. This needs to be taken into consideration if the game is not going to divide players into two categories: those who have mobile access, and those who do not. Until ownership of a smartphone is firmly established as the norm rather than the exception, too many advantages to users with mobile access would not be advisable. This line of thought is confirmed by some of the respondents, voicing their fear of a potential rift between the "serious" players, and the more casual ones. Again, if an extra fee for mobile features is implemented, the gameplay will to some extent be affected by what solvency each player has outside the virtual world, and players will not play on equal conditions.

Mobile access to improve game quality

When analyzing the responses from the survey through the aspects of game quality (described in section 2.3.2), arguments can be put forward that the four aspects that could be affected in a positive manner are mainly *learnability, immersion, socialization* and *motivation*. The learnability aspect can be

improved by the (from the respondents') desired features of mobile access to databases concerning items, quests, locations, etc. The immersion aspect regarding game quality refers to the feeling to be in another world - and constant connection via notifications and other mobile features would improve the game. Lastly, socialization as a game quality aspect involves e.g. social perception, sharing, communication and interaction - all of which could benefit from increased mobile access to the virtual world through the smartphone. *Motivation* could be improved by giving the player notifications of virtual world events, giving players reminders and incentives to log in.

Mobile access as a new source of revenue for virtual world vendors

At the end of the day, developing and releasing new features to a virtual world (or any software) does not come for free. The responses from our survey clearly points in one direction when it comes to the issue of payment; not many of our respondents are prepared to pay extra for mobile features. As long as this is the common standpoint, vendors will have a difficult time promoting advanced paid mobile features for a large population. Perhaps a better strategy would be to integrate the development costs of the mobile features in to the regular monthly subscription cost, or use a payment model more widely accepted by the mobile user community, such as a small one-time fee for installation.

6 Conclusion

6.1 Mobile access to online virtual gaming worlds

In this thesis we have shown that mobile access to online virtual gaming worlds can be a viable implementation for virtual world vendors, and can contribute to the success of the platform. Though many users have different opinions, the there seems to exist a demand for access via mobile devices. The majority of the investigated aspects of mobile gaming received a variety of responses in our survey. Very few questions received a coherent response in attitude from the participating respondents. However, two aspects of gameplay stood out in this way; synchronous PvE and PvP gameplay is not a desired feature of mobile MMORPG gaming. The result show that players are not willing to relinquish the central functionalities provided by a PC keyboard and mouse, and a big screen in exchange for mobile access when it comes to these main game activities. Instead, players desire the more surrounding functionalities such as customization and socialization. The role of mobile access in online gaming worlds such as WoW is therefore to act as a complement to the actual stationary gameplay, but not to replace it entirely. Not surprisingly, the social functionalities such as chat and messaging are a prominent motivation factor for accessing the virtual world through the smartphone.

Identifying specific roles for mobile access to virtual worlds proved difficult, in part because of the mainly incoherent responses from the online survey. However, it is clear that mobile access will have difficulties establishing itself as a new source of revenue for virtual world vendors, since very few are willing to pay extra money for mobile features.

6.2 Implications for future research

Future research can explore how widespread the usage actually is, when the phenomenon is more common. It remains unclear how mobile access affects users, and how the access as a phenomenon can affect the virtual world. Future research should try to determine how mobile access to a virtual world affects users on a large scale, and how the access affects the virtual world. More research is also needed to determine how different gaming modes can be developed to be compatible with the existing virtual world, but more appropriate for the mobile use context. Such a gaming mode could be exclusive for mobile users, in order to let mobile users compete on equal terms. Another question is how much players are ready to pay for mobile access – should it be included in the regular feature set, in order to promote the game as a whole? Further research questions are how player assets in the real world tie in to and affect the virtual world, if such a intertwining is wanted or not by players, and how it can be mitigated if not.

Appendix 1 - Pearson correlations

Question	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1. Age	1																																
4. Number of years playing WoW:	0,051	1																															
5. Approximate time played per week (hours)	-0,197	0,21	1																														
6. [Questing, leveling, raiding, dungeons/instances, killing monsters]	0,127	-0,125	0,05	1																													
7. [Player vs player combat, battlegrounds, duels, arena]	-0,151	-0,001	,254*	-,409**	1																												
8. [Reading and discussing game information, items, strategies, etc]	-,245*	0,158	,349**	-0,048	0,168	1																											
9. [Socializing, chatting about general subjects, making friends]	-0,175	0,118	,287*	-0,113	0,165	,438**	1																										
10. [Organizing raids, events, or other teamwork]	-0,174	0,17	,314**	-0,134	0,086	,470**	,422**	1																									
11. [Trading items, using the Auction House, using crafting professions]	-0,18	-0,021	0,115	,241*	-0,096	0,129	0,177	0,173	1																								
12. [Trading items via Auction House]	0,03	0,045	-0,025	0,214	-,249*	-0,002	-0,054	0,093	,412**	1																							
13. [Customizing my character's skills, items and appearace]	-0,082	-0,001	-0,02	0,118	-0,187	-0,017	0,074	0,042	0,229	,586**	1																						
14. [Search information regarding items, quests, locations, etc.]	-0,08	-,244*	0,136	0,178	-0,07	,302**	0,04	0,109	0,12	,419**	,391**	1																					
15. [Managing my in-game friend list.]	-0,087	0,009	0,138	0,129	-0,095	,406**	,446**	,372**	,241*	,353**	,343**	,365**	1																				
16. [Create, edit and view calendar events.]	0,118	,243*	0,135	-0,016	0,007	,309**	,336**	,467**	-0,022	0,169	0,133	,285*	,474**	1																			
17. [Playing against computer opponents, such as killing monsters or doing quests]	-0,001	-0,07	0,082	,251*	-0,111	-0,02	-0,07	-0,076	0,225	,377**	,231*	0,192	0,084	-0,011	1																		
18. [Player versus Player (PvP) gameplay, such as battlegrounds, duels or arena]	-0,129	-0,138	,246*	-0,071	,425**	,298*	-0,031	0,153	-0,016	0,065	0,089	0,115	0,177	0,201	,342**	1																	
19. [Access to the same chat functions as the stationary PC client]	-0,063	0,03	,331**	0,062	0,025	,396**	,352**	,393**	0,058	,276*	,274*	,372**	,378**	,413**	,303**	,246*	1																
20. [The ability to use travel routes and transportations to move between zones]	-0,102	-0,099	0,127	,238*	-0,139	0,165	0,099	0,075	0,101	,459**	,483**	,488**	,454**	,351**	,622**	,274*	,519**	1															
21. [Getting instant notifications about trading such as auctions sold or won]	-0,016	0,084	0,196	0,162	-0,099	0,213	0,12	0,088	,371**	,733**	,516**	,370**	,374**	0,22	,424**	0,23	,474**	,475**	1													
22. [Notifications about personal messages such as chat or mail.]	0,093	0,048	0,228	0,148	-0,052	,398**	,274*	0,184	0,127	,365**	,337**	,449**	,517**	,402**	0,21	0,175	,565**	,393**	,664**	1													
23. [Notifications regarding as much as possible in my game]	-0,006	0,12	,274*	0,212	-0,142	,413**	0,198	0,212	0,219	,510**	,466**	,534**	,476**	,268*	,352**	0,186	,507**	,506**	,709**	,712**	1												
24. [Cooldown notifications on items, spells or abilities, such as trade skill cooldowns]	0,156	0,017	0,058	0,153	-0,229	0,187	-0,062	0,136	0,009	,422**	,451**	0,208	0,137	0,156	,333**	0,153	,318**	,329**	,417**	,464**	,465**	1											
25. [Chatting about items, quests, and other gameplay goals.]	-0,168	0,064	,418**	0,091	0,118	,438**	,462**	,308**	0,173	,360**	,324**	,414**	,454**	,323**	,363**	,280*	,607**	,440**	,568**	,585**	,579**	0,227	1										
26. [Chatting and socializing in general]	-0,199	0,111	,384**	0,016	0,035	,497**	,634**	,452**	,234*	,268*	,276*	,353**	,517**	,475**	0,135	0,16	,698**	,408**	,480**	,623**	,562**	0,162	,723**	1								
27. [Voice communication features in chat channels or between players]	-,242*	0,144	,340**	0,024	0,04	,414**	,495**	,311**	0,146	0,23	,324**	,317**	,523**	,366**	0,104	,243*	,491**	,308**	,405**	,528**	,478**	0,173	,671**	,713**	1								
28. [Viewing other players when they are playing ("spectator/observer mode") for example in raid instances or arenas]	-0,188	0,142	,267*	-0,07	0,194	,390**	,290*	0,158	-0,029	0,189	0,207	,264*	,359**	,298*	,311**	,246*	,391**	,530**	,259*	,342**	,320**	0,124	,449**	,452**	,454**	1							
29. [Reading in-game chat channels such as General City chat or Trade chat without writing in them.]	-,306**	0,107	,354**	0,084	0,011	,509**	,350**	,427**	0,114	,304**	,234*	,442**	,416**	,489**	0,222	,293*	,458**	,425**	,516**	,451**	,546**	,233*	,636**	,562**	,577**	,454**	1						
30. [Spectating/observing certain locations in the world such as city capitals or other points of interest]	-,284*	-0,06	0,186	,250*	-0,114	0,165	0,137	,284*	,359**	,499**	,367**	,379**	,471**	,300**	,474**	,269*	,450**	,596**	,574**	,429**	,521**	,239*	,488**	,421**	,419**	,447**	,646**	1					
31. [Seeing other players in the mobile application who are close to me in real life, and letting them see me (for example on a map)]	-,236*	-0,095	0,068	0,03	-0,008	0,09	0,168	0,155	0,06	,284*	,389**	,373**	,330**	,279*	,260*	,273*	,443**	,399**	,357**	,440**	,495**	,271*	,350**	,432**	,488**	,295*	,429**	,476**	1				
32. [Gaining achievements by completing objectives in the real world, such as being at specific real world locations (e.g. moving a certain distance, or visiting a famous building)]	-0,15	-0,029	0,09	0,067	0,089	0,056	0,017	0,13	0,202	,361**	,354**	,274*	,291*	0,133	,348**	,357**	,369**	,442**	,442**	,305**	,495**	0,184	,330**	,243*	,332**	,250*	,444**	,635**	,465**	1			
33. [Comparing achievements, items or trade items with people I meet in real life]	-,262*	-0,12	0,179	0,103	0,058	0,128	0,079	,251*	0,162	,334**	,295*	,424**	,293*	0,219	,396**	,313**	,435**	,524**	,405**	,311**	,477**	,239*	,384**	,298*	,262*	0,194	,512**	,652**	,531**	,762**	1		
34. I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages.	-0,104	0,175	0,189	0,016	-0,117	,328**	,340**	,325**	0,039	,271*	,332**	,302**	,362**	,364**	,297*	0,08	,560**	,394**	,444**	,535**	,599**	,243*	,501**	,635**	,542**	,309**	,482**	,413**	,519**	,400**	,470**	1	
35. I want to have as much access to gameplay features as possible on my mobile phone	0,057	0,091	0,05	0,176	-0,115	0,112	0,098	0,104	0,176	,415**	,311**	,277*	,233*	,253*	,724**	,245*	,392**	,575**	,426**	,397**	,486**	,293*	,453**	,339**	,327**	,402**	,353**	,446**	,417**	,328**	,377**	,432**	1
36. I would pay extra if necessary to gain access to mobile gameplay or socializing features.	-0,084	,235*	0,169	,260*	-0,032	0,206	,279*	,235*	0,15	0,193	,276*	0,124	,379**	,266*	,390**	,271*	0,227	,286*	,261*	,306**	,322**	0,201	,482**	,344**	,434**	,243*	,395**	,391**	0,191	,238*	0,168	,302**	,485**

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 2 - Forum and email letter

How would you like to access WoW from your mobile phone? We are running a survey and writing a master thesis on the subject. It would be great if you could help answer it - it only takes a few minutes. The survey is anonymous.

Copy and paste the following link to your browser address field (Google server):
https://spreadsheets0.google.com/spreadsheet/viewform?formkey=dGF2OEJrSVhkXzY3TjEtcWJCaXZRbGc6MA

If you have questions or comments about the survey, or the topic in general, feel free to post in this thread, or send us an e-mail (see details on survey).

Have a nice weekend.
Thanks

Appendix 3 - Research survey

World of Warcraft Survey

This survey is targeted to players who have played and are familiar with World of Warcraft (WoW). The survey is about usage and requested features of mobile access to the game. The survey is completely anonymous. You need to be at least 12 years old to participate in the survey. You can start filling out the survey now, or continue reading here if you want to know more.

About mobile access to WoW:
Today, it is possible to bring the WoW experience and community with you in your mobile phone. Currently, it is possible to use the auction house, armory, guild chat, calendar and more from your smartphone via the official WoW Remote application. We have created a study about what features users would like to use via their mobile phone.

Thank you for taking the time to help us. We would appreciate it very much if you could send the link to this questionnaire to other people that you know would be suitable for participation in this survey.

This is a research survey from students of Lund University, Sweden. Approximate completion time 5 minutes. This survey is not affiliated or endorsed by Blizzard Entertainment.

Contact information
Nils Bylander - mkv04nby@student.lu.se
Adrian Nilsson - cid05ani@student.lu.se
Gustaf Öqvist - ara05goq@student.lu.se
* Required

Please fill in your information in the boxes below:

1. Age *
----

2. Sex *
- ◯ Male
- ◯ Female

3. Which region do/did you play in? *
Europe

4. Number of years playing WoW: *

- ◯ 0 to 1
- ◯ 1 to 2
- ◯ 2 to 3
- ◯ 3 to 4
- ◯ 4 to 5
- ◯ 5 to 6
- ◯ 6 to 7
- ◯ 7+

5. Approximate time played per week (hours) *

If you're not currently playing, please select the estimated time played when you were active.

- ◯ 0 to 5
- ◯ 6 to 10
- ◯ 11 to 20
- ◯ 21 to 30
- ◯ 31 to 40
- ◯ 41 or above

Estimate how much time you spend on each of the following activities. *

1: I don't spend any time with this. 5: I spend a lot of time with this.

	1	2	3	4	5
6. Questing, leveling, raiding, dungeons/instances, killing monsters	◯	◯	◯	◯	◯
7. Player vs player combat, battlegrounds, duels, arena	◯	◯	◯	◯	◯
8. Reading and discussing game information, items, strategies, etc	◯	◯	◯	◯	◯
9. Socializing, chatting about general subjects, making friends	◯	◯	◯	◯	◯
10. Organizing raids, events, or other teamwork	◯	◯	◯	◯	◯
11. Trading items, using the Auction House, using crafting professions	◯	◯	◯	◯	◯

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
12. Trading items via Auction House	○	○	○	○	○
13. Customizing my character's skills, items and appearance	○	○	○	○	○
14. Search information regarding items, quests, locations, etc.	○	○	○	○	○
15. Managing my in-game friend list.	○	○	○	○	○
16. Create, edit and view calendar events.	○	○	○	○	○

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
17. Playing against computer opponents, such as killing monsters or doing quests	○	○	○	○	○
18. Player versus Player (PvP) gameplay, such as battlegrounds, duels or arena	○	○	○	○	○
19. Access to the same chat functions as the stationary PC client	○	○	○	○	○
20. The ability to use travel routes and transportations to move between zones	○	○	○	○	○

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
21. Getting instant notifications about trading such as auctions sold or won	○	○	○	○	○
22. Notifications about personal messages such as chat or mail.	○	○	○	○	○
23. Notifications regarding as much as possible in my game	○	○	○	○	○
24. Cooldown notifications on items, spells or abilities, such as trade skill cooldowns	○	○	○	○	○

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
25. Chatting about items, quests, and other gameplay goals.	○	○	○	○	○
26. Chatting and socializing in general	○	○	○	○	○
27. Voice communication features in chat channels or between players	○	○	○	○	○

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
28. Viewing other players when they are playing ("spectator/observer mode") for example in raid instances or arenas	○	○	○	○	○
29. Reading in-game chat channels such as General City chat or Trade chat without writing in them.	○	○	○	○	○
30. Spectating/observing certain locations in the world such as city capitals or other points of interest	○	○	○	○	○

Estimate how much you would like to use each feature on your mobile phone: *

	I would not use it at all.	I would probably not use it.	I might use it.	I would probably use it.	I would use it very much.
31. Seeing other players in the mobile application who are close to me in real life, and letting them see me (for example on a map)	○	○	○	○	○
32. Gaining achievements by completing objectives in the real world, such as being at specific real world locations (e.g. moving a certain distance, or visiting a famous building)	○	○	○	○	○
33. Comparing achievements, items or trade items with people I meet in real life	○	○	○	○	○

34. I want my friends and guildmates to be able to reach me on my mobile phone at all times via chat messages. *

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

35. I want to have as much access to gameplay features as possible on my mobile phone *

1: I don't care about using WoW via mobile *5: The more WoW features on my phone, the better*

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

36. I would pay extra if neccessary to gain access to mobile gameplay or socializing features. *

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

37. What features would you like to see in the mobile app?

This question is optional.

38. How do you think mobile access to WoW would effect you and your usage of WoW?

This question is optional.

39. How do you think mobile access will affect the WoW world?

This question is optional.

40. What are your general thoughts about mobile access to WoW or other MMORPG:s?

This question is optional.

Thank you for participating in this survey!

Submit

Appendix 4 - Open questions

What are your general thoughts about mobile access to WoW or other MMORPG:s?

1	It's great! Look at previous question.
2	Developers will make buggy barely tested software that will spend the first months being almost unusable, and then when it finally is no-one remembers it.
3	Cool idea!
4	IT is a great immersion and is gravely needed as it is in fact an interractive game
5	It could be very useful for things like posting auctions, mail and socializing but not for combat.
6	Brings more life to the game.
7	A lot of lag.
8	Great idea that should be expanded.
9	Sorry for no more answers but I think this game alredy steals enough time from people alredy so I can't really say that making more ways for people to spend their time on it is a good thing ;)..
10	Interesting, depending on the features that could be implimented. Seems rather hard to get anything other than things revolving around the social / economic aspect running well on a mobile device. In a more topic-related comment: I don't see 40 players on a mobiel device dodging the onyxia deep breath during a raid / end
11	...Seriously? Your phone should mean you're limited to real life and need a break from WoW.
12	I'm for it!
13	[insert shrug here]
14	good for social stuff and organising
15	nowadays too much is connected to your mobile phone....so wouldn't want a game that I play for fun on my mobile phone
16	achivements in the real world? wtf are you FUCKING kidding me? get 10 achi points for go to sleep the first time? get achi points for getting a million dollar? an achivement for getting laid?do you REALLY have to casualise the real world too? wasn't it enough to get a more clueless player base? do you really want faggots getting an achivement visiting Blizz HQ? i'm going to fucking kill the creators and coders if this comes out. I played wow for fucking 5 years. I fucking off tanked MC when i was 13. The magic is GONE, you assheads is probably happy with having a sheep flock following you around every corner you take. You don't even realize where you went wrong, and wondered when you lost a bit of your old playerbase, that's because you're fucking fungusheads. FUCK
17	Bara så ni vet så finns det redan en app som innehåller i stortsett allt förutom att man kan "styra" karaktären, i smartphones. Appen heter Armory. Kolla upp detta om ni inte gjort de.
18	i think its both good and bad, actually...it will help me plan my gaming more, but on the other hand, i will take the gaming with me wherever i go in my pocket...and i dont know how i would feel about that just yet. it may lead to me getting tired of the game faster...
19	Mobile with WoW on it? = chat, trade, AH and things like that, I think every1 hates to play wow on the phone or something BIG like that
20	Its all about the money isn't it?
21	BAD!
22	I like it very much.
23	I would love whatsapp and wow to work together so I can message a player ingame or send a message to a guildy from a phone without having to worry about country borders. Also, if linked to your realid-friendslist you could communicate without having to need to give your phone number.

How do you think mobile access will affect the WoW world?

24	The more people affecting the world at any given time, the more alive the WoW world becomes, making the game more fun to play.
25	Badly. People would have less reason to log in and the game would lose subs because plenty of people would notice that when you can do the MMO without the RPG for free it's still pretty good.
26	making the hardcore players more hardcore
27	The economy would be more involving and interresting and the interraction would be greatly improved
28	You might start seeing less players in the game world if you can control too many things through your phone
29	Less downtime for players which would result in better organizing and contact in groups and guilds.
30	Not a lot, since most players are sort of mobile with their laptops
31	Greatly affect it to a positive degree.
32	The die-hards will probably use it the way the auction house App is used today, however I don't think most would care that much when the possible hype dies later on.
33	Probably bring more trolls or farmers or gold sellers.
34	I believe that the addition of mobile services will benefit the WoW world, but it will be an addition only, not a game-changer.
35	I have no real idea. Possibly more people would be online more often so it would stress the servers a bit, and possibly it would make

	people more social and active, but other than that I have no idea.
36	It may cause a divide between "serious" players and beginner or casual players, and turn Azeroth into a world where you're not taken seriously unless you have the mobile service. It may also handicap players who don't have access to a mobile phone, or a good enough mobile phone (especially if it'd only be available for people with smartphones or iPhones). It could also cause a rift between richer and poorer players, especially if mobile access carries an additional fee. For example, a raiding group or guild might prefer players with mobile service, and that could make it more difficult for players who don't want or can't afford a mobile service to be involved in the game. That said, it could also provide a more immersive game play experience, and entice players to play more often. A mobile service could allow WoW to penetrate into our daily lives like facebook and email have. We can get phone notifications from a lot of websites now, so it's like we're never truly disconnected from the internet. Why should WoW be different? As long as it doesn't negatively impact the playing experience, I think I'd be okay with mobile WoW. But like doing achievements, it shouldn't be a required part of gameplay.
37	more use of chat functions (especially guild chat), more communication within guilds, players more active
38	Bara så ni vet så finns det redan en app som innehåller i stortsett allt förutom att man kan "styra" karaktären, i smartphones. Appen heter Armory. Kolla upp detta om ni inte gjort de.
39	the game will be more streamlined, so people playing will have less downtime. this is just what they have done every expansion, adding more flightpaths, more graveyards, etc. people dont want to be forced to walk over half the world just to make a 5-man.
40	probably in a bad way..
41	It will of coarse make tasks easier to do and also sooth down the addiction - / increase. When you have the thing you're addicted to in your hands, the feeling of traveling home just for WoW decreases, at the same time - if you dont have the mobile with you (if thats the case) , the addiction increases and you wanna get back home
42	Bad.
43	More social and more players online the hole day.
44	it will most likely become a more social environment. Wow will be used more as a chat client and guild members/ friends will be more likely to keep playing the game.

What features would you like to see in the mobile app?

45	Dungeon/zone and item information!
46	More chat features, RealID, auctions and maybe npcscanning.
47	Profession managing
48	Auction and mail notification
49	Travelling, pet managment, introductions/lectures ex "how to raid", "how to beat (insert boss name)" etc. Put out and answer to player requests ex "healer needed for.
50	Ability to raid/heroic 5 man.
51	A friendlist chat program.
52	Just a general increase in the ability to play the game from my mobile.
53	Being able to view your character, being able to possibly sign in to guild chat (although you would have to have a note next to your name saying you are 'on the phone' when doing so so that people won't think you are available for dungeons and stuff at that moment.)
54	none
55	Being able to use the Auction House, getting certain notifications like when auctions sell or someone sends me mail or a friend gets on WoW, and I really like the real-life achievements and being able to compare achievements and whatnot on my phone.
56	Bara så ni vet så finns det redan en app som innehåller i stortsett allt förutom att man kan "styra" karaktären, i smartphones. Appen heter Armory. Kolla upp detta om ni inte gjort de.
57	mostly chat functions, and some ways to change my gear and inventory. maybe some bank feature as well...
58	guild chat, trade chat, AH trade/sell/update and maybe some other feature :P
59	I dont want any of this wow experience on a mlbile phone.
60	A fun thing would be to see people play raids, dungeon arena etc. And it would be nice if i can do some quest and talk to people with voice.
61	The ability to private message
62	The guild news feed that is availbale in game so i can see what has been going on/boss kills/loot when i am offline. full armory functionality and the means to synchronize and add calender events from my phone calender.

How do you think mobile access to WoW would affect you and your usage of WoW?

63	I'd 'play' a little more on my phone, just chatting when nothing is currently going on wherever I am
64	Get me more addicted!
65	It would probably lenghten my gameplay hours and enhance my experience on the game outside of raiding
66	I'd think I'd probably play the game less to be honest, I sit afk in SW or org most of the day just chatting in guild/trade etc whilst doing the housework and looking after my kid.
67	It woyld increase. Might not be too good.
68	Less time stuck infront of a computer. Ability to play wherever and whenever I want. Travelling would be that much more fun! Not much really, think it is gonna take a lot of the battery and a big bill for the use of 3g (yes still 3G here ><).
69	More usage.
70	my main interest would be the ones I rated high during the questions, which is, in short, limited to the social aspect of the game. Talking about stuff game and non-game related, friends, items, etc, but not I cannot see me actually playing the game on a mobile device.
71	Might start playing the game again.
72	It would most likely increase my time spent with the game. I might be more active. I'm not sure. I'll need an Android or iPhone before I can find out.
73	easy to reach
74	none what so ever.. wouldn't want wow connected to my mobile phone
75	I might be more inclined to sign on if I knew a friend was already on, or that something important was waiting for me in Azeroth.
76	Bara så ni vet så finns det redan en app som innehåller i stortsett allt förutom att man kan "styra" karaktären, i smartphones. Appen heter Armory. Kolla upp detta om ni inte gjort de.
77	it would probably make me spend more time with things around wow. but it might save me some time planning raids and dungeons when im on my way home or something. that way, i can play as soon as i get home :)
78	very much itwould be easier to access if im traveling or going away on the weekend where i cant access my computer
79	--- :P
80	I play much more then I do today.
81	None
82	i'd use teamspeak less and use wow more to communicate with friends and guildies

Appendix 5 - Glossary

Android	Software operating system used in mobile devices.
iOS	Software operating system used in Apple's mobile devices.
MMOG	Massively multiplayer online game. Most commonly denoting a type of virtual world focused on gaming objectives.
MMORPG	Massively multiplayer online role playing game.
MUD	Multi-user Dungeon
NPC	Non-player character.
PvE	Player versus Environment.
PvP	Player versus player.
Quest	Assignment(s) given to players' in-game, generating experience points as well as other game goal rewards.
WoW	World of Warcraft

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