



University
of Glasgow

**An exploration of the Massively Multiplayer Online Role-Playing Game
World of Warcraft as a tool for facilitating incidental vocabulary
acquisition**

Author: Anamaria Kinga Maior

University of Glasgow

British Council ELT Master's Dissertation Awards: Commendation



University
of Glasgow

An exploration of the Massively Multiplayer Online
Role-Playing Game *World of Warcraft* as a tool
for facilitating incidental vocabulary acquisition

by

Anamaria Kinga Maior

0205778

A dissertation submitted in part requirement for the degree of

MEd TESOL

School of Education

Word Count: 15,143

August, 2016.

Acknowledgements

I would like to thank my supervisor, Dr. Lavinia Hirsu, for her wonderful support and kindness throughout this project. I am also grateful to my partner, Iskren Ivanov, for his patience in listening to endless speculations on improving my work. Finally, I am much obliged to my tutors at Glasgow University for their effort and assistance.

Abstract

This case study explores the extent to which incidental vocabulary acquisition (IVA) can occur in the context of the MMORPG *World of Warcraft* through the reading of quest texts and interaction with the game environment. Schmidt's (1990) *Noticing Hypothesis* and Nation's (2007) *Four Strands*, in combination with previous studies on multimodal environments, form the theoretical foundation of this project. Mixed methods were used to collect data through two types of research instruments: vocabulary pre- and post-tests designed by the researcher for the purpose of this study along with one-to-one semi-structured interviews. Data collection took place in 4 stages: vocabulary pre-test, game-play, vocabulary post-test and one-to-one semi-structured interviews over Skype. The participants were three second language learners of English (students at Glasgow University), who all expressed an interest in playing computer games. The findings suggest that *initial receptive knowledge* of new vocabulary items from playing the MMORPG *World of Warcraft* can occur incidentally in a relatively brief period of time (2-4 hours). Acquisition, albeit fragile, seems to be greatly facilitated by a combination of *word frequency exposure*, especially at 1-4 and 15+ occurrences, where the average improvement was 40% and 43% respectively. Furthermore, *visual representations* of creatures and locations seen in-game through the process of *questing* (completing in-game assignments) can also assist incidental vocabulary acquisition (IVA). One implication of the current study is that second language learners of English could be actively encouraged to play an MMORPG of their own choosing, as successful in-game vocabulary acquisition might encourage and assist further development of their vocabulary. Concurrently, the newly learnt vocabulary is transferable from the virtual environment to real life and as a result, it could be strengthened through practice. Finally, the study proposes further research be undertaken in the realm of online games to measure the amount of both *receptive* and *productive knowledge* of incidental vocabulary acquired from game-play.

Table of Contents

Title Page.....	i
Acknowledgements.....	ii
Abstract.....	iii
Table of Contents.....	iv
List of Figures and Tables.....	vi
Abbreviations.....	vii
1.0 Introduction.....	1
1.1 Background and context of the study.....	1
1.2 The purpose of the study.....	2
1.3 Outline.....	3
2.0 Literature Review.....	4
2.1 Vocabulary acquisition: definition.....	4
2.2 Optimal conditions for vocabulary acquisition: Schmidt's <i>Noticing Hypothesis</i> and Nation's <i>Four Strands</i>	4
2.2.1 Vocabulary acquisition and Schmidt's <i>Noticing Hypothesis</i>	4
2.2.2 Vocabulary acquisition and Nation's <i>Four Strands</i>	5
2.3 Incidental vocabulary acquisition (IVA): definition.....	7
2.3.1 Incidental vocabulary acquisition (IVA) through extensive reading.....	8
2.3.2 Testing incidental vocabulary acquisition (IVA): the controversy explained.....	11
2.4 Vocabulary acquisition through multimodal environments.....	13
2.5 Context for incidental vocabulary acquisition (IVA): <i>World of Warcraft (WoW)</i>	14
2.5.1 <i>World of Warcraft (WoW)</i>	14
2.5.2 MMORPGs and <i>World of Warcraft</i> as informal SLA learning environments.....	16
2.5.3 The MMORPG <i>World of Warcraft</i> as an interactive multimodal learning environment with rich meaning-focused input.....	18
2.6 Research questions.....	21
3.0 Methodology.....	21
3.1 Research paradigm.....	21
3.2 Mixed methodology, research instruments and data analysis.....	22
3.3 The design of research instruments and data collection.....	23
3.4 Vocabulary tests: exercises I-IV.; reliability, validity and practicality of tests; quest sample.....	25
3.4.1 Vocabulary tests: exercises I-IV.....	25

3.4.2 Reliability, validity and practicality of vocabulary tests	27
3.4.3 Quest sample from <i>World of Warcraft</i>	28
3.5 Semi-structured interviews	30
3.6 Participants.....	30
3.7 Confidentiality and anonymity	31
3.8 Potential risks	31
4.0 Findings	32
4.1 Research question 1: <i>To what extent does the number of in-game word exposure frequency in quest texts facilitate the comprehension of incidental vocabulary?</i>	32
4.2 Research question 2: <i>To what extent does the interaction with the game environment through visual representations of creatures and locations assist with the comprehension of incidental vocabulary from game-play?</i>	35
4.3 Research question 3: <i>To what extent does the interaction with quest texts through in-game actions facilitate the comprehension of incidental vocabulary?</i>	38
4.4 Findings: final totals from vocabulary tests	43
5.0 Conclusion	43
5.1 Limitations of the study	43
5.2 Implications and suggestions for future research	44
6.0 Bibliography	46
7.0 Appendices	51
7.1 Ethics application: approval and amendments.....	51
7.2 Call for Participants: Pamphlet (see Request for Amendments above)	55
7.3 Consent form	56
7.4 Participant Guidelines.....	57
7.5 Vocabulary tests	58
7.5.1 Vocabulary pre-test	58
7.5.2 Vocabulary post-test	61
7.6 Interview	65
7.6.1 Interview questions	66
7.6.2 Sample interview: Kimkimkim (15.05 minutes)	66

List of Figures and Tables

Disclaimer: all screenshots used in this study were taken by the researcher in-game (*World of Warcraft*) and were or will be used purely for educational purposes.

Figures and their specification	Page nr.
Figure 1. Walking with hunter pet in Elwynn Forest on a sunny day	15
Figure 2. A level 1 versus a level 100 character	16
Figure 3. Accepting a quest from Guard Thomas at East Elwynn Bridge	19
Figure 4. <i>Protect the Frontier!</i> – quest text from Guard Thomas at East Elwynn Bridge	20
Figure 5. Examples from Exercises I. and II.	26
Figure 6. Examples from Exercises III. and IV. of the vocabulary pre- and post-tests	27
Figure 7. The objectives of the quest <i>Protect the Frontier!</i> – quest text from Guard Thomas at East Elwynn Bridge	28
Figure 8. Meeting <i>prowlors</i> and <i>young forest bears</i> in Elwynn Forest	29
Figure 9. <i>5/8 Prowler or Forest Wolf slain</i> , a message to notify the quest advancement	29

Tables and their specification	Page nr.
Table 1. Data collection: sequence, stages, duration and research site	24
Table 2. The 37 vocabulary items listed according to word exposure frequency	25
Table 3. Unknown and acquired vocabulary items according to word exposure frequency ranges	33
Table 4. Pre- and post-test results of all participants: Exercise I.	36
Table 5. Pre- and post-test results of all participants: Exercise II.	37
Table 6. Pre- and post-test results of all participants: Exercise III.	39
Table 7. Pre- and post-test results of all participants: Exercise IV.	40
Table 8. Individual improvement of visually and non-visually represented vocabulary items	42
Table 9. Final total results from pre- and post-tests of all participants	43

Abbreviations

CALL: Computer Assisted Language Learning

IVA: incidental vocabulary acquisition

L1: first language, known as mother tongue or native language

L2: second language, usually learnt after and in addition to L1

MMORPG: massively multiplayer online role-playing game

MyEVA: My English Vocabulary Assistant, an integrated vocabulary-learning system developed in Taiwan

Naturalistic CALL: computer assisted language learning in online informal learning contexts

NPC: a non-playing character in a digital game that is controlled by the computer program

PvE: Player versus Environment or MMORPG gameplay where players play against characters or things controlled by the computer program

PvP: Player versus Player or MMORPG gameplay where players compete against other players in real-time through combat or duelling

RPG: Role-Playing Game or MMORPG gameplay where players take on and play out a specific role in a fantasy world

RPPvP: role-playing PvP

SLA: second language acquisition

SVST: Standardised Vocabulary Size Test, Nation (2008)

WoW: *World of Warcraft*® - one of the most popular subscription-based MMORPGs with approximately 5.5 million subscribers as of November 2015.

1.0 Introduction

1.1 Background and context of the study

For the past two decades, interactive media (e.g. video and online games) have been rapidly expanding in contrast with passive media – TV and radio (Mawer and Stanley, 2011). Amongst them, online games, specifically MMORPGs (massively multi-player online role-playing games) are currently one of the most popular forms of entertainment, especially among “the video-game generation” (Lee and Hoadley, 2007) or “Digital Natives” (Prensky, 2001), who grew up with the use of Internet communication tools. However, the player-base of online games extends beyond the former group and encompasses people of all ages (Yee, 2009; Nardi, 2010; Cornillie *et al.*, 2012:245). Furthermore, some players can spend up to 25 hours per week on average inside the game (or games) of their choice (Williams *et al.*, 2008:1002).

MMORPGs are graphical 2- or 3-D real-time digital strategy games, highly immersive and interactive, globally connected virtual environments (Rankin *et al.*, 2006; Kongmee *et al.*, 2011; Mawer and Stanley, 2011; Sylven and Sundqvist, 2012), where players control their personalised *avatar* (in-game character) continuously through a camera, keyboard and mouse, using hand-eye coordination in order to move through and interact with the game environment (Peterson, 2010; Whippey, 2011). Additionally, MMORPGs are rich semiotic narrative environments that include game-generated texts (e.g. quests, combat texts, descriptions of in-game abilities called *tooltips*), as well as player-to-player and player-to-environment interactions that involve continuous critical thinking and problem-solving skills during game time (Steinkuehler, 2004; Dickey, 2007; Nardi, 2010; Chik, 2011; Rama *et al.*, 2012; Coxhead and Bytheway, 2015). For example, these skills may involve defeating potent enemies (e.g. other players and *NPCs*: non-player characters), trading virtual items for in-game currency, exploring the game environment through walking, flying, swimming, and constantly improving the players’ *avatars* with better equipment (*gear*), spells and abilities.

Since there is a plethora of MMORPGs available on the market, they were narrowed down to one specific game. After careful consideration, *World of Warcraft*® (or *WoW*, by Blizzard Entertainment, Inc.) was chosen as the context of the current study due to the following reasons: 1. it offers large amounts of game-generated text input (16,281 quests from level 1 to 100 as of December 2015); 2. all quest texts can be found in online databases on supporting websites, such as www.wow.gamepedia.com; 3. the game is free to play from levels 1-20, which will

cover the scope of the current research study; 4. the researcher's own students shared informal reports of vocabulary learning from playing *WoW* and 5. the researcher herself has extensive experience of playing the game and is familiar with it.

Even though MMORPGs – and *World of Warcraft* - are designed for entertainment, not educational purposes, they have attracted significant attention from researchers in the field of SLA and Naturalistic CALL (Steinkuehler, 2004; Rankin *et al.*, 2006; Peterson, 2010, 2012). Since the latter is defined as learning a second or foreign language in online informal learning contexts, MMORPGs are an appropriate example for it (Chik, 2013:835). The main reason for this is that engaging in these games tends to compel the players to use English in order to be able to enjoy and advance their gaming experience (Sylvén and Sundqvist, 2012) due to English being the “de facto gaming language” of these “globalised game-worlds” (Chik, 2013:836). Therefore, a large number of studies conducted on MMORPGs cover second language learning through social interaction and communication with other players (Steinkuehler, 2004; Peterson, 2010, 2012; Ryu, 2013), as well as intrinsic motivation (Dickey, 2007; Sykes and Reinhardt, 2013). Some studies cover the complexity of language used in online games in detail (Thorne *et al.*, 2012) and very few have probed into the language strategies learners have adopted during game-play (Bytheway, 2015).

1.2 The purpose of the study

As there is currently limited systematic research conducted in the field of incidental vocabulary acquisition (IVA) in the context of online games for second language learners of English, this study proposes to combine digital gaming and vocabulary acquisition through extensive reading by using Schmidt's *Noticing Hypothesis* (1990, 2010) and Nation's (2007) theory of *Four Strands*. The study will focus on Nation's first strand in particular: **meaning-focused input** through reading (see 2.2.2).

The term incidental vocabulary acquisition (IVA) is mostly applied to tasks, such as reading and listening, undertaken with the purpose of personal understanding and enjoyment (Schmidt, 2010). It is essential to note here that IVA is not planned, nor controlled by learners: rather, it is “the effortless acquisition of lexis” (Dörnyei, 2009:169). The current study's purpose is to measure whether incidental vocabulary acquisition (IVA) can be facilitated while playing the MMORPG *World of Warcraft* in the span of approximately 2-4 hours.

Furthermore, most researchers in the field of vocabulary acquisition agree that the *frequency* of occurrences of new vocabulary items can greatly influence their successful acquisition by learners (Schmitt and McCarthy, 1997; Pigada and Schmitt, 2006). Additionally, Gee (2007) argues that in-game *images* and *actions* can assist

players' vocabulary acquisition the same way "traditional" learners associate words with images or actions. Therefore, the current study will also take into consideration the following significant aspects: *word exposure frequency*, *visual representations* and *actions* in-game, specifically in quest texts (see research questions in 2.6).

1.3 Outline

The first chapter of the study, Literature Review (2.0), will define and describe the optimal conditions necessary for successful vocabulary acquisition, including Schmidt's (1990) *Noticing Hypothesis* and Nation's (2007) *Four Strands* theories. Then, it will cover how *incidental vocabulary acquisition* (henceforth referred to as IVA) occurs and offer a critical analysis of previous studies related to IVA. Then, as a necessary step, the controversy regarding IVA testing will be explained. Next, multimodal environments will be covered briefly as they pertain closely to the context of the study: the MMORPG *World of Warcraft*. The subsequent sub-chapters will provide more details regarding the game itself. Finally, the research questions will be presented.

The second chapter of the study, Methodology (3.0), will cover the research paradigm, methods and research instruments utilised, including the vocabulary pre- and post-tests designed by the researcher. Reliability, validity and practicality of the tests will also be described. Furthermore, the one-to-one semi-structured interviews, the participants, the ethical process, confidentiality and anonymity as well as potential risks will be explicated. The third chapter of the study, Findings (4.0), will discuss and compare the data in relation to previous research studies while answering the proposed research questions. Finally, the Conclusion (5.0) will outline the limitations and implications of the study along with suggestions for future research.



2.0 Literature Review

2.1 Vocabulary acquisition: definition

Vocabulary acquisition is a highly complex process that involves different aspects of knowledge. The most comprehensive specification of vocabulary acquisition to date is the one set by Nation (2001:27), which lists both aspects of receptive and productive vocabulary knowledge based on three elements: “1. **form** (sound, spelling, word structure), 2. **meaning** (associations, referents, the concept expressed) and 3. **use** (word patterns, collocations, constraints on word usage)”. Most researchers agree that the most essential lexical aspect needed for vocabulary acquisition is **the form-meaning link**: this may be adequate to allow recognition of a word (Schmitt, 2010:15). As the acquisition of vocabulary is an incremental process “both in terms of acquiring an adequate vocabulary size and in terms of mastering individual lexical items”, **the form-meaning link** is probably the most appropriate aspect of knowledge to be measured at the beginning of the incremental learning process (Schmitt, 2010:16-19). However, for practical reasons, only one of the word knowledge aspects – **meaning** – will be measured in the present study. Therefore, when referring to vocabulary acquisition hereafter in this project, it should be interpreted as *comprehension of meaning*. Additionally, vocabulary acquisition requires certain optimal conditions for successful learning to occur, which will be discussed next.

2.2 Optimal conditions for vocabulary acquisition: Schmidt’s *Noticing Hypothesis* and Nation’s *Four Strands*

Prior to discussing the optimal conditions that facilitate vocabulary acquisition, it has to be noted that these apply to both *intentional* and *incidental learning* in SLA.

2.2.1 Vocabulary acquisition and Schmidt’s *Noticing Hypothesis*

According to Schmidt’s (1990) *Noticing Hypothesis*, the learner’s “consciousness” in use is needed to facilitate both *intentional* and *incidental learning*. He distinguishes “consciousness as intentionality”, which involves a learner’s deliberate, goal-directed decision to learn (Schmidt, 2010:722) and “consciousness as non-intentionality” or “incidental learning”, which means the involuntary process of “picking up” (or incidental learning of) a language through exposure, e.g. reading, listening, speaking and writing tasks (Ellis, 2002:55; Rott, 2012). Schmidt (1990, cited in Skehan, 1998:48) further argues that noticing is a necessary, but insufficient condition for effective learning. In

other words, learners will notice input based on a combination of *external factors*: the complexity of input, the context, instructional treatment, task characteristics, exposure to language - and *internal factors*: the learners' aptitude, motivation, current language level, unique experience of language exposure, learning styles and strategies (Schmidt, 2010:730-733). The input that the learner notices, either intentionally or incidentally, will then become intake and subsequently, L2 knowledge (Ellis, 2002:56). However, it is crucial to specify that only the vocabulary that is considered important and necessary, specifically for comprehension of meaning, will be noticed and processed by the learner – it is contingent on their personal choice (Kweon and Kim, 2008; Zhu, 2015:970). Nevertheless, *word exposure frequency* can aid this process, which is the first of six determinants that influence noticing, as specified by Schmidt (1990):

1. Frequency of form (or *word exposure frequency*) – the more often a particular form (or word) is encountered, the more likely it is to be noticed by the learner
2. Perceptual salience of form – the more a particular form (or word) stands out from the others, the more likely it is to be noticed
3. Instruction – which can help the learner notice and analyse forms (or words) previously incomprehensible
4. Time and individual differences in processing ability – these are problematic as every learner is different
5. Readiness to notice – a learner's internal structures predispose them for what they are ready to learn
6. Task demands – which relate to what is expected of the learner as a result of an activity (Schmidt, 1990, cited in Skehan, 1998:48-53).

In the current study, due to time limitations, there were no appropriate measuring instruments designed for perceptual salience of form or readiness to notice, and instruction may have altered the incidental nature of learning this project aims to examine. Therefore, the main focus will be on *word exposure frequency*, while taking into consideration *time* and *task demands* as facilitators of IVA. They will be addressed in more detail in the Methodology chapter of this project (see sections 3.3 and 3.4).

2.2.2 Vocabulary acquisition and Nation's *Four Strands*

There is another set of optimal conditions needed for SLA to occur. Nation (2007:2) proposes a framework of Four Strands or “continuous sets of learning conditions” to assist SLA: **1. meaning-focused input**, **2. language-focused learning**, **3. meaning-focused output** and **4. fluency** (the order rearranged by the researcher). Nation (2007) suggests that all four strands should be implemented equally in order to maintain a balanced language course – they constitute necessary and sufficient

conditions for all types of SLA to occur (*ibid.*). However, as will be demonstrated later (see sections 2.4 and 2.5), these four strands do not apply only to classroom settings and teacher controlled activities. They also permeate informal language settings, be it in everyday real life situations or, increasingly, in online or virtual environments (Chik, 2013; Coxhead and Bytheway, 2015). The present study will focus on the latter in the form of an online computer game, specifically the MMORPG (massively multiplayer role-playing game) *World of Warcraft*.

The first strand (meaning-focused input) usually involves receptive language learning through reading and listening, thus providing a platform to facilitate *incidental learning*. Nation (2007:3) enumerates typical activities related to this strand as “extensive reading, shared reading, listening to stories, watching TV or films, and being a listener in a conversation”. It is important to note here that some of the conditions needed for this strand are rich quantities of input with sufficient and spaced repetition of vocabulary items, as well as learners’ interest to understand this input (Nation, 2007:3). These conditions are usually met in MMORPGs, as section 2.5 will exemplify.

The second strand (language-focused learning) involves deliberate or intentional learning of the language (Nation, 2007:6) through typical activities, such as pronunciation practice, using word cards, intensive reading, translation, memorising dialogues. These are usually entitled “learning strategies”. The third and fourth strands (language-focused output and fluency) are closely interconnected as they are based on productive learning through speaking and writing, although the last strand (fluency) includes reading and listening as well. There is a great variety of activities involved in the last two strands. However, due to practical reasons, such as time constraints and lack of resources, only the first strand, **meaning-focused input**, will be applied to *incidental vocabulary acquisition (IVA)* in the context of a specific online virtual environment, the MMORPG *World of Warcraft*.

Notably, a comparison of two vocabulary acquisition studies utilising the first two strands shows that generally, strand 1 (**meaning-focused input**) produces much less learning, perhaps due to strand 2 (language-focused learning) involving conscious effort on part of the learner. Waring and Takaki’s (2003) research based on a 56-minute meaning-focused (strand 1) reading of a graded reader shows that only 4 words were learnt “reasonably well” and 12 “partially” out of 25 vocabulary items. In contrast, a study of Nation (2001:298) on deliberate vocabulary learning (strand 2) showed the learning rate of 35 words in 60 minutes. Nevertheless, Nation and Webb (2011:114) contest these findings and suggest that if more sensitive tests could be designed to measure how much time is actually spent on vocabulary learning during extensive reading, the comparison of the two types of learning could produce more reliable evidence. Furthermore, strand 1 (**meaning-focused input**) also has the benefit of

improving learners' receptive skills in an enjoyable manner while developing their content matter knowledge (Nation, 2007:9; Schmidt, 2010:724). An example of the latter is the array of different creatures encountered in the online game *World of Warcraft*.

Having considered the optimal conditions needed for IVA to occur, the current study will focus on **meaning-focused input** through reading and interaction with an online computer game as an informal learning environment. It will investigate whether *incidental learning* of vocabulary items can occur taking into account Schmidt's (1990, 2010) *Noticing Hypothesis*, which emphasises *word exposure frequency* through extensive input along with *time* and *task demands*, as well as Nation's (2007) *first strand*, which also concentrates on **meaning-focused input**. However, it is worth noting here that all of the above points lose their significance if there is no motivation or intrinsic interest on part of the learner to actively engage in the learning process, specifically extensive reading in this case (Dörnyei, 1998:120; Huckin and Coady, 1999:188). As seen above (2.2.1), motivation is one of the internal factors that exerts influence on noticing (Schmidt, 1990). Since online computer games usually facilitate motivation (Yee, 2006; Gee, 2007; Sykes and Reinhardt, 2013), they were chosen as the context of the present study with the presumption that the participants engaged in them willingly and for personal enjoyment, thus providing a suitable platform for IVA, which will be covered in more detail in 2.3.

2.3 Incidental vocabulary acquisition (IVA): definition

Since the 1990s, research into vocabulary in SLA has seen a significant increase (Rott, 2012) while the acquisition of vocabulary through *incidental learning* (IVA) remains one of the most widely debated issues. Schmitt (2010:29) characterises *incidental learning* as a "by-product of language usage, without the intended purpose of learning a particular linguistic feature". Dörnyei (2009) and Rott (2012) further stipulate that IVA refers to learners engaging in meaning-focused receptive language while reading, listening, speaking or writing with no conscious intention to commit vocabulary to memory. Zhu (2015:968) adds that the learners' main goal is "to comprehend [meaning] or communicate", thus, it is not considered to be intentional learning.

However, Schmidt (1990, 2010) argues that IVA is not completely unintentional either: after all, **attention** and **noticing** are requisites for any learning to happen, which means the learners are conscious of the process, even if not at all times. Furthermore, they may guess or infer the meaning of words from context, which implies awareness. Inferring word meaning from context is a specific lexicon-oriented learning strategy and

is considered *intentional learning* (Oxford, 2003; Nation, 2008; Dörnyei, 2009; Saville-Troike, 2012; Zhu, 2015).

The *incidental vs. intentional* dichotomy in SLA has been analysed by many researchers. Nevertheless, luminaries, such as Dörnyei (2009:171), Nation and Webb (2011:112), support the argument that the two learning systems are complementary and L2 efficiency can only be achieved through the co-operation of both. Ultimately, there is a limit to what teachers can draw learners' attention to and what can be learnt in the classroom, therefore, additional *incidental learning* is necessary and should be accrued from extensive input, especially through reading of authentic texts (Pellicer-Sánchez and Schmitt, 2010:32). The dichotomy between *incidental* and *intentional learning*, however, is outside of the scope of the current study, which focuses on IVA as the unintentional or incidental acquisition of vocabulary from **meaning-focused input** through reading (Nation, 2008), assisted by the *Noticing Hypothesis* (Schmidt, 1990, 2010) in the context of an online game.

2.3.1 Incidental vocabulary acquisition (IVA) through extensive reading

An overview of the literature shows that most studies on IVA have been conducted using extensive reading practice. Extensive reading is generally viewed as a pleasurable voluntary activity (Brown *et al.*, 2008), which involves either teacher-recommended or self-chosen texts at a level suitable for the learner (Huckin and Coady, 1999). It is a receptive cognitive ability that is considered "the ideal medium" for vocabulary acquisition due to the following reasons: 1. printed materials provide more time for the learner to process new words than aural input (Ellis, 1994, cited in Rott, 2012:1); 2. through reading, the L2 learner can acquire the meanings and connotations of new vocabulary and even their usage in certain contexts (Zhu, 2015); 3. partially known vocabulary can also be cumulatively enriched through this practice (Schmitt, 2010).

Perhaps the most vigorously debated issue within the field of IVA is *word exposure frequency* during extensive reading. There is a general consensus on the incremental nature of vocabulary acquisition from reading, however, there is no agreement on how many and exactly what types of exposures are necessary for successful acquisition (Huckin and Coady, 1999; Laufer and Goldstein, 2004; Zhu, 2015). In theory, *word exposure frequency* influences vocabulary acquisition in two ways: 1. by increasing the possibility of noticing and processing new words by the learner and 2. by increasing the chance that an initial memory trace is retained, then through subsequent occurrences is strengthened (Schmitt, 2010:161; Rott, 2012; Zhu, 2015:969). It is highly likely that a

word encountered frequently in a text will receive more attention from the learner and thus, produce more cognitive processing or mental response (Zhu, 2015:969).

The first seminal works in the field of IVA were that of Saragi *et al.* (1978, cited in Pellicer-Sánchez and Schmitt, 2010:33), who recommended a minimum of 10 repetitions of a vocabulary item in a text for IVA to occur. Their study was based on the reading of an authentic novel (*A Clockwork Orange* by Burgess, 1972) and a test taken by twenty native English students on the Russian slang words used in the novel. The average score on a multiple-choice meaning recognition test was 76%. Later, Nagy *et al.* (1985) suggested the probability of learning vocabulary from context after 1 exposure to be between 0.10 and 0.15, however, in a follow-up study, Nagy *et al.* (1987) found this was much lower: 0.05. Furthermore, in his seminal work, Nation (1990) surveyed previous studies on IVA, based upon which he recommended that, on average, 5-16 incidental word exposures are necessary for full acquisition to occur.

Additionally, Horst *et al.* (1998) concluded that after 8 exposures in a text, vocabulary items were more likely to be learnt. Waring and Takaki's (2003) study also shows a minimum of 8 exposures are needed for form recognition, however, in an unprompted meaning test, even 18 exposures provided a low, 10-15% chance to recall the meaning of a word. Three months later, both meaning recognition and translation test scores dropped, the latter even more significantly, from 4.6 to 0.9. In addition, Wu and Xu's (2006) study of 55 Chinese students reading a 3,332 word long English story shows that 14-17 exposures were necessary for IVA to occur, which is significantly higher on average, but is congruent with Nation's (1990) recommendation.

Another IVA study conducted by Kweon and Kim (2008) concurs with Wu and Xu (2006), where 12 Korean learners of English read 3 authentic novels containing 134,013 words in the course of 5 weeks. The two researchers not only tested for *word exposure frequency*, but also word class, which was not included in the studies described above. Kweon and Kim's (2008) findings demonstrate that among content words, nouns were more easily retained than verbs and adjectives, possibly due to nouns being more basic on a conceptual level (Kweon and Kim, 2008). Additionally, the higher *word exposure frequency* (≥ 20) yielded the best retention rates in comparison with 7-19 and 1-6 exposures in a post-test administered immediately after reading, although some of the vocabulary with lower *word exposure frequency* was also acquired when their meaning was crucial for comprehension. This was considered a novel finding. However, after one month, a second post-test indicated that vocabulary attrition occurred for nouns with 7-19 *word exposure frequency*.

Furthermore, Pigada and Schmitt (2006) also claim that higher *word exposure frequency* produces better retention rates in meaning: except for single and 2-3 exposures, all other brackets (4-5, 6-10, 10+ and 20+) show clear overall improvement,

especially starting at 10+ exposures, on average from 8.3% to 23.7%. This was a case study of one learner, which lasted for a month. During this time, the learner read 30,000 words. Overall, it is estimated that on average, 14.5 words/hour were learnt during the study. Brown *et al.* (2008) agree with the Kweon and Kim (2008) as well as Pigada and Schmitt (2006) in that higher *word exposure frequency* results in better acquisition rates. Even though Brown *et al.* (2008) used different frequency bands: 2-3, 7-9, 10-13 and 15-20 through three different input modalities: reading-only, reading-while-listening and listening-only (see 2.4); nevertheless, the data from the reading-only group showed that 15-20 exposures had the highest retention rate on a multiple choice test, followed by the 7-9, then 10-13 and 2-3 exposures respectively. In contrast, the meaning-translation test scores were considerably lower.

In addition, Pellicer-Sánchez and Schmitt's (2010) work is noteworthy for its replication of Saragi *et al.*'s (1978) study utilising a different methodology and research questions. The participants were 20 Spanish students of English who read an unabridged novel: *Things Fall Apart* by Achebe (2001) containing 67,000 words. Words in the Nigerian language Ibo – unknown to the participants – were used throughout the novel. It was concluded that meaning recognition rate of the unknown vocabulary was the highest: 43%, followed by spelling recognition: 34%, and word class recall: 20%, then meaning recall: 14%, suggesting that recall from only incidental learning tends to be difficult. Also, there was a noticeable increase of vocabulary acquisition at 5-8 exposures: 11%, compared to single or 2-4 exposures: 5%, which rose sharply to 48% at 10-17 exposures. At 28+ exposures lexical learning still continued, but at a lower rate than in the 5-8 and 10-17 exposure ranges.

Finally, there is new data to support the above studies from Pellicer-Sánchez's (2015) study on eye-tracking movement during L2 reading of a 2,300 word long short story containing 48 nonwords, e.g. *holter* for "house" or *cambul* for "ring" (Pellicer-Sánchez, 2015:12). It was found that already after 3-4 exposures, the nonwords were read faster and after 8 exposures they were read at a similar pace as real words that were known previously (Pellicer-Sánchez, 2015:1). Also, 86% and 75% of the target nonwords were recognised for form and meaning, whereas a meaning recall test resulted in 55% (*ibid.*). This study concurs with previous research that also claimed a minimum of 8 encounters with new vocabulary was needed for recognition, and in general, active recall is more difficult than passive recognition (Horst *et al.*, 1998; Waring and Takaki, 2003; Kweon and Kim, 2008; Brown *et al.*, 2008). For definitions of *active* versus *passive recognition* and *recall*, see Laufer and Goldstein's (2004) categorisation below.

2.3.2 Testing incidental vocabulary acquisition (IVA): the controversy explained

As previous studies suggest (Pellicer-Sánchez and Schmitt, 2010; Zhu, 2015), one of the main reasons for the controversy regarding IVA seems to be the insurmountable task of taking all possible variables and factors into consideration when conducting research in this field, thus leading to a large variety of tests employed to measure IVA. Some of the variables are the age, aptitude, motivation, proficiency level of participants, even the different L2s learnt; others are the length and nature (authentic or not) of texts used in the studies, different time periods spent on reading these texts, real or nonwords used as target vocabulary to be learnt and various modalities used as input, including textual, visual and aural. Previous studies took into consideration different aspects of vocabulary: word class, spelling, form, meaning and level of frequency (Zhu, 2015). However, it should be noted here that previous research did not test for meaning at different levels (*recall* and *recognition*) consistently (Zhu, 2015:972). Laufer and Goldstein (2004:406-407) categorised four different degrees of knowledge of meaning in vocabulary acquisition based on 435 L2 learners' tests:

1. **active recall** – the L2 target word has to be supplied, e.g. translation test where the prompt is given in L1
2. **passive recall** – a demonstration of comprehension of the L2 vocabulary, which is given as a prompt: e.g. translation into L1
3. **active recognition** – choosing the L2 target word from 4 options, the prompt is in L1
4. **passive recognition** – the L2 target word is given as a prompt and there are 4 meanings given in L1 to choose from.

The results of their study show a reliable hierarchy of difficulty as follows: **active recall > passive recall > active recognition > passive recognition** (Schmitt, 2010:85). Recalling form or meaning from memory (either passively or actively) is considered to require a higher degree of knowledge as it indicates a better memory trace than recognition. Most previous studies have tested for form and meaning recognition in IVA (see 2.1.2) and administered active or passive recall tests (Zhu, 2015). The results unanimously show that vocabulary knowledge acquired from extensive reading is usually quite fragile and will undergo attrition after 2-4 weeks if not encountered or used in the meantime (Waring and Takaki, 2003; Kweon and Kim, 2008; Brown *et al.*, 2008).

However, most studies utilised multiple-choice tests, which automatically guarantee a 25% chance of correct answers by guessing. This is by no means a reliable indication of vocabulary acquisition and it overlooks the measurement of subtle improvements or partial word gains (Zhu, 2015). Therefore, Kweon and Kim (2008:194)

recommend meaning-translation tests, self-report checklist measures and word-form recognition tests – in general, a mix of different measurement instruments to overcome the weaknesses of multiple-choice tests (Pellicer-Sánchez and Schmitt, 2010). Unfortunately, the current study could not accommodate all of these recommendations. Therefore, it was more practical and less time consuming to test only for initial receptive vocabulary knowledge of the participants, for example through having them recognise word-form and provide a synonym for the target vocabulary (see research instruments in section 3.4).

At the same time, the present study attempted to conform with Nation's (2008) three requirements, which are widely accepted as necessary for vocabulary tests: **reliability** (assisted by minimum 30 items to be assessed, familiar formatting, clear instructions and possible variations in answering), **validity** (suitable for the learners' level, taken seriously without cheating, used for the purpose for which it was designed) and **practicality** - suitable length, convenient marking, easily interpretable scores and tests are inexpensive to produce copies of (*ibid.*, 153-155). These features were carefully considered and a range of tasks was designed to strengthen the reliability, validity and practicality of the research instruments (see section 3.4).

Finally, as the present study's focus is on *comprehension of meaning*, it should be pointed out that certain semi-contextualised techniques can assist L2 vocabulary acquisition to a great extent, specifically recall of comprehension (Oxford and Crookall, 1990). These are: words paired with imagery, the application of synonymy and the grouping of vocabulary items according to semantic categories (Oxford and Crookall, 1990; Schmitt and McCarthy, 1997:212-213; Schmitt, 2010:52-55). However, a limitation of illustrations is that visual representations are restricted to concrete nouns, certain verbs of movement and concrete adjectives, thus decreasing the pool of target vocabulary used for testing (Schmitt and McCarthy, 1997; Schmitt, 2010:52-55). Therefore, the use of imagery was applied to concrete nouns taken from the online computer game chosen as the context of the present study, e.g. *goblin*, *murloc*, *kobold*, *worg*.

Furthermore, since the main purpose of the current study was to test only for initial receptive vocabulary knowledge, a sensitive test was designed in an attempt to follow Nagy *et al.* (1985) and Nation's (2008) recommendation. This type of test usually covers a small amount of vocabulary and applies only one variable to the study as per Huckin and Coady (1999), which is *word exposure frequency* in the present study. L2 was used in this study and all degrees of knowledge were tested, except for active recall due to certain limitations of the study outlined in the Conclusion, including time constraints and lack of resources.

2.4 Vocabulary acquisition through multimodal environments

The final step before introducing the context of the present study in more detail is covering vocabulary acquisition through multimodal environments. A learning environment can be considered multimodal if it uses at least two different modes of content knowledge: **verbal** (through texts) and **non-verbal** (visual, aural, spatial) as defined by Paivio (1986, cited in Moreno and Mayer, 2007:310) and Gee (2007). The learners who use these educational environments either for intentional or non-intentional learning can acquire knowledge through both modalities, thus enhancing their multimodal literacy skills (Schrader and Lawless, 2010:200; Zheng *et al.*, 2015:773).

For example, a study conducted by Tight (2010) with a group of 128 American undergraduate adults attending a Spanish course measured L2 vocabulary acquisition through 4 different modalities: visual, auditory, kinaesthetic and mixed modality (the latter combining all 3). The learners' most preferred mode was visual, while the highest overall mean gains were achieved by the mixed-modality group in all 3 post-tests. Additionally, a study at Michigan State University conducted with 26 American learners of beginner Russian utilised three different input modalities to test vocabulary acquisition (Sydorenko, 2010): video, audio and captions. The group that saw a video with audio and captions learned more word meanings as shown in a translation test than the groups that saw video with captions and video with audio only. The data also show that captions received the most attention, followed by video and audio (Sydorenko, 2010). As seen from the above, a combination of both verbal and non-verbal modalities tends to produce higher results in administered post-tests. However, these studies did not measure *word exposure frequency* and its effect on IVA, which points to a gap in research.

Additionally, multimodal environments can be **interactive** or **non-interactive**, as categorised by Moreno and Mayer (2007). In the former, multidirectional communication between the learner and the environment is possible and the learner has control over their own learning as their actions determine the presented words and pictures; however, in the latter, pre-determined messages do not allow for any interaction between the learner and the environment (e.g. a narrated animation or a text with illustrations). Notably, Yang and Wu's (2015) recent research from Taiwan conducted with 93 undergraduates learning English concludes that most participants preferred an **interactive** mixed modality learning environment (MyEVA preference mode) over a less interactive mixed modality programme (MyEVA basic mode), with

using an Internet dictionary or a paper dictionary being the least chosen modalities. Furthermore, the highest rate of successful learning outcomes was achieved when using the MyEVA programme's preference mode (Yang and Wu, 2015:317). Therefore, in order to stimulate interest and engagement in the participants, the MMORPG *World of Warcraft* was chosen as the context of the present study as it can be considered an **interactive** multimodal environment for the following reasons: it has both verbal and non-verbal modalities and the players continuously interact with the game environment.

2.5 Context for incidental vocabulary acquisition (IVA): *World of Warcraft (WoW)*

Note: From this section onwards, learners will be referred to as *players* in order to further exemplify the incidental nature of learning activities they are engaged in when playing online games.

2.5.1 *World of Warcraft (WoW)*

World of Warcraft is a 3-D real-time digital strategy game. It was released in November 2004 and has had 5 expansions since then, with the latest one entitled *Legion* scheduled to launch in August 2016. The game can be played on *realms* (official Blizzard servers which host the game world) that are divided into 4 types: PvE (player-versus-environment), PvP (player-versus-player), RP (role-playing) and RPPvP (role-playing PvP). Players can choose a realm depending on their game-style preferences, although these may overlap in-game.

Furthermore, players tend to voluntarily spend considerable amounts of their social lives in *WoW* (Yee, 2006; Williams *et al.*, 2008:1002; Nardi, 2010). On the one hand, this is probably due to the immersive nature of the game, which creates a multimodal environment. As Figure 1 shows, the images, weather effects, 3-D objects (e.g. nature, characters) and ambient sounds (which cannot be reproduced here) all contribute to an appealing fantasy world, which may provide the sensation of being immersed in the game world (Gee, 2007; Paivio, 1986, cited in Moreno and Mayer, 2007:310; Peterson, 2010; Whippey, 2011).



Fig. 1. Walking with hunter pet in Elwynn Forest on a sunny day, *World of Warcraft* – screenshot taken by researcher on 09/04/2016.

On the other hand, players are often drawn to *WoW* because it increases their motivation (Yee, 2006; Sykes and Reinhardt, 2013), which is one of the fundamental *internal factors* influencing their attention and noticing as learners (Schmidt, 2010:730-733). Gee (2007), Juul (2005) and Rieber (1996, cited in Dickey, 2007:256) found that the high intrinsic motivation to participate in game-play can be explained by players doing *quests* (or missions for rewards, such as experience points, gear and currency) while challenging themselves as the game progressively becomes more difficult. As illustrated in Figure 2, this intricate process of *levelling* provides a sense of achievement and consistently strengthens one's avatar's gear and abilities (Dickey, 2007; Walker Rettberg, 2008; Nardi, 2010). Additionally, in *WoW*, failure helps the depth of experience which leads to players wanting to improve their gaming skills; concurrently, it provides instant feedback on their performance, the worst case scenario being the death of the avatar caused by another player or *mobs*, creatures from the game (Steinkuehler, 2004; 2005; Juul, 2005). All the above elements (e.g. immersion and levelling) paired with socialising in-game enrich the players' gaming experience by increasing their intrinsic motivation.



Fig. 2. A level 1 versus a level 100 character (night elf priest, the researcher's avatars): the gear and spells (not all visible here) are much more potent on the latter, Morniie. Screenshot taken by researcher on 1/06/2016.

2.5.2 MMORPGs and *World of Warcraft* as informal SLA learning environments

As mentioned in the Introduction, MMORPGs are an attraction for researchers in Naturalistic CALL because they are considered online informal learning environments suitable for SLA. Apart from the in-game rewards and achievements, research studies have discovered that the key reasons for extensive playing are usually socialising and competing with other players (Rankin *et al.*, 2006; Thorne *et al.*, 2009; Nardi, 2010; Cornillie *et al.*, 2012; Thorne and Fischer, 2012). These support the theoretical assumption that in an interactive learning environment such as online games learners construct understandings by interactions with tools, materials, information and other learners (Gee, 2007; Dickey, 2007; Sykes and Reinhardt, 2013; Zheng *et al.*, 2013:207), which, in turn, encourage intrinsic motivation crucial for effective learning (Dörnyei, 1998; Gee, 2007). Therefore, in the past decade, a growing number of research studies have been conducted on MMORPGs, including *WoW*. These explore mainly the effect of communication and collaboration among players on their SLA.

For example, most recently, Wu *et al.* (2014) investigated the attitudes of 19 casual or non-gamers of an MMORPG called *Everquest* through quantitative and qualitative analysis and found that participants used English to communicate with other players in an enjoyable way, mainly for the purposes of becoming familiar with the game. Likewise, Zheng *et al.* (2012) collected and analysed thirteen different types of communicative activities from a 47-minute long gaming episode including 4 participants (one of them a researcher) who were all new to *World of Warcraft*. The data show that the first three most frequent activities were *coordinating*, *distributing gameplay knowledge* and *reporting on actions*. In support of these, *negotiation of meaning* and *understanding other's perspective* were also high on the list (Zheng *et al.*, 2012:249). The activities assisted the players in achieving their individual and collective goals: in their case, questing in a human area called *Westfall*. However, the study did not measure the players' vocabulary acquisition from game-play.

Furthermore, another study, conducted by Rama *et al.* (2012) with a small number of participants learning Spanish, found that *WoW* creates a safe "learning and languaging" space, it emphasizes communicative competence and promotes collaborative action between expert and novice players as the latter might need more help at the start, specifically in game mechanics (Rama *et al.*, 2012:249). The creation of a safe learning environment in MMORPGs is shared by Zheng *et al.* (2012) and Peterson (2010, 2012:376-377), who point out that the majority of players' inhibition and anxiety reduced during game-play mainly due to using typed text and an anonymous avatar during the interactions they participated in. Additionally, their communicative competence was enhanced in general. However, their vocabulary acquisition was not measured.

Notably, Kongmee *et al.* (2011) conducted action research, whereby the researchers immersed themselves into an MMORPG to play with their participants to observe and assist their game-play. Likewise, their study concluded that MMORPGs are digital "safe spaces" for language learning where players are highly motivated to engage in communication and interaction with others (Kongmee *et al.*, 2011; Coxhead and Bytheway, 2015). However, it is important to point out here that although playing an MMORPG for beginner L2 players proved to be quite a challenge, they became more confident and loquacious as they familiarised themselves with the game mechanics (Peterson, 2012). Perhaps these "brutally authentic" game environments (meaning both game-texts and players' language used as stated by Rama *et al.*, 2012:336) might be more suitable for intermediate and advanced L2 players. Therefore, the present study requested the participants have an IELTS 5.5 score, specifically in Reading (see 3.5).

Another noteworthy study that should be mentioned here is Bytheway's (2015) taxonomy of vocabulary learning strategies used when playing *WoW*, which was conducted with six experienced players who were SLA learners at the same time. The study revealed 15 different vocabulary learning strategies (Bytheway, 2015:514-518) that were actively and successfully used by the participants (e.g. interacting with players, requesting/giving explanations, receiving/giving feedback). The findings suggest that learners can acquire vocabulary through different aspects of game-play, such as motivation and socialising. However, the most interesting and relevant points to the current study, which were reported by the six players, are: "noticing frequency/repetition of words" and "equating image/action to word" as being useful for language learning when playing (Bytheway, 2015:516).

All the above studies are suitable examples to show that MMORPGs – including *WoW* – can improve L2 players' meaning-focused output and even fluency (Peterson, 2012; Coxhead and Bytheway, 2015:69), which are two of Nation's (2007) *Four Strands* – see 2.2.2. However, these studies have not focused on the other strands: e.g. language-focused learning, since MMORPGs are not formal learning environments where players are instructed by tutors to pay attention to form or any other aspects of language. There have also been very few studies that explored the first strand: **meaning-focused input**. Therefore, the present study attempts to fill the gap by using this particular strand to measure IVA from game-play.

2.5.3 The MMORPG *World of Warcraft* as an interactive multimodal learning environment with rich meaning-focused input

As mentioned previously, MMORPGs, *WoW* included, are interactive multimodal environments where players are exposed to both verbal (different types of text) and non-verbal (visual, aural and spatial) elements during gameplay – components which are missing when reading books (Peterson, 2010; Whippey, 2011). Furthermore, two of the most important aspects of MMORPGs, *visual representations* and *quests* (or tasks given to players by NPCs, see Figures 3. and 4. below) provide extensive authentic input for SLA (Walker Rettberg, 2008; Thorne *et al.*, 2012). As Dickey (2007) and Nardi (2010) explain, the role of quests in MMORPGs is to advance the players' avatars through the process of levelling, which is the gradual increase in experience measured in units entitled *levels*. All quests are based on the game's narrative environment, gradually increase in difficulty, provide resources and experience for levelling and encourage collaboration and strategic planning among the players (Dickey, 2007:264). In addition, these functions strongly contribute to fostering players' motivation while advancing gameplay as they instil a sense of achievement (Dickey, 2007:263; Gee, 2007).



Fig. 3. Accepting a quest (*Protect the Frontier!*) from Guard Thomas at East Elwynn Bridge, Elwynn Forest, *World of Warcraft* – screenshot taken by researcher on 09/04/2016.

Furthermore, quest texts are highly complex in linguistic diversity and complexity, including sentence structures, as Thorne *et al.*'s (2012) mixed methods study shows. The researchers triangulated data from 64 Dutch and American *WoW* players' questionnaires and analysed 363 random quests containing 36,856 words that were highly likely to be met and read by the participants. Both the Lexical Sophistication (LS) and Mean Segmental Type-Token Ratio (MSTTR) tests utilised were high, meaning that there was a large number (>.60) of lower-frequency vocabulary (above 2,000 of the American National Corpus) as well as a high proportion (.78) of unique word types (Thorne *et al.*, 2012:288-290). As this study confirms, the plethora of quests in *WoW* can be recognised as providing substantial amounts of **meaning-focused input**, and are therefore relevant to Nation's (2007) *first strand*. Furthermore, the quests can enable Schmidt's (1990, 2010) *noticing* through *word exposure frequency*.

One limitation of the quest texts in *WoW* is their transferability to other contexts (Thorne *et al.*, 2009:811): due to the narrative taking place in a fantasy world, some of the low-frequency vocabulary is archaic or highly specific to the game only. For example, see Fig. 4.: the quest uses the word *prowler* for "wolf", although in this particular quest, this archaic form is explained by the modern term.



Fig. 4. *Protect the Frontier!* – quest text from Guard Thomas at East Elwynn Bridge, Elwynn Forest, *World of Warcraft* – screenshot taken by researcher on 09/04/2016.

However, that is not to exclude the possibility of low-frequency vocabulary's application in real life either, depending on the players' interests and language proficiency. Additionally, Chik (2015:82) argues that even though expertise and vocabulary from online games may not be directly related to daily communication, the process of acquiring these can become "a booster" for language learners.

In summary, this literature review has discussed two optimal conditions for *incidental vocabulary acquisition* (IVA): Schmidt's (1990, 2010) *Noticing Hypothesis* and Nation's (2007) *Four Strands*. Due to time constraints and a lack in resources, it was decided that only the *first strand* (**meaning-focused input**) will be applied to the current study along with three determinants of *noticing*: *word exposure frequency*, *time* and *task demands*. These will be utilised to measure one aspect of word knowledge due to time limitations: *comprehension of meaning* at the *initial receptive* level. Finally, the context of the current study will be the online game *World of Warcraft*, as it provides a large amount of **meaning-focused input** and *word exposure frequency* through quest texts.

2.6 Research questions

Previous studies have shown an improvement in vocabulary acquisition through multimodal environments, such as MyEva (Yang and Wu, 2015) or Tight's (2010) mixed modality study, which used visual, aural, spatial and interactive modes for learning. Since the context of the current study is also a 3-D interactive multimodal environment rich in imagery, it is presumed that *visual representations* (particularly of creatures, locations) and *actions* from quest texts may facilitate IVA even in a relatively brief period of time: 2-4 hours of game-play. Additionally, Schmidt's (1990, 2010) first determinant for *noticing*, that is, *word exposure frequency*, will be applied as a variable in this study. Therefore, the following main research questions were formulated:

- 1. To what extent does the number of in-game word exposure frequency facilitate the comprehension of incidental vocabulary?*
- 2. To what extent does the interaction with the game environment through visual representations of creatures and locations assist with the comprehension of incidental vocabulary from game-play?*
- 3. To what extent does the interaction with quest texts through in-game actions facilitate the comprehension of incidental vocabulary?*



3.0 Methodology

3.1 Research paradigm

For the purpose of the current study, the interpretivist paradigm has been chosen as the theoretical framework mainly due to its interpretation of how people understand their world through experience, achieved “through perceptual and cognitive activity” (Hammersley, 2012:1-2). An interpretivist researcher tries to understand the “subjective” meaning behind an action (in this case, incidental vocabulary acquisition through the medium of online gaming), which means interpreting it through the lens of “the actors” or game participants in this case (Schwandt, 2000:191; Mason, 2006:22; Darlaston-Jones, 2007:21; Goldkuhl, 2012:4-5; Bryman, 2012:380). The researcher works close to the practice field, thus being able to engage in the studied practices themselves (Goldkuhl, 2012:6). Additionally, the interpretivist framework allows the

researcher to participate in “the actors’ lives”, which means they attempt to think and feel like their participants while achieving “inside” understanding (Schwandt, 2000:192).

Furthermore, as this study had only 3 participants for the purpose of exploring to what extent incidental vocabulary acquisition occurs in a specific online game, it was most suitable to conduct a case study (Dörnyei, 1997; Bryman, 2012).

3.2 Mixed methodology, research instruments and data analysis

Generally, qualitative research selects samples for investigative purposes, whereas quantitative research uses samples statistically representative of a certain population (Carter and Little, 2007:1318). Therefore, mixing these two methods can encourage creative thinking and extensions to new dimensions, such as online or virtual environments (Mason, 2006:9-14). Subsequently, the current study falls in line with this idea and the interpretivist paradigm as it investigates the lived experiences of players in an online game and its potential influence on their English language learning abilities.

Furthermore, the interpretivist paradigm chosen for the current study is believed to function well with a mixed methodology and exploratory studies. Mixing quantitative and qualitative methods was deemed to offer more perspectives and in-depth explanations of the issue being researched (Mason, 2006; Sharp, 2012; Mayoh and Onwuegbuzie, 2015: 92). With regards to the above, the researcher designed a combination of *vocabulary tests* with the same input for all participants (objective measurement) and one-to-one *semi-structured interviews* (qualitative method). The interviews were expected to show more insight into the personal opinions of the participants (Lichtman, 2010) on game-play and its connection to their vocabulary learning, whereas the vocabulary tests were carefully designed to consistently measure the potential changes and improvements in their short-term vocabulary acquisition. Due to time constraints, only 2-4 hours of game-play were required of the participants.

For the purposes of data analysis, the concept of *methodological triangulation* as first described by Denzin (1978, cited in Johnson *et al*, 2007:114-115) and later supported by other researchers (Sechrest and Sidani, 1995; Mason, 2006; Sharp, 2012; Mayoh and Onwuegbuzie, 2015) was chosen. Through triangulation, two or more methods are used to observe the same phenomenon, which can contribute to “superior explanations” of it through either “convergence, inconsistency or contradiction” (Johnson *et al*, 2007:115). Administering the vocabulary pre-and post-tests within 48 hours of game-play followed by a one-to-one semi-structured interview 1 week after game-play provided a suitable combination of quantitative and qualitative data for the purposes of the current study. The interviews ensured the “in-depth description of lived

experience” (Mayoh and Onwuegbuzie, 2015:101), while the pre- and post-vocabulary tests measured possible IVA objectively. Finally, as triangulation can improve the estimates of a study, it was also chosen to strengthen the validity and reliability of the findings (Sechrest and Sidani, 1995:84; Sharp, 2012; Mayoh and Onwuegbuzie, 2015:97).

3.3 The design of research instruments and data collection

Due to the exploratory nature of this study into the field of incidental vocabulary acquisition in the context of playing an online game, the quest texts from *World of Warcraft* were chosen to provide **meaning-focused input** (Nation, 2007). These quest texts became the basis for the research instruments of the current study: *vocabulary tests* and one-to-one *semi-structured interviews* (see Table 1).

The participants had to read the quests (in-game tasks or missions) in order to be able to progress when playing. However, there are 13 different races available for players in *WoW* (Blizzard, 2016) and all have different starting areas with specific storylines, which encompass a great variety of quests. It would not have been feasible to cover all in such a limited research study. Thus, the most popular race (“human”) was singled out for this study.

Firstly, all the quest texts from the human starting area were copied from a public website (the most up-to-date one at the time of writing, wow.gamepedia.com/Elwynn_Forest_storyline) and collected into a word document. The number of words added up to 5,395 (45 quests in total, 9 quest chains). Secondly, the vocabulary items were input and analysed through the COCA corpus (Corpus of Contemporary American English) as *WoW* originates from the USA. Next, the **599 words** belonging to the lower frequency ranges (500-3,000 and >3,000) of COCA were manually added to an excel sheet for comparison and preparation of the vocabulary tests. Additionally, there was a time constraint on vocabulary testing as there were 4 stages of data collection (see Table 1). Therefore, the Standardised Vocabulary Size Test (Nation, 2008) with 140 multiple-choice items could not be used in this research study.

The stages of data collection were created as Table 1 shows:

Table 1. Data collection: sequence, stages, duration and location (research site)			
Sequence (in days)	Stages of data collection	Duration	Location
Day 1.	1. Vocabulary pre-test	Approx. 20 minutes	University Library
Day 2. (at participants' leisure)	2. Game-play (questing in <i>WoW</i>)	Between 2-4 hours	Participants' home, no observation
Day 3. (within 48 hours after game-play)	3. Vocabulary post-test	Approx. 15 minutes	University Library
Day 4. (1 week after game-play)	4. Semi-structured interview	Approx. 15 minutes	University Library or Skype

To replace the SVST, the researcher prepared a pre- and a post-vocabulary test to evaluate the participants' IVA. These tests were based on the lower frequency **599 vocabulary items** in order to check the participants' knowledge of the words chosen both before and after playing *World of Warcraft*. First, the 599 items were classified based on the number of occurrences (between 1 and 44) in accordance with previous studies conducted on word frequency exposure during extensive reading (Horst *et al.*, 1998; Waring and Takaki, 2003; Kweon and Kim, 2008; Brown *et al.*, 2008; Pellicer-Sánchez and Schmitt, 2010). Then, 37 vocabulary items were chosen (only content words: nouns and verbs) in order to ensure the "sensitivity" of testing, that is: using a small amount of vocabulary items (maximum two types of word class) and applying only one variable, *word exposure frequency* (Nagy *et al.*, 1985; Nation, 2008). The 37 vocabulary items were not tested for word form (grammar), only their original form was used (for example, *extinguish* – which appears in the quest texts as *extinguish*, *extinguished*, *extinguishing*). These decisions were made based on Nation's (2008) requirements for practical vocabulary tests. Additionally, the results of all tests were kept strictly confidential. However, individual results were made available to the participants at their own request at the end of their interviews.

With regards to the vocabulary tests, they were renamed "activities" in order to reduce the atmosphere of a formal setting. The content of both tests was the same (vocabulary items and exercises). The game-play stage was tested by the researcher and it was concluded that a more experienced "gamer" participant could cover the human starting area (Elwynn Forest) in 2 hours, a less experienced participant would probably need up to 4 hours. The researcher encouraged the participants to take breaks when playing if needed – and to stop game-play when they finished the final quests in Elwynn Forest since the vocabulary tests included only this area. After the post-test, if participants wished, they could play more – this did not influence their interviews in retrospect.

Finally, one-to-one semi-structured interviews were prepared in order to allow for the flexibility of the participants' subjective opinions to surface while acknowledging the stance of the researcher at the same time (Lichtman, 2010; Bryman, 2012). Ideally, 5 random participants were supposed to be interviewed as this is considered an appropriate sample size for qualitative studies (Lichtman, 2010). However, there were only 3 participants in total, thus, all of them were interviewed. The participants were also free to choose whether they wanted to be interviewed face-to-face or over Skype – the latter option was chosen by all. Each interview was audio-recorded and transcribed (see Appendix 8.5.1 for a sample). Data collection occurred throughout the span of two weeks in May, 2016 and due to the lack of further participants, it closed mid-June 2016.

3.4 Vocabulary tests: exercises I-IV.; reliability, validity and practicality of tests; quest sample

As the context of the current study was chosen to be the MMORPG *World of Warcraft*, which can be considered an interactive multimodal learning environment (Gee, 2007; Moreno and Mayer, 2007), the researcher decided to design the exercises in the vocabulary tests using both verbal and non-verbal (visual) input in order to simulate the game environment as closely as possible. Therefore, the following exercises were designed based on the three research questions (see 2.6).

3.4.1 Vocabulary tests: exercises I-IV.

The first research question aimed to investigate if in-game *word exposure frequency* can facilitate incidental vocabulary acquisition (IVA) specifically through quest texts. Therefore, the 37 vocabulary items were grouped according to the number of occurrences in all the quests in Elwynn Forest (see Table 2). After this, they were spread out across the four different exercises of the vocabulary tests.

1 to 4 occurrences	5 to 7 occurrences	8 to 14 occurrences	15+ occurrences
award	abbey	bridge	collect
gather	deliver	pie	guard
investigate	extinguish	vineyard	mine
road	farm		objectives
situation	lake		receive
threat	rest		boar
volunteer	schedule		gnoll
search			goblin
weapon			gryphon
brook			kobold
compensation			murloc
pathway			worg
recruit			reward
starving			

The second research question intended to find out whether the interaction with the game environment through visual representations of creatures and locations can assist with IVA from game-play. For this purpose, exercises I. and II. were designed using vocabulary items specific to the fantasy world of *WoW*, such as creatures, e.g. *murloc*, *worg*, *kobold*, etc. and locations, e.g. *bridge*, *vineyard*, *pathway*, *abbey*. It was decided that matching exercises (image to concept and vice versa) are the best to assist recall of vocabulary knowledge, especially for nouns (Schmitt and McCarthy, 1997; Nation, 2008; Rott, 2012). Both exercises used verbal and non-verbal (visual) modalities for testing (see Fig. 5.). These words were specifically chosen to ensure that they could not be met by the participants outside the game environment before the vocabulary post-test.

10 seconds

answer: B



Screenshots taken from www.wowhead.com



Screenshot taken in-game by researcher on 09/03/2016.

Fig. 5. Examples from Exercises I. and II.

The third research question aimed to discover whether the reading of and interaction with quest texts can facilitate IVA from game-play. Exercises III. and IV. were designed using vocabulary items taken from quest texts (see Fig. 6.). Exercise III. was based on Nation (2008) and Rott's (2012) work, which suggest providing synonyms, meaning or writing a short sentence using the vocabulary that requires definition. Exercise IV. follows the same format as Nation's (2008) Vocabulary Level's Test and both exercises used only verbal modality, mainly due to time constraints.



Fig. 6. Examples from Exercises III. and IV. of the vocabulary pre- and post-tests.

3.4.2 Reliability, validity and practicality of vocabulary tests

All exercises were designed with Laufer and Goldstein's (2004) classification of degrees of vocabulary knowledge in mind (active and passive recall, active and passive recognition). Due to the short amount of time spent by the participants in-game, it was decided to test only for passive recognition and passive recall of vocabulary meaning, except in Exercise III., where participants had the choice of writing a short sentence that would define the vocabulary items. It is vital to point out that the matching exercises (I. and II.) were considered more convenient to start with as each slide was timed (10 seconds/vocabulary item), requiring all participants to answer simultaneously. In contrast, the other two exercises (III. and IV.) were completed at the participants' leisure (within the given time frames, see vocabulary

tests in Appendix, 8.4) as it was assumed that more time was needed for processing exercises III. and IV. Additionally, the participants were encouraged not to guess answers even if they felt worried about their results: it was explained to them by the researcher before both tests that they should be as honest as possible in providing their answers. However, it was not possible to ascertain whether any answers were guessed during the testing stage.

Furthermore, the vocabulary tests were designed to comply with Nation's (2008) three requirements: for **reliability**, there were more than 30 items chosen following a familiar format, clear instructions and variations to answering; for **validity**, the vocabulary items were chosen to match the participants' language level (IELTS 5.5), there was no possibility of cheating on their part as the tests were taken in the researcher's presence and they were used for the purpose they were designed for (Nation and Webb, 2011). Finally, for **practicality**, the tests were of a suitable length (37 vocabulary items and maximum 20 minutes long), easy to mark and interpret, as well as inexpensive to produce.

3.4.3 Quest sample from *World of Warcraft*

In order to illustrate and clarify the purpose of all research questions, including *visual representations*, *actions* and *word exposure frequency*, the quest *Protect the Frontier!* shown as an example in the literature review (2.5.4) is explained in more detail here (see Fig.7.).

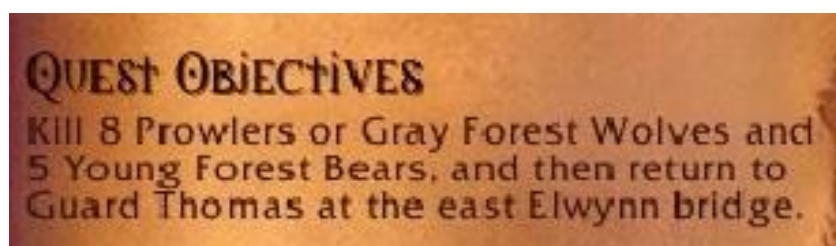


Fig. 7. The objectives of the quest *Protect the Frontier!* – quest text from Guard Thomas at East Elwynn Bridge, Elwynn Forest, *World of Warcraft* – screenshot taken by researcher on 09/04/2016.

Once the players accept this quest, they have to search for *prowlers* (*gray forest wolves*) and *young forest bears*. They do so by walking around the forest and very soon they encounter the creatures in-game (see Fig. 8.). They are able to read their nametags as every single creature in *WoW* has one. This is how the players know which mobs they need for their quests.



Fig. 8. Meeting *prowlors* and *young forest bears* in Elwynn Forest. Screenshot taken by researcher on 09/04/2016.

When the creatures are found, they usually have to be slain for quest completion – as soon as the player does the action of slaying, an on-screen message appears in the middle of the screen to notify how many creatures are already slain, see Fig. 9.



Fig. 9. *5/8 Prowler of Forest Wolf slain*, a message to notify the quest advancement – screenshot taken by researcher on 09/04/2016.

As seen from the above screenshots, the players need to read and interact with the quest texts and on-screen vocabulary in order to advance their game-play. However, only four words from the 37 items included in the tests appear in on-screen messages (such as the one in fig. 9.): *investigate*, *extinguish*, *gather* and *collect* – therefore, an analysis of on-screen vocabulary items was not included in this research study. On the other hand, the creatures from exercise I. appear in large numbers throughout Elwynn Forest and will be encountered approximately 40+ times by the participants during questing. Therefore, they were suitable to be included for the analysis of *word exposure frequency*.

3.5 Semi-structured interviews

The one-to-one semi-structured interview was designed based on the research questions as well, in support of the vocabulary tests. Questions 1-3 (see Appendix 8.5) consisted of the initial stage of collecting general feedback on playing the game and the participants' impression of it. Question 4 (see Appendix 8.5) and its consecutive four sub-questions followed the research questions and were meant to gather the participants' lived experiences of *word exposure frequency*, *visual representations of images* (creatures and locations) and *actions* from quest texts in-game. The researcher also added the questions *Why?* and *How?* to prompt the participants' personal opinions.

3.6 Participants

In order to call for participants from a variety of English SLA learners, permission was obtained to present the research study and invite participants during the in-session English language classes at the Language Centre. Furthermore, the Ethics Application was approved (see Appendix 7.1) and a pamphlet was displayed on the University Library's *Noticeboard* in order to reach a wider group of students (see Appendix 7.2). To ensure a smooth transition from one stage of the data collection to the other, the participants were also contacted and updated on the different stages through email.

The participants were aged 18+ and had to meet two criteria: 1. having an overall IELTS level of 5.5/CEFR B2, specifically in Reading, in order to ease their understanding of the quest texts (Rama *et al.*, 2012) as well as 2. experience of playing computer games. Ideally, a minimum of 5 and a maximum of 8 participants at IELTS level 5.5 (non-native speakers of English) were needed for this research project. In the end, even though there were enquiries from more participants, only 3 took part in the study.

3.7 Confidentiality and anonymity

When the participants volunteered, they were emailed a Consent Form and Participation Guidelines, in which they were informed about the study in detail, in language suitable for their English level (see Appendix 8.2 and 8.3). The Consent Form briefly outlined the “rights and responsibilities” of the participants and the researcher (Hammersley and Traianou, 2012:7). The participants were also notified that their participation was voluntary and they were allowed to opt out of at any time if they wished since consent is central to the participants’ choice and they had the freedom to refuse taking part in research or withdraw anytime for any reason (Howe and Moses, 1999; Barchard, 2003). Furthermore, the research did not gather, nor reveal identity-specific data, nor any information the participants wished to withhold after having received feedback from the researcher in the form of findings – thus ensuring the genuine purpose of the research towards their contributions. Pseudonyms chosen by the participants were used instead of their real names to ensure anonymity – these were their *WoW* characters’ names. From here on, they will be referred to as Magekrasus, Wajis and Kimkimkim. It should be noted that Magekrasus and Wajis had played *WoW* before in their L1, but Kimkimkim was completely new to the game.

Finally, no participant was treated unfairly or discriminated against (Howe and Moses, 1999). The researcher shared all the information necessary to ensure the participants were comfortable with the research process and did not deceive them with regards to the aims of the study. All data was kept confidential and password protected during the process of writing the research study.

3.8 Potential risks

The project was considered to be of low risk. However, possible fatigue caused by playing the computer game *WoW* was expected to occur, especially if the participants (or players) were new to it. Therefore, the game-play took place at their leisure in a comfortable environment (their homes) and they were encouraged to take breaks when playing. The lack of formal observation facilitated an informal learning environment where the participants were asked to play as they usually do when engaging in online games. The researcher was also available in-game to provide assistance if needed and updated the participants on the stages of data collection by email to ensure a smooth transition from the beginning to the end.



4.0 Findings

This chapter presents detailed results from the vocabulary pre- and post-tests of the three participants as well as a discussion of the most significant and relevant data from the semi-structured interviews (for a complete interview transcript see Appendix 8.5.1). The chapter also attempts to answer the research questions by critically evaluating the findings in comparison with previous research from the fields of *incidental vocabulary acquisition* and *online gaming*.

4.1 Research question 1: *To what extent does the number of in-game word exposure frequency in quest texts facilitate the comprehension of incidental vocabulary?*

Table 3 below summarises the individual improvement of participants categorised by *word exposure frequency* (ranges 1-4, 5-7, 8-14 and 15+). Due to the uneven number of vocabulary items per range (particularly the mid-ranges as presented in Table 2), the averages shown in percentage are *not* representative and *cannot* be generalised. However, for the three players overall, the 15+ range demonstrates a 43%, while the 1-4 range a 40% improvement in the post-tests. This can be concluded due to these two ranges having an almost equal amount of vocabulary items. For example, Wajis excelled on the post-test in the 15+ frequency range with an improvement of 80%, however, had 0% improvement in the 1-4 range. On the other hand, Kimkimkim showed no improvement in the 15+ range while he had a surprising 100% improvement in the 1-4 frequency range, which is known to be more difficult to acquire (Pigada and Schmitt, 2006; Brown *et al.*, 2008; Schmitt, 2010). Finally, Magekrasus had a solid 50% improvement in the 15+ frequency range and 20% in the 1-4 range in his post-test.

Table 3. Unknown and acquired vocabulary items according to *word exposure frequency* ranges

<i>Magekrasus: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	0	1	extinguish	0	1	vineyard	0	1	boar	0	1
brook	0	1							kobold	0	1
pathway	1	0							murloc	1	0
award	0	1							gnoll	1	0
compensation	0	1							gryphon	1	0
									guard	0	1
Total	1	4	Total	0	1	Total	0	1	Total	3	3
Improvement in %	20%		Improvement in %	0%		Improvement in %	0%		Improvement in %	50%	
<i>Wajis: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	0	1				vineyard	1	0	worg	1	0
brook	0	1							boar	1	0
pathway	0	1							murloc	1	0
									gnoll	1	0
									gryphon	0	1
Total	0	3	Total	0	0	Total	1	0	Total	4	1
Improvement in %	0%		Improvement in %	0%		Improvement in %	100%		Improvement in %	80%	
<i>Kimkimkim: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	1	0	farm	1	0	vineyard	1	0	worg	0	1
brook	1	0							murloc	0	1
pathway	1	0							gnoll	0	1
Total	3	0	Total	1	0	Total	1	0	Total	0	3
Improvement in %	100%		Improvement in %	100%		Improvement in %	100%		Improvement in %	0%	
Average Improvement in %	40%			33%			67%			43%	

As the overall data from Table 3 shows, the highest average improvement of vocabulary acquisition occurred in items from the *word exposure frequency* range 8-14 (67%). While this is in line with previous studies (Horst *et al.*, 1998; Waring and Takaki, 2003), due to the low number of items, it is not reliable data. Notably, the 15+ range showed 43% and the 1-4 range 40% improvement rate on average. The results from the 15+ range were expected and are in line with previous research on IVA. For example, Wu and Xu (2006) argued that 14-17 exposures were needed for successful IVA; Brown *et al.* (2008) confirmed that 15-20 exposures, whereas Kweon and Kim (2008) found that ≥ 20 exposures showed the highest retention rates. Furthermore, Pellicer-Sánchez and Schmitt (2010) also found that 10-17 exposures produced the

highest retention rate after extensive reading. Additionally, Pigada and Schmitt's (2006) findings concur with the current data: they showed solid improvement starting at 10+ exposures. All the above data support the theory of *word exposure frequency* increasing the possibility of noticing and processing new vocabulary as well as the chance of an initial memory trace to be retained, then strengthened due to repetitions of the items (Schmitt, 2010; Rott, 2012; Zhu, 2015).

Furthermore, even though most studies on *word exposure frequency* suggest that minimum 6-8 occurrences are needed for successful acquisition (Horst *et al.*, 1998; Waring and Takaki, 2003; Brown *et al.*, 2008; Pellicer-Sánchez and Schmitt, 2010), the current study seems to support the 1-4 exposure frequency range as well. Overall, there is an average of 40% improvement from this range, which was not expected. The data from Table 3 suggest that, as per Pellicer-Sánchez's eye-tracking study's recommendation of 3-4 exposures for faster reading, both successful recognition of word form and comprehension of meaning occurred in the 1-4 exposure frequency range. This might be due to the fact that the players were required to understand the new items to progress their questing and levelling in-game. It is also possible that they interacted with these words due to the quests specifically mentioning them. Therefore, the idea of an interactive multimodal environment facilitating IVA seems to support Yang and Wu's (2015) research, whose participants also preferred this type of environment. Their results showed improvement when the interactive multimodal environment was used versus the non-interactive one.

However, only one participant (Kimkimkim) managed to provide the correct answers to the three items belonging to the 1-4 exposure frequency range in the post-test: *brook*, *pathway*, *road*; and one other participant (Magekrasus) answered *pathway* correctly. As the interviews also confirmed, the screenshots for *pathway* and *road* were somewhat dark, the images difficult to distinguish and the meaning of the two words quite similar. Nevertheless, the participant, who was new to *WoW* (Kimkimkim), might have paid more attention to these as he was in an unfamiliar and potentially dangerous environment. This supports Schmidt's (1990) *Noticing Hypothesis*, according to which only important or necessary items will be noticed by the learners. Magekrasus might have learnt *pathway* by chance or guessed the answer as him and Wajis were already comfortable and familiar with Elwynn Forest: therefore, they did not necessarily have to know the meaning of the three words from the 1-4 word exposure frequency range. Instead, they probably used the map to orientate themselves and did not need the vocabulary to progress their questing. However, it is noteworthy to say that both of them still attempted an answer in the post-test. This finding suggests that new players might be more careful and attentive in a game environment, a finding which might warrant further research.

Moreover, the semi-structured interviews support the above data. For example, when asked whether the participants noticed words that were repeated frequently, they all answered affirmatively. They were also asked if the repetitions might have helped them in remembering new words, to which they also replied positively. Finally, each of them provided examples when prompted: Magekrasus remembered *goblin*, Wajjis *vineyard* and Kimkimkim *pathway, road, farm* and even others that were not included in the tests, such as *caster, spider* and *quest* – the latter was actively used in his replies, seemingly with ease. This is quite remarkable as interviews were held 6-7 days after game-play, except for Wajjis whose interview was 2 days after game play due to a forthcoming trip. While this was an interesting finding, prompting for examples was merely a side question in the interview as measuring and analysing active recall of vocabulary was not the aim of the current study (see Appendix 8.5).

The above findings from the vocabulary tests and interviews indicate a positive answer to research question 1: that is, both low and high *word exposure frequency* is likely to facilitate incidental vocabulary acquisition and comprehension from game-play, although their extent may vary from player to player. Additionally, it should be pointed out here that the test items measure only initial receptive learning, thus, the findings are inconclusive.

4.2 Research question 2: *To what extent does the interaction with the game environment through visual representations of creatures and locations assist with the comprehension of incidental vocabulary from game-play?*

In exercise I., players had to choose an image (out of 3) and match it to a given vocabulary item in ten seconds in order to test their interaction with *visual representations* of creatures in-game. The results from exercise I. (Table 4) consistently show improvement for two participants: Magekrasus had +3, Wajjis had +4 correct answers, while Kimkimkim had -1 correct answer and surprisingly, +4 incorrect answers. These data mean an improvement from 28.57% to 71.42% for Magekrasus and 28.57% to 85.71% for Wajjis, both of whom were familiar with *WoW*. On the other hand, Kimkimkim, who was new to the game, showed a decrease from 57.14% to 42.85%. This might be due to the unfamiliar creatures and new vocabulary pertaining to a fantasy world he had not met before as the other two players showed clear improvement for the same vocabulary items. His interview statement regarding this exercise seems to support this reason: *“in that time I can’t remember all these words in one time I can only remember some of them”*. He probably could not recall all the

vocabulary items related to creatures in *WoW*, which might be the reason for his inconsistent answers in exercise I.

Nevertheless, the most significant observation is that all players provided an answer for each vocabulary item in the post-test, unlike the pre-test (see Table 4). This suggests that the players were probably certain or confident enough of their newfound knowledge of the *WoW* creatures and were willing to risk answers related to these. This finding supports Peterson (2010, 2012), Kongmee *et al.* (2011) and Rama *et al.*'s (2012) argument for MMORPGs, including *WoW*, being “safe” learning environments which encourage risk taking on the learners’ (players’) part.

Table 4. Pre- and post-test results of all participants: Exercise I.

<i>Ex. I. Pre- and post-test results from all participants</i>							
<i>Nr.</i>	<i>Answers</i>	<i>Pre-test Magekrasus</i>	<i>Post-test Magekrasus</i>	<i>Pre-test Wajis</i>	<i>Post-test Wajis</i>	<i>Pre-test Kimkimkim</i>	<i>Post-test Kimkimkim</i>
1	C - worg	C	C	no answer	C	no answer	B
2	B - goblin	B	B	B	B	B	B
3	A - boar	no answer	C	no answer	A	A	A
4	A - kobold	B	B	A	A	A	B
5	B - murloc	A	B	C	B	A	A
6	A - gnom	no answer	A	no answer	A	no answer	B
7	A - gryphon	no answer	A	no answer	C	A	A
	Total Incorrect	2/7	2/7	1/7	1/7	1/7	4/7
	Total No Answer	3/7	0/7	4/7	0/7	2/7	0/7
	Total Correct	2/7	5/7	2/7	6/7	4/7	3/7

In exercise II., the players were given a list of vocabulary items, from which they had to choose the correct word and match it to a screenshot in ten seconds. This exercise was testing the players’ interaction with visual representations of locations in-game. The data show a general improvement for Magekrasus (from 40% to 50%) and Wajis (from 60% to 70%) and a surprising increase from 50% to 100% for Kimkimkim in the post-tests (see Table 5). Magekrasus and Wajis had +1 correct answer in their post-test while surprisingly, Kimkimkim had +5 correct answers in comparison to his pre-test and no mistakes, which is contradictory to his results from exercise I. The two most problematic vocabulary items were *vineyard* and *brook* as they were clearly unknown to all players in the pre-test, but Wajis and Kimkimkim chose *vineyard* correctly in the post-test; *brook* was correct only for Kimkimkim. The words *road* and *pathway* were possibly confusing due to the accompanying screenshots being somewhat dark and the meaning of the two words quite similar. However, both Kimkimkim and Magekrasus managed to score them correctly. Kimkimkim also had the highest incorrect answers in the pre-test (5 out of 10), but also the best, 100% correct score (10 out of 10) in the post-test, which is a solid improvement.

Table 5. Pre- and post-test results of all participants: Exercise II.

Ex. II. Pre- and post-test results from all participants							
Vocabulary	Answers	Pre-test Magekrasus	Post-test Magekrasus	Pre-test Wajis	Post-test Wajis	Pre-test Kimkimkim	Post-test Kimkimkim
road	9	no answer	no answer	5	5	6	9
pathway	5	9	5	9	9	7	5
vineyard	6	no answer	no answer	no answer	6	2	6
lake	1	1	1	1	1	1	1
mine	4	no answer	9	4	4	4	4
farm	2	2	2	2	2	5	2
bridge	8	8	8	8	8	8	8
brook	7	no answer	3	no answer	no answer	9	7
abbey	3	4	4	3	3	3	3
weapon	10	10	10	10	10	10	10
	Total Incorrect	2/10	3/10	2/10	2/10	5/10	0/10
	Total No Answer	4/10	2/10	2/10	1/10	0/10	0/10
	Total Correct	4/10	5/10	6/10	7/10	5/10	10/10

Furthermore, during the interviews, all players acknowledged that seeing the creatures and locations in-game was very helpful for understanding which animals they had to slay or where they had to go to complete their quests. For example, Magekrasus noted: *“I create an image so I remember if I saw it”*. Additionally, Wajis said that the words from the quests *“still exist in the real life so I could imagine and learn new words and ... how can I say practising and learning new words in the game”*. Finally, Kimkimkim as a new player confirmed that *“for some words like farm or pathway, if you can look at the picture in the game and you can have a picture to look in this way and you may feel a little imperative (sic) about this word you may remind this word very deeply (...) I can see this picture in this games so I maybe feel uhh, I can feel very deep to remember this game, this word not game so I cannot forget this words”*.

The above findings support previous research on multimodal environments where verbal and non-verbal (especially visual) elements are combined to assist SLA in general (Moreno and Mayer, 2007; Brown *et al.*, 2008; Tight, 2010; Gee, 2007; Thorne *et al.*, 2012), however, none of these studies measured incidental vocabulary acquisition. The study closest to the present research is Yang and Wu’s (2015) work on vocabulary acquisition through four modalities, which suggests that the highest improvement occurred when participants used a mixed modality based e-learning system, MyEVA. This included verbal and non-verbal (visual/auditory) input as well as the option of navigation or interaction with the system. The current study seems to support Yang and Wu’s (2015) findings due to having a higher number of acquired vocabulary items that are visually represented versus the non-visually represented ones.

Additionally, the data from exercises I. and II. could be considered a novel finding regarding incidental vocabulary acquisition from online games as there are no previous

studies known to the researcher conducted on this topic. It is very important to note here that the players were actively interacting with the game environment, specifically *visual representations*, when playing. This interaction seems to facilitate successful IVA, thus suggesting a positive answer for research question 2: that is, *visual representations* of creatures and locations are likely to assist with the comprehension of incidental vocabulary from game-play. However, it should be reiterated here that the test items only indicate initial learning, thus rendering the findings inconclusive. A detailed comparison of results for visual versus non-visual vocabulary items will be made in the next section after a presentation of the findings from exercises III. and IV.

4.3 Research question 3: *To what extent does the interaction with quest texts through in-game actions facilitate the comprehension of incidental vocabulary?*

At the time of writing, the researcher was not aware of any studies testing for the effectiveness of quest texts through in-game actions on players' incidental vocabulary acquisition. Therefore, no point of comparison can be drawn with previous research. Nevertheless, the researcher will attempt to provide evidence to answer research question 3.

In exercise III., the players had to provide a synonym, word meaning or a sentence to explain the vocabulary items given. Table 6 shows their results. As there was more than one possible correct explanation, the researcher carefully considered each answer and deemed that Wajis and Kimkimkim were 100% correct in both tests. Magekrasus provided correct answers for 6 out of 8 words and could not answer 2 in the pre-test, however, he tried to provide one new answer in the post-test, albeit incorrectly. Nevertheless, he took the risk and was confident enough to attempt it. He was also the only participant to write a sentence in the post-test (see Table 6, *recruit*).

Table 6. Pre- and post-test results of all participants: Exercise III.

<i>Ex. III. Pre- and post-test results from all participants</i>							
Nr.	Answers (or similar explanations)	Pre-test Magekrasus	Post-test Magekrasus	Pre-test Wajis	Post-test Wajis	Pre-test Kimkimkim	Post-test Kimkimkim
1	reward: a prize; give a prize	give sb. price (sic)	give sb. price (sic)	give sth to someone / respect	give prize - <i>more specific!</i>	the gift I can get after finishing sth.	something received for award someone <i>more specific</i>
2	objective: aim/goal	aim, target	aim, target	goal	goal	aim or goal	aim/goal you want to achieve
3	receive: get	get	get	obtain sth from someone	get sth. from sb. else	to get	get/collect - <i>more specific</i>
4	award: give a prize; a prize	no answer given	no answer given	prize	prize	to give something to someone	to appreciate someone by something - <i>more specific</i>
5	volunteer: do sth. of their own will, without payment	sb want to do sth ...	sb want to do sth. voluntarily (sic)	do sth for free	feel free to do sth.	be self-willing to do something	on one's own thought - <i>nuance different</i>
6	recruit: hire someone; a person who is hired to do sth.	sb give the occouption (sic) for another	<i>The employer (sic) get sb. for work.</i>	find sb to work	work together - <i>different meaning!</i>	let someone into a team	let someone into a team or a company
7	guard: take care of; a person taking care of sy./sth.	no answer given	mark, score	help someone to be save (sic)	defend someone - <i>more specific!</i>	defend someone or something	defend/protect sth or someone beside something or someone - <i>extra information</i>
8	search: look for	find out	find out	looking for sth.	look for	look at or find something	find/explore - <i>different nuance</i>
	Total Incorrect	0/8	1/8	0/8	0/8	0/8	0/8
	Total No Answer	2/8	1/8	0/8	0/8	0/8	0/8
	Total Correct	6/8	6/8	8/8	8/8 => 3+ more specific answers	8/8	8/8 => 3+ more specific & 2+ other answers

It is even more noteworthy that both Wajis and Kimkimkim provided more information in the form of different meanings or nuances to the vocabulary items. These tend to be closely connected to the meanings used in *WoW*. For example, Kimkimkim specified the meaning of *receive* by adding *collect* to his post-test alongside *get*, which was his pre-test answer. Or, Wajis clarified the meaning of *guard* as *defend someone* in his post-test in comparison with *help someone to be save* (sic) in his pre-test. He also changed his explanation of *reward* from *give something to someone/respect* to a more specific answer in the post-test: *give prize*. Interestingly, to explain *reward*, Kimkimkim also specified his answer further: from *the gift I can get from finishing sth.*, he changed it to *sth. received for award someone (sic)*. Another, more specific example is Kimkimkim's explanation of *award*: he rewrote his pre-test answer of *to give something to someone* and changed it: *to appreciate someone by something*. Additionally, he also changed the meaning of *search* from *look at (sic) or find something* to *find/explore*. All of the above explanations of word meaning from the post-test were probably written under the influence of questing in *WoW* as they seem to pertain to the game environment, which supports the research of Thorne *et al.*

(2012), whereby quests are a significant element of game-play. Wajis seems to confirm this when stating “*actually I'm not sure, just maybe I got more clear... clearer with those words*” – he probably means through questing or playing the game. Another reason for the change in answers might be as suggested by Kimkimkim. In the interview, he stated “*I thought you may expect different results, so I don't want to give the same answers to you*”.

In exercise IV., the players had to choose one answer from a multiple choice of 3 (see Table 7). Both Wajis and Kimkimkim had a flawless score in both tests; Magekrasus did not know the meaning of *compensation* and *extinguish* in the pre-test, however, he attempted both in the post-test.

Table 7. Pre- and post-test results of all participants: Exercise IV.

Ex. IV. Pre- and post-test results from all participants							
Nr.	Answers	Pre-test Magekrasus	Post-test Magekrasus	Pre-test Wajis	Post-test Wajis	Pre-test Kimkimkim	Post-test Kimkimkim
1	c: investigate: look into	c	c	c	c	c	c
2	b: compensation: a repayment	no answer	a	b	b	b	b
3	b: schedule: timetable	b	b	b	b	b	b
4	b: extinguish: put out	no answer	a, but student remembered and showed the motion of extinguishing!	b	b	b	b
5	b: a threat: a danger	b	b	b	b	b	b
6	c: starving: very hungry	c	c	c	c	c	c
7	c: gather: pick	c	c	c	c	c	c
8	b: collect: pick up	b	b	b	b	b	b
9	b: situation: problem	b	b	b	b	b	b
10	c: deliver: take to people's houses	c	c	c	c	c	c
11	b: pie: a type of dessert	b	b	b	c	b	b
12	b: rest: relax	b	b	b	b	b	b
	Total Incorrect	0/12	2/12	0/12	0/12	0/12	0/12
	Total No Answer	2/12	0/12	0/12	0/12	0/12	0/12
	Total Correct	10/12	10/12	12/12	12/12	12/12	12/12

Both answers were incorrect (see nr. 4 in Table 7), but it is noteworthy to mention that during the post-test, the player imitated the motion of *extinguishing* a fire (which was included in one of the first quests in Elwynn Forest). This suggests that he now possibly knew what the action represented, but not the synonym *put out*, which was given in the multiple choice test. This was also confirmed by the interview, where he confidently stated that *extinguish* means “*to put something down (...) put something clean*” (*sic*). He might have understood the action pertaining to the word, but could not

provide the correct synonym or explanation for it. Nevertheless, it is noteworthy to point out that this participant attempted to answer even the unknown words, which seems to support the idea of online games as safe learning environments where players are willing to take risks (Peterson, 2010, 2012; Zheng *et al.*, 2012; Rama *et al.*, 2012). Another explanation could be that he might have felt pressured to perform better on the post-test, however, he did not confirm this in the interview when prompted.

In addition, all players confirmed that reading the quests assisted them in playing the game. Kimkimkim and Magekrasus admitted some frustration at the start, but they both adapted very quickly to the English texts. All players stated that, in general, they enjoyed playing *WoW*. To support the findings from the vocabulary tests, Magekrasus added that *“when you play it you study some English words you that don’t know and you can remember it easier than you just to read some books”*. Wajis admitted *“before I played the game I was not sure, after I went through the game and I finish all the quest and I think I get familiar with those words”*. Kimkimkim was somewhat concerned that not all the vocabulary was useful in real life, however, he stated *“I need to understand the quest at first exactly it’s English so of course this can help me to improve my English understanding”*, as well as *“maybe when you can talk with your friends it also can help you improve your spoken English”*. Both Wajis and Kimkimkim elaborated on the fact that playing *WoW* would probably be beneficial for their language skills, but at the same time, they would rather play with native speaker players in order to improve their English since they have previous experience of playing computer games where they frequently communicated with their foreign friends. They considered the social factor quite important in this regard, which is an additional finding of the current study.

As a final step, the results of visual and non-visual representations of vocabulary items need to be compared in detail in order to establish which ones were more effective in the case of the three participants. Overall, Table 8 highlights the visually represented vocabulary items in yellow and the non-visually represented ones in bold text for each participant. Wajis and Kimkimkim knew all the non-visual items in both tests. However, Magekrasus did not know 4 non-visually represented vocabulary items in the pre-test: *award*, *guard*, *compensation* and *extinguish*. He did not provide correct answers for them in the post-test, which suggests that acquisition has not occurred. In the case of *extinguish*, he imitated the action during the post-test, but marked the wrong answer. Therefore, the number of correct answers for visually represented items outweighs the non-visual ones in his case.

Table 8. Individual improvement of *visually* (yellow) and *non-visually* (bold) represented vocabulary items

<i>Magekrasus: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	0	1	extinguish	0	1	vineyard	0	1	boar	0	1
brook	0	1							kobold	0	1
pathway	1	0							murloc	1	0
award	0	1							gnoll	1	0
compensation	0	1							gryphon	1	0
									guard	0	1
Total	1	4	Total	0	1	Total	0	1	Total	3	3
<i>Wajis: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	0	1				vineyard	1	0	worg	1	0
brook	0	1							boar	1	0
pathway	0	1							murloc	1	0
									gnoll	1	0
									gryphon	0	1
Total	0	3	Total	0	0	Total	1	0	Total	4	1
<i>Kimkimkim: Unknown and acquired vocabulary items according to word exposure frequency ranges</i>											
Word frequency 1-4			Word frequency 5-7			Word frequency 8-14			Word frequency 15+		
Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect	Pre-test: not known or incorrect	Post-test: correct	Post-test: not known or incorrect
road	1	0	farm	1	0	vineyard	1	0	worg	0	1
brook	1	0							murloc	0	1
pathway	1	0							gnoll	0	1
Total	3	0	Total	1	0	Total	1	0	Total	0	3

Therefore, the above findings cannot provide an affirmative answer to research question 3, as most *non-visual* vocabulary items (including words representing actions from quests) were already known by the participants in the pre-test or showed no improvement in the case of four specific vocabulary items. Additionally, as the definition of “in-game actions” tends to be quite broad, it is difficult to determine whether these could have facilitated incidental vocabulary comprehension.

4.4 Findings: final totals from vocabulary tests

As seen from Table 9, each player has an overall improved score in the post-test compared with the pre-test. The highest improvement belongs to Wajis (13.51%), followed closely by Magekrasus (10.82%) and Kimkimkim (10.81%). Even though there was a general improvement in all three cases, the results cannot be generalised due to a number of limitations, which will be presented next.

Table 9. Final total results from pre- and post-tests of all participants

<i>Final TOTALs</i>	<i>Pre-test Magekrasus</i>	<i>Post-test Magekrasus</i>	<i>Pre-test Wajis</i>	<i>Post-test Wajis</i>	<i>Pre-test Kimkimkim</i>	<i>Post-test Kimkimkim</i>
Final TOTAL Incorrect	11/37	3/37	6/37	1/37	2/37	0/37
Final TOTAL No Answer	4/37	8/37	3/37	3/37	6/37	4/37
Final TOTAL Correct	22/37	26/37	28/37	33/37	29/37	33/37
% Correct	59.45%	70.27%	75.67%	89.18%	78.37%	89.18%



5.0 Conclusion

5.1 Limitations of the study

Inevitably, there are a number of limitations to the current study. The sample size (3 participants) and the time spent in-game were low (2-4 hours), therefore, the data cannot be generalised to a larger population. However, the findings support previous research studies conducted on gaming and SLA, where most participants felt that learning had taken place to a certain extent during game-play (Peterson, 2010; Kongmee *et al.*, 2011; Rama *et al.*, 2012). At the same time, it is important to keep in mind that IVA differs from player to player and is greatly influenced by both internal and external factors (Schmidt, 2010), which could not be covered in their entirety here.

Furthermore, only one area of the MMORPG *World of Warcraft* was included in the study (human area, Elwynn Forest) – where the quest texts consisted of merely 5,395 words. In order to expand the amount of input, during the design stage of the vocabulary tests, all quests from the blood elf starting area (Eversong Woods) were also collated. They added up to 11,325 words. However, this amount was considered

too large for 2-4 hours of game-play, therefore, the quests from this area were not included in the current study.

Even though the findings show general improvement for all three participants, their newfound vocabulary knowledge was only tested for short-term memory as there was no possibility for a follow-up test 2-4 weeks after game-play. Therefore, vocabulary knowledge might have undergone attrition as time passed (as shown by Waring and Takaki, 2003; Kweon and Kim, 2008), especially if they did not continue playing *WoW*. However, attrition does not necessarily lead to complete elimination of lexical knowledge, which tends to inherently be in a state of flux (Schmidt, 2010:23). Additionally, as the interviews show, the participants seemed confident that even a brief period of game-play has helped them learn new vocabulary, and that if they could continue, more vocabulary would be acquired.

Finally, even though the researcher originally planned to monitor the participants' game-play and IVA for a minimum of 1 month, this was not possible due to time restrictions, the players' schedules and the lack of resources (for example, a monthly subscription to *WoW*). A longitudinal study with follow-up post-tests would have been more reliable as there has been a call for such studies by many researchers (Schmitt, 2010; Nation and Webb, 2011; Coxhead and Bytheway, 2015), and it could have produced more reliable data, including measurement of attrition rate.

5.2 Implications and suggestions for future research

This study has attempted to measure to what extent incidental vocabulary acquisition (IVA) can occur while playing the MMORPG *World of Warcraft* for approximately 2-4 hours at the participants' own leisure in order to simulate their usual game-play experience. Even though the findings are inconclusive, they suggest that even in a short span of time incidental vocabulary acquisition can occur when playing an online game with rich **meaning-focused input** (Nation's *first strand*). *Word exposure frequency* and *images* related to concepts through questing in-game can facilitate incidental vocabulary acquisition at least at the initial receptive stage of learning, as shown by the results. Therefore, it is recommended that learners of a second language (in this case, English), who prefer using more interactive media for entertainment, should be actively encouraged to choose and play an MMORPG that suits their personal interests. It is highly likely that not only their motivation levels to understand and learn new vocabulary from the game will increase (Juul, 2005; Yee, 2006; Sykes and Reinhardt, 2013), but they will also use their newfound knowledge with other players in order to be able to successfully advance and enjoy their game-play (Coxhead and Bytheway, 2015).

Even though it was mentioned that transferability of certain low-frequency vocabulary (e.g. *gnoll, garrison, gryphon, kobold, murloc, prowler*) related to the fantasy world of *WoW* may be inadequate for language learners, the game has rich comprehensible input of a large amount of vocabulary that could be actively used even in their daily lives (e.g. *explore, discover, collect, deliver, vineyard, bridge, pathway, road*). Furthermore, successful learning experiences through game-play could become “a booster” for the learners to engage in further activities or raise their motivation levels (Chik, 2015:82; Bytheway, 2015). Future studies could undertake measuring which words originating from the game are met and used actively by the participants in their everyday life.

Another important implication of the current study could be the introduction of homework or perhaps even classroom activities to engage second language learners in a similar type of game-play, either for the purposes of vocabulary acquisition or language practice, where they would be compelled to continuously use the new vocabulary in the process of learning. This might be a novelty to many; it could even cause frustration at the start to some (similarly to this study’s participants). However, the learners are expected to overcome this challenge sooner or later, especially if they were undertaking “adventures” together. As all incidental learning needs subsequent practice and engagement with the newly acquired knowledge (Dörnyei, 2009; Schmitt, 2010; Nation and Webb, 2011), tutors could reinforce it through in-class explanations and exercises. Moreover, it is highly likely that learners would notice a significant number of the structures they meet in-game also in real life, for example, when studying in a formal environment.

Furthermore, it is recommended that in-depth longitudinal vocabulary studies be conducted in the context of online games with a large (100+) number of second language learners in order to provide generalisable data. Additionally, future studies could focus not only on **meaning-focused input** and its comprehension, but also the players’ meaning-focused output and fluency (Nation’s *Four Strands*, 2007), thus covering not only receptive, but also productive knowledge at the same time (Laufer and Goldstein, 2004).

This study has shown that incidental vocabulary acquisition from playing the MMORPG *WoW* can successfully occur even in a brief period of game-play. However, the knowledge acquired by the players is probably fragile, therefore it needs additional game-play and practice to be strengthened. Nevertheless, the findings suggest that playing *WoW* might be a viable way to acquire new vocabulary incidentally.



6.0 Bibliography

Barchard, K.A. 2003. Ethics in on-line data collection. In: *The Western Psychological Association Annual Convention*. Vancouver, British Columbia, Canada, 2 May 2003.

Blizzard, Inc. 2016. Blizzard Entertainment, [online] Available at: <<http://eu.blizzard.com/en-gb/games/>> [Accessed 21 December 2015].

Brown, R., Waring, R. and Donkaewbua, S. 2008. Incidental vocabulary acquisition from reading, reading-while-listening, and listening to stories. *Reading in a Foreign Language*, 20(2), pp. 136-163.

Bytheway, J. 2015. A taxonomy of vocabulary learning strategies used in massively multiplayer online role-playing games. *CALICO Journal*, 32(3), pp. 508-527.

Carter, S.M. and Little, M. 2007. Justifying Knowledge, Justifying Method, Taking Action: Epistemologies, Methodologies, and Methods in Qualitative Research. *Qualitative Health Research*. 17(10), pp. 1316-1328.

Chik, A. 2011. Learner autonomy development through digital gameplay. *Digital Culture and Education*, 3(1), pp. 30-45.

Chik, A. 2013. Naturalistic CALL and Digital Gaming. *TESOL Quarterly*, 47(4), pp. 834-839.

Chik, A. 2015. "I don't know how to talk basketball before playing NBA 2K10": using digital games for out-of-class language learning. In: Nunan, D. and Richards, J.C., eds. 2015. *Language learning beyond the classroom*. New York: Routledge. pp. 75-84.

Chik, A. 2016. Digital gaming and language learning: Autonomy and community. *Language Learning & Technology*, 18(2), pp. 85–100.

Cornillie, F., Thorne, S.L. and Desmet, P. 2012. ReCALL special issue: Digital games for language learning: challenges and opportunities. *ReCALL*, 24(3), [online] Available at: <<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=8699371&fileId=S0958344012000134>> [Accessed 21 December 2015].

Coxhead, A. and Bytheway, J. 2015. Learning Vocabulary Using Two Massive Online Resources: You Will Not Blink. In: Nunan, D. and Richards, J.C., eds. 2015. *Language learning beyond the classroom*. New York: Routledge. pp. 65-74.

Crawford, G., Gosling, V.K. and Lights, B. 2011. *Online gaming in Context – The social and cultural significance of online games*. London: Routledge.

Darlaston-Jones, D. 2007. Making connections: The relationship between epistemology and research methods. *The Australian Community Psychologist*, 19(1), pp. 19-26.

Dickey, M.D. 2007. Game design and learning: a conjectural analysis of how massively multiple online role-playing games (MMORPGs) foster intrinsic motivation. *Education Tech Research Dev.*, 55, pp. 253-273.

Dörnyei, Z. 1998. Motivation in second and foreign language learning. *Language Teaching*, 31(3), pp. 117-135.

Dörnyei, Z. 2007. *Research methods in applied linguistics: Quantitative, qualitative and mixed methodologies*. Oxford: OUP.

- Dörnyei, Z. 2009. *The psychology of second language acquisition*. Oxford: OUP.
- Ellis, R. 2002. *Second Language Acquisition*. Oxford: OUP.
- Gamepedia, 2016. Gamewiki. [online] Available at: www.wow.gamepedia.com/Elwynn_Forest_storyline > [Accessed 30 March 2016].
- Gee, J.P. 2007. *What video games have to teach us about learning and literacy*. New York: Palgrave MacMillan.
- Goldkuhl, G. 2012. Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, (21)2, pp. 135-146.
- Hammersley, M. and Traianou, A., 2012. Ethics and Educational Research, British Educational Research Association, [online] Available at: <https://www.bera.ac.uk/wp-content/uploads/2014/02/Ethics-and-Educational-Research.pdf> > [Accessed 13 January 2016].
- Horst, M., Cobb, T. and Meara, P. 1998. Beyond *A Clockwork Orange*: Acquiring Second Language Vocabulary through Reading. *Reading in a Foreign Language*, 11(2), pp. 207-223.
- Howe, K.R. and Moses, M.S. 1999. Ethics in educational research. *Review of Research in Education*, 24, pp. 21-60.
- Huckin, T. and Coady, J. 1999. Incidental vocabulary acquisition in a second language. *SSLA*, 21, pp. 181-193.
- Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. 2007. Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research*, 1(2), pp. 112-133.
- Juul, J. 2005. *Half-Real: Video Games between Real Rules and Fictional Worlds*, Cambridge: MIT Press.
- Kongmee, I., Strachan, R., Montgomery, C. and Pickard, A. 2011. Using massively multiplayer online role-playing games (MMORPGs) to support second language learning: Action research in the real and virtual world. In: *2nd Annual IVERG Conference: Immersive technologies for Learning: virtual implementation, real outcomes*. Middlesborough, UK, 27-28 June 2011.
- Kweon, S.O. and Kim, H.R. 2008. Beyond raw frequency: Incidental vocabulary acquisition in extensive reading. *Reading in a Foreign Language*, 20(2), pp. 191-215.
- Laufer, B. and Goldstein, Z. 2004. Testing Vocabulary Knowledge: Size, Strength, and Computer Adaptiveness. *Language Learning*, 54(3), pp. 399-436.
- Lee, J. J., & Hoadley, C. 2007. Leveraging Identity to Make Learning Fun: Possible Selves and Experiential Learning in Massively Multiplayer Online Games (MMOGs). *Innovate*, 3(6), [online] Available at: <http://hypermedia468.pbworks.com/w/file/attach/82076390/Lee%2520%2526%2520Hoadley%25202007%2520JOE%2520Identity,%2520experiential%2520learning,%2520engagement,%2520motivation,%2520MMOGs%2520copy.pdf> [Accessed 21 December 2015].
- Lichtman, M. 2010. *Qualitative Research in Education – A User's Guide*. 2nd ed. London: SAGE.

- Mason, J. 2006. Mixing methods in a qualitatively driven way. *Qualitative Research*, 6(1), pp. 9-25.
- Mawer, K. and Stanley, G. 2011. *Digital Play – Computer games and language aims*. Surrey: DELTA Publishing.
- Mayoh, J. and Onwuegbuzie, A.J. 2015. Toward a Conceptualization of Mixed Methods Phenomenological Research. *Journal of Mixed Methods Research*. 9(1), pp. 91-107.
- Moreno, R. and Mayer, R. 2007. Interactive Multimodal Learning Environments. *Educational Psychology Review*, 19, pp. 309-326.
- Nagy, W.E., Herman, P. A. and Anderson, R.C. 1985. Learning Words from Context. *Reading Research Quarterly*, 29(2), pp. 233-253.
- Nagy, W.E., Anderson, R.C. and Herman, P.A. 1987. Learning Word Meanings From Context During Normal Reading. *American Educational Research Journal*, 24(2), pp. 237-270.
- Nardi, B.A. 2010. *My Life as a Night Elf Priest – An Anthropological Account of World of Warcraft*. Michigan: The University of Michigan Press.
- Nation, I.S.P. 1990. *Teaching and Learning Vocabulary*. New York: Newbury House.
- Nation, I.S.P. 2001. *Learning Vocabulary in Another Language*. Cambridge: CUP.
- Nation, I.S.P. 2007. The four strands. *International Journal of Innovation in Language Learning and Teaching*, 1(1), pp. 2-13.
- Nation, I.S.P. 2008. *Teaching Vocabulary: Strategies and Techniques*. Boston: Heinle.
- Nation, I.S.P. 2011. Research into practice: Vocabulary. *Language Teaching*, 44(4), pp. 529-539.
- Nation, I.S.P. 2014. How much input do you need to learn the most frequent 9,000 words? *Reading in a Foreign Language*, 26(2), pp. 1-16.
- Nation, I.S.P. and Webb, S. 2011. *Researching and Analyzing Vocabulary*. Boston: Heinle.
- Oxford, R. and Crookall, D. 1990. Vocabulary Learning: A Critical Analysis of Techniques. *TESL Canada Journal*, 7(2), pp. 9-30.
- Oxford, R. 2003. *Language Learning Styles and Strategies: an overview – PhD paper*.
- Pellicer-Sánchez, A. and Schmitt, N. 2010. Incidental vocabulary acquisition from an authentic novel: Do *Things Fall Apart?*. *Reading in a Foreign Language*, 22(1), pp. 31-55.
- Pigada, M. and Schmitt, N. 2006. Vocabulary acquisition from extensive reading: A case study. *Reading in a Foreign Language*, 18(1), pp. 1-28.
- Peterson, M. 2010. Massively multiplayer online role-playing games as arenas for second language learning. *Computer Assisted Language Learning*, 23(5), pp. 429-439.
- Peterson, M. 2012. Learner interaction in a massively multiplayer online role playing game (MMORPG): A sociocultural discourse analysis. *ReCALL*, 24(3), pp. 361-380.
- Prensky, M. 2001. Digital Natives, Digital Immigrants Part 1. *On the Horizon*, 9(5), pp. 1-6.

- Rama, P.S., Black, R.W., van Es, E. and Warschauer, M. 2012. Affordances for second language learning in *World of Warcraft*. *ReCALL*, 24(3), pp. 322-338.
- Rankin, Y.A., Gold, R. and Gooch, B. 2006. 3D Role-Playing Games as Language Learning Tools. *Eurographics*, 25(3), [online] Available at: <https://www.researchgate.net/publication/266883764_3D_Role-Playing_Games_as_Language_Learning_Tools> [Accessed 21 December 2015].
- Rankin, Y.A., Gold, R. and Gooch, B., 2006. Evaluating Interactive Gaming as a Language Learning Tool. In *Proceedings for ACM SIGGRAPH Conference*, [online] Available at: <<http://www.langwidge.com/studies/a44-rankin.pdf>> [Accessed 21 December 2015].
- Rott, S. 2012. Incidental Vocabulary Acquisition. In: *The Encyclopedia of Applied Linguistics*, [online] Available at: <<http://onlinelibrary.wiley.com/doi/10.1002/9781405198431>> [Accessed 4 April 2016].
- Ryu, D. 2013. Play to Learn, Learn to Play: Language Learning through Gaming Culture. *ReCALL*, 25(2), pp. 286-301.
- Saville-Troike, M. 2012. *Introducing Second Language Acquisition*. New York: CUP.
- Schmidt, R. 1990. The Role of Consciousness in Second Language Learning. *Applied Linguistics*, 11(2), pp.129-158.
- Schmidt, R. 2010. Attention, awareness, and individual differences in language learning. In: Chan, W. M., Chi, S., Cin, K. N., Istanto, J., Nagami, M., Sew, J. W., Suthiwan, T. and Walker, I. *Proceedings of CLaSIC 2010*, Singapore, December 2-4 2010. Singapore: National University of Singapore, Centre for Language Studies, pp. 721-737.
- Schmitt, N. & McCarthy, M. 1997. *Vocabulary: Description, acquisition and pedagogy*. Cambridge, UK: Cambridge University Press.
- Schmitt, N. 2010. *Researching vocabulary: a vocabulary research manual*. Palgrave Macmillan.
- Schrader, P.G. and Lawless, K.A. 2010. The Hidden Literacies of Massively Multiplayer Online Games. In: Pullen, D.L., Gitsaki, C. and Baguley, M., eds. 2010. *Technoliteracy, Discourse and Social Practice: Frameworks and Applications in the Digital Age*. New York: IGI Global.
- Schwandt, T.A. 2000. Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics and social constructionism. In: Denzin, N.K. and Lincoln, Y.S., 2000. *Handbook of Qualitative Research*. SAGE.
- Sechrest, L. and Sidani, S. 1995. Quantitative and qualitative methods: Is There an Alternative? *Evaluation and Program Planning*, 18(1), pp. 77-87.
- Sharp, J.G. 2012. *Success with your Education Research Project*. 2nd ed. London: SAGE.
- Skehan, P. 1998. *A cognitive approach to language learning*. Oxford: OUP.
- Steinkuehler, C. A. 2004. Learning in massively multiplayer online games. In Kafai, Y.B., Sandoval, W. A., Enyedy, N., Nixon, A. S. and Herrera, F., eds., *Proceedings of the Sixth International Conference of the Learning Sciences*. Mahwah, NJ: Erlbaum, pp. 521–528.

- Sydorenko, T. 2010. Modality of input and vocabulary acquisition. *Language Learning and Technology*, 14(2), pp. 50-73.
- Sylyen, L.K. and Sundqvist, P. 2012. Gaming as extramural English L2 learning and L2 proficiency among young learners. *ReCALL*, 24(3), pp. 302-321.
- Sykes, J.M. and Reinhardt, J. 2013. *Language at Play – Digital games in second and foreign language teaching and learning*. Boston: Pearson.
- Thorne, S.L., Black, R.W. and Sykes, J.M. 2009. Second Language Use, Socialization and Learning in Internet Interest Communities and Online Gaming. *The Modern Language Journal*, 93, Focus Issue, pp. 802-821.
- Thorne, S.L., Fischer, I. and Lu, X. 2012. The semiotic ecology and linguistic complexity of an online game world. *ReCALL*, 0(3), 279-301.
- Thorne, S.L. and Fischer, I. 2012. Online Gaming as Sociable Media. *ALSIC: Apprentissage des Langues et Systèmes d'Information et de Communication*, 15(1), [online] Available at: <<http://alsic.revues.org/2450>> [Accessed 22 December 2015].
- Tight, D.G. 2010. Perceptual Learning Style Matching and L2 Vocabulary Acquisition. *Language Learning*, 60(4), pp. 792-833.
- Walker Rettberg, J. 2008. Quests in *World of Warcraft*: Deferral and Repetition. In: Corneliussen, H. and Walker Rettberg, J., eds. 2008. *Digital Culture, Play, and Identity: A World of Warcraft Reader*, pp. 167-184.
- Waring, R. and Takaki, M. 2003. At what rate do learners learn and retain new vocabulary from reading a graded reader? *Reading in a Foreign Language*, 15, pp. 130–163.
- Whippey, C. 2011. It's not all about the words: Non-textual information in World of Warcraft. *Proceedings of the American Society for Information Science and Technology*, 48(1), pp.1-4.
- Williams, D., Yee, N. and Caplan, S.E. 2008. Who plays, how much, and why? Debunking the stereotypical gamer profile. *Journal of Computer-Mediated Communication*, 13(4), pp. 993-1018.
- Wu, M.L., Richards, K. and Saw, G.K. 2014. Examining a Massive Multiplayer Online Role-Playing Game as a Digital Game-Based Learning Platform. *Computers in the Schools*, 31:1-2, 65-83, [online] Available at: <http://www.tandfonline.com/doi/abs/10.1080/07380569.2013.878975#.VqUAp_mLSbg> [Accessed 21 December 2015].
- Wu, W. and Xu, H. 2006. Effects of Frequency on Incidental Vocabulary Learning through Reading. *Journal of Chongqing University*, 12(4), pp. 116-121.
- Yang, F.O. and Wu, W.V. 2015. Using Mixed-Modality Learning Strategies via e-Learning for Second Language Vocabulary Acquisition. *International Forum of Educational Technology and Society*, 18(3), pp. 309-322.
- Yee, N. 2006. Motivations of Play in MMORPGs – Results from a Factor Analytic Approach, [online] Available at: <<http://www.nickyee.com/daedalus/motivations.pdf>> [Accessed 22 December 2015].
- Yee, N., 2009. Befriending ogres and wood-elves: Relationship formation and the social architecture of Norrath. *Game Studies*, 9(1), [online] Available at: <<http://www.gamestudies.org/0901/articles/yee>> [Accessed 22 December 2015].

Zheng, D., Newgarden, K. and Young, M.F. 2012. Multimodal analysis of language learning in *World of Warcraft* play: Languaging as Values-realizing. *ReCALL*, 24(3), pp. 339-360.

Zheng, D., Bischoff, M. and Gilliland, B. 2015. Vocabulary learning in massively multiplayer online games: context and action before words. *Education Tech Research Dev*, 63, pp. 771-790.

Zhu, Y. 2015. Revisiting Word Exposure Frequency and Incidental Vocabulary Acquisition. *Theory and Practice in Language Studies*, 5(5), pp. 968-973.



7.0 Appendices

7.1 Ethics application: approval and amendments

Ethics Committee for Non-Clinical Research Involving Human Subjects

Notification of Ethics Application Outcome – UG and PGT Applications

Application Details

Application Type: PGT
CSS/SOE/2015/142

Application Number:

Applicant's Name Anamaria Kinga Maior Project
Title **An exploration of the MMORPG *World of Warcraft* as a tool for facilitating incidental vocabulary acquisition**

Application Status

Approved – Pending Permissions (please see below)

Approved – No (further) Permissions Required

X

Not approved – Full Resubmission Required (please see overleaf)
Resubmission Rec'd

Note: Start and End Dates of Approval will only be given when ethical approval has been granted and when all the relevant permissions have been received.

Start Date: 06/05/2016

End Date: 31/08/2021

Permissions

Please find below the list of permissions that you **MUST** obtain and submit to the Ethics Administrator before commencing with data collection. You can either provide a scanned copy of the permission letters to: education-ethics@glasgow.ac.uk, or send a hard copy to: J. Turner PGT Office St Andrew's Building 11 Eldon Street Glasgow G3 6NH

Permission required from:

Language Centre

Received in Admin Office:

Received

Recommendations (where Changes are Required)

- **Where changes are required all applicants must respond** in the relevant boxes to the recommendations of the Committee and return to the Ethics Office to explain the changes you have made to the application.
- **(If application is Rejected a full new application must be submitted by returning to the Ethics Office. Where recommendations are provided, they should be responded to and this document provided as part of the new application.**

(Shaded areas will expand as text is added)

MAJOR RECOMMENDATION OF THE COMMITTEE

APPLICANT RESPONSE TO MAJOR

--	--

MINOR RECOMMENDATION OF THE COMMITTEE

APPLICANT RESPONSE TO MINOR

1 Please spell out abbreviation in title	An exploration of the Massively Multiplayer Online Role-Playing Game <i>World of Warcraft</i> as a tool for facilitating incidental vocabulary acquisition *****
2.1 Please articulate briefly what the research approach is and	The research methodology and data collection include a pre-game and post-game activity in small groups (depending on participant numbers, see step 4) and individual game-play done in the participants' homes (see step 3). This project is considered to be low risk because it does not involve any of the high risk examples in lists 1-5 in the Risk Guidance Document.

how it is low risk. (The methodology is explained in detail later in the form, but a brief summary needs to be provided to justify classification as low risk).

Step 1: possible fatigue caused by playing a computer game (*World of Warcraft*)

Step 2: especially participants with limited gaming experience might become fatigued while playing the game

Step 3: this research study is considered as low risk because the participants will be playing the game in their own homes, at their own leisure in a comfortable environment known to them – and will be encouraged to take breaks

Step 4: none of the game-play done in the participants’ leisure time will be recorded so they do not feel pressured; the results of this research study consist of the participants’ answers from their pre-game and post-game activities which will be conducted in a small group (5-8 participants) in the University Library, a familiar environment

Step 5: the risk assessment has been reviewed and updated.

Duration/time:

Plain Language Statement: This is a quite intensive study for the participants. Therefore it is particularly appropriate that the PLS clearly states what sort of time commitment this is likely to involve and that it is clear that participants can discontinue the study at any point.

Sequence of stages	Stages of data collection	Duration	Location
Stage 1.	1. Pre-game activity	20 minutes	University Library, study room
Stage 2.	2. Game-play (with breaks if you wish)	Between 2-4 hours	Your home, at your own pace
Stage 3.	3. Post-game activity	15 minutes	University Library, study room
Stage 4.	4. Interview	20 minutes	Face-to-face or over

	<table border="1" data-bbox="628 165 1444 237"> <tr> <td data-bbox="628 165 807 237"></td> <td data-bbox="807 165 1110 237"></td> <td data-bbox="1110 165 1273 237"></td> <td data-bbox="1273 165 1444 237">Skype</td> </tr> </table> <ol style="list-style-type: none"> 1. You will be able to choose a time that is most convenient for you. 2. Individual game-play in your own home using your PC or laptop, with as many breaks as you wish. 3. A post-game activity in the University Library within 24 hours after game-play is finished. 4. A face-to-face or online interview in the University library or over Skype. This interview will be audio-recorded (within 1 week after the post-test). <p>Voluntary participation:</p> <p>Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to participate, you will be asked to sign a consent form. After you sign the consent form, <i>you can still stop taking part in this research study at any time without giving a reason.</i> If you withdraw from the study before data collection is completed, your personal data will not be used in the study and it will be destroyed.</p>				Skype
			Skype		

REVIEWER COMMENTS
REVIEWER COMMENTS

APPLICANT RESPONSE TO

(OTHER THAN SPECIFIC RECOMMENDATIONS)

<p>The ethics application is very thorough and clearly written.</p>	
---	--

Please retain this notification for future reference. If you have any queries please do not hesitate to contact Jennifer Turner, Ethics administrative contact for UG and PGT Applications: education-ethics@glasgow.ac.uk

End of Notification.

College Research Ethics
Request for Amendments - Reviewer Feedback
Ethics Committee for Non-Clinical Research Involving Human Subjects

Application Details

Undergraduate Student Research Ethics Application Postgraduate Taught Student

Research Ethics Application X

Application Number: CSS/SOE/2015/142

Applicant's Name: Anamaria Kinga Maior
Project Title: An exploration of the Massively Multiplayer Online Role-Playing Game World of Warcraft as a tool for facilitating incidental vocabulary acquisition

Original Date of Application Approval: 06/05/2016

Date of Amendments Approved: 31/05/2016

Outcome: Amendments Approved

Reviewer Comments

Amendment approved for change in recruitment. Please note that relevant permission will be required.

Permission from John Briggs received - 02/06/2016. Amendment approved and permission granted.



7.2 Call for Participants: Pamphlet (see Request for Amendments above)

Looking for students to take part in a research study:

1. Do you love online games?
2. Have you played some before?
3. Is your IELTS Reading 5.5?



If you answered **YES** to all of the above, then I'd like to invite you to take part in a research study on playing computer games!

Please contact: 0205778m@student.gla.ac.uk

Thank you!

Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk
Online games study
0205778m@student.gla.ac.uk


7.3 Consent form

Title of Project: An exploration of the Massively Multiplayer Online Role-Playing Game *World of Warcraft* as a tool for facilitating incidental vocabulary acquisition

Name of Researcher: Anamaria Kinga Maior

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I understand that the interview will be audio-recorded.
4. I understand that any information recorded in the investigation will be made and kept anonymous and will remain confidential and no information that identifies me will be made publicly available
5. I understand that I can contact the researcher for this project by e-mail to receive more information.

I agree / do not agree (delete as applicable) to take part in the above study.

Name of Participant	Date	Signature
<i>Anamaria Kinga Maior</i>		
Researcher	Date	Signature

7.4 Participant Guidelines

Dear Participant,

Please see the guidelines below. They were written to help you step by step during the research study on *World of Warcraft*. If you have any questions, please contact me by email (0205778m@student.gla.ac.uk).

- Create an account at: <https://eu.battle.net/account/creation/wow/signup/> - no credit card details needed (free to play up to level 20)
- Download and install *World of Warcraft* on your PC or laptop **at least 2 days before** Friday, 20th May, 2016.
- Pre-game activity in Room 101, Anderson Building (C1 on campus map: http://www.gla.ac.uk/media/media_1887_en.pdf) on Friday, 20th May @ 5.00 pm.
- Game-play: login the game, make a human character and do all quests in Elwynn Forest (try to finish by late evening on the 22nd May, 2016)
- Post-game activity in Room 101, Anderson Building (C1 on campus map: http://www.gla.ac.uk/media/media_1887_en.pdf) on Monday, 23rd May @ 5.00 pm.
- Interview in the University Library or over Skype (date and times to be chosen by you)

Please **do not start** playing the game before our meeting **on the 20th of May, 2016!** When we meet, I will give you more details on what to do and how to contact me if there are any problems.

Finally, when you finish all the quests in Elwynn Forest, please **do not continue** questing in Westfall or another area. **After the post-game activity** (Monday, 23rd May, 2016), **you can continue playing as much as you wish.**

Thank you very much for your time and help!

A. Kinga Maior

MEd TESOL, School of Education

University of Glasgow



7.5 Vocabulary tests

7.5.1 Vocabulary pre-test

Pre-game activity

20 mins.

Participant's pseudonym (in-game character's name): _____

Date _____

****Note:** all vocabulary items from this activity are related to and taken from the MMORPG *World of Warcraft*. You are free to explain the words based on your knowledge of the game or your everyday knowledge of English from the real world. **Try not to guess the answers if you do not know them.** For this research, it is very important that you give an honest answer. Keep in mind that there are no right or wrong answers. Thank you!

Exercise I. Match the pictures with the words (names) provided! Write the answer on the line – only one correct answer is possible.

Example: **mana wyrm** (picture on PPT)

Answer: B

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Exercise II. Read the words you were given and match them with the numbers! They usually refer to locations or places in the game.

Example: look at the screenshot, choose a word (or words), write the correct number next to the word(s)

Answer: garrison

you have 1 minute to read them before the screenshots appear

<i>Words to choose from</i>	<i>Answers</i>	<i>Words to choose from</i>	<i>Answers</i>
garrison	example	mine	
road		farm	
pathway		bridge	
vineyard		brook	
lake		abbey	
		weapon	

Exercise III. Try to explain in your own words **the meaning** of the following vocabulary items – or give a **synonym** (=> same meaning, different word) – or write a sentence using the words. If you do not know them, leave the space blank.

Example: *hero*

a person considered brave by others (**meaning**)

a champion (**synonym**)

He became a *hero* in the war by saving others.
(**sentence**)

1. reward

2. objective

3. receive

4. award

5. volunteer

6. recruit _____

7. guard _____

8. search _____

Exercise IV. Circle one answer from the possibilities given.

Example: skim: I <skimmed> the text.

- a. wrote it
- b. cleaned it
- c. read it over quickly**

Answer: c.

1. investigate: A detective's job is <to investigate> crimes.

- a. to commit
- b. to report on
- c. to look into

2. compensation: Mary broke John's car. He is now asking for <a compensation>.

- a. a grand prize
- b. a repayment
- c. nothing

3. schedule: Everything went according to <schedule>.

- a. shopping list
- b. timetable
- c. travel list

4. extinguish: The fire <was extinguished> with the help of the firefighters.

- a. was cleaned
- b. was put out
- c. was fanned

5. threat: In winter, ice on the roads poses <a threat>.

- a. a question
- b. a danger
- c. safety

6. starving: "I am <starving>! I haven't eaten in 24 hours."

- a. crying

- b. not hungry at all
 - c. very hungry
7. gather: My friend likes <gathering> flowers in the fields.
- a. cutting
 - b. separating
 - c. picking
8. collect: "Could you <collect> a parcel for me tomorrow?"
- a. send off
 - b. pick up
 - c. buy
9. situation: We have to deal with the current <situation> as soon as possible.
- a. generation
 - b. problem
 - c. analysis
10. deliver: You have <to deliver> the pizzas before they get cold.
- a. eat
 - b. bake
 - c. take to people's houses
11. pie: My grandma bakes a delicious <pie>.
- a. cake
 - b. a type of dessert
 - c. a type of salty snack
12. rest: It's nice <to rest> after a long day of work.
- a. to go running
 - b. to relax
 - c. to do the dishes

Thank you for your co-operation!



7.5.2 Vocabulary post-test

Post-game activity**15 mins.**

Participant's pseudonym (in-game character's name): _____

Date _____

****Note:** all vocabulary items from this activity are related to and taken from the MMORPG *World of Warcraft*. You are free to explain the words based on your knowledge of the game or your everyday knowledge of English from the real world. Try not to guess the answers if you do not know them. For this research, it is very important that you give an honest answer. Keep in mind that there are no right or wrong answers. Thank you!

Exercise I. Match the pictures with the words (names) provided! Write the answer on the line – only one correct answer is possible.

Example: mana wyrm (picture on PPT)

Answer: B

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Exercise II. Read the words you were given and match them with the numbers! They usually refer to locations or places in the game.

Example: look at the screenshot, choose a word (or words), write the correct number next to the word(s)

Answer: garrison

****you have 1 minute to read them before the screenshots appear****

<i>Words to choose from</i>	<i>Answers</i>	<i>Words to choose from</i>	<i>Answers</i>
garrison	example/0.	mine	
road		farm	
pathway		bridge	
vineyard		brook	
lake		abbey	
		weapon	

Exercise III. Try to explain in your own words **the meaning** of the following vocabulary items – or give a **synonym** (=> same meaning, different word) – or write a sentence using the words. If you do not know the word, leave the space blank.

Example: *hero*

a person considered brave by others (**meaning**)

a champion (**synonym**)

He became a *hero* in the war by saving others.
(**sentence**)

1. reward _____

2. objective _____

3. receive _____

4. award _____

- 5. volunteer _____
- 6. recruit _____
- 7. guard _____
- 8. search _____

Exercise IV. Circle one answer from the possibilities given.

Example: skim: I <skimmed> the text.

- a. wrote it
- b. cleaned it
- c. read it over quickly**

Answer: c.

- 1. investigate: A detective's job is <to investigate> crimes.
 - a. to commit
 - b. to report on
 - c. to look into
- 2. compensation: Mary broke John's car. He is now asking for <a compensation>.
 - a. a grand prize
 - b. a repayment
 - c. nothing
- 3. schedule: Everything went according to <schedule>.
 - a. shopping list
 - b. timetable
 - c. travel list
- 4. extinguish: The fire <was extinguished> with the help of the firefighters.
 - a. was cleaned
 - b. was put out
 - c. was fanned
- 5. threat: In winter, ice on the roads poses <a threat>.
 - a. a question
 - b. a danger
 - c. safety
- 6. starving: "I am <starving>! I haven't eaten in 24 hours."

- a. crying
 - b. not hungry at all
 - c. very hungry
7. gather: My friend likes <gathering> flowers in the fields.
- a. cutting
 - b. separating
 - c. picking
8. collect: "Could you <collect> a parcel for me tomorrow?"
- a. send off
 - b. pick up
 - c. buy
9. situation: We have to deal with the current <situation> as soon as possible.
- a. generation
 - b. problem
 - c. analysis
10. deliver: You have <to deliver> the pizzas before they get cold.
- a. eat
 - b. bake
 - c. take to people's houses
11. pie: My grandma bakes a delicious <pie>.
- a. cake
 - b. a type of dessert
 - c. a type of salty snack
12. rest: It's nice <to rest> after a long day of work.
- a. to go running
 - b. to relax
 - c. to do the dishes

Thank you for your co-operation!



7.6 Interview

7.6.1 Interview questions

Interview questions (semi-structured interview, max. 20 minutes)

Participant's pseudonym (in-game character's name): _____

Date _____

Face-to-face

Online, over Skype

1. Did you enjoy playing *WoW* in English? Why/why not?
2. How do you think playing *World of Warcraft* or similar online games can help you with learning new words?
3. Do you remember any new words from playing *WoW*?
 - 3.1 If yes, please give an example and say what helped you to understand the meaning of the new word.
4. Do you think playing the game made it easier for you to understand new words? Why/why not?
 - 4.1 Did you notice any words that were *repeated many times* during the game? Could you give an example?
 - 4.2 Did it help you to understand a word when you saw it *many times* while playing? How?
 - 4.3 How did connecting *visuals* from the game (for example, images of locations or animals/creatures) help you to understand new words?
 - 4.4 Do you think that reading the quest texts and *doing the quests* themselves help you understand new words from the game? Why/why not?



7.6.2 Sample interview: Kimkimkim (15.05 minutes)

Note: Ithil is the name of the researcher's in-game character; K stands for Kimkimkim (the name of the participant's in-game character)

Ithil: Can you tell me first, did you enjoy playing the game, *World of Warcraft*, in English?

K: I enjoyed, but..you know I have no friends here, I have no international friends or some friends in this game so I feel a little alone so I am not enjoy playing some games by myself or alone, you know.

Ithil: Ahhh, absolutely, so yes and no.

K: I like playing computer games but I don't want to play games alone, so if I have some...a lot of friends I like playing this game.

Ithil: So you would probably like it more if your friends were playing with you, right?

K: Yeah.

Ithil: That's really good to hear; and was it ok to play in English?

K: Yeah, I think it's ok, maybe at the beginning I feel a little upset, or frustrated, or a little difficult to.. how to do something, but as I said if I have some friends they can tell me; like you can tell me how to do something maybe I can feel it is very easy to start with.

Ithil: Good, good ok. And... in general, how do you think that playing this game and other online games can help you to learn new words? Or do you think that it can help?

K: Of course it can help - for some words like farm or pathway, if you can look at the picture in the game and you can have a picture to look in this way and you may feel a little imperative (?) about this word you may remind this word very deeply this is for some maybe technical words.

Ithil: Yeah, like your spells, right?

K: Yeah, yeah, yeah.

Ithil: Ah so you mean you can remember it?

K: Ye but it's not for the... yeah maybe when you can talk with your friends it also can help you improve your spoken English, but for academic English i'm not sure.

Ithil: Not so much, perhaps. So I couldn't hear you so clearly before... so did you give an example of a new word that you learned?

K: Yeah, pathway, or road, or farm - I can see this picture in this games so I maybe feel... I can feel very deep to remember this game, this word not game... so I cannot forget this words.

Ithil: That's really wonderful, that's good to hear! So, let me ask you a little bit about the game and these vocabulary items. For example, when you were playing, did you notice any words that were repeated many times?

K: Yeah, for example quest this is word was repeat again and again and some...maybe some technical words like caster or some words how to say...a place, or spider, or some other animals and I can see them again and again.

Ithil: So it was quite easy when you saw it many times to remember, right?

K: Yeah, but in that time I can't remember all these words in one time, I can only remember some of them.

Ithil: Only some of them, yes, I think there was quite a lot happening.

K: And a lot of words I don't thinking I can used it in my life.

Ithil: Ahh, yes, that's the other, it's not very useful for real life, although some of them, like the ones, you know receive and reward and recruit - all these, you know, are very useful in real life as well.

But the creatures, like the worg and the boar not so much perhaps. Ok, cool! And when you saw these creatures and the locations, then you realised that there is something you have to do there right?

K: Yeah.

Ithil: Yeah the quest was sending you there, so you had to do something.

K: Yeah, so I need to understand the quest at first exactly... it's English so of course this can help me to improve my English understanding.

Ithil: Yes, yes, I think you definitely read the quests and you wanted to know what to do so that was really, really good... So you wanted to see the data, let me send you your data so you can have a look at your results, they are very interesting, so let me send you ... this is yours, you can accept.

K: I just download it within maybe a few seconds... how to open it?

Ithil: I think you have to double click.

K: Double click?

Ithil: Mhm.

K: Ok, I open.

Ithil: See?

K: What about your another participate, the Chinese guy?

Ithil: Ah yes, basically he also had interesting results...

K: Did you have a..did you have an interview with him?

Ithil: Yes, I had an interview as well, yes.

K: I mean have you do... have you done the interview with him?

Ithil: Yes.

K: Tonight?

Ithil: Ahh not today, he went back to China.

K: Ah, he went back to China?

Ithil: Yes, unfortunately, he's going home for the summer.

K: And how do you do this interview with him if he is in the China?

Ithil: No, no, it was on Monday, his interview was on Monday.

K: Oh I just looking at my... you sent me the...

Ithil: Your data, yeah, see...?

K: I can't know which data mine.

Ithil: Oh, it has... I sent you the one which says vocabulary results Kimkimkim, that should be yours, right?

K: Oh, Kimkimkim! Exercise pre, exercise post...

Ithil: Yes, the pre- and the post-, so the first one and the second one, and you see it was a bit difficult for you to know the creatures, because they are very new so unfortunately...

K: Yeah.

Ithil: But you see it's very good that you tried everything! How come you tried all the answers, that was very impressive, hmm? Do you remember why you chose all the answers on Monday?

K: You mean the first?

Ithil: The post-.

K: The post- or pre-?

Ithil: Ahh the post-, you have more answers, see?

K: Yeah, here are some answers, but for the creature name I can't remember this.

Ithil: Ahh, it's ok but you tried - so that is very very good... it's an improvement as well - and exercise 2, see, everything was correct, but not the first time - only the second time!

K: Hmm, yeah.

Ithil: It's really perfect.

K: It's just that as me said... as my said ...as I said this some words like pathway or some other things.

Ithil: Or brook, even more difficult! brook is actually a difficult one, so very very well done, can I just ask you when you were writing the meanings of the words in exercise 3, see, yeah... you sometimes gave a different meaning which is very interesting, it's more speciic - how come you decided to give a different answer on Monday than on Friday?

K: Because I thought you may expect different results, so I don't want to give the same answers to you...the same result is nonsense for you and for me.

Ithil: To be honest, it's even better, I think maybe in the game you saw for example - see: to receive, see, you actually added collect - so it is even more specific.

K: Yeah, maybe...

Ithil: Or you said you want to achieve a goal or an aim - it's a bit longer as well and even better than is something received for award - it's really good, yeah so that was very interesting to see.

The last exercise was quite easy, so you knew everything obviously on Friday, so that didn't show any changes.

K: Yeah.

Ithil: But see it's a very high percent.

K: Maybe next time you can change the vocabulary. Maybe more difficult vocabulary. This vocabulary is maybe a little simple for us.

Ithil: Mhm, it's very good that you knew most of them - but luckily not everything so that's good! Ok, so that's very good to hear - that you wanted to try all the answers on Monday. And see it's from 78% up to 89% and you answered every single question - all of them, it's really good!

K: Yeah.

Ithil: Soo, would you ask to ask anything as well, maybe?

K: Hmm...

Ithil: Or..?

K: Ask something?

Ithil: Only if you want to!

K: Do you enjoy your research?

Ithil: Ah, yeah, it's definitely enjoyable.

K: Why you chose this topic to research?

Ithil: Ah, yeah, why; first because I am also interested in learning vocabulary and how we do that, and secondly because I also like computer games and there is very little research on computer games and incidental learning, or real learning happening there, so I decided to try it and see what I find.

K: So, but you can choose another games not World of Warcraft, you can choose Legend of Legends..

Ithil: Ah, League of Legends?

K: Ah yes League of Legends.

Ithil: It doesn't have so much text, you know, when you are playing League of Legends you play with your friends and you tend to talk a lot but you don't read so much, but in WoW you actually have to read more so that's why you have to read more.

K: No, I don't think so, I think maybe as 30 levels you want to...you may pay more attention to..how say you level, or some information about champions so you may look at their skills of the champion, so...

Ithil: Well it depends on the player - if they like to do the quests, or if they like to read it, or if they are a new player like yourself, you were a new player so you had to check carefully what to do where to go, but players who have been playing longer don't read as much that's true...

K: Yeah.

Ithil: Ok, well you never know maybe in the future I can also research other games where you have more communication... Of course, in WoW you can also have more communication if you play with your friends, but you were playing alone, so yeah...

K: Yeah, so I don't want to play this game.

Ithil: Ye, it's a bit boring alone yeah, I agree I agree.

K: Maybe in China I play this because I have a lot of Chinese friends but...you know, in Europe this game has a different service ..a different system I think.

Ithil: Ok well, thank you very much for your time and keep in touch!

K: Ok, I will, I hope you can keep in touch with me. Thank you have a nice evening.

Ithil: Bye, have a nice evening!

