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Abstract

As Norwegian youth have been found to spend almost two hours a day playing video games (Medietilsynet 2014), the current study seeks to investigate the effects this recreational gaming might have on English vocabulary acquisition. The four research questions, focusing respectively on the participants' vocabulary gains, attitudes toward learning through video games, and learning strategy use while gaming, were addressed through a mixed methods approach, in which three data collection tools were employed. First, a vocabulary test was administered in order to measure the 22 Norwegian 10th grade participants' incidental vocabulary acquisition through their playing of the video game Bastion. Following, the participants completed a short questionnaire, which mapped out their gaming proficiency, so as to link their perceived difficulty of the game to their vocabulary test scores. Finally, the participants were interviewed in focus groups, in order to elicit their attitudes toward using video games for learning, as well as the vocabulary learning strategies they employed while gaming.

The popularity of video games has increased drastically over the past decades. As a result, researchers have focused their attention on investigating the learning outcomes that can be achieved through video games. In the educational context, Ranalli (2008) found that the combination of The Sims and complementary materials lead to some vocabulary acquisition, while results from Vahdat and Behbahani's study (2013) showed that more vocabulary was acquired through gaming than by means of what the researchers termed traditional vocabulary instruction. In the out-of-school context, two Swedish studies (Sundqvist and Wikström 2015; Sylvèn and Sundqvist 2012) showed that the amount of gaming their participants did in their spare time had a positive connection to both their vocabulary size and their English test scores. Inspired by the positive results of these studies, as well as by the positive vocabulary learning outcomes obtained through extensive reading (Mason and Krashen 1997; Pellicer-Sánchez and Schmitt 2010), the current study aimed to measure whether out-of-school gaming of the video game Bastion over a four-week period, with no explicit focus on language, could lead to incidental acquisition of ten vocabulary items from the game.

The results of the vocabulary test showed that the participants were able to achieve an average score of 6.77 out of 13 (53.1%), which showed that incidental vocabulary acquisition through the playing of Bastion was indeed possible. Additionally, the results demonstrated that more meaning (67.3%) than form (42.6%) of the target vocabulary was acquired by the

study's participants. In regards to the connection between gaming proficiency and vocabulary test scores, those who perceived the game as easy achieved higher mean scores (9.00) than those who thought it was a bit difficult (6.00), suggesting that the difficulty level of video games might have a significant impact on their usefulness for learning.

As for the participants' attitudes toward using video games for learning, the focus group interviews showed their tendency to think that commercial video games would not produce good learning outcomes. Rather, games would have to be made for learning, and preferably require mastering certain skills or knowledge in order to progress the plot. In terms of learning strategies, guessing from context was found to be the most common strategy employed by the participants. Additionally, some participants said that they asked other players for explanations in multiplayer games, or that they used Google to find the meaning of unknown words. Overall, the game itself was perceived as more important than the language by the study's participants, and only a few participants showed an awareness of the learning strategies they used while gaming.

The conclusions drawn by the current study can be further explored. Research on extensive reading found that more knowledge of form was acquired than of meaning (Pigada and Schmitt 2006; Pellicer-Sánchez and Schmitt 2010). The fact that more knowledge of the words' meaning was acquired in the current study might imply that video games can be useful for acquiring a type of knowledge that is difficult to gain through reading (Lawson and Hogben 1996). However, more research is required to see whether similar results would be obtained through a different vocabulary test or with a larger sample. In terms of implications for teaching, the fact that only some participants were aware of their learning strategy use shows that video games is a language resource that can be exploited in school, by providing learners with appropriate strategies for use when gaming, thus facilitating learner autonomy during a major spare-time activity.

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Abbreviations

EFL: English as a Foreign Language

FPS: First Person Shooter

L1: First Language

L2: Second Language

MMORPG: Massively Multiplayer Online Role-Playing Game

RPG: Role-Playing Game

WoW: World of Warcraft

1. Introduction

1.1. Research aim

The aim of this thesis is to investigate the effects of recreational play of video games on vocabulary acquisition, and the strategies learners employ while playing. In order to describe the aim fully, it has been broken down into the following four research questions.

1. Can Norwegian 10th grade students acquire English vocabulary through playing video games in a non-educational setting? If so, which types of vocabulary knowledge are acquired?
2. Is there a connection between how well the students perform in the game and the vocabulary they acquire?
3. What are the students' attitudes toward using video games for learning purposes?
4. What learning strategies, if any, do the students use when faced with a new vocabulary item while playing?

While quantitative instruments are capable of providing data for addressing the first two research questions, the last two require a qualitative approach. The thesis has therefore employed a mixed-methods approach, using a test and a short questionnaire as the sources of quantitative data, as well as focus group interviews for its qualitative data.

Norwegian children play a substantial amount of video games in their spare time. A survey by the Norwegian Media Authority (Medietilsynet 2014) examined the types of leisure activities children aged nine to sixteen are engaged in, and found that they played video games for an average of 108 minutes a day. In contrast, the 2000 surveyed children spent 50 minutes a day on reading. Boys were found to spend twice the amount of time playing video games as do girls, while reading time declines for both genders as they grow older. By the age of 15, 28% of the boys and 19% of the girls in the survey reported that they never read books or magazines (Medietilsynet 2014:19). With the surge in video game popularity, a growing research body has investigated the learning outcomes that might result from playing video games.

1.2. Video games

Earlier studies have examined whether video games used in an educational setting can facilitate vocabulary acquisition, for example by using supplementary school materials with a simulation video game (Ranalli 2008). Other studies have tasked their participants with playing video games without any supplementary materials, but the participants in these studies have been aware of the fact that vocabulary acquisition has been the aim of their gaming, for instance by having completed a pre-test before their gaming (Chen and Yang 2013; Theodorsen 2015). In contrast, the current thesis aims to investigate whether vocabulary can be acquired incidentally from video games, without any focus on language while gaming. In doing so, the study hopes to emulate the gaming that the children are already doing at home, and thus find out whether this can lead to vocabulary acquisition.

The motivational draw of video games has been mentioned by several researchers as a key reason for their potential to be used in education (deHaan 2005b; Gee 2005a). Gee (2005a:34) notes that 'lots of young people pay lots of money to engage in an activity that is hard, long and complex.' Some researchers have attempted to understand the motivational effect of video games (Przybylski et al. 2009) through an investigation of the psychological needs that are met by games. One of these is the autonomy need, which is satisfied through the interactive nature of games.

Research on interactivity is inconclusive. Some researchers have found that video game interactivity hindered the vocabulary acquisition process (deHaan et al. 2010), while others concluded that interactivity led to more acquisition (Ritterfeld et al. 2009). Additionally, researchers have concluded that video games that are overly challenging make it difficult to focus on language (Chen and Yang 2013; deHaan 2005b).

1.3. Extensive reading and vocabulary

Incidental vocabulary acquisition refers to cases where the acquisition of vocabulary is not in focus, but rather a by-product of the activity. An example of such an activity is extensive reading, where the effect is well-documented (Krashen 1989; Mason and Krashen 1997; Pellicer-Sánchez and Schmitt 2010; Pigada and Schmitt 2006). The current study was inspired by the incidental vocabulary acquisition that has been found to occur during extensive

reading, with the assumption that this acquisition might also take place when playing video games.

A clear link between extensive reading and playing video games is that of motivation. More than 20 years ago, Krashen (1989:489) argued that the enjoyment that learners found in reading an exciting book made extensive reading preferable to direct instruction, even though the latter method was more time efficient. Krashen's argument might be applied to video games as well. Even though they might not be as efficient as other types of vocabulary instruction (Chen and Yang 2013; Ranalli 2008), it can be argued that for a majority of Norwegian learners of English, reading a book is nowhere as interesting as playing a good video game. With recent studies showing that fewer children are enjoying reading (Medietilsynet 2014), and following Krashen's argument about the enjoyment of reading, video games could potentially result in similar or even better learning than that of extensive reading.

1.4. Methodology

The participants of the study are 22 students from three 10th grade classes in Rogaland and Finnmark. As the study required the participants to play the game at home, participation was voluntary, and finding willing participants thus proved to be difficult. The study therefore used convenience sampling (Dornyei 2007:129).

As for the design of the study, the participants were first required to play the video game Bastion at home over a period of four weeks. The game was selected based on criteria proposed by other researchers (Chen and Yang 2013; deHaan 2005a; Gee 2005a). In terms of language, two factors were considered in the game selection process: 1) the game should provide both written and oral exposure to the words, and 2) the overall language of the game should be relatively simple, as to facilitate incidental acquisition of the more complex target vocabulary items. Regarding practicality, the first criterion was that the game should be relatively short, and require less than 10 hours to complete. Additionally, the game had to be compatible with different types of computers (Windows, Mac, Linux), in order to minimalize technical issues. The game was also required to have received favorable reviews by critics, while still being a game that the participants would be unlikely to have played previously to the study.

After having played the game for a four-week period, the participants completed a vocabulary test, a questionnaire, and participated in a focus group interview. The vocabulary test consisted of ten vocabulary items from the game's fantasy world, designed to address the two research questions concerned with vocabulary acquisition. First, it measured whether the participants were able to acquire vocabulary incidentally through playing Bastion. Additionally, the tasks were designed so that the different degrees of vocabulary knowledge (form, meaning, productive and receptive) could be measured (Nation 2005). With the addition of the questionnaire, the combined results of the two were used to see whether there was a connection between gaming proficiency and vocabulary acquisition.

Following the vocabulary test and questionnaire, the participants were interviewed in semi-structured focus group interviews (Dornyei 2007:136). Focus group interviews were chosen for two reasons. Firstly, and most importantly, interviewing lower secondary students one by one might not produce elaborated responses, as many might be intimidated by the situation. Allowing them to be interviewed together with their peers was thought to create a more comfortable setting for the interviewees, thereby potentially resulting in more input. Secondly, 22 participants can be a lot to interview individually, and thus interfere with the planned schedule of the teachers. As a result, splitting these into groups of four was thought to make the interviews more manageable, both for the researchers and the teachers involved.

1.5. Outline of the thesis

As for the structure of the thesis, chapter 2 first gives an overview of some factors that are unique to video games in relation to other media: interactivity, motivation and multimodality. Following is a section on vocabulary, focusing on types of vocabulary knowledge and vocabulary learning strategies, followed by two sections that investigate vocabulary in relation to gaming, both in educational and out-of-school settings. The last section of chapter 2 deals with extensive reading, presenting the extensive reading approach as outlined by Day and Bamford (2002), and looking at some studies that investigate the efficiency of the approach in regards to language acquisition. Chapter 3 outlines the methodology of the study by first examining quantitative and qualitative research, followed by an account of the specific data collection methods employed by the study, the procedures for data analysis, some ethical considerations, and finally addressing the reliability and validity of the study.

The data is presented in chapter 4, where the results of the vocabulary test are examined first, followed by the responses from the questionnaire and focus group interviews. Chapter 5 contains the discussion, where the four research questions form the structure. Additionally, the limitations of the study are discussed at the end of the chapter. Finally, chapter 6 contains the conclusion, where major findings are summarized, suggestions are made for further research, and implications for teaching are presented.

2. Theoretical background

The following chapter consists of three sections. The first (2.1) reviews research done on three main aspects of video games: interactivity, motivation and multimodality, in order to see how these factors influence their usefulness for learning. Following is a chapter on vocabulary (2.2), with a focus on different types of vocabulary knowledge and vocabulary learning strategies. Then, studies documenting vocabulary acquisition through video games are reviewed in section 2.3, followed by an examination of three studies that researched the relation between out-of-school gaming and vocabulary. The last section discusses extensive reading (2.5), examining the extensive reading approach and detailing some studies on the efficiency of the approach for vocabulary acquisition, in order to attempt to make a link between reading and video games.

2.1. Video games

As was seen in the introduction Norwegian children play a substantial amount of video games in their spare time, spending as much as 108 minutes a day gaming on average (Medietilsynet 2014:18). Additionally, the same survey found that 50 minutes are spent on reading daily. This shows that video games have not claimed the place of books, but rather emerged as an additional language platform, perhaps for those who would not have read any books in the first place. Much research (and media coverage) has framed the emergence of video games as negative by highlighting the connection between video games and violence[1], as well as gaming addiction[2]. However, a smaller research body has investigated the potential language learning outcomes of these two hours of daily gaming.

The current study employs the term 'video games' in order to describe games in which the player controls a 'character' on a screen. These characters can range from actual persons in first person shooters (FPS) to cars in driving games and entire nations in strategy games.

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[1] See http://www.apa.org/news/press/releases/2015/08/violent-video-games.aspx for a report by APA that found a link between violent video games and aggression. This is, however, controversial, and many researchers disagree with their methods (http://www.bbc.com/news/technology-33960075).

[2] While the link between games and violence is controversial, the fact that video games can lead to addiction is universal. Numerous websites are made to support parents whose children's gaming is problematic, such as this info sheet by the Norwegian Media Authority (http://www.medietilsynet.no/globalassets/publikasjoner/2015/problemspillingbrosjyre_bm.pdf).

Although video games might be understood as games that are played on consoles, as a contrast to 'computer games', the term 'video games' is used to refer to games across all platforms in the current thesis (Gee 2003:1).

Video games come in a wide variety of different genres, the most popular ones including sports games, first person shooters (FPS), role-playing games (RPGs), survival games and simulation games (Medietilsynet 2014). The sports games genre includes titles like the football game FIFA and driving games, such as Need for Speed. Popular FPS games are, for instance, Call of Duty and Counter Strike, in which the players use guns in order to win battles against other players. While one goal in these games is shooting other players, the primary aim is usually to complete objectives such as controlling an area or retrieving objects (such as in the game mode Capture the Flag). Although RPGs are no longer among the most popular games for Norwegian children (Medietilsynet 2014:41), the massively multiplayer online role-playing game[3] (MMORPG) World of Warcraft (WoW) used to be immensely popular. Additionally, Bastion is an RPG. Minecraft and DayZ are two examples of survival games, in which the primary goal is to survive. These are also called sandbox games due to the great deal of freedom that is given to the players. The final genre that was mentioned is simulation games, which includes The Sims and Civilization. As suggested by the name of the genre, these games aim to simulate different aspects of reality, for instance by controlling the life of a family in The Sims, or an entire nation in Civilization.

Following a brief introduction, three factors will be discussed in this section: interactivity, motivation and multimodality. These three in particular were chosen because they are defining factors of video games (Gee 2005a:34; Granic et al. 2014:67; Ritterfeld et al. 2009:691). Interactivity separates video games from other media, by providing the player with the possibility to influence the story and gameplay. Furthermore, a major strength in implementing video games in learning is their ability to motivate gamers to perform challenging tasks for hours on end. Lastly, multimodality refers to the multiplicity of modes that are found in video games, and this section examines how this might affect learning outcomes.

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[3] Massively multiplayer does not refer to the size of the game, but rather the way that the game handles multiple players. In MMOs, a large quantity of players inhabit the same 'world' (instance) simultaneously, while there are a limited number of total instances (less than 10 for smaller games, and closer to 100 in the case of WoW. In contrast, other online games such as Counter Strike usually have no more than 20 players in the same instance, while hundreds of thousands of these instances are active concurrently.

2.1.1. Interactivity

The perhaps most essential defining characteristic of video games is interactivity (Granic et al. 2014:67), which Steuer (1993:10) defines as 'the degree to which users of a medium can influence the form or content of the mediated environment'. Compared to movies, where the viewers simply watch the screen, listen to the dialogue and perhaps read the subtitles, there is an additional level of involvement in playing video games. Video games are designed in a way that requires the player to actively engage with them, in order for the games to react to the players' actions (Granic et al. 2014:67). Many games also have 'cutscenes', in which the story is developed without the player's involvement, similar to scenes from movies. Cutscenes do, however, play a small role compared to actual gameplay in most games, and many games even allow the players to skip these scenes.

A more elaborate definition is given by Weber et al. (2014:7), who define video game interactivity as '(the possibility of) (sic) a continuous information exchange between the user and the game system and/or the possibility for users to manipulate the content and form of a video game'. As this definition suggests, video games can have varying degrees of interactivity, and Weber et al. (2014:45) identified six dimensions of interactivity. These include: 1) feature-based, 2) customization and co-creation, 3) controller responsiveness, 4) artificial intelligence, 5) perceptual persuasiveness, and 6) exploration. Feature-based is related to the player's ability to change settings such as graphics and control layout, while customization and co-creation has to do with whether the player can customize the character's appearance, choice of equipment and abilities. The intuitiveness of controls and the game's user interface is measured in controller responsiveness, while the life-likeness of the non-player characters is shown in the artificial intelligence dimension. Lastly, perceptual persuasiveness relates to the degree to which the player is immersed in the game, while exploration has to do with the extent the player can influence how the game is played in terms of story and objectives. Following these distinctions, a game where the player can customize their character, explore freely and use modifications to change what the game looks like, such as World of Warcraft, will have a higher degree of interactivity than Pong or Candy Crush.

Several researchers have attempted to see if there is a connection between the interactivity of video games and the language that can be learned from them, often with the assumption that the increased level interactivity in relation to other media would lead to greater language gains. A study by deHaan et al. (2010) examined what effect different degrees of interactivity had on vocabulary recall, aiming to discover whether the interactivity

would help or hinder the participants' ability to recall words. The participants were paired, in which one played the game while the other watched. The game in question was a music video game, in which the player had to hit the correct button at the correct time in order to produce the text of a rap. After having played the game, 41 words from the rap lyrics were tested in a cloze-test, where the results showed that the players recalled 7.23 words on average. In contrast, the watchers were able to recall an average of 21.7 words. Even though both groups were able to recall words, which is positive in terms of using video games for language learning, the interactivity of the game seemed to be a hindrance when recalling words from the game in the cloze-test. The authors note that even though the interactivity of this particular game had a negative impact on vocabulary recall, other kinds of interactivity that are more closely related to the language of the game might have more positive impacts on language learning (deHaan et al. 2010:86). In other words, the interactivity of the game was diverting the players' attention from the language and towards the gameplay, and was thus not conductive to learning (deHaan et al. 2010:84).

Another study by deHaan (2005a) examined whether an American adult could learn Japanese from a baseball video game. Although the subject was able to improve his Japanese, he had problems focusing on listening to and reading the language while simultaneously playing the game. While the interactive nature of the video game seemed to be a hindrance in this case, the participant also mentioned that it was easier to understand the language on lower difficulty settings (deHaan 2005a:280). Thus, the hindrance might not have been the interactivity of the game, but rather the difficulty level, as the participant noted that it was easier to focus on language once he had learned how to play the game.

Ritterfeld et al. (2009:692) investigated the effect that interactivity and multimodality in serious games (games made for a specific purpose such as education) had on the learning outcomes of 100 U.S. university undergraduates. Based on the game 'Metalloman', which was designed to teach the concepts and processes of the human digestive system, the researchers constructed four groups who either 1) played the game, 2) watched a recording (replay) of the game, 3) read a hypertext based on the game or 4) read a text based on the game. By assigning one group to play the game and another to watch a replay of the game, the researchers attempted to separate multimodality and interactivity in order to see whether there was a difference in their effects on learning outcomes (Ritterfeld et al. 2009:694). When comparing the results from the groups, they found that those who played the game were able to gain more definition knowledge than those who watched the replays (Ritterfeld et al. 2009:695). Although replays generated slightly better process knowledge than gaming, the

gaming group scored higher for all categories on the follow-up test, which suggests better knowledge retention from gaming. Additionally, the gaming group scored higher than both the hypertext and text groups, while the hypertext group gained more knowledge than the text group. These findings show a tendency in which increased degrees of interactivity lead to increased knowledge gain, thus contrasting the findings of the three studies reviewed above, which found interactivity to be a hindrance in the language acquisition process. One thing to note about this study is that it used a serious game, which was constructed to teach a specific concept, while the games in the other three reviewed studies were regular, commercial games. This tendency is consistent with what was suggested by deHaan et al. (2010:86), who noted that games with an interactivity that is more closely related to the language would be able to result in better learning outcomes than the rap video game in their study. Additionally, the study by Ritterfeld et al. (2009) did not focus on second or foreign language learning, but rather on learning new concepts in the first language of the participants. Still, their findings suggest that under the right conditions, such as those where the game is designed for learning, interactivity might be an aid in the language acquisition process.

Few studies have been able to measure the effects of video games' interactivity on learning. Among the four studies reviewed above, two of the studies examined interactivity by discussing participant self-reports (Chen and Yang 2013; deHaan 2005a), while two attempted to measure the effect of interactivity with tests (deHaan et al. 2010; Ritterfeld et al. 2009). The inconclusiveness of these findings might be a result of interactivity being difficult to manipulate in research studies. When studies use pairs of participants where one plays the game while the other watches, the conditions are not similar, as the onlookers would most likely not have played the game in the same way as their matched player, thus generating different content and sequence of events than what would be natural for them (Weber et al. 2014:4). Ritterfeld et al. (2009:694) attempted to account for the individualized content which might be produced by different players by matching the participants in their pairs by 'age, sex, digital game experience and expertise in the subject area'. In doing so, they might have been able to attribute their positive results to the different degrees of interactivity, and their positive results regarding interactivity are significant in determining whether interactivity is a hindrance or an aid in gaining knowledge.

The different results of the research reviewed in this section show that although video games have existed for several decades, there is not yet a clear consensus about their usefulness for language learning. While Gee (2005a) and deHaan (2005b) believed that the interactivity of video games should be one of the strengths of the medium in education, results

from the reviewed research (Chen and Yang 2013; deHaan et al. 2010), except in one case (Ritterfeld et al. 2009:694), show that it is more of a hindrance. One thing that researchers agree on, however, is that the interactivity plays an important role in video games' ability to engage players, and is an important factor in regards to their motivational effect.

2.1.2. Motivation

While interactivity is a defining characteristic of video games, their ability to motivate players is crucial for their popularity. Przybylski et al. (2010:155) presented a model for understanding motivation in video games, claiming that game play might meet three basic human needs: competence, autonomy and relatedness. Ever since the first arcade games in the 70s and 80s, the focus has been on mastering goals and challenges. The games are designed in a way that allows the players to always increase their competence, by providing players with increasingly difficult challenges as their skill levels increase. Multiplayer first person shooters, for instance, attempt to match players with others who have a similar skill level, and role-playing games feature increasingly stronger monsters and bosses as the games progress. Additionally, games are good at rewarding players when they increase their competence, and provide constant feedback when goals are met by, for instance, awarding trophies or achievements to the players when they achieve an in-game milestone.

The autonomy need is related to freedom, and the fulfilment of this need comes as a result of the interactive nature of video games. While the old arcade games such as Pong and Donkey Kong had pre-determined paths that players had to follow from A to B, newer games are designed in a way that allows the players to make their own, meaningful choices. The games that allow for the highest amount of player autonomy are sandbox games such as Minecraft, a hugely popular game among children today, in which the only forced objective is survival. The players are placed in an enormous world, where they need to collect resources, build tools and shelter, and survive monster attacks. If the players should die, they lose all their on-body possessions and need to start over. What they do in order to survive is entirely up to the players, who can even choose to remove the threat of monsters entirely from the game, purely focusing on constructing elaborate objects and buildings (Duncan 2011:7). Thus, the autonomy need is met to a great extent in games such as Minecraft, by providing full power to the players in regards to how they want to play the game. Following the theory by Przybylski et al. (2009), this kind of game should thus be highly motivating.

Social relatedness is the third need that is met by video games, and is concerned with the vital role that social interaction has in video game play (Przybylski et al. 2010:156). However, the way video games meet this need has changed through the previous decades. Arcade games and console games during the 70s and through the 2000s required the gamers to be in the same room in order to play together, which meant that gamers usually played with their friends. A variety of massively multiplayer online games (MMOs) was developed during the mid-80s, but online gaming can be said to not have become 'mainstream' until the release of World of Warcraft in 2004. In these games, players are able to connect with other people from around the world, work through different challenges in the games together with them, and often form lasting bonds that extend to the real world. Recently, an increasing amount of multiplayer versions of previously single-player games have been released[4], which suggests that game developers are aware of the motivational nature of this social interaction.

Krashen's Affective filter hypothesis (Krashen 1982:29) might be applied in order to understand how video games can be conductive to learning. The hypothesis states that negative emotional factors can interfere with the second language acquisition process, and act as a 'filter' that prevents input from being used for language acquisition by the learner. The factors that are included in the hypothesis are motivation, self-confidence and anxiety. In regards to motivation, Krashen notes that 'performers with high motivation generally do better in second language acquisition' (Krashen 1982:30). Language teaching that does not inspire motivation in the learners leads to boredom, thus raising their affective filters. Self-confidence and anxiety are closely linked, and are both affected by the dynamic of the classroom. A classroom that allows for trial and error will result in better self-confidence and less anxiety in the learners, while a classroom that does not allow for mistakes will raise the students' affective filter, and might thus inhibit learning. The following two paragraphs examine how video games deal with these three factors.

Video games generally allow for trial and error. While many old video games for consoles, such as the Nintendo Entertainment System, required the player to start from the beginning if their in-game character died an excess amount of times, newer games often leave much more room for failure. In the event that one strategy proves not to work, the player can simply retry that particular scenario again, experimenting with alternate strategies. This, in turn, might lead to more confident and less anxious players, since they know that failure is not the end. On trial and error, Gee (2005a:35) says that video games encourage players to 'take

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[4] Examples include the long-time single-player series Grand Theft Auto (GTA) and The Elder Scrolls, both of which have had multiplayer versions released in the recent years.

risks, explore, and try new things', noting that schools can learn from video games by allowing for the students to take more risks and learn from their mistakes. In another article (Gee 2005b:7), he elaborates on this point, stating that students should be encouraged to try different learning styles and different solutions for solving problems without risking a bad grade, like players of video games do.

Although video games are perceived as fun and motivating in many cases, research has dismissed the notion that all video games will be perceived as fun for students simply because they are video games. Squire (2005:1) attempted to use the strategy game 'Civilization III' in a history class, as a way of motivating the students to learn a subject they were otherwise not very interested in. His initial introduction of the game caused the students to question how they could learn anything from playing a video game. Additionally, six or seven hours were required just to learn the basics of the game, resulting in 25% of the students finding the game so difficult and uninteresting that they withdrew from the gaming class and joined reading groups instead (Squire 2005:2). Interestingly, the students who most enjoyed playing the game, and learned the most from playing it, were mainly the academic underachievers. Squire (2005) notes that different players are motivated by different games. While some might enjoy the building and managing of an empire in Civilization, others might find motivation in playing more fast-paced games (Squire 2005:3). Similarly to how a book that motivates a reader to finish it in one sitting might be completely uninteresting to another reader, or one learning strategy might suit some students better than others, the same principle seems to apply to video games.

In sum, two means of understanding video game motivation were presented in the above paragraphs. Przybylski et al. (2010:155) applied the principles of self-determination theory in order to understand the ways in which video games stimulate the three basic needs of competence, autonomy and social relatedness. Additionally, the Affective Filter Hypothesis by Krashen (1982:29) was applied to video games in order to understand how they might be useful vehicles for language acquisition.

2.1.3. Multimodality

Another defining characteristic of video games is their multimodality. Multimodal texts are defined by Walsh (2006:24) as having more than one mode, so that 'the meaning is communicated through a synchronization of modes'. These modes include, but are not limited

to, spoken and written language, moving or stationary images and sound. Examples of multimodal texts include comic books, movies, web pages and video games. In a text where several of these modes are included, the reader has to use a wide array of senses such as sight and hearing in order to read the text, which might in turn influence the way the meaning is understood (Walsh 2006:35). A movie might for instance include a scene that the viewer perceives as a calm scene, but as the intensity of the music increases, the viewer can sense that something is about to happen. In this example, the two modes present widely differing meanings, and the viewer has to use the senses of sight and hearing in order to understand the scene as a kind of 'calm before the storm', which would have been lost without the inclusion of two modes. As explained by Gee (2003:14), the images might communicate meanings that are different from those communicated by the words, 'and the combination of the two modes communicates things that neither of the modes does separately'.

A potential disadvantage of multimodality is that the inclusion of several modes requires the readers to split their attention, which might in turn cause information to be missed (Guichon and McLornan 2007:85). In cases where the same information is presented in different modalities, however, such as in videos with subtitles, research has found that the inclusion of text resulted in more language acquisition. Neuman and Koskinen (1992:96) examined whether bilingual 7th and 8th grade students could learn science vocabulary and concepts from watching captioned television. Their study had four groups, all of which were reading or watching the same show: 1) captioned TV, 2) TV without captions, 3) reading along while listening to a text and 4) reading a text. Their results showed that the participants who watched TV with captions scored higher than the other groups on both the word meaning and word recognition post-tests, while the two reading groups had the lowest scores on all tests (Neuman and Koskinen 1992:100).

A similar study was conducted by Guichon and McLornan (2007:89), who found that inclusion of subtitles led to increased comprehension in 20-year-old French learners of English. Their study consisted of four groups: 1) audio only, 2) video with audio, 3) video with English subtitles and 4) video with French subtitles. Increased modality resulted in progressively more comprehension, with 19.7% for the audio group, 25.1% for the video group, and 30.2% and 29.7% for the two groups who watched videos with subtitles. This was, however, a pilot study, consisting of 10 participants per group, and the researchers stress that only tentative comparisons can be made from their results (Guichon and McLornan 2007:91).

In a third study, Perez et al. (2014:130) investigated the effects of captioning in foreign language vocabulary acquisition by assigning one group to watch videos with no

captions, and three groups with varying degrees of captioning (full captions, keyword captions, and full captions with highlighted keywords). Their vocabulary test results showed that the captioned groups scored significantly higher than the control group on form recognition (11.07 for full captioning, 7.13 for no captioning), as well as the multiple-choice tasks that tested receptive knowledge of meaning (0.60 for full captioning, 0.53 for no captions). There were, however, no significant differences between the groups in the tasks testing productive knowledge of meaning by means of translation to the L1.

Video games are prime examples of multimodal texts. Like movies, they include still and moving images, oral and written language in the form of text and dialogue, and sound, such as music. In video games, the players need to use different controls such as a computer mouse and keyboard or a game controller in order to move their characters, while also needing to be able to assess their in-game environments and their positions within these environments (Shinkle 2008:908). Although far more research has been conducted on the addition of modalities in relation to TV and text, some researchers have investigated the effects of video game multimodality on language learning as well.

In addition to interactivity, Ritterfeld et al. (2009:694) also examined whether the multimodality of video games could lead to more effective learning outcomes in relation to two media with lower degrees of multimodality: a text and a hypertext. The study used a game and texts based on the game that were designed to teach the human digestive system's concepts and processes. Overall, their results showed that multimodality had a positive effect on knowledge gains in both the post- and follow-up tests, and that the largest gap was in definition knowledge (Ritterfeld et al. 2009:695), which suggests that the multimodality of video games can aid in acquiring specific vocabulary, such as that related to the human digestive system.

In Ranalli's (2008) study of language learning through The Sims, a game in which the player acts out the life of a family by building homes, following career paths, and generally simulating real life, some of the participants reported that they were displeased with the lack of exposure to spoken English in the game. One participant noted that 'maybe a game with listening incorporated will be better off' (Ranalli 2008:452), and although there is plenty of written English in the game, the characters speak in a fictional language called 'Simlish'. As the written words are accompanied by utterances such as 'sul sul' (which is Simlish for hello), the players are exposed to two languages, while at least one of them is unknown to them, which might disrupt the acquisition process.

A study by Rankin et al. (2006:4) investigated whether L2 students were able to improve their English through playing the role-playing game EverQuest 2, where the participants mainly received textual input from the in-game dialogues. The few instances of aural input caused the participants to suggest that audio should be included for all the dialogue, as their pronunciation would benefit from it. Additionally, Chen and Yang (2013) attempted to set criteria that should be followed when using games for learning. One of these is that the games should have subtitles and clear pronunciation, in order to provide the players with both written and oral input (Chen and Yang 2013:139). DeHaan also proposed a theoretical framework for video games and language learning, in which he mentioned 'simultaneously presented aural and textual language' (deHaan 2005b:229) as one of the advantages of using video games for learning, as it allows the players to use one of the channels to decode the other. In the extensive reading context, Nagy et al. (1987:43) mention exposure to oral language as an important factor in vocabulary growth.

This section reviewed research on interactivity, motivation and multimodality, examining these three factors in relation to language acquisition. All but one study (Ritterfeld et al. 2009) found that interactivity was not conductive to learning, and implied that difficult video games draw the attention of the players away from the language and towards the gameplay. Despite the fact that research on interactivity has shown it to be detrimental for language acquisition in relation to less interactive media (Chen and Yang 2013; deHaan 2005a; deHaan et al. 2010), theory on motivation (Przybylski et al. 2010) mentions interactivity (autonomy need) as one of the three major factors in why video games are motivating. Although a small amount of research has been conducted specifically on video games and multimodality, the findings from the three studies reviewed above that examined multimodality in texts and video (Guichon and McLornan 2007; Neuman and Koskinen 1992; Perez et al. 2014) showed that increased levels of multimodality led to more acquisition. In particular, the inclusion of both oral and written language seems to be an important reason for the increased acquisition from multiple modes, which was reflected in participant responses from studies examining video games and learning (Chen and Yang 2013; Ranalli 2008; Rankin et al. 2006).

2.2. Vocabulary

Vocabulary forms the main building blocks of language, and is the unit of meaning that is used to form both sentences and whole texts (Read 2000:1). Without understanding the meaning of the words that are read, written, heard or spoken, it is impossible to learn and understand a new language. Native speakers of a language are estimated to know around 20,000 word families, and gain 1,000 new word families per year (Nation 2001:9). While these numbers might be unattainable for most learners of English as a second or foreign language, a core vocabulary consisting of the 2,000 most frequently used words (Thornbury 2002:21) is considered appropriate in order to be able to read and understand texts in a language. These high-frequency words are often learned through classroom instruction (Nation 2005:582). Additionally, there are low-frequency words, such as those related to a specific profession or hobby, which are usually acquired gradually, often out of the classroom (Nagy et al. 1987:3; Neuman and Koskinen 1992:104). This section will begin by examining types of word knowledge, before discussing vocabulary learning strategies, and end with two sections that examine vocabulary acquisition through gaming.

2.2.1. Types of knowledge

Vocabulary knowledge is difficult to define, as seen in the different characterizations between researchers (Laufer 1998:256). Something most agree on, however, is that there are several degrees of vocabulary knowledge. First, vocabulary knowledge can be defined as knowing the form, meaning and use of a word (Nation 2005:584). Form refers to knowing the spelling and pronunciation of a word, meaning involves understanding the concept and associations, while use is concerned with knowing the grammatical functions and collocations of the word. Acquiring a vocabulary item is a gradual process, and knowledge may be partial at first, expanding as the word is encountered multiple times in reading or through multiple teaching sessions (Nagy et al. 1987:11).

Additionally, researchers distinguish between receptive and productive knowledge. The terms receptive and productive will be used throughout this thesis, although some researchers have used passive and active to describe this distinction. Receptive knowledge is, according to Nation (2005:484), the kind of knowledge that is required when dealing with a word in listening or reading, and can, for instance, be tested by asking the test-takers to match

words to paraphrases (Laufer 1998:259). Productive knowledge is required in order to be able to use a word in writing or speaking, and Laufer (1998:257) distinguishes between controlled and free productive knowledge. While controlled productive knowledge implies being able to produce a word when prompted by a task, free knowledge includes producing the word without any prompts. In the current thesis, all the productive tasks in the vocabulary test measure the participants' controlled productive knowledge.

2.2.2. Vocabulary learning strategies

In terms of language development, it is common to distinguish between learning and acquisition. Learning is defined as conscious development, and is acquired through, for instance, working with language activities that are aimed toward learning a specific set of words. Acquisition, on the other hand, is an unconscious process that occurs when engaged in activities that include language input (Krashen 1982:7), such as reading or playing video games.

Oxford (1994:1) defines foreign or second language learning strategies as 'specific actions, behaviors, steps or techniques students use – often consciously – to improve their progress in apprehending, internalizing, and using the L2'. As seen in this definition, the term learning is used for both conscious and unconscious strategies for language improvement. Learning and acquisition are often difficult to distinguish, especially in terms of learning strategy use (Oxford 1990:4). Thus, in order to avoid confusion by using different terms such as 'acquisition strategies', the term learning strategies is used in this thesis to refer to both conscious processes such as using dictionaries, and processes that can be both conscious and unconscious such as guessing from context.

When encountering new vocabulary in reading or playing video games, the learner has to decide whether to search for the meaning of the word or simply proceed, hoping for the meaning to be elaborated on at a later point. While the choice of strategy might not be a conscious one for the learner during the act of reading or gaming, vocabulary learning strategies are often taught in school, as a way to 'make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations' (Oxford 1990:8). Having practiced in school, students might apply these strategies, perhaps unconsciously, to their out-of-school activities as well as in school, and thus become autonomous learners of English. Oxford's (1990) definition also places emphasis on making learning more self-

directed, which is consistent with the English subject curriculum in Norway (Utdanningsdirektoratet 2006), where learner autonomy is important.

Nation (2005:589) lists the following four major vocabulary learning strategies: 1) guessing from context, 2) using a dictionary, 3) learning from word cards and 4) using word parts. Guessing from context is mentioned as 'the most important strategy' (Nation 2005:589), and is the strategy that is most commonly used by students participating in approaches such as extensive reading (Day and Bamford 2002:138). At first, this strategy is time-consuming and might cause the reading speed to drop drastically (Nation 2005:589), but through practice, the guessing will eventually no longer disrupt the reading. However, as mentioned previously, the learner needs to have a core vocabulary in order to be able to guess unknown words from context. According to Nation (2005:590), the learners need to be familiar with 98% of the words in a text in order to be able to guess the meaning of the unknown word from the context.

Some researchers question the effectiveness of guessing from context in terms of acquiring new vocabulary. Lawson and Hogben (1996:105) distinguish between comprehension and acquisition of meaning through context, where comprehension involves generating a meaning that allows the current sentence in which the word appears to make sense, while acquisition refers to learning the word for future recall. As a result, they argue that being able to understand the sentence that contains the new word does not mean that the word has been learned, but rather that a likely meaning has been generated for understanding a specific passage of text (Lawson and Hogben 1996:130). However, research on extensive reading has shown that, although mostly unconsciously, this is the most commonly used strategy (Krashen 1982; Nagy et al. 1987), most likely because it is not as disruptive to the flow of the reading as, for instance, use of a dictionary.

Use of dictionaries is the second language strategy described by Nation (2005). Dictionaries have traditionally had a role in the classroom, whether a separate dictionary or text-appropriate translations in book margins are used. Depending on the level of the learners, bilingual or monolingual dictionaries can be used, with bilingual dictionaries giving the first language translation and monolingual dictionaries providing a definition in the second language. Again, a vocabulary of 2,000 words or more (Nation 2001:292) is noted as the required proficiency level in order for learners to begin using monolingual dictionaries effectively. Dictionaries have traditionally been in book form, requiring the learners to manually search for the words they are looking for, which could be very time-consuming. As computers are becoming a natural part of the language classroom, however, students can

search in databases such as ordnett.no or Oxford Learner's Dictionaries and quickly find a translation or definition of the words they are looking for. Additionally, the results from a study by Bytheway (2011) revealed that use of Google was a common strategy used when gaming.

Video games often have 'built-in' dictionaries. When the players find a new item, they are usually given the name of the item, as well as a short description of what it is. In Bastion, for instance, the narrator will give these descriptions every time the player finds a new weapon. In the event that the player finds an item, they can also read a short description in their inventory, and have the option of showing the items to a character in the game in order to receive a brief spoken description of the item. In tandem with understanding words from context, the players of Bastion or other RPGs will rarely need to use a dictionary outside the game in order to understand words.

Thirdly, Nation (2005:590) discussed the use of word cards in order to learn new vocabulary. Similarly to the use of dictionaries, this is a conscious strategy. It involves the use of cards, on which the target vocabulary item and information such as its definition and collocations are written. Although it might not seem like this strategy would be feasible in terms of gaming, some examples of gaming practices can be associated with this strategy. For example, players of Counter Strike need to learn a set of 'callouts' in order to communicate efficiently with their team. These refer to names of different portions of the map, such as 'patio', 'catwalk' and 'tetris', which are used to signal the exact position of the enemy team's players. In order to learn these, a new player might use a modified version of the word cards strategy by printing out maps that show where these different callouts are located, and glance at this map during their gaming.

Using word parts is the last strategy that will be discussed briefly. Learning word parts allows the learner to draw on their knowledge of a word part, e.g. knowing that the suffix -*able* gives words the meaning of being capable of something, such as in the word 'breakable'. In order to be able to utilize this learning strategy, classroom time needs to be devoted to practicing it (Nation 592:2005), as it involves the memorizing of a set of affixes. When these are learned, they can be applied to a large number of words, making it a worthwhile strategy to spend time on in the classroom. It is, however, unlikely that the participants will utilize this strategy while playing video games, as the strategy might be more complex than the other three. For the current study, however, two of the monster names that are elicited in the vocabulary test might be learned through use of word parts: Gasfella (a fella made of gas) and Scumbag (a bag of scum).

Bytheway (2011) conducted a case study of six experienced male gamers aged 20-30 who had English as their second language. She examined which learning strategies second language learners use when playing massively multiplayer online games (MMORPGs). The six participants used 15 different learning strategies (Bytheway 2011:33), most of which are related to the four proposed by Nation (2005:589). These strategies include reading in-game information/pop-ups, requesting/giving explanations, equating image/actions to words, and playing in English. Reading in-game information and pop-ups is related to use of dictionaries, but is different in that the game itself provides the explanations. Multiplayer games enable the application of different sets of learning strategies, such as asking other players what a word means, and the participants valued both requesting and giving information about words (Bytheway 2011:45). Equating images/actions to words involved learning the meaning of a word through the image associated with it. This strategy is useful when learning the meaning of fantasy words in RPGs, as the players can for instance use an ability, and then understand its meaning by observing its function. As a final note, the participants placed high value on playing games in English, as opposed to playing a version translated to their first language. Although the participants reported to play the games for fun, they also noted that they were required to learn new vocabulary in order to be able to play the games effectively (Bytheway 2011:62).

This section presented two ways of distinguishing vocabulary knowledge: 1) form, meaning and use, and 2) receptive and productive knowledge (Nation 2005; Laufer 1998), which will later be used when discussing the test results of the current thesis. Additionally, four vocabulary learning strategies were examined: 1) guessing from context, 2) using dictionaries, 3) using word cards and 4) using word parts (Nation 2005). Other strategies specific to video games, such as asking others for explanations were also examined (Bytheway 2011).

2.3. Video games and vocabulary acquisition

As vocabulary is one of the main building blocks of languages, it is natural that much of research on learning language through video games has been on whether they can be useful for vocabulary acquisition.

A study on foreign language acquisition through an adventure video game was conducted by Chen and Yang (2013), who aimed to investigate whether a non-educational game could facilitate vocabulary acquisition. Their participants were to play the game for one and a half hour, followed by a test consisting of 20 vocabulary items that were asked to translate from English to Chinese. As seen in their post-test results, the participants were able to translate 6.27 of the words on average (Chen and Yang 2013:134), which was an improvement of two words from the pre-test scores (4.27). While this indeed shows that video games can be used for language learning, a gain of two vocabulary items from a two-hour session is not very impressive when it comes to the effectiveness of video games for learning. The authors argue that the limited vocabulary gains might be a result of the game's high interactivity making it difficult to concentrate on the language. Another explanation is that the participants did not have enough time to reach the points of the game where they would encounter the vocabulary items that were later tested, resulting in no exposure to the words prior to the test (Chen and Yang 2013:137). Finally, a translation test might not be the best way to measure vocabulary acquired incidentally through gaming, as the games provide no exposure that is conductive to this type of knowledge.

While Chen and Yang examined vocabulary gains from simply playing a video game, Ranalli (2008) implemented supplementary materials such as vocabulary lists, exercises, weekly quizzes and more, and examined whether these could lead to vocabulary acquisition in conjunction with the simulation game 'The Sims'. Thirty low-frequency words from the game that the participants were likely to encounter while playing were tested, with the pre- and post-tests showing an improvement from 14.22 to 18.44 acquired words on average (Ranalli 2008:448). While this increase is larger than that of Chen and Yang's study, showing that implementation of supplementary materials might boost the vocabulary gains, it is still quite a low number. The author also notes that the participants felt that the supplementary materials played a larger role than the actual game in learning the vocabulary, as the game did not 'provide sufficient examples of the target vocabulary in context' (Ranalli 2008:448), which is an issue in using video games for learning a specific set of words. In many games with high degrees of player autonomy, such as 'The Sims', it is impossible to predict when and how often the learners will be exposed to the set of words, as the different tasks they choose to perform will lead to different sets of dialogues. If a player chooses a specific career path, for instance, words related to the other career paths might never be encountered. Similarly, if the player spends more time building their home than on finding new friends in the game, they might not receive exposure to the vocabulary items related to relationships. Ranalli therefore

argues that it might be impractical to use simulation games for learning a specific set of words (Ranalli 2008:453). This claim might be extended to include other games with similar amounts of freedom, including online games. However, this does not mean that these games are unsuited for language acquisition, but rather that they need to be used in a different way, for instance by supplementing the linguistic exposure of regular coursework. Ranalli (2008:453) compares this to extensive reading, noting that this approach would likely be much more popular than extensive reading of books among students.

The two studies discussed above showed that it is, to a certain extent, possible to learn vocabulary from playing video games. They did not, however, examine the usefulness of the method in comparison with other forms of instruction. Vahdat and Behbahani (2013) conducted a comparative study of two groups of Iranian EFL learners in which one group played a video game while the other group read five chapters from the game's story, before being assigned vocabulary drills related to the chapter. Test results showed that the experimental group was able to acquire 16.75 vocabulary items on average, while the control group had 14.05 correct words on average in the vocabulary test (Vahdat and Behbahani 2013:66). From the experimental group, as many as 85% of the subjects reported that they were motivated when trying to learn through video games (Vahdat and Behbahani 2013:67). No numbers for the control group's motivation are presented, but it is clear from the study that motivation is a huge factor in video games' usefulness as language learning tools.

In the Norwegian context, Theodorsen (2015:11) investigated whether minimal exposure of vocabulary items through video games could lead to L2 acquisition in 40 Norwegian secondary school students aged 11-13. The game used for his study was Black and White, a simulation game in which the player assumes the role of a god, performing miracles and tending to the villagers. An improvement of 12.8% was found from the pre- to the post-test results (Theodorsen 2015:18), suggesting that, even from limited exposure, vocabulary can be acquired incidentally by playing video games. Additionally, the researcher observed three trends. First, those who watched the game achieved similar scores as those who played the game (Theodorsen 2015:22), contrasting the findings by deHaan et al. (2010:84) that showed interactivity to be a hindrance in the language acquisition process. Additionally, those who played without subtitles scored higher than those who had subtitles on, which contrasts the results of research done on captioned TV, where the inclusion of multiple modes was found to result in higher degrees of acquisition (Guichon and McLornan 2007:89; Neuman and Koskinen 1992:100; Perez et al. 2014:130). Finally, a significant amount of the acquired words (36.6%) were related to actions taken by the players in the game (Theodorsen

2015:23), suggesting a connection between the way players are exposed to words and the extent to which they are acquired.

Although the studies discussed in this section might be argued to have had low learning outcomes (Chen and Yang 2013; Ranalli 2008; Theodorsen 2015; Vahdat and Behbahani 2013), they did confirm the hypothesis that video games could be useful tools for vocabulary acquisition. Ranalli (2008) found that the participants relied more on the supplementary materials than on the game itself due to the vocabulary items rarely appearing in the game, and the minor acquisition of just two vocabulary items in Chen and Yang's study (2013) might be a result of a limited amount of time. Video games often require a large amount of time to get acquainted with and to learn the basics (deHaan 2005b; Squire 2005), which might be off-putting to many teachers when considering using them in school. Vahdat and Behbahani's (2013) study showed that playing video games could actually be more efficient than vocabulary instruction such as chapter drills, suggesting that spending time on video games might be worthwhile. Finally, Theodorsen (2015) demonstrated that minimal exposure to vocabulary items in video games could result in incidental acquisition.

2.4. Out-of-school gaming and L2 proficiency

Although most of the research on learning language through video games has been conducted in classrooms, some researchers have investigated whether playing video games at home can have a positive effect on language. Sundqvist and Wikström (2015) examined the correlation between the amount of time Swedish 8th and 9th graders spent on video games at home and vocabulary test scores. Additionally, they looked at the correlation between time spent playing video games and grades on essays, as well as the final grades of the participants. Their participants consisted of three groups: non-gamers, moderate gamers, who played up to five hours per week, and frequent gamers, who played more than five hours per week[5]. In the vocabulary tests, frequent gamers achieved the highest scores, with a mean of 22.7 for the productive and 71.6 for the receptive test (Sundqvist and Wikström 2015:71). The moderate gamers scored significantly lower, with mean scores of 14.4 and 58.4, and the non-gamers'

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[5] These categories do not reflect those by The Norwegian Media Authority (Medietilsynet 2015), who classified those who play games for 1-4 hours *daily* as moderate gamers, while frequent gamers were classified as 4 those who spend more than 4 hours daily on video games.

scores were even lower, scoring 13.7 and 55.2 for the productive and receptive test respectively.

Sylvèn and Sundqvist (2012) investigated whether there was a positive correlation between the L2 proficiency of 11-12 year old learners and the time they spent on activities involving the use of English, such as playing video games, in their spare time. Questionnaires and language diaries were used to map out the participants' gaming habits, and a vocabulary test consisting of everyday lexical items was used to assess their language proficiency. The participants' grades on an English national test were also examined in order to achieve a broader understanding of their English proficiency levels. As with the study in the above paragraph, the participants were grouped as non-gamers, moderate gamers, and frequent gamers. While the results showed that frequent gamers achieved the highest scores on all the types of tests that were conducted in the study, the researchers emphasize the importance of not overgeneralizing their findings (Sylvèn and Sundqvist 2012:314). Other variables such as general language aptitude and the participants' English prior to gaming were not investigated, which the researchers feel might have influenced the results. In regards to causality, they question whether the gamers scored high because of their high frequency of gaming, or if the frequent gamers possessed a certain level of proficiency, which in turn allowed them to play games with advanced language (Sylvèn and Sundqvist 2012:316). Nonetheless, the findings are important in that they add to the body of research that confirms a correlation between English proficiency and out-of-school gaming.

A small-scale study of four intermediate to advanced L2 English students examined whether playing the massively multiplayer online game (MMORPG) EverQuest 2 improved the participants' English vocabulary (Rankin et al. 2006:3). The participants had not played the game before, and learned to play it as a part of the study. Questionnaire and interviews showed that all four students had experienced an improvement in their English. This increase was confirmed by an examination of the game's text log, which contained the in-game chat interactions of the players and the text that was otherwise provided by the game, such as dialogues with non-player characters (NPCs). Results from the vocabulary analysis showed that the participants were able to define 35% of the words that the NPCs had used only once in conversation, and 55% of the words that were used more than five times by the NPCs (Rankin et al. 2006:3). Although it is difficult to draw conclusions from such a small study, their findings indicate that out-of-school playing of RPGs can be well suited for increasing the vocabulary size of L2 English learners.

In this section, three studies that investigated out-of-school gaming and L2 proficiency were examined (Rankin et al. 2006; Sundqvist and Wikström 2015; Sylvén and Sundqvist 2012), highlighting a positive correlation between out-of-school gaming and vocabulary size. However, these studies did not investigate whether video games could be used in an out-of-school setting in order to acquire a specific set of vocabulary items, by incorporating games into approaches similar to extensive reading.

2.5. Extensive reading

Based on the studies reviewed in the previous sections, video games should provide sufficient language exposure for vocabulary acquisition to take place. As the amount of research on video games and learning is still relatively limited, the thesis will in the following sections present the extensive reading approach and its effects on language acquisition, in order to see whether the learning outcomes of the two approaches (extensive reading and gaming) are similar.

A general definition of extensive reading is that it 'involves rapid reading of large quantities of material or longer readings for general understanding, with the focus generally on the meaning of what is being read rather than on the language' (Carrell and Carson 1997:50). Different researchers have used similar terms such as silent sustained reading, pleasure reading, free reading, and free voluntary reading in order to describe the same concept, and the term extensive reading will be used to refer to these different terms in the current thesis. In this section, a presentation of the extensive reading approach as presented by Day and Bamford (2002:137) will be given, before some studies on language acquisition through extensive reading are examined.

2.5.1. The extensive reading approach

While the definition above explains the act of extensive reading as opposed to other reading strategies, such as intensive reading and skimming, it is not concerned with extensive reading as an approach. Briefly explained, the common practice of allowing the students to read a book for 15 minutes in silence during school is an act of extensive reading, but it does not necessarily mean that the teacher has employed an extensive reading approach. Day and

Bamford (2002:137) outline ten principles that they perceive as the foundation of an extensive reading approach. In short, these principles are concerned with how the students should read, what they read, why they read, and what the role of the teacher is.

The first principle is that the reading material should be within the learners' reading competence. As the reading is to be fluent, guessing the words from their context might be the only feasible vocabulary learning strategy when employing an extensive reading approach. This principle is thus consistent with Nation's (2005:590) view that in order to learn words from context, the learners need to know about 98% of the words in the text. Secondly, the teacher needs to have a wide variety of materials available, so as to encourage students to read by providing books that suit different preferences. Principle number three states that learners choose what they want to read. This principle is closely related the previous two principles, as the learners can choose to read the material that they think they will understand and expect to enjoy. Furthermore, the learners should be able to stop reading and choose a new text if the current one is too difficult or does not interest them. While the learners should be able to choose what they want to read, it is important to monitor the level of language in the books they read, as the language needs to be within the learners' proficiency level. Difficult language leads to frequent stops to look up words in dictionaries, which has a negative impact of the fluency of the reading (Day and Bamford 2004:8). The fourth principle states that learners should read as much as possible, and the earlier principles facilitate this by creating an environment in which the reading is enjoyable. In order to be effective, reading is required to take place both out-of-school and in the classroom.

As seen in the definition of extensive reading above, the purpose of reading is not to focus on the language, but rather on the meaning of the text as a whole. The fifth principle is related to this, stating that extensive reading should be for pleasure, obtaining information, and a general understanding of the text that is read. Furthermore, principle six states that there should be few or no follow-up exercises to the reading, as 'reading is its own reward' (Day and Bamford 2004:8). The extensive reading approach encourages reading without use of dictionaries, and the seventh principle is that the reading speed is usually fast, based on the thought that more fluent reading leads to more enjoyment (Day and Bamford 2002:138). Additionally, the reading should be individual and silent, allowing the learners to progress at their own pace. Finally, the last two principles are concerned with the teacher's role. In an extensive reading approach, the teacher should explain the purpose of the approach to the students, and assist them in selecting appropriate books. By keeping track of what the students read, the teacher can help them find books with increasingly difficult language. The teacher

also needs to be a role model for the students, by taking part in the process together with the students, and showing positive attitudes towards reading.

In sum, the extensive reading approach facilitates reading that is enjoyable to the students, by providing materials that are within their language level, and allowing them to choose what they want to read. As a contrast to the familiar approach of reading a text in a textbook before being assigned comprehension tasks, extensive reading has no, or few, follow-up tasks. The result of this is that most of the learning that takes place in relation to vocabulary is unconscious, incidental acquisition, as the learners are discouraged from using dictionaries.

2.5.2. Extensive reading and vocabulary acquisition

One of the strengths of extensive reading is that it promotes incidental learning, which is contrasted with intentional learning. Incidental learning happens when the learners are not informed beforehand that they are expected to learn something from a task, such as reading a short text. However, if the learners are informed that there will be a test after reading the text, the learning is intentional (Hulstijn 2001:10). In the vocabulary development context, incidental learning refers to tasks in which the acquisition of vocabulary is not the goal, but rather a by-product, while intentional learning is concerned with tasks that are aimed at teaching vocabulary (Hulstijn 2001:13). Researchers such as Krashen (1989:440) have argued that incidental vocabulary acquisition by means of comprehensible input through reading is the most effective way to acquire spelling and vocabulary. Nagy et al. (1987:3) share Krashen's view, and argue that incidental learning when reading is the most common way of acquiring vocabulary during the school years.

Krashen's Input Hypothesis (1982:22) claims that learners move from one stage of linguistic competence to the next through being exposed to the language that is a bit beyond their current competence level, illustrated by i + 1 (i = current competence, i + 1 = slightly beyond current competence). However, he discourages teaching that deliberately attempts to enforce a rigid i + 1 structure, such as fine-tuned grammatical syllabi, as the students are rarely at the exact same stages (Krashen 1982:25). Instead of fine-tuning the language, Krashen suggests rough-tuning the language level (aiming for a level that is 'roughly' ahead of where the students currently are) for three reasons. First, it ensures that at least some of the input will be i + 1, without having to guess the exact level of the students. Additionally, in

teaching situations or instances where a group of people are to read the same text, this ensures that more than one of them will receive instances of i + 1. Lastly, rough-tuning allows for a natural repetition, as the i + 1 will reoccur naturally across different instances of reading and teaching (Krashen 1982:24).

Several studies have been conducted to investigate the effectiveness of extensive reading in terms of language acquisition. Pigada and Schmitt (2006) conducted a case study of a 27-year old Greek learner of French living in England, where they investigated whether extensive reading could lead to enhanced vocabulary over a one-month period. In contrast to studies that measured only the acquisition of meaning, they also investigated knowledge of the words' spelling and grammatical behavior (knowledge of articles that are used with the specific nouns, and prepositions that followed the verbs) (Pigada and Schmitt 2006:9). The tests were conducted in the form of interviews. For the spelling test, the interviewer read the words out aloud while the participant wrote them down. The knowledge of meaning and grammar was elicited through another interview, in which the participant was given lists of the words, and asked to report any kind of knowledge he had in regards to the meaning of the words. Additionally, the participant was asked about the words' prepositions in this interview. Their findings showed that the most substantial increase from the pre- to the post-test was for the words' spelling. In the case of nouns, the participant was able to spell 34.2% of the words correctly in the pre-test, and 53.6% in the post-test, while the percentage increased from 39.6% to 66.6% for verbs. Meaning showed an increase from 7.9% to 20.7% and 8.7% to 27.0% for nouns and verbs respectively, while the scores for grammatical behavior increased from 12.9% to 42.9% for nouns and 4.0% to 20.6% for verbs (Pigada and Schmitt 2006:13). The lower numbers for meaning are consistent with Lawson and Hogben's (1996:130) claim about learning from context being an inefficient strategy for acquiring word meanings.

A study by Pellicer-Sánchez and Schmitt (2010) investigated whether reading of an authentic novel could lead to incidental vocabulary acquisition of an unknown language in EFL students. The participants read the book Things Fall Apart, an English novel that also contains use of a language that was completely foreign to the participants: the Idemili dialect of the Nigerian language Ibo (Pellicer-Sánchez and Schmitt 2010:37). Four types of knowledge were elicited through use of both a multiple-choice test and a series of interviews: 1) spelling recognition (receptive form[6]), 2) word class recall, 3) meaning recall (productive meaning) and 4) meaning recognition (receptive meaning). Results from their tests showed

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[6] The additions in parentheses are how the word classes used in Pellicer-Sánchez and Schmitt's study relate to those used in the current thesis.

that the participants achieved the highest scores for meaning recognition (14.45) and spelling recognition (11.65), while the scores for word class recall (6.65) and meaning recall (4.80) were significantly lower (Pellicer-Sánchez and Schmitt 2010:41). Scores for all four categories also increased significantly by frequency of occurrence. For instance, the participants were able to recall the meaning of 7% of the words that occurred 1-8 times in the text, and 55% of those that occurred more than 10 times (Pellicer-Sánchez and Schmitt 2010:42). While the numbers for spelling recognition share this increase (28% for 1-8 occurrences, 76% for 10+), the amount of exposure to new vocabulary items appears to be especially important in terms of acquiring productive knowledge of their meaning. As the researchers note, recall mastery of meaning might be achieved through extensive learning provided the learners are presented with adequate repetitions (Pellicer-Sánchez and Schmitt 2010:43).

In a series of three studies conducted by Mason and Krashen (1997:90), they investigated the value of extensive reading in English as a foreign language (EFL). The first study applied extensive reading to a university class consisting of students who had failed the EFL exam and had to retake the subject. The control group continued traditional instruction, including reading selection, vocabulary and grammar exercises, comprehension questions and translation exercises (Mason and Krashen 1997:92), and both groups were administered a cloze-test at the end of the semester. A comparison of the test scores showed that the experimental class was far behind (22.55 vs. 29.70) in the pre-test, while they had almost caught up after a semester of extensive reading (31.40 vs. 33.05) (Mason and Krashen 1997:94). The second study compared extensive reading to a class that was mainly taught reading comprehension and worked on intensive reading of short texts (Mason and Krashen 1997:94). Four classes were compared for this study, two of which were from a junior college, and two from a prestigious university. The same cloze-test was administered in order to measure outcomes, and the extensive reading approach produced significantly higher scores for both the junior college and university students (Mason and Krashen 1997:94). Their final study compared three groups: one followed an extensive reading program and wrote summaries in English, one did extensive reading and wrote summaries in Japanese (L1), and the third worked extensively on cloze exercises (Mason and Krashen 1997:96). These groups then completed the same cloze-test as was used in the two previous studies. Differences in the post-test scores for the cloze (44.29), extensive reading and summaries in Japanese (45.52), and extensive reading with summaries in English (46.89) were marginal, but the gain from

pre-test scores put the extensive reading + English group significantly ahead of the cloze group (18.86 vs. 14.16) (Mason and Krashen 1997:97).

In sum, this section defined extensive reading as rapid reading of large quantities of material with the focus on meaning (Carrell and Carson 1997:50), and presented the extensive reading approach as outlined by Day and Bamford (2002), where the focus is on enjoyable reading. Studies on extensive reading and vocabulary were also examined, where the approach was found to result in efficient acquisition of vocabulary (Mason and Krashen 1997), with form being acquired in particular (Pellicer-Sánchez and Schmitt 2010; Pigada and Schmitt 2006)

In 1989, Stephen Krashen argued for extensive reading over vocabulary instruction methods by saying that 'even those [methods] that seem to be fairly interesting are nowhere as interesting as reading a good book' (Krashen 1989:450). For many students today, it can be argued that even the most interesting books are nowhere as interesting as playing a good video game, which is why it is important to research their effect on language learning. The study aims to add to the limited research body of this area by examining the non-educational gaming that takes place in the spare time of the students. This aspect of video games has not been examined widely, and since gaming takes up a substantial amount of many Norwegian children's spare time, it seems relevant to study its effects on language acquisition.

3. Methodology

3.1. Introduction

This chapter aims to describe the methods that have been used in order to answer the research questions of the thesis, which are as follows:

1. Can Norwegian 10th grade students acquire English vocabulary through playing video games in a non-educational setting? If so, which types of vocabulary knowledge are acquired?
2. Is there a connection between how well the students perform in the game and the vocabulary they acquire?
3. What are the students' attitudes toward using video games for learning purposes?
4. What learning strategies, if any, do the students use when faced with a new vocabulary item while playing?

In order to address the research questions, the thesis uses a combination of qualitative and quantitative data collection methods, resulting in a mixed methods approach. This chapter first describes the methods that were employed for the study, discussing mixed methods studies, as well as the characteristics of quantitative and qualitative approaches in section 3.2. The following section (3.3) gives an outline of the data collection tools used by the study, before describing the specific processes regarding collection and analysis, as well as how they were carried out in the current study. Following is a discussions of some ethical considerations (3.4), before the reliability and validity of the study are discussed in section 3.5.

3.2. Methods

3.2.1. Mixed methods

This thesis is based on a mixed methods research approach, which Dornyei (2007:163) defines as 'involving the collection or analysis of both quantitative and qualitative data in a single study with some attempts to integrate the two approaches at one or more stages of the

research process'. The design of these studies can vary, depending on the research questions of the study and the method that is given priority. For instance, if a study employs a quantitative questionnaire in order to recruit appropriate participants for an interview, the qualitative data represents the main data body, while the quantitative data can be used to demonstrate the strength of the sampling by showing that it was purposeful (Dornyei 2007:172).

There are multiple reasons for why a researcher might opt to use a mixed methods design for a study, and Greene et al. (1989:259) present five main reasons for choosing to employ a mixed methods approach. Firstly, mixed method studies allow for a triangulation of the research data (Dornyei 2007:165; Greene et al. 1989:256), which is a way of eliminating the weaknesses of one research method by utilizing a second method that does not share its limitations, thus increasing the validity of the findings. Secondly, the mixing of methods can provide a complementarity, that is, an 'elaboration of the results from one method with the results from the other method' (Greene et al. 1989:259). The third purpose is that of development, which allows the mixed methods researcher to use findings from one method to help develop the results from the other method, for example by using a questionnaire to map out the participants' interests, and then including their specific interests in the interview questions. Fourthly, a mixed methods approach might cause the researcher to discover paradoxes and contradictions in the answers from the different research methods, and thus result in a re-framing of the research questions (Johnson and Onwuegbuzie 2004:22). The final purpose is that of expansion, which aims to expand the range of research questions that can be answered by using different methods (Greene et al. 1989:259).

In the case of this thesis, mixed methods serves two of these purposes: complementarity and expansion. The results from the vocabulary test are complemented by the results from the questionnaire in order to find out whether there is a connection between gaming proficiency and vocabulary acquisition, and the interview asks questions about the participants' experiences with the game in order to understand the test scores. Additionally, the study is expansive in the sense that it aims to answer a diverse set of research questions, which in turn require different research methods. The quantitative data is used to assess the outcomes of the participants' four weeks of playing a video game, while the qualitative data is used to examine the process that the students go through when learning new vocabulary through video games.

3.2.2. Quantitative research

Quantitative research is defined by Dornyei (2007:24) as 'involving data collection procedures that result primarily in numerical data which is then analyzed by statistical methods'. Standardized procedures are applied to both the data collection and the analyzing of the data, with the aim of being able to make objective, generalized and universal claims (Dornyei 2007:34). In order to make general claims, quantitative studies are by definition not concerned with individual cases, but rather larger trends among groups of people. If researchers are to be able to make these universal claims, quantitative research needs to have a sample size that is large enough for these generalizations to be made. For quantitative research, a sample size of 30 participants is considered appropriate (Dornyei 2007:100), and this sample should be representative of the larger group which it is a part of. A representative sample of Norwegian lower secondary school students, for instance, would include participants of the appropriate age group, with a relatively equal division between genders, and students with varying degrees of performance in the subject that is researched. Samples that are chosen at random will often make it possible to generalize the research findings (Johnson and Onwuegbuzie 2004:19).

In the case of this thesis, two quantitative research methods are employed: a vocabulary test and a questionnaire. The purpose of the vocabulary test is to measure whether the participants were able to acquire English vocabulary through playing the video game, while the questionnaire is used to see how difficult the participants perceived the game to be. This data was to be used in order to answer whether there was a link between video game proficiency and acquired vocabulary. Additionally, the questionnaire was to survey how many of the participants completed the game, and the reasons for not completing it.

3.2.3. Qualitative research

Dornyei (2007:24) defines qualitative research as 'involving data collection procedures that result primarily in open-ended, non-numerical data which is then analyzed primarily by non-statistical methods'. While the focus of quantitative research is on statistical analysis of numbers, qualitative research is concerned with the researcher's own interpretation of the data, making it a more subjective approach. Dornyei further describes qualitative research as 'describing, understanding and clarifying a human experience' (Dornyei 2007:126), which means that the aim of qualitative research is not to make claims that are representative of a

group or an entire population, but rather to have a few individuals who can give insight and answers to the research questions of the study.

In the case of this particular study, focus group interviews are used to answer the two research questions that require qualitative methods. The first of these examines the participants' own thoughts about the usefulness of using video games for learning. Motivation is a key factor in why video games are seen as a potential learning platform, and this is a factor that is difficult to measure quantitatively, and thus requires qualitative input. Additionally, the vocabulary learning strategies that the students use while playing video games are examined in the interviews.

3.3. Data collection

3.3.1. An overview of the study

In this section, the data collection methods that were used in order to answer the four research questions of this thesis will be outlined and accounted for. As a reminder, the four questions deal with vocabulary acquisition, the impact of gaming proficiency on the acquisition, the students' attitudes towards learning through video games, and the learning strategies that the participants use when they encounter new words in games. The study lasted for four weeks, where the participants played the video game Bastion at home. No tasks related to the game were administered before the final vocabulary test, as the study aimed to recreate an experience similar to that the participants usually have when they play video games at home. Other studies (deHaan 2005a; Ranalli 2008) have created frameworks for how the students should work with the game by supplementing the playing of the game with tasks. These supplementary tasks were usually aimed at maximizing the learning in the participants, but this paper has opted not to utilize them, as they would not be beneficial in addressing the research questions. While supplementary tasks would most likely result in higher test scores, they would also shift the focus of the thesis away from casual gaming at home.

After four weeks of playing the game, the participants completed a short test consisting of five tasks, which tested their knowledge of ten vocabulary items from the game. The purpose of this test was to provide quantitative input for answering the research question

concerned with whether Norwegian year 10 lower secondary school students could acquire English vocabulary from playing video games in a non-educational setting.

The participants also completed a short questionnaire addressing the research question of whether a connection exists between the students' gaming proficiency and the vocabulary they were able to acquire. Lastly, focus group interviews were used to address the final two research questions. These related to the students' attitudes toward using video games for learning purposes, and the learning strategies they employed when faced with new words in games.

3.3.2. The game

The study uses an Action Role-playing Game (ARPG) released in 2011 called Bastion. In this game, the player assumes the role of The Kid, one of a few survivors after a catastrophe (the Calamity) has destroyed most of the world. The Kid sets out to restore the world to its pre-catastrophic state by travelling through different levels and collecting Cores that help rebuild the fantasy world of the game.

Role-playing games (RPG) are known for containing large amounts of text, both in the form of conversation between characters and information about different items that help advance the story (deHaan 2005b:233). Bastion consists of roughly 3000 lines of dialogue (Bastion FAQ 2011), and assuming that there are 10 words per line on average, the script consists of roughly 30,000 words, which is the same as short books such as Charlie and the Chocolate Factory. The game takes 7-9 hours to finish on average, giving a reading speed of roughly 70 words per minute, which is below the reading speed of 120 words per minute in television programs (Neuman and Koskinen 1992), and most likely even lower than the average reading speed of many lower secondary students.

While the strengths of RPGs lie in the amount of text they contain, they suffer in that the language is not very applicable to 'real world language' (deHaan 2005b:233). Bastion is set in a fantasy world, and thus contains words that are related to fantasy, such as names of monsters, items and buildings. An argument against the findings from this thesis might thus be that the results are insignificant, as all the vocabulary items that the participants were able to acquire are fantasy words. The research questions of this thesis are, however, not concerned with whether the vocabulary they acquire is useful, but if vocabulary is at all acquired through gaming. Furthermore, the fact that all the words are specific to Bastion means that no pre-

testing was required, and testing their knowledge of fantasy words is thus an advantage in terms of time required to carry out the study. Additionally, a pre-test would be detrimental to the aim of investigating their incidental acquisition of these vocabulary items, as the test might have caused the participants to pay additional attention to these words while playing.

Multiple researchers (Chen and Yang 2013; deHaan 2005a; Gee 2005a) have attempted to set criteria for what qualities a game should have in order to be useful for learning, five of which were used in the selection of Bastion. These have been divided into two categories: language-related and practicality-related criteria. First, the game was required to present the participants with both written and oral exposure to the words, by including clear pronunciation and subtitles. This was provided by Bastion's narrator, who commented on the player's actions and surroundings throughout the entire game. Secondly, the language of the game needed to be relatively simple, in order for the participants to have knowledge of 98% of the game's words, as per Nation (2005). By ensuring that the overall language of the game was below the current proficiency levels of the participant, incidental acquisition through guessing from context was facilitated.

Following was three criteria related to the practicality in terms of maximizing the number of volunteer participants. First, the game needed to be relatively short, so that the participants could be expected to complete it within a reasonable amount of time. Bastion took a maximum of ten hours to complete, and a longer game might have appeared as intimidating to potential participants. Secondly, in order to avoid losing out on participants due to technical issues, the game was required to be playable on different types of computers, such as Windows Mac and Linux, as well as not be too taxing in regards to computer specifications[7]. Thirdly, the game was required to have received positive critic reviews, as to choose a game that the participants were likely to enjoy.

By meeting these criteria, Bastion was considered a game that should provide the participants with ample exposure to the chosen vocabulary items, in a context that facilitated incidental acquisition through guessing their meaning. Additionally, technical issues were minimalized by considering the different types of computers the game would be able to run on.

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[7] To clarify: the game needed to be playable on both older and cheaper computers. Had the study employed newer and more graphically heavy games, many would have been unable to participate due to not having a sufficiently powerful computer.

3.3.3. The participants

The recruitment process began in early September 2015, when a number of English teachers working at lower secondary schools in Rogaland were contacted by e-mail about participation in the research study (Appendix 1). Two 10th grade teachers were positive to the project, and their classes were visited. During these visits, the classes were given a brief presentation of the project, without mentioning that the study was investigating language, so as not to influence the results. They were told that the project aimed to investigate whether video games could be useful for learning, which seemed to resonate well with many of the students, resulting in 27 volunteer participants from these two classes. Additionally, they were informed briefly about the game, and told that two gift cards of 600 NOK each would be rewarded to two random participants who completed the study. These gift cards had two functions. Firstly, they were meant to ensure that as many as possible would finish the entire research cycle. Secondly, they were to encourage those who were less experienced gamers to participate in the study, so as to enable a comparison of test results and perceived game difficulty. The fact that both experienced and less experienced gamers were encouraged to join the study was also made clear. They signed up by writing down their name and e-mail address on a sheet of paper, so that they could be further contacted with information about when the study was to begin, and to receive their copy of the video game, Bastion.

During the initial research cycle, almost half the participants dropped out of the study due to various reasons, and only 14 took the vocabulary test, questionnaire and interviews. The high dropout rate could be a result of several factors. One might be that the participants did not feel that they had enough spare time to take part in a study of this scope, as the 10th year of school is a busy one. However, as the participation was voluntary, the participants were not required to provide their reasons for dropping out of the study. As a result, another research cycle had to be initiated, and another set of e-mails was sent out to English teachers in Rogaland. These were sent out in December 2015, which was the beginning of the busy second half of 10th grade. No teachers gave positive responses to the participation requests, often due to a lack of class time to spare for the project.

Several other attempts were made to recruit participants over the next months, and in March, eight additional participants were recruited from a lower secondary school in Finnmark. As these would be participating in the project without any relation to their school, their parents were also informed about the project, and given information about what their children had signed up for (Appendix 2).

Overall, the participants in the study are mixed in terms of gender and geographical location. In the results from the national tests that Norwegian lower secondary school students take every year, students from Rogaland are among the top four regions in English, while students from Finnmark are placed in the bottom half (Utdanningsdirektoratet 2015:7). By having participants both from Rogaland and Finnmark, the differences in English proficiency across the different regions are minimalized. The final sample consisted of 14 participants from Rogaland, and 8 from Finnmark, with 11 boys and 11 girls. Although gender differences are not discussed in the current thesis, the equal makeup of gender is positive in terms of the study's validity (Dornyei 2007:96).

As for the sampling strategies, the study utilizes convenience sampling, which Dornyei (2007:129) describes as 'the least desirable but the most common sampling strategy'. This strategy was used for two reasons: a lack of need to recruit participants that fit specific criteria, and availability of participants. Provided the participants were 10th grade Norwegian lower secondary school students who attended English classes, they did not need to fulfill any other criteria, as that would be irrelevant in regards to the research questions.

3.3.4. The test

Different types of tests are the most common way to obtain quantitative data (Dornyei 2007:95). The type of test depends on what the study wishes to examine, and the various types, such as language tests and psychological tests, each have their own guidelines and specific literature. As this thesis will be using language tests, the discussion will be limited to that particular type. At the end of the four-week period, the participants completed a short test consisting of ten questions that relate to vocabulary from Bastion, and aiming to investigate whether they were able to learn vocabulary by simply playing the game. While the initial gaming period was supposed to last for four weeks, problems with finding a time that suited the teachers at the school in which the project was carried out caused the actual time period to be six weeks for 14 of the participants. The results of this test serve as the base quantitative input for the thesis.

The vocabulary items in the test are related to the game itself and its fantasy world. By eliminating the possibility that the participants might have learned the words from other sources, this allows the thesis to draw conclusions on whether the words were actually acquired from playing the game. Even though all the words are not made up, they either have

a different meaning in the game than what the participants might know from before, or the test elicits a meaning that is specific to the game. An example is the word Core. The real world definition of a core is the central part of something, such as an apple or the earth, or a central part of more abstract concepts such as a conversation. In the vocabulary test, the participants are asked about the Cores' function in the game, and the dictionary definitions of a core will not result in a correct response. Cores in the game are used for a very specific task: restoring buildings that allow the players to improve their characters.

The words were chosen based on how frequently they appear in the game. Although an exact counting of the words was not conducted, the researcher played through the game twice, taking note of which words appeared at least five times throughout the game. Words that appeared frequently during the first half of the game were given priority, in order to ensure that all the participants would have encountered the target vocabulary items. As the different difficulty levels did not alter the language of the game in any way, all the participants were ensured to receive some exposure to the words, as long as they played the game for a few hours. The ten words that were ultimately chosen were Calamity, Core, two weapons from the game, Arsenal, Forge, Monument, and three monsters: Squirt, Scumbag, and Gasfella.

The test consisted of three different types of tasks, which measured different types of knowledge about the target words. Some of these tasks will be explained briefly here, while a more in-depth presentation will be given in the results chapter (for the whole test, see Appendix 4). First, the participants were presented with an image from the game, for which they were to answer four questions about the content in the image. In terms of word knowledge, this task measured their productive knowledge of the form and meaning of two target words. Following is an example of one of the three tasks of this type:

In this image, we see the Kid standing next to a circle of people who appear to have turned to ash, with a shining blue object in the middle'.

1. What event in the game caused the people in the image to turn to ash? Give a short explanation of the event.
2. What is the shining blue object in the middle, and what is its use in the game world?

Question 1 required the participants to briefly explain the concept of the Calamity, the major catastrophe that destroyed the game's world, and turned most of its inhabitants to ash. This event forms the base of the game's story, and is referenced throughout the entire game. Question 2 would require the knowledge of Cores and their use in restoring the Bastion (the home of the game's protagonist). Answering in the line of 'it is a core, and is used to get new buildings in the bastion' would show an understanding of the word. Cores recur throughout the entire game, and the player is required to locate a number of these during the game.

The second task type asked the participants to describe two of the weapons they used in the game, thus demonstrating a productive knowledge of the meaning of these two weapons. The last type was a draw the lines-task, in which the participants were asked to draw lines connecting four (out of nine) words to their correct object in a screenshot from the game. This tested their receptive knowledge of the form of four words, which means that it only required them to recognize the words, as opposed to producing the words themselves. Following is a demonstration of this task.

In this image, we see some of the objects that the player encounters in the 'Bastion'. Draw lines to connect the four correct words on the right with their respective object in the image, marked by a red circle.

- Arsenal
- Distillery
- Shard
- Pecker
- Forge
- Squirt
- Shrine
- Anklegator
- Monument

The five principles for language assessment as presented by Brown and Abeywickrama (2010:25) were considered when constructing the vocabulary test. They include practicality, reliability, validity, authenticity, and washback. Following is a discussion of how the vocabulary test in the current study measures against the five principles.

The first principle is that of practicality, which is concerned with how practical the test is to carry out in terms of budget, materials and resources, and the time required to design, execute, and score the test. While some time was required in designing the test, as the tasks were made to test different types of knowledge, the execution of the test was both simple and not too time-consuming. As the test had clear instructions for what the participants were expected to include in all the tasks, there were no major issues in carrying out the test. Furthermore, these instructions made for an easier scoring of the tests, as it had been made clear what the test answers were expected to contain. The only issue in regards to execution was that some participants misunderstood Task 3 (Appendix 4), which could have been avoided if an example of how the task was to be solved had been included in the test. In this case, two participants circled the words instead of drawing lines to connect the words with their respective object in the provided screenshot from the game.

Reliability is concerned with whether the test would yield the same scores if graded by different examiners, or if taken by the same or similar samples at a later occasion. In order to be completely reliable, a test should have very clear instructions for grading, as for the

grading to be as objective and reliable as possible. Additionally, the test items should be unambiguous. In order to reliably score the tests, instructions for what should be included in the test answers were added to the test questions. Task 1b looked like this:

> What is the shining blue object in the middle? Why do you need to collect them in the game?
>
> (Svaret bør: 1) gi navnet på objektet, 2) forklare hva objektet brukes til i spillet)
>
> [The answer should: 1) provide the name of the object, 2) explain the object's use in the game][8]

In this way, the tasks provided a model for what should be included in the test answers, in order to make the tasks as unambiguous as possible, without giving away any of the actual answer. When grading this task, an explanation of what the object is used for in the game, no matter how short, would earn the participant a point.

Validity is categorized into three kinds of evidence: content, criterion, and construct validity (Brown and Abeywickrama 2010:30). In order to claim that a test is valid in terms of content, it needs to measure what it proposes to measure. In other words, a valid vocabulary test measures the test-takers' vocabulary knowledge. Criterion validity refers to whether the test and its results are similar to that of previous or similar tests. This can be achieved by for instance basing the test on a well-established measurement procedure, although the current study did not do this. The third kind of validity is that of construct, which is concerned with whether the test accounts for the various elements of what is being tested. In the current thesis, this was done by measuring two aspects of vocabulary knowledge: form and meaning, as well as productive and receptive knowledge (Nation 2005), thus achieving a clearer picture of the participants' knowledge of the target vocabulary items. In order for a test to be valid, it also needs to match the tasks that the students have been working with prior to the test, which in this case exclusively consists of playing the game (Brown and Abeywickrama 2010:42). To accommodate this, the study opted to use screenshots and situations from the game in the vocabulary test. One task, for instance, asks the participants to produce a description of two weapons that they used in the game. The participants who have played the game extensively might be able to define these simply from having used them over an extensive period of time,

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[8] [8] The sentence in [brackets] is a translation; this information only appeared in Norwegian on the vocabulary test.

and thus having learned to define the weapons through knowing what the weapons do, and when they are appropriate to use.

Authentic tests contain natural language, and present their test items in authentic contexts, the way they are actually being used in real situations. In the case of this study, the authentic context of the target words was in the video game, and the test shows the words as they appear in the game by for instance including screenshots from the game in four of the five tasks.

When it comes to washback, which refers to the effect that the test has on the teaching and learning, the students were aware that they would be taking a test at the end of the research cycle, but they did not know what type of test it would be. Had the test been the conclusion of a four week cycle in school, this would have been a weak point of the test. However, since the thesis aims to emulate the gaming that the participants already do at home, the lack of a washback effect should not be viewed as a drawback for the test.

As for the data analysis procedures, the tests were graded by the author, but several measures were implemented to ensure a reliable scoring. For the tasks that tested knowledge of both meaning and form, one point was awarded for meaning and one for form. In regards to meaning, the tasks explicitly stated which meaning of the words the participants were to include in their test answers. An example is Task 1a, which looked as follows.

What caused the people in the image to turn to ash? Give a short explanation of the event. **(Svaret bør: 1) gi navnet på hendelsen, 2) forklare hva hendelsen gjorde med spillets verden, <u>i tillegg til å gjøre menneskene til aske</u>)**
[The answer should: 1) provide the name of the event, 2) explain what the event did to the game's world, <u>in addition to turn the people to ash.</u>]

This test item includes the information that should be included in their response: the name of the event that caused the people in the image to turn to ash, and an explanation of what the event did to the game's world. Additional instructions were also included in Norwegian, as not to cause any confusion for the participants as to what should be included in their answers. The Norwegian instructions were meant to ensure that the test items were as unambiguous as possible, in order to avoid misunderstandings having an influence on the results. Additionally, as the image used for this task shows people who have turned to ash (Appendix 4), these instructions were added in order to avoid answers such as 'the Calamity, which caused the people to turn to ash'.

Below is a table summarizing the points that could be awarded for each of the tasks on the vocabulary test, as well as the distribution of the different types of knowledge that were tested in the various tasks.

	Max score	Meaning	Form	Productive	Receptive
Task 1a	2	1	1	2	-
Task 1b	2	1	1	2	-
Task 2	2	2	-	2	-
Task 3	4	-	4	-	4
Task 4	3	1	2	3	-
Full test	**13**	**5**	**8**	**9**	**4**

Table 1. Scoring for the vocabulary test: Maximum scores and types of knowledge

As Table 1 shows, the tasks elicit knowledge of meaning, form, productive and receptive knowledge, although these are not distributed evenly. Task 1a and 1b awarded points for production of the two words Calamity and Core, as well as their definition. In Task 2, the participants were awarded one point for each correctly described weapon from the game. Task 3 was a draw-the-lines task, where one point was given for each word that the participants were able to link to the corresponding object in the provided screenshot from Bastion. Finally, Task 4 tested their knowledge of the names of two monsters from the game, as well as awarding one point for definition knowledge.

Due to the low amount of participants in the study, no statistical procedures were run with the dataset (VanHoorhis and Morgan 2007:48). The participants' test scores were inputted into Excel, and then used to create tables presenting the 1) mean scores, 2) standard deviation, 3) number of participants scoring 50% or more, as well as the points scored for meaning, form, productive and receptive knowledge. As the thesis is concerned with investigating the extent to which these different types of knowledge are acquired through gaming, the scores for each task is examined in detail in section 4.1. Although no statistical procedures were applied, the findings were compared in instances where test scores were linked with questionnaire responses, such as in section 4.2, in which the participants' perceived game difficulty is compared with their test scores.

As for the administration procedures, the test was distributed in three instances. First with two participants from one 10th grade class who acted as a semi-pilot, but whose answers were still included in the study. Following this group, the 12 remaining 10th graders in Rogaland took the test on the same day. For these two groups, the test was administered in

their school by the author. Additionally, due to a restricted amount of time available for carrying out the project, these two groups ended up completing the test after 6 weeks, instead of the originally planned 4 weeks. As for the group of eight in Finnmark, the test was administered in the home of one participant, by this participant's mother, after a gaming period of 4 weeks. The test took between 20-25 minutes to complete for all three groups, and was immediately followed by a short questionnaire.

3.3.5. Questionnaire

Questionnaires are defined by Dornyei (2007:102) as 'any written instruments that present respondents with a series of questions or statements to which they are to react either by writing out their answers or selecting from among existing answers'. This definition is quite broad, and allows for plenty of customization in terms of questionnaire design. While tests aim to evaluate the performance of the participants in different ways, questionnaires are non-evaluative (Dornyei 2007:103), and simply seek to collect additional information about the participants. Questionnaires can, for instance, elicit general facts about participants related to who they are, where they come from, their educational background and occupation. Additionally, questionnaires might find out what people do, and what people think, which means that questionnaires can also be used as a qualitative data collection tool. Using questionnaires containing several open-ended questions as a qualitative method is however discouraged by researchers (Dornyei 2007:104), as they will never be able to elicit the same kinds of rich descriptions that can be achieved through, for instance, an interview.

In the case of this study, the questionnaire was used as a supplementary tool to the test, which served as the primary quantitative data collection method. While the test measured the amount of vocabulary the participants were able to acquire, the questionnaire aimed to enable making a connection between the test results and the participants' gaming proficiency. In other words, it aimed to see whether participants who perceivde the game to be easy achieve higher test scores than those who thought it was difficult. Additionally, it was to measure how many of the participants played the video game to completion, and elicit why those who did not finish the game were unable to do so. Their responses would then aid in assessing whether this was a motivating game for the participants.

The questionnaire consisted of four close-ended items, and one open-ended item. Three of the close-ended items were related to the difficulty of the game, and asked the

participants which difficulty mode they chose for the game, whether they activated a feature called shrines in order to further increase the difficulty, and how difficult they perceived the game to be. The last close-ended item asked the participants whether they had finished the game, and the open-ended item was a follow-up question to this one, asking about why they did not finish the game (see Appendix 4 for the questionnaire). While the aim of the three questions related to difficulty was to assess a research question, the questions about completion had two functions: to better understand the test results, and to gauge how appropriate the video game Bastion was for this group of students.

In terms of strengths and weaknesses, questionnaires are well suited for collecting a large amount of information in relation to the time needed to execute them, but are limited if the researcher aims to achieve the same kind of deep understanding that can be obtained through interviews. Studies that use questionnaires as the main research tool take a lot of time to construct, but are easy to administer to large groups of participants as this can be done by mail or over the internet (Dornyei 2007:113). A well-constructed questionnaire consisting of questions that are worded without ambiguity can be a very effective research tool, provided the researcher is not trying to use the questionnaire in order to elicit elaborate answers from the participants. While the questionnaire used for this thesis has one open-ended question, the question is impossible to misinterpret, as it simply asks the participants why they did not finish the game. As a result, all participants have been able to answer this question without problem. In total, the questionnaire served its purpose of linking the test scores to the perceived difficulty of the participants, while also being highly practical, as it consisted of just five questions.

As for the data analysis procedures, the questionnaire acted as a secondary source of quantitative data, and was combined with the vocabulary test scores in order to investigate the connection between gaming proficiency and vocabulary acquisition. As with the test scores, the questionnaire responses were inputted into Excel. Three sets of data from the questionnaire were compared to the test scores: 1) perceived game difficulty, 2) shrine activation and 3) reasons for not finishing the game.

3.3.6. The interviews

Interviewing is the most commonly used qualitative data collection method, perhaps as a result of it being such a natural and recognizable setting for many people due to its popularity

on TV, the radio, and in newspapers (Dornyei 2007:134). Interviews fall within three categories of structure. In the structured variant, the interviewer has prepared an interview guide that is followed strictly, without leaving much room for flexibility in the interviewer or interviewee, making the structured interview similar to the questionnaire in form. Semi-structured interviews also use an interview guide, but it is followed much more loosely, with the interviewees being encouraged to elaborate on different answers. This is the most commonly used interview structure in applied linguistics research (Dornyei 2007:136). The last category outlined by Dornyei is the unstructured interview, which aims to create a relaxed atmosphere in order for the interviewee to reveal more than might be revealed in a more formal interview. The researcher uses a very brief interview guide with a few questions to start the interview, and then follows the direction that the interviewee is heading.

The thesis opted to incorporate interviews as a data collection method as a result of two research questions requiring qualitative data in order to be answered. These interviews were conducted in the form of focus interviews, a group format of interviews where the participants are interviewed in small groups, usually consisting of 6-12 members (Dornyei 2007:144). Additionally, the interviews were semi-structured, as to allow and encourage the interviewees to discuss among themselves, elaborate and build on answers, and brainstorm (Dornyei 2007:144). While the interviewer follows an elaborate interview guide in semi-structured interviews, there is room for the interview to not follow the plan precisely if the interviewees bring up new and interesting ideas.

Focus group interviews were chosen due to two reasons. Firstly and most importantly, it was thought that the low age of the participants in the study might cause the one-to-one interview setting to appear as intimidating. People are generally not as intimidated by the thought of participating in a focus group interview as in a regular interview (Dornyei 2007:146). Also, when recruiting participants, the knowledge that they would be participating in one-to-one interviews could limit the amount of learners who signed up for the study. Additionally, the interviews might not have resulted in the same elaborate answers if the interviewees had been placed in an intimidating situation. The second reason for choosing this format was due to time constraints, as a great deal more time would be needed to interview 22 participants individually than in groups. This was mainly a concern where the participants were interviewed during school, as additional class time would be required, which would then interfere with the planned schedule of the teachers. Although one-to-one interviews could still be conducted with a smaller number of the total participants (i.e. 8 instead of 22), these two factors together form the reason for why focus group interviews were chosen for the study.

While focus group interviews are less intimidating than one-on-one interviews, they have their limitations. When being interviewed in groups, the interviewees might not answer the questions truthfully, as to not go against what is thought to be the accepted answer for the rest of the group (Dornyei 2007:146). This might cause the more controversial opinions to get lost in the interview process. Another weakness of focus group interviews is that it is more difficult for the researcher to get personal and elaborated responses from single participants than in a regular interview format (Dornyei 2007:146). These limitations might make the focus group format less suited for research that relies on one method, but as the interview topics are not controversial in the case of this thesis, focus group interviews were considered a suitable format.

The interview guide consisted of 11 questions, which were grouped into four categories: experience with video games, attitudes towards learning through video games, thoughts on Bastion, and learning strategies. In total, these categories aimed to address the research questions related to the students' attitudes to learning English through video games, and examine which vocabulary learning strategies they used while playing. As the interviews were not concerned with the participants' English language proficiency, but rather with the content of their responses, the interviews were carried out in Norwegian, as to enable the participants to share their thoughts in the language they were most comfortable communicating in (see Appendix 5 and 6 for the original and translated versions of the interview guide).

Questions in the first category asked the participants about their general experiences with video games, and had two aims: to act as an opening category in which all the participants would be comfortable talking, and to identify the kinds of games they played in order to utilize these at later stages of the interviews. It did not address a specific research question in particular, but the responses from this category could be used for discussions related to other research questions. For instance, although the interviews and test scores were not linked, as a measure to preserve the participants' anonymity, a general trend that shows that the participants as a whole do not play games similar to Bastion would be useful information when discussing the test scores. Finally, the responses might be used to strengthen the study's validity, if the games played by the participants were similar to those popular nationally (Medietilsynet 2014), as this would mean that the sample was consistent with the national average in regards to game preferences.

The second set of questions examined the participants' general thoughts on learning through video games, and was aimed at addressing the research question concerned with the

students' attitudes towards using video games for learning purposes. Questions in this category had two themes: the participants' thoughts about the use of video games in school, and their own perceptions about what they learn from playing video games at home. Some of the questions also tasked the interviewees with comparing video games to books, in order to see whether they thought that the language exposure in video games was similar to that while reading a book. Before conducting the interviews, the assumption was that the participants would mostly have a positive attitude towards using video games. It was also thought that different types of games would result in the participants learning different aspects of language. For instance, it was assumed that those who played games where they had to communicate in English through a microphone would see an improvement in their pronunciation and intonation.

In the third category, the participants were asked questions about Bastion. This category did not target any specific research questions, but was to be used when accounting for the test and questionnaire results. If a high amount of participants responded that they did not enjoy the game, this would then serve as an explanation of the high drop-out rate. Additionally, this category of questions aimed to see whether the participants perceived Bastion to be a good game for language learning, and whether they felt that the difficulty of the gameplay had an effect on their focus on language in the game. Although the individual participants' interview responses were not linked to their test scores, the question about difficulty also serves as an additional data source when discussing whether there is a link between gaming proficiency and acquired vocabulary.

Finally, the fourth and last category aimed to answer the research question related to the learning strategies the participants employ when faced with new words while playing. This research question was included in order to see whether the learning strategies that are used while playing video games are similar to those used during extensive reading. As the participants were not informed about the study's intent, and not asked to employ any kinds of learning strategies in their playing of the game, the range of answers in this category was expected to be quite wide. The final question in this category examined whether the participants relied on spoken or written input when playing the game, as Bastion allows for almost pure reliance on aural input.

In terms of data analysis, as the interviews were conducted in Norwegian, they later had to be translated into English in order to be presented in the current thesis. This translation was done by the researcher, and was limited to the quotations that have been used in the thesis. Additionally, attempts were made to keep the style of the participants' language as

unaltered as possible in the translations. The participants did not write their names on the vocabulary tests, which meant that the vocabulary test scores could not be directly compared to the interview responses. However, some links have been drawn between the interviews and the test/questionnaire responses as a whole.

The interviews were carried out after the participants had been administered the vocabulary test and questionnaire. In total, six groups of participants were interviewed. With the exception of group A, which consisted of two participants, there were four participants in each group. In total, the interviews provided 52 minutes of material, and the average interview lasted for eight and a half minutes. All six groups gave their permission to be audio recorded, which was done on both a laptop and a cellphone, as to minimalize potential technical errors. The four groups in Rogaland were interviewed face-to-face, while the interviews with two groups in Finnmark were done by means of video calls on Skype. No video was recorded for any of the groups, and participant names were not mentioned at any point during the interviews, as to preserve their anonymity.

3.4. Ethical considerations

As the thesis collected the participants' personal information in the form of their names and e-mail addresses in order to distribute the game, the project was reported to the Norwegian Centre for Research Data (NSD), which approved the project. There are additional ethical issues to consider when the research participants are children. NSD (2016) mentions 15 years as the age when children can give their own consent for research study participation, and the Norwegian Research Ethics Committees (2016) state that children can grant consent on their own behalf as young as 12 when involved in research studies that do not involve any kinds of sensitive information.

In the case of the 14 participants that were recruited through a lower secondary school, consent was granted orally, and the parents were not involved. This was decided as a result of conversation with the teacher, who stated that the parents did not need to be informed, as the test and interviews were to be carried out in school. The eight remaining participants were recruited out of school, and the procedure for informing the participants and their parents was thus different. A consent form was signed by the participants, which informed the students of what they were granting consent for (Appendix 3). Additionally, an e-mail was sent to the

participants' parents in order to inform them about the extent of their children's consent (Appendix 2).

Once the participants had signed up for the study, they were allowed to withdraw at any time without providing a reason for doing so. Additionally, their identities were kept anonymous, and the data from the interviews will be deleted upon completion of the study.

3.5. Reliability and validity

Reliability is defined by Joppe (2000a) as follows:

> The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability. In other words, if the results of the study can be reproduced under a similar methodology, then the research instrument is reliable.

Thus, reliability is concerned with consistency and dependability, as well as whether similar studies employing the same research instruments can achieve comparable results. Some means for achieving a high reliability can be unambiguous test items, use of tested research tools, and piloting. Additionally, setting the same conditions for all participants ensures reliability in terms of execution.

In terms of unambiguous test items, the participants were provided with a question, as well as an elaboration in Norwegian, which described what their answers should contain. The test and questionnaire results showed that very few instances of wrong answers were due to misunderstandings of the tasks, which suggests that these additional elaborations in the participants' first language improved the reliability of the test and questionnaire.

Due to a low number of participants, it was difficult to pilot the current study before it was conducted on the first group of 14 participants. Two of these did, however, take the test, questionnaire and interview before the remaining 12, as they were in a different 10th grade class than the rest of the participants. The data collected from the participants in this class was originally supposed to be used as a pilot, until it became clear that almost half the participants had dropped out. Despite the data from these two being used in the full study, the tests, questionnaires and interviews conducted with them suggested that the research tools could be

used as they were. If this small-scale pilot had indicated that there were flaws in the design of either research instrument, however, modifications would have been made and the two participants' responses would have been discarded.

As for the reliability in terms of execution, the study suffered a bit. Although there were no issues with administering the test and questionnaire to the participants in Finnmark, carrying out the interviews over Skype might have influenced the participants' responses and attitudes toward the setting. Overall, considerably more elaborated responses were elicited in the face-to-face interviews than in the Skype interviews.

Validity refers to whether the study and its instruments actually measure what they set out to measure (Joppe 2000b). The face or content validity of a study is concerned with whether the research instruments are suitable for answering the research questions. Additionally, a study's external validity is dependent on the sample being representative of the population that is being studied, as well as controlling external factors that might influence the results.

Mixed methods were employed in order to enable the study to answer its broad range of research questions, provide more in-depth answers to these. As presented in the section about the interviews, the data collected from different methods provide broader grounds for discussing the results from the vocabulary test. While a quantitative study of the subject would have been able to conclude whether students learn from playing video games, a mixed methods approach better examines the nuances of why and how they were able to do so. While the sample is not on the higher end for a quantitative study, a sample of 22 participants should be sufficient for a study of this size (Dornyei 2007:100), especially considering that the study uses several data collection methods.

In terms of the sample, some factors strengthen the study's external validity in terms of representing the total population under study. Although gender differences in learning through video games are not examined in this study, the fact that the study has 11 male and 11 female participants increases the validity of the study by having an equal share of each gender, allowing for more generalized conclusions, or at least implications, to be drawn.

Additionally, the games that the participants play match those that are popular nationally. The survey conducted by the Norwegian Media Authority examined what games Norwegian children play (Medietilsynet 2014:41). Among boys, action and shooter games such as Grand theft auto (GTA), Call of Duty and Battlefield are the most popular, while many also play the football game FIFA and the survival game Minecraft. Girls spend more

time playing mobile games such as Candy Crush and Hay Day, but The Sims, GTA, and FIFA are also popular. These game genres are similar to the games that the participants of the current study reported to play in the focus group interviews, which suggests that the participant body is similar to the national average in terms of gaming preferences.

In regards to external factors influencing the results, the study attempted to emulate the recreational gaming that the participants normally do in their spare time. Although the study's design caused different variables such as play time and word exposure to influence the outcomes, it was deemed to be the best way to obtain answers to the research questions regarding out-of-school gaming. Had the study been designed to interfere with the gaming by for instance tasking the participants with keeping logs of their gaming, in order to ensure that equal exposure and play time, the test results might have been more consistent, and thus more reliable. They would, however, not be as valid, as the results would not have reflected the regular gaming of the participants.

4. Results

This chapter presents the results of the research on English vocabulary acquisition in Norwegian 10th graders through playing video games. Three data collection methods were implemented in the research project: a vocabulary test, a questionnaire, and focus group interviews. In total, the results from these three research methods are used to address the four research questions of the study:

1. Can Norwegian 10th grade students acquire English vocabulary through playing video games in a non-educational setting? If so, which types of vocabulary knowledge are acquired?
2. Is there a connection between how well the students perform in the game and the vocabulary they acquire?
3. What are the students' attitudes toward using video games for learning purposes?
4. What learning strategies, if any, do the students use when faced with a new vocabulary item while playing?

Section 4.1 presents the results from the 20 minute vocabulary test that was taken by the 22 lower secondary school 10th graders after having played Bastion for four weeks. This section first explains the purpose of the tasks, before presenting the results on individual tasks. The questionnaire findings are then described in section 4.2, before the results from the focus group interviews are presented in section 4.3, structured by question category. General trends across the focus groups are presented, in addition to quotations of participants from the six focus groups.

4.1. Vocabulary test

4.1.1. Task overview

The vocabulary test had five tasks, and in line with Nation's (2005:584) distinction of form, meaning and use, as well as the productive/receptive distinction, the tasks were constructed to test different types of knowledge. This was done in order to see which types of knowledge the

participants were more likely to acquire by playing video games for fun. The test consisted of ten vocabulary items, and had a maximum score of thirteen points, the three extra points being due to three tasks eliciting both the form and meaning of the words. In the discussion for each task, two examples of participant responses are shown: one that awarded at least one point, and one that awarded no points.

4.1.2. Task 1: Image and text

The first task aimed to elicit the participants' productive knowledge of two key words from the game world: Calamity and Core. Presented with an image with a descriptive text and two questions, the participants were to produce the names of the two words, and define them briefly (Appendix 4). One point was awarded for each of the correct words, and another for their definition, giving a total of four available points for Task 1 (two for Task 1a and two for Task 1b). Following is a table that displays the results on Task 1a.

	Max score	Mean	SD	% of Ps scoring 50% or more[9]	Meaning	Form[10]
Test scores	2	0.73	0.77	54.5%	12 (54.5%)	4 (18.2%)

Table 2. Results on Task 1a

Task 1a asked the participants to provide the name of the event that had caused the people in the image to turn to ash (Calamity), and give a brief description of what the event had done to the world of the game. For example, the response 'The destruction of the world. Can't remember what it was called' was awarded one point, as it contained a brief explanation, but not the correct word. However, the response 'it made the world become more interesting' would not award a point for the participant. As seen in Table 2, the participants scored 0.73 points on average on this task. Four participants were able to remember the term for the event (see column Form), while 12 participants were able to provide an explanation of the word (see column Meaning). 54.5% of the participants were able to score at least one point on this task, and the standard deviation of 0.77 suggests a wide variation in the test responses.

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[9] This column refers to the percentage who scored at least one point (or 50% of the total available points) on this task

[10] The meaning and form columns refer to the points that were scored for word definitions and forms. Numbers in parentheses refer to the scores in relation to the maximum points that could have been awarded across all participants (22 for meaning and 22 for form).

For Task 1b, the participants were to name an object (Core) in the middle of the picture, and explain why the player needs to collect these cores in the game. Responses similar to ' It's called a Core. When you collect them you can build up the Bastion' would earn the participant a point, while 'Blue shining thing. You level up when you collect it' would not. As with the previous task, two points was the maximum.

	Max score	Mean	SD	% of Ps scoring 50% or more	Meaning	Form
Test scores	2	1.18	0.85	72.7%	16 (72.7%)	10 (45.5%)

Table 3. Results on Task 1b

Table 3 shows that the average score was 1.18 for this task, which is higher than that of the previous task. A higher deviation than Task 1a, as well as a high percentage of participants scoring one point or more on this task, suggests that many participants scored 0 and 2 points. Ten participants were able to produce the word Core, while another three called it a Shard, which has the same function in the game, but is a less powerful and more common version of a Core. As these are visually distinct (a shard is red, and much smaller), those who called it a shard were not awarded a point for form. As for the meaning, 16 participants were able to explain what Cores are used for in the game, and with the exception of Task 3, this is the highest score for form achieved in the vocabulary test.

4.1.3. Task 2: Descriptive task

As with Task 1a and 1b, Task 2 was designed to elicit the participants' productive knowledge. While the two previous tasks tested both form and meaning, this task aimed to measure their knowledge of the meaning of two weapons in the game. As one point was awarded for each weapon that was described correctly, the task had a maximum score of two points. Although the participants were awarded points for production of correct descriptions, this task also required them to have receptive knowledge of the weapon names, as they would need to be able to recognize the weapon names in order to be able to produce a description. They were presented with a list of the 11 weapons that appear in the game, and asked to describe two of these. A correct description would include an explanation of how the weapons worked, and this task resulted in responses that were varying in length. Provided the participants were able

to demonstrate an understanding of the weapons' functions, the length of the answers did not matter. Some participants gave descriptions such as 'they were the most fun and looked cool', which would not be an appropriate answer. Below is an example of an elaborate test response.

Scrap musket. It had a range that could kill many enemies in one shot. If upgraded the reload was faster it would be more efficient, kills multiple monsters in one click.

The results the participants obtained for Task 2 are presented in Table 4, which shows that the average for this task was 1.50. This score is higher than that of the previous tasks, which might be a result of the participants being given a choice of which weapons to describe. Additionally, the higher average might suggest that meaning is acquired better than form through playing video games. 81.8% of the participants were able to describe at least one weapon, while 68.2% were able to describe both weapons. The high standard deviation suggests that most participants scored either 0 or 2 points on this task.

	Max score	Mean	SD	% of Ps scoring 50% or more	Meaning	Form
Test scores	2	1.50	0.80	81.8%	33 (75.0%)	-

Table 4. Results on Task 2

4.1.4. Task 3: Draw the lines

For the third task, the participants were presented with a screenshot from the game consisting of a portion of the player's home, the 'Bastion', and nine words from the game. Four items in the screenshot were marked with red circles, and the participants were to draw lines between these items and the correct words above the image. While the two previous tasks tested productive knowledge, the aim of this task was to test their receptive knowledge of the form of these words. One point was awarded for each correct pairing, giving a maximum score of four.

	Max score	Mean	SD	% of Ps scoring 50% or more	Meaning	Form
Test scores	4	2.73	1.35	81.8%	-	60 (68.2%)

Table 5. Results on Task 3

As was the case for Task 2, the participants scored higher on this than on Task 1, with an average score of 2.73. As seen in Table 5, 81.8% of the participants were able to score two points or higher, while all participants except three were able to connect at least one word with its corresponding object in the screenshot. Two of these appear to have misunderstood the task, one having drawn lines between the words themselves and the other participant having circled the words themselves. Seven participants were able to achieve scores of four points, while nine scored three points on this task. Similarly to previous tasks, the standard deviation is high for Task 3.

4.1.5. Task 4: Image and text

As in Task 1, the participants were presented with an image and a corresponding short text. This image depicted two enemies from the game, and the participants were asked to name the two enemies, as well as explain what happened in the game when the player attacked one of these. The task tested the participants' productive knowledge of two words' form, in addition to the meaning of one word. Three points were awarded for this task: one for each correct monster name, and one for the description of one of the monsters. A response like 'If you hit the big one it slowly shrinks and it spews out poison. Don't know what they are called.' would award one point, while 'Scumbag, they shot out a blue mud that can cause damage' awarded two points.

	Max score	Mean	SD	% of Ps scoring 50% or more	Meaning	Form
Test scores	3	0.64	0.58	4.5%	13 (59.1%)	1 (2.3%)

Table 6. Results on Task 4

The participants scored lowest on this task by far, with an average of 0.64. As seen in Table 6, 13 participants were able to describe what happens when one of the enemies were attacked, and thus show knowledge of the meaning. In contrast, just one of the participants was able to provide the name of one monster. Nine participants scored zero points on this task, while eight of these did not write anything at all. As seen in the relatively low standard deviation, these low scores were consistent among all participants. The high numbers for Tasks 2 and 3 suggest that some types of knowledge are more readily acquired incidentally than others when playing video games.

4.1.6. Meaning, form, productive and receptive knowledge

In order to investigate which types of knowledge the participants were most likely to acquire through playing video games, an analysis of the responses for tasks eliciting the different types of knowledge was conducted. Table 7 displays the distribution of these types, showing the total points achieved by all the participants for all the tasks, and the maximum points that could be awarded for all participants combined in parentheses.

Task	Meaning	Form	Productive	Receptive
Task 1a	12 (22) 54.5%	4 (22) 18.2%	16 (44) 36.4%	0 (0)
Task 1b	16 (22) 72.7%	10 (22) 45.5%	26 (44) 59.1%	0 (0)
Task 2	33 (44) 75.0%	0 (0)	33 (44) 75.0%	0 (0)
Task 3	0 (0)	60 (88) 68.2%	0 (0)	60 (88) 68.2%
Task 4	13 (22) 59.1%	1 (44) 2.3%	14 (66) 21.2%%	0 (0)
Total	**74 (110) 67.3%**	**75 (176) 42.6%**	**89 (198) 44.9%**	**60 (88) 68.2%**

Table 7. Test scores for tasks eliciting meaning, form, productive and receptive knowledge

Among the five tasks, those that elicited meaning could award a total of 110 points, while those where form was the focus could award 176 points for all the participants combined. For the tasks that had to do with the meaning of words, the participants scored 74 points collectively, or 67.3 % of the total available points. In contrast, the tasks that elicited form resulted in 75 points. Although this number is close to that achieved for meaning, it is low when considering the total points that were available for the tasks eliciting form, amounting to 42.6% of the total.

In addition to meaning and form, the tasks also differed in whether they tested productive or receptive knowledge of the target words. Four of the tasks tested productive knowledge, giving a maximum of 198 points for all the participants combined, while just one task tested receptive knowledge, with this one task having a maximum total score of 88 points. For the productive tasks, the participants scored 88 points, or 44.9% of the total

available points. The receptive task, however, gave a total score of 60 points, amounting to 68.2% of the total available points. Although only one tasks tests receptive knowledge, which means that no conclusions can be drawn, these numbers suggest that more receptive than productive knowledge might be acquired when playing video games.

4.1.7. Task summary

Overall, the participants were able to answer more than half the questions correctly, with a mean score of 6.77 for the entire test. As seen in Table 8, 63.6% of the participants were able to score seven points or higher on the test. Tasks 2 and 3 were those where the highest number of participants were able to score at least 50% of the points, as well as being those with the highest average scores in relation to their max scores. In contrast, Task 1a and Task 4 produced a low amount of correct answers, and contributed to lowering the total average score.

	Max score	Mean	SD	% of Ps scoring 50% or more
Task 1a	2	0.73	0.77	54.5%
Task 1b	2	1.18	0.85	72.7%
Task 2	2	1.50	0.80	81.8%
Task 3	4	2.73	1.35	81.8%
Task 4 (50%=>2)	3	0.64	0.58	4.5%
Full test (50%=>7)[11]	**13**	**6.77**	**-**	**63.6%**

Table 8. Test scores for all tasks: Summary

4.2. Questionnaire

The participants completed a short questionnaire consisting of three questions about the game's difficulty: one question about whether they played through the entire game, and one

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[11] As no half points were awarded, 2 points is considered 50% for Task 4, and 7 points counts as 50% for the full test.

open question about why they did not complete the game. These questions were included in order to see whether there was a connection between the participants' test scores and their perceived game difficulty. All 22 participants completed the questionnaire, but one participant did not respond to the first two questions.

Difficulty mode	Amount	Percentage
Non-sweat mode	5	23.8%
Normal mode	16	76.2%
No response	1	4.5%
Total	22	

Table 9. Responses to Question 1: Which difficulty mode did you choose for the game?

The first question asked the participants about the difficulty mode that they chose for the game. Bastion is set to 'Normal mode' by default, but the players can opt to choose a 'Non-sweat mode' if they want an easier experience, as the enemies are weaker and the penalty for dying multiple times is reduced in this mode. As seen in Table 9, most participants opted to keep the game in normal mode. One participant did not respond to this question, likely as a result of not knowing which mode was active, as this participant responded to be inexperienced with video games. It should be noted that the language level of the game was not altered by changing the difficulty level.

In addition to the initial difficulty, the players are also able to increase the difficulty further by activating a feature called 'shrines' in the game. These shrines allow the players to increase the difficulty of specific aspects of the game, by, for instance, increasing the health of the enemies by 10%, or reducing the damage that the player inflicts. When the shrines are activated, the players get a more difficult game, but this increased risk results in greater rewards when the player kills the enemies.

Shrine activation	Amount	Percentage
Yes	14	63.6%
No	8	36.4%
Total	22	

Table 10. Responses to Question 2: Did you activate any shrines?

As seen in Table 10, the majority of the participants opted to further increase their difficulty by activating at least one shrine. These responses are connected to those from the difficulty

mode question, as the participants who set the game to non-sweat mode would be unlikely to activate shrines and thus get a more challenging game.

Table 11 displays the connection between the achieved test scores and shrine activation. As can be seen, those who activated shrines achieved significantly higher scores on the vocabulary test than those who did not. Additionally, the standard deviation is lower for those who activated shrines, which suggests that few participants within the 'yes' group had low scores on the test.

Shrines	Mean test score	SD
Yes	8.14 (*n*=14)	2.93
No	4.38 (*n*=8)	3.74

Table 11. Mean test scores related to shrine activation

The third question asked the participants how challenging they thought the game was, since the thesis aimed to see whether there is a connection between perceived difficulty and vocabulary gain. As seen in Table 12, most of the participants opted to go for the middle responses, with nine participants reporting that the game was easy, and 11 saying that it was a bit difficult. These responses suggest that the difficulty level of Bastion was appropriate in the case of these particular participants, although the game was too difficult for two participants.

Perceived difficulty	Amount	Percentage
Very easy	0	0%
Easy	9	40.9%
A bit difficult	11	50.0%
Very difficult	2	9.1%
Total	22	

Table 12. Responses to Question 3: How difficult did you think the game was?

Table 13 illustrates the participants' responses regarding perceived difficulty in relation to their test scores, and demonstrates a tendency of those who found the game to be easy to achieve higher scores than those who thought it was a bit difficult. Although just two participants thought that the game was very difficult, the mean of 1 point suggests that it might be nearly impossible to acquire vocabulary through gaming if the difficulty level is too high.

Perceived difficulty	Test scores	
	Mean	SD
Easy	9.00 (*n=9*)	2.55
A bit difficult	6 (*n=11*)	3.32
Very difficult	1 (*n=2*)	1.41

Table 13. Perceived difficulty and test scores

As a final examination in regards to shrines, Table 14 shows the connection between perceived difficulty, shrine activation and test scores. Although there is a low amount of participants within each category, the tendency for those who activated shrines to score higher than those who did not illustrates the importance of gaming proficiency for vocabulary acquisition.

Perceived difficulty	Test scores	
	Shrine=yes	Shrine=no
Easy	9.63 (*n=8*)	4.00 (*n=1*)
A bit difficult	7.00 (*n=5*)	5.17 (*n=6*)
Very difficult	1.00 (*n=1*)	0 (*n=1*)

Table 14. Perceived difficulty, shrine activation and test scores

As was seen in Table 14, eight of those who reported that the game was easy also activated shrines, while just one did not. Five of those who said that it was a bit difficult reported to activate shrines, scoring 7 points on average. The remaining six did not activate any shrines, and achieved an average of 5.17 points. Results from these comparisons reveal that there might be a link between gaming proficiency and vocabulary acquisition. Another reason for varying scores might be that many participants did not finish the game, as is presented in Table 15.

Game completion	Amount	Percentage
Yes	4	18.2%
No	18	81.8%
Total	22	

Table 15. Responses to Question 4: Did you finish the game?

Table 15 shows that just four participants played through the entire game, while the remaining 18 quit during different stages of the game. This questionnaire item had an open follow-up question asking the participants why they did not finish the game, which resulted in a variety

of answers. These responses were grouped into five categories: Difficulty, Interest, School, Time, and External factors. In cases where answers would fit into more than one category, they were placed according to the hierarchy presented above. For example, an excuse that included interest and time such as 'Didn't have time and played other games that I think are more fun' would be categorized as Interest. The reason for this is that difficulty and interest are directly linked to the research questions, while time and external factors are not.

Difficulty included responses that reported the game to be too challenging. The reason given by one participant demonstrates one of the challenges with using an interactive medium such as video games for learning.

> I am not a very experienced gamer so I don't know how to play that kinda game, and when I died a few times I didn't wanna play anymore

Another response from this category illustrates the importance of unlimited retries in video games: 'I died 5 times and had to start the game all over again so I gave up'. It should be noted that the players do not have to start from the beginning of Bastion when they die too many times, but rather from the beginning of the current level. In total, five participants reported difficulty to be the reason for their not finishing the game. Table 16 shows a comparison of the test scores and reasons for not finishing the game, and reveals that with the exception of external factors, the average score (5.20) is the lowest for the Difficulty category. Additionally, the standard deviation of 3.42 illustrates that there was a wide range of test scores within this category.

Reason	Mean score	SD
Finished	9.50 ($n=4$)	2.38
Difficulty	5.20 ($n=5$)	3.42
Interest	6.40 ($n=5$)	3.36
School	9.50 ($n=2$)	2.12
Time	6.60 ($n=5$)	4.39
External factors	1 ($n=1$)	-

Table 16. Reasons for not finishing the game and test scores

The Interest category included responses indicating that the participants perceived the game as uninteresting. One participant reported not to enjoy the type of game.

> I thought it was a bit boring and I usually don't like games where you see '2d' and a small closed map with not much freedom, which I think are the best games. Like: dayZ, Arma

Other responses for this category were not as elaborate, and included reasons such as 'I was bored so I gave up…'. Five participants' responses belonged to this category, which suggests that the game might not have been the best choice in relation to these particular students' interests. When compared to the test results, Table 16 reveals that the participants who belong to this category scored 6.40 on average, and similar to Difficulty, the scores for Interest had a high number for standard deviation (3.36).

Responses in the School category mentioned being busy with schoolwork as the reason for not finishing the game. As the participants were 10th grade students, thus in the middle of a busy year of school due to the necessity of summative assessment in all school subjects, some responses were expected to fall under this category. One response revealed that the participant 'kind of forgot about the project. I had to constantly delay the gameplay because it was right when we had the big tests'. Two participants' responses belonged to the School category. Although these reasons can be speculated to come as a result of the participants perceiving school-related excuses as more appropriate than other reasons, an examination of the test results for this category in Table 16 shows that the average score for these two participants was 9.50. The number for standard deviation (2.12) also suggests that both participants in the School category achieved high scores.

The Time category included responses in which the participants reported to not have enough spare time to play the game. While this is similar to the School category, the reasons for not having time to play were not provided in the responses that fall under this category. Five responses belonged to this category, and mostly consisted of short utterances such as 'I didn't have time'. When compared to the test scores, the participants who reported time to be the reason for not finishing the game scored 6.60 points on average (Table 16), but although this is similar to the average score for the entire body of participants (6.77), the standard deviation of 4.39 is the highest among all the excuse categories. Within this group, three participants scored 8, 10 and 11 points, while the final two scored 1 and 3 points, suggesting that no generalizations can be made from the results within this category.

One student mentioned external factors as the reason for not finishing the game. In this one case, 'Pc problems' was the given reason, and the participant was able to score just 1

point. Finally, four participants were able to finish the entire game. As seen in Table 16, the mean score for this group was 9.50, with a low standard deviation (2.38). As could be expected, those who played through the entire game, thus receiving more exposure to the target words than those who did not, were able to achieved the highest average scores on the vocabulary test, together with those placed in the School category.

4.3. Focus group interviews

4.3.1. Interview overview

The interviews were carried out after the participants had taken the vocabulary test and completed the questionnaire, aiming to answer the two research questions related to the students' attitudes towards using video games for learning purposes, and the learning strategies they used when faced with new words while playing. Semi-structured focus group interviews were chosen as the interview format, as focus groups were more likely to be a comfortable setting for the 15-16 year old participants. In total, there were six focus groups, which were initially to consist of four participants each. However, due to dropouts in one class, group A had two participants, while there were four participants in each of the remaining groups.

As the participants are all the same age group, and the groups are for the most part similar, the results from the interviews will be presented according to interview question categories. Interview quotations are translated from Norwegian by the researcher.

4.3.2. Experience with video games

This category asked general questions about whether the participants played video games, and which games and game genres they enjoyed playing. The purpose of the category was mainly to start the interview with questions that all the participants would be able to answer, but also to find out which games they enjoyed, so that specific examples from those games could be used by the interviewer where appropriate. Additionally, the games the participants played could later be compared to the national average.

Nearly all the participants said that they play video games, except in group D, where one participant reported to not play games at all. However, this participant said that she played some games on her mobile phone. In group E, all the participants played some video games, although not very frequently.

When asked about types of games, first person shooters (FPS) were popular among all the groups, and especially the game franchise Counter Strike (CS). Other games genres varied more among the groups, ranging from driving games in group A, survival games in group B, Massive online multiplayer role-playing games (MMORPG) such as World of Warcraft (WoW) in group C, and mobile games in group D. All the participants in group E reported to enjoy games that allowed for free roaming, and three participants mentioned Minecraft as an example of the games they played. Group F reported to play Minecraft, RPGs such as Pokémon, and The Sims.

4.3.3. Attitudes toward learning through video games

Questions in this category were concerned with whether the students thought that they learned anything from playing video games, and whether they thought that video games could be used in the classroom. Group A felt that video games could be used in school, as they learned history from playing some games, as indicated in the quotation below:

> I have learned a lot from Assassin's Creed. It, like, says a lot about how things were before. Assassin's Creed Black Flag, for example, taught me about pirates. You can learn quite a lot from the franchise. […] You become so immersed in the game that it becomes easier to learn, it is so exciting that you are unable to put it away.

The ability to motivate and hold the player's attention is mentioned as the reason why the above participant thinks games are good for learning. Additionally, they thought that video games could eventually earn the same status that books have in school, as long as the games were made specifically to teach something.

> You need to make it exciting, but at the same time educational. You have to learn in order to progress in the game.

When asked about whether they thought they could learn anything from driving games, their responses also indicated a feeling that low-frequency vocabulary such as that related to cars could be acquired through video games.

> You can learn more than you think. I learned a lot about cars and about how they work, it was almost like a language… I have learned quite a lot from video games. I hate books (yeah)[12].

As seen in the quotation above, the participants in group A reported to dislike reading books. This showed a view in which there was a dichotomy between video games and books, in which the former is entertaining and the latter educational. To probe further, they were asked about similarities between books and games.

> They are quite different, I would say. Video games are more for entertainment right now […] while books are much more learning.

The other groups were more reluctant when asked about video games in the classroom. Group B thought that games could teach history if they were set in a specific time period, while group C thought that movies would gain more popularity in school before games. When asked whether games that were not made specifically for learning could be used in the classroom, a participant from group C gave the following response:

> Maybe if you add more mathematics and strategy. If they explain what we are supposed to learn so that we think about it later, and do not just play the game aimlessly.

As seen above, some of the participants had a very conscious approach to learning, and thought that they would learn more from video games if they were given instructions about what they were supposed to learn. Group D had a more reserved view when asked about this, and did not think that the games they played in their spare time had a place in school.

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[12] Parentheses in the quotations from the interviews are used to signal overlapping speech.

> I don't exactly think that FPS games can be used for that [learning]. […] well…there are many mathematics games. […] you can learn some words and expressions that you would not encounter in other places.

Once again, the participants mentioned the potential for learning low-frequency vocabulary from playing video games. The interviewees in group E did not have a lot to say on this issue, but when asked whether they thought video games could be assigned as a kind of reading homework, one participant responded that 'you can do that, it would probably be more fun'. However, they did not think that this would produce the same learning outcomes as books. Additionally, two participants in this group reported that one teacher had allowed them to play an algebra game on their iPads in order to learn mathematics.

In group F, the participants thought that video games could be used in school if they had the correct properties.

> Yes, maybe, it depends (yeah, it depends). Depends on what type of game it is. [What should they be like?][13] Have a story, maybe. (Yeah). […] There are also some mathematics games…

Their response is similar to that of groups C and D, who also felt that games should include mathematical tasks or exercises in order to be useful for learning. This seems to be a recurring view, and few groups thought that regular, commercial games would be suited for school-use. Only a few participants reported to read books, and the participants seemed to view books as educational and video games as entertaining.

The groups were then asked specifically about the language they learned from playing video games, and they were convinced that video games had a great influence on their English. One participant in group A reported learning language in order to be able to play video games.

> The first [English word] that I learned was 'play', [because] I had to know what to press. I learned English words as well, since I watched English movies, or children's cartoons, and I played a lot of video games. […] I speak English more often in games than in school.

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[13] Question by interviewer.

As seen above, this participant responded that he spoke more English while gaming than during English lessons in school, and the same might be expected for many other children who play online games that require oral communication in order to win. Additionally, they noted that they use English to convey information to the people they played with when playing online games: 'tell them that one [other player] is here and one is there, for example', so that the rest of their team will know where the enemy is located.

The participants in group B noted that 'there are often words that we don't have in Norwegian. It is easier to speak English when talking to people [in the game]'. They also noted that video games helped them with the pronunciation of words: 'you listen to others, and there are often people who are English, and then you hear how they pronounce words'.

Group C was divided, with half the participants learning mainly oral English through communicating through microphones in FPS-games, and the other half communicating mostly through text in MMORPGS. The participants who played World of Warcraft noted that they 'look for groups to do stuff with, write what you are going to do, write your role. Co-operate in order to win'.

In group D, the participants mostly communicated orally when playing Counter Strike, and felt that they learned from doing so sometimes, but not always. When asked whether they thought that communicating in English in the game helped them in school, they responded that 'it helps a bit that we speak [English] in our spare time'.

The participants in group E played single-player games almost exclusively, and reported to never communicate with other players in English. All the interviewees in this group did, however, agree that they learned English vocabulary from playing video games, saying that 'I guess it's mostly single words'.

Three interviewees in group F reported to learn English from video games, while one participant stated that she did not learn any language from games. Their learning outcomes consisted of vocabulary, pronunciation and spelling.

> […] new words. When there is sound, you also learn how to speak (and when there is text, you learn how the words are written).

Findings from this sub-section illustrate that most of the 22 participants of this study feel that they learn different aspects of English through playing video games. One tendency is that most groups report that video games help them learn new vocabulary, and that the spoken and

written language of games helps them acquire knowledge of both pronunciation and spelling. Additionally, those who play multiplayer games report video games to provide them with many opportunities to practice their oral skills.

4.3.4. Thoughts on Bastion

This category of questions did not target any specific research question, but was included in order to investigate whether Bastion was an appropriate game for this particular age group. As a result, the responses from this category were to provide additional grounds for discussing the results of the vocabulary test, and possibly to account for the drop-out rate. The two questions were concerned with whether the participants felt that Bastion was a good game for learning English, and whether they found the actual gameplay difficult.

Group A thought that the game was good for learning English, and reported to like the narrator in particular. 'He talked quite a lot and narrated quite a lot'. When asked about the narrator's non-standard accent, both participants agreed that 'it was quite good, I liked it, he commented so well'. One participant in group D also noted that 'the fact that the narrator spoke in addition to the text made it easier to get all the information'. Additionally, an interviewee in group F reported that the narrator was helpful in instances where the gameplay was difficult, which suggests a difficulty in focusing on written text during difficult gameplay sequences.

Although the groups agreed that the game was decent in terms of educational value, most groups also shared the opinion that the language in the game was a bit too simple for their level. Group B said that 'yes, well…if they, like, were smaller kids. I knew most of it from before. The language was quite simple [...] some objects had weird words'. While group A also felt that there were not any difficult words in the game, they mentioned that 'if there was one word that you did not understand, you still understand the context, so you might understand the meaning of the words after all'. In group F, the participants also thought that the language was easy to understand.

Group E presented some views on the game's language which conflicted with those of the other groups, and the group itself was also divided, with half the group viewing Bastion as good for learning and the other viewing it as bad.

[Was the game good for learning?] No (no) (it was OK), the text was a bit too fast, so it was difficult to learn anything, but you were able to read some of it… It was not very exciting (no) (I thought it was exciting).

About the difficulty of the actual gameplay, groups A, B, D, E and F thought that the game became more challenging as they got further into it, while Group C felt that 'everything was easy'. The groups did not think that it was difficult to focus on language due to the challenging gameplay, except one participant from group F, who also noted that the narrator helped in these cases. An interviewee in Group A gave the following response when queried about the game's difficulty, which the group's other participant agreed to.

It was fun and sometimes difficult, because some parts were difficult, like the end [of the game]. You need to think about how to get through it. For example, if there were many enemies, you had to decide which one to take out first.

As seen in the above quotation, more focus seems to be required when there are difficult combat sequences, which might cause less attention to be focused on the language. Overall, the groups did not have much to say about Bastion, which is likely due to only four participants having finished the game. However, the participants thought that the gameplay was of an appropriate difficulty, but that the language might have been a bit too simple for their proficiency level. As seen in the interview quotations, group B mentioned that some objects had weird words, and that these were difficult to understand. While most of the language was simple, which means that the participants were most likely able to understand the 98% of words that are required in order to guess new words from context (Nation 2005:590), the participants would not know the meaning of the actual words that were tested.

4.3.5. Learning strategies

The final category of interview questions aimed to examine which learning strategies the participants employ when playing video games. The questions asked the participants what they did when encountering new words in games, and whether they focused on written or oral language while playing.

All six groups said that they understood new words from the context in which they appeared when playing Bastion. One participant from group C responded: 'If you read the sentence or listen to what they say, you understand the relation between the word and the others', while an interviewee in group B stated that 'You simply learn in relation to the context'. The participants in group D noted that they 'see how [a word] is used in the sentence in order to understand it', and group A found that they 'understood the meaning eventually, when you know what [the fantasy word, item] does, and it kind of gets explained eventually'. Groups E and F reported not to have had difficulties understanding the words in the game, but also said that they tried to understand the words from their context in some cases.

The groups were also asked about whether they used dictionaries or similar tools in order to understand new words in other games that had more 'real-life' vocabulary than what could be found in Bastion's fantasy world. An interviewee in Group C gave a thorough explanation of their process.

> I mostly try to figure it out myself, read the sentence and such. In relation to what happens in the game. I look the word up if I am unable to understand it, because I often stop and am unable to do anything because I do not understand what I am supposed to do. That is when I look it up, because there are many words than you cannot understand. […] It is no fun if you do not understand the story, then you are unable to progress.

In group B, the participants mostly played online games, in which they interact with other players, and their process was a bit different than that in group C.

> There are often other people who tell you what [the words] mean. You usually play with others. But you learn from someone else. Sometimes dictionaries, well, not dictionaries, but google. Especially before, when you did not know English very well.

No groups reported to use actual dictionaries, but rather Google, in order to understand the meaning of new words. Group A responded that 'I have always played in English, [and] could just search for words that I did not know on Google. […] I just search for it, and I get a link to like urban dictionary or something'. The only group that did not seem concerned with understanding the meaning of new words was group D, which responded that 'I usually don't care. It depends on whether it is quite important to understand, and if it appears several times,

then you need to know it. But if it does not, we just don't care about it, you could say.' The participants in group E did not report to use any additional learning strategies, while group F reported that they try to figure out the words' meanings 'only if they are important in relation to the [game's] content'.

The final interview question was concerned with whether the participants focused more on the narrator or on the subtitles when playing Bastion. In group A, one participant reported to focus entirely on listening, while the other participant relied an equal amount on both modes.

Group B responded that 'You could hear what he said, so you did not have to read, because it was clear'. When asked whether a full focus on listening would have an impact on learning the spelling of new words, they responded that 'You might spell some words wrong. If you know English, then you will know how to write it, if you are good at it. But if not, you might not be able to'. This response suggested that this group thought that a certain level of English proficiency was required in order to use video games for learning, especially in terms of learning how to spell new words.

As for group C, they said that 'When there is text, I read the text. If I do not understand what I hear, I read'. Group D had a similar opinion, relying on 'Listening more than reading. You sometimes need to read, but it depends on which game you are playing. […] We look at the subtitles if we hear a word that we have not seen before'.

The participants in group E had conflicting opinions about this. Two participants preferred to read, one focused equally on both modes, and the last participant mostly listened to the narrator. As for group F, one participant preferred to listen, while the other three enjoyed relying on both modes.

4.4. Summary

The three research methods seem to have resulted in some general trends in the student responses that can be used to further discuss the research questions. In the case of the vocabulary test, the students scored 6.77 out of 13 points, and the questionnaire responses provided links to the test answers that can be analyzed in order to investigate whether there is a connection between video game proficiency and vocabulary acquisition. Finally, the interviews provided examples of the students' attitudes towards using video games, in

addition to the participants giving detailed explanations of the vocabulary learning strategies that they use when playing video games. The significance of the presented results will be analyzed further in the following discussion chapter.

5. Discussion

This chapter discusses the findings presented in the previous chapter, and is structured by research questions. Section 5.1 discusses whether the participants of the study were able to acquire English vocabulary through playing the video game Bastion out of school. The next section (5.2) discusses the link between perceived game difficulty and vocabulary acquisition in the participants. In section 5.3, the students' attitudes toward using video games for learning purposes are discussed, while section 5.4 examines the learning strategies that the students use while playing video games.

5.1. Vocabulary acquisition

This section aims to address whether the Norwegian 10th grade secondary school students in this thesis were able to learn English vocabulary from playing the video game Bastion at home. Previous research showed that video games could actually lead to vocabulary acquisition (Chen and Yang 2013; deHaan 2005a; Ranalli 2008; Theodorsen 2015; Vahdat and Behnahani 2013), although the amount of acquired language was limited (Chen and Yang 2013; Ranalli 2008). Only one study (Vahdat and Behnahani 2013) reported that playing video games was significantly superior to traditional classroom instruction. A small body of research has demonstrated a correlation between out-of-school gaming and English proficiency (Sundqvist and Wikström 2015; Sylvén and Sundqvist 2012). Additionally, a study by Rankin et al. (2006) found that the four participants were able to acquire L2 vocabulary through playing a massively multiplayer online role-playing game (MMORPG).

If we define video games as multimodal texts, the concepts of extensive reading might be applicable to playing video games. Studies on extensive reading have shown the method to be viable in terms of vocabulary acquisition, in some cases surpassing that of traditional classroom instruction such as vocabulary and grammar exercises and reading comprehension tasks (Mason and Krashen 1997; Pigada and Schmitt 2006). Enjoyment and motivation are mentioned as two important factors contributing to the success of extensive reading approaches (Krashen 1989; Mason and Krashen 1997). Today, video games are increasingly more popular in relation to books (Medietilsynet 2014), and these factors can thus be said to be even more present in video games (Duncan 2011; Ferguson and Cole 2012; Przybylski et

al. 2010). Research has shown that multimodal texts lead to improved acquisition over texts with fewer modes, such as captioned versus non-captioned TV (Neuman and Koskinen 1992; Perez et al. 2014), captioned TV compared to audio (Guichon and McLornan 2007), and video games in relation to text and hypertext (Ritterfeld et al. 2009).

The results from gaming in this study will be compared to both other studies that investigated video games, but also to studies where extensive reading or video was in focus. There are obvious dissimilarities between books and video games, some of which were examined in section 2.1. For one, video games contain significantly more modes than books, which allows for much less reliance on written text while gaming. As was seen in the quotations from the interviews, many participants said that they did not read the text at all while gaming. Another difference lies in the degree to which the content can be altered. Video games have a high degree of interactivity, and provide the players with the power to decide how they want to play the games. While this might be an advantage in terms of immersion and motivation, research on video games is still inconclusive as to whether the interactivity is an aid or hindrance in language acquisition (deHaan et al. 2010; Ritterfeld et al. 2009). Additionally, the interactivity of video games means that the story progression is not linear, as it is in books, which might result in unpredictable exposure to target words. Still, there are some similarities between the modes. Many video games contain rich textual exposure, which is especially true in the case of role-playing games such as Bastion. Additionally, both media are enjoyable, although video games can be argued as even more enjoyable than books for the majority of Norwegian children (Medietilsynet 2014). It is thus of interest to see how the results from the current study compare to those done on other media.

5.1.1. Full test scores

Based on the research reviewed above, it is reasonable to assume that it should be possible to acquire vocabulary through playing video games. In order to measure vocabulary gain, a vocabulary test was administered to the participants of the study, in which knowledge of 10 vocabulary items from the video game Bastion was tested. Five tasks were constructed to account for different types of knowledge: form and meaning (Nation 2005:584) and productive/receptive knowledge (Nation 2001:24).

Results from the vocabulary test revealed that the participants were able to score 6.77 points on average out of 13 (52.1%). No pre-test was administered, as the participants would be unfamiliar with the specific meanings of the words in relation to Bastion. Furthermore, a

pre-test would disable the possibility of investigating incidental acquisition, as the participants would be aware of which words were tested during their playing of the game. In comparison, the participants in Chen and Yang's (2013:134) study showed a gain of two vocabulary items (4.09 to 5.91) from the pre- to the post-test, while Ranalli's (2008:448) study of The Sims resulted in a gain of four words (14.22 to 18.44)

Although these two studies had similar aims as the current study, their procedures were different. A major difference in Chen and Yang's study is that the participants played the game for 1.5 hours in one sitting, instead of the four weeks provided for the current study. Following, the researchers note that not all participants might have encountered the target vocabulary items (Chen and Yang 2013:138), while the current study attempted to ensure that all participants would receive exposure to the target vocabulary items, by testing knowledge of those that appeared during the early levels of the game. Additionally, the vocabulary tests were dissimilar, as the participants in Chen and Yang's study were asked to translate 20 vocabulary items from English to Chinese. Incidental vocabulary acquisition through gaming or reading does not automatically provide knowledge of the words' translation to the learner's first language. Their participants might thus have understood the meaning of more than the two words that they were able to translate in the test, although they were unable to produce a translation.

In the case of Ranalli's (2008) study, the vocabulary test was similar to that of the current thesis, incorporating different types of tasks, such as matching, multiple choice and short answer tasks (Ranalli 2008:447). Beyond this, however, the two studies were largely dissimilar. First, the two games (The Sims and Bastion) used by the studies are different in several ways. Perhaps most importantly, the rigid structure of Bastion means that the participants were guaranteed to have encountered the target vocabulary items, while the high amount of freedom in The Sims caused the exposure to be unpredictable (Ranalli 2008:253). Additionally, Bastion provides rich exposure to both written and oral language, while The Sims consists exclusively of text (although the characters speak a made-up language called Simlish, but this might cause more harm than good in relation to language acquisition) (Ranalli 2008:452). A comparison of these two studies' results might thus indicate that both modes are important for language acquisition through gaming. The process of playing the game was also different between the two studies. Both between and during their playing of The Sims, the participants in Ranalli's study worked with several supplementary materials such as vocabulary lists and quizzes (Ranalli 2008:443), placing much less emphasis on the game than the current study, in which there were no supplementary materials. In the case of

Ranalli's study, the participants were exposed to the target vocabulary items several times through the supplementary materials (the same items that were on the tests were also tested in quizzes and appeared in the vocabulary lists), but this exposure was outside of the game.

As for the age and proficiency level of the two aforementioned studies' participants, they were college level (Chen and Yang 2013) and university (Ranalli 2008) students, while the current study's participants are 10th graders. The discrepancy in the findings among these three studies might suggest that language acquisition through video games is more suited for lower levels of English, thus hinting that more advanced vocabulary is harder to acquire through gaming than that elicited through the current study. Although Chen and Yang did not provide a list of their vocabulary, an examination of Ranalli's target vocabulary items (2008:455) reveals that many of the words used for his vocabulary test were rather advanced (fidelity, exquisite, durable), although many were at a basic level as well (flirt, career, tickle).

Furthermore, the ways in which the participants were exposed to these words are different from the current study. While the words 'flirt' and 'career' were likely to be learned by many of the participants, as these represent two goals in The Sims: forming relationships and advancing in the chosen career path, the meaning of 'exquisite' and 'fidelity' were unlikely to be of importance to the gameplay. Similarly, some words were more directly related to the gameplay in the current study, and words such as Core, which plays a major role for the gameplay of Bastion, have a high acquisition rate (59.1%). On the other hand, names of the enemies (Scumbag and Gasfella) resulted in low acquisition rates (21.2%)

Although the two studies (Chen and Yang 2013; Ranalli 2008) and the current study are difficult to compare due to the differences outlined above, the results present four implications related to vocabulary acquisition through gaming. First, games that have a linear story progression might be better for learning specific vocabulary than those containing a great deal of freedom. Secondly, exposure to spoken language as well as written might lead to more acquisition than just text. This notion was also seen in the current study's interviews, in which some participants said that the two modes made it easier to receive all the information. Thirdly, the low numbers for acquisition in Chen and Yang's study (2 words) suggests that incidental vocabulary acquisition through gaming might not result in translation knowledge. Finally, it might be difficult to acquire advanced or more abstract vocabulary through gaming, suggesting that games are more useful for learners of lower proficiencies.

As the participants of the current study played the video game out of school, with no instructions to focus on language while playing, the fact that the participants were able to acquire 52.1% of the words on average in the vocabulary test supports the notion that

incidental vocabulary acquisition is possible from playing video games. Thus, it provides a positive answer to the first research question of the study. While previous research has shown a link between out-of-school gaming and general vocabulary size (Sundqvist and Wikström 2015; Sylvén and Sundqvist 2012), research on acquisition of specific vocabulary items through of out-of-school gaming is scarce, and these results thus add to the limited research body examining learning outcomes from out-of-school gaming.

5.1.2. Types of knowledge

The test design allowed for the examination of which types of knowledge the participants were able to acquire through incidental vocabulary acquisition from playing video games. Two types of knowledge were tested: meaning and form. Additionally, productive knowledge was tested in four tasks, while one task measured the participants' receptive knowledge of four words. How these knowledge types were distributed in the test was shown in Table 7 (section 4.1.7), where the points scored for different task types were also presented.

Results from these tasks displayed that the participants were able to achieve similar scores on tasks eliciting meaning and form, with 74 points in total for meaning and 75 for form. In relation to the maximum score that could have been achieved across all participants, 67.3% was scored for meaning and 42.6% in tasks eliciting form. These findings thus suggest that it is easier to gain knowledge of meaning than form through incidental vocabulary acquisition when playing video games. This contrasts the statement by Lawson and Hogben (1996:130) about learning from context being an inefficient learning strategy in terms of acquiring knowledge of word meanings. However, Lawson and Hogben were discussing learning from context in terms of reading, which differs from the context of the current study. Similar findings were reported by Pigada and Schmitt (2006:13), who found that extensive reading produced more knowledge of form than meaning in their case study of a Greek learner of English. Books and video games are largely dissimilar, and this comparison implies that there is something different in the exposure to words when gaming than when reading, and that this difference might have an influence on the types of knowledge that are acquired.

In a study by Pellicer-Sánchez and Schmitt (2010:41), the participants were able to acquire significantly more receptive form (34%) than productive meaning (14%) through extensive reading of an authentic text. However, the highest scores were for receptive meaning (43%). While no receptive meaning was tested in the current study, the scores achieved for productive meaning (67.3%) and receptive form (68.2%) contrast those found by

Pellicer-Sánchez and Schmitt (2010). The researchers argue that it is difficult to acquire productive knowledge of form through incidental learning, but that sufficient exposure to the target word might result in this type of knowledge (Pellicer-Sánchez and Schmitt 2010:43), which might mean that the natural repetition of video games is conductive to acquiring this type of knowledge. Their argument is reflected in the results of their study, in which the words that occurred 1-8 times had an acquisition rate of 7% for productive meaning, while the participants scored 55% for words they had been exposed to more than 10 times. In the case of the current study, all four tasks that tested productive knowledge of meaning produced average scores above 50%, even for the vocabulary item that the participants were exposed to fewer than 10 times (the meaning of Scumbag).

A reason for this might be that interactive environments such as video games allow the players to experience the 'words'. For example, Task 1b elicited the form and meaning of the word Core, and while the name was mentioned several times throughout the game, the function (and thus meaning) of these Cores might be of greater importance to the player, as they represent one of the main goals of the game: rebuilding the Bastion. Every time the players collect a Core, they are allowed to build an additional building in the Bastion, which unlocks a new set of upgrades for their character. As character progression represents a major motivational aspect of RPGs, this meaning is more likely to be remembered by the players than the name of the Core.

Similarly, Task 2 asked the participants to describe their two favorite weapons from the game. Following the argument of experiencing the words from above, they would in this case have used the weapons extensively and thus received ample exposure to their meaning. For instance, when the players received their first ranged weapon (the Fang Repeater) in the game, they would see that they could use it to inflict damage to enemies that were inaccessible when using a melee weapon such as the Cael Hammer. This exposure thus provided them with grounds for comparing the two weapons, and an understanding of which situations they were most effective in.

Additionally, no productive knowledge of form was required, as the participants were provided with a list of the 11 weapons that appeared in the game. Some receptive knowledge was required, however, as they would need to be able to recognize the weapon they chose to describe. This was the only task in which the words' forms were not explicitly tested, which might be another reason for the high mean score achieved for this task (75%).

The largest contrast between points scored and maximum points available is found in Task 4, where participants were asked to name two types of monsters from the game (Gasfella

and Scumbag), and describe what would happen if they were to hit the Scumbag in the game (it shrinks). While one participant was able to name the Scumbag, resulting in a total of one point out of 44 for meaning (2.3%), 13 managed to answer what happens when you attack it (59.1%). The low scores for monster names were surprising, as the monsters' names are based on their in-game appearance: the Gasfella is a fella made out of gas, while the Scumbag is a large bag of scum. Thus, participants might have been expected to use their word parts in order to understand the meaning in this case, but as none said that they used this strategy, they might not have been familiar with this vocabulary learning strategy. Furthermore, the narrator talks a great deal about the different enemies:

> He heads for the biggest dump in town, Scumbag Alley. Some Scumbags still feeding of the city's trash. […] And there he is, the oldest Scumbag of them all. Gershel. (Bastion level 3: The Workmen Ward)

As seen in this example, the name of the Scumbag is mentioned several times in quick succession. During the first three levels of the game, the narrator uses the name six times, which should be sufficient input for acquiring the vocabulary item. One explanation in this case is that the participants might not have perceived 'Scumbag' as the name of the monster, but rather that it was a 'scumbag' (an unpleasant person). This explanation is reasonable, as many might have encountered this word before, and would thus not realize that it was the actual name of the monster, rather than a word used to describe it. More surprising is the fact that no participants were able to recall the name of the Gasfella. It is the first monster that the player encounters in the game, in which the narrator says 'That a survivor? No ma'am, it's a Gasfella, forced out from underground' (Bastion level 1: The Rippling Walls). Additionally, the narrator mentions the name five times during the first three levels of the game.

> Up north is where the Gasfella foreman used to live, tending to his flock. […] Know why Gasfellas all dress alike? Kid's wondering the same thing. (Bastion level 3: The Workmen Ward)

The participants were provided with ample exposure to the name of this type of monster, which was expected to have resulted in at least some acquisition. Word selection was based on their frequency during the first three levels, as many participants were expected not to finish the game, thus possibly eliminating a weakness of the study by Chen and Yang (2013),

in which not all participants encountered the target vocabulary items. However, the names of these two monster types are only encountered during the first half of the game. In the case of Gasfella, the players only encounter it during the first six levels of the game, and then again in level 13 (the game has 21 levels). Scumbags are encountered in two additional levels, but also no later than level 13, which means that there was a long period between the initial exposure to these words and the vocabulary test. Thus, there might have been an extended period in which the participants received no exposure to the words, especially for those who finished the game. In comparison, the participants were able to score 4 out of the 22 (18.2%) available points for form in Task 1a (Calamity), and 10 out of 22 (45.5%) in Task 1b (Core). Again examining the first three levels, we see that the narrator uses the word Calamity five times, and the word Core 10 times, and the scores for these two tasks reflect the increased exposure to Core in relation to Calamity. As Scumbag and Gasfella are mentioned six and five times during the first three levels, the acquisition rates for these were expected to be similar to that of Task 1a. However, the acquisition of meaning for these tasks (1a=54.5%; 1b=72.7%; 4=59.1%) reflects the amount of exposure to the three elicited vocabulary items, suggesting that acquisition of form requires more exposures than meaning in the case of video games. This contrasts the findings by Pellicer-Sánchez and Schmitt (2010) in relation to extensive reading, where less exposure was required to acquire knowledge of form than meaning.

Relating this finding to studies on captioned videos might provide an additional explanation for these results. As seen in the study by Perez et al. (2014:130), the study participants who watched the videos with subtitles scored significantly higher on form (7.13 for no captions vs 11.07 for full captions), while the scores for meaning recall were similar across the groups. Interview responses from the current study revealed that a great deal of the participants focused mostly on listening to the narrator, while many also said that they preferred to mix the modes. Additionally, some participants said that they stopped reading the text during challenging portions of the game. An examination of Task 4 in relation to Task 1b (Core) might provide some insight as to why the scores for Task 4 were so low. When the players are exposed to the names of the game's monsters, they usually have to fight them. In contrast, the first encounter with a Core is when the player has completed the first level and entered the Bastion. While monster names are presented in relation to challenging gameplay, or high-interactivity sequences, cores are often introduced in instances where the players are not in control of their character such as short cutscenes, in which the degree of interactivity is much lower (see Appendix 7 for images depicting the first encounters of Gasfellas, Scumbags and Cores).

Scores for Tasks 1a and 4 are thus consistent with what was found in the study by deHaan el a. (2010:82), where the watchers of a rap video game scored significantly higher than the players (23.27 vs. 7.42) on a vocabulary test. The researchers concluded that the interactivity in their video game was not conductive to learning, as it unnecessarily diverted the attention of the players away from the vocabulary (deHaan et al. 2010:84). This might be the case in Bastion as well, and the vocabulary items in Task 4 were those where the interactivity had been the least conductive to the language. For instance, when fighting the Gasfella, the player has to focus on when the monster raises his weapon, so that the player can raise their shield at the correct time (the timing is very precise), in order to block the attack. Failure to block the attack several times in succession might lead to the players having to start from the beginning of the current level, which means that the gameplay will be perceived as more important than the language. The second monster, the Scumbag, shrinks in size when attacked by the player, as well as ejecting blue slime that the player has to be careful not to step in. As 59.1% of the participants were able to describe what happened when they hit the Scumbag (while just one was able to produce its name), it is clear that their focus was diverted from the language and towards the gameplay, suggesting that stressful situations such as the combat in Bastion are not conductive to acquisition of form. However, the relatively high scores for meaning on Task 4 imply that knowledge of meaning might be acquired even through high-stress situations in video games.

In the case of the rap video game (deHaan et al. 2010), the players had to focus on a scrolling bar on the top of the screen that indicated which buttons on the controller to press, while the text was placed at the bottom of the screen. Focusing on both the gameplay and reading the text was thus nearly impossible, and although the participants did hear the words being spoken (rapped), research has shown that inclusion of both oral and written language produces the best learning outcomes (Guichon and McLornan 2007; Neuman and Koskinen 1992; Perez et al. 2014; Ritterfeld et al. 2009). A similar text placement is found in Bastion, where the text is also placed near the bottom, while the action takes place in the middle to top areas of the screen. As was the case for the players of the rap video game in the study by deHaan et al. (2010), this placement would most likely cause the players in the current study to have difficulties focusing on fighting the monsters and reading the text at the same time.

In contrast to Task 4, which had the lowest average scores, the participants scored scored 2.73 points on average in Task 3. This task asked the students to recognize four words from the game, and draw lines connecting them to their respective objects in a screenshot. The obvious explanation for the high scores in this instance is that this was the only receptive task,

and thus the most valid in terms of how the participants had been exposed to the words prior to the test (Brown and Abeywickrama 2010:42). Additionally, Nation (2005:585) notes that more learning is required for productive than receptive knowledge. As was the case for Task 2 (the weapons task), the participants had received significant exposure to the words in this task. The screenshot presented was of the game's home base, which the players returns to every time they complete a level. Two of the words were names of the buildings that the players used the most: the Forge and the Arsenal, which they needed in order to change weapons and abilities. Furthermore, the last two words consisted of the name of a monster, and the Monument, which they interacted with each time they had collected a Shard or a Core.

Another explanation for the lower scores on tasks eliciting form might be the fact that the participants played the game at different times over the 4-week period, and some might have stopped playing several weeks before the test was carried out. The meaning of fantasy words might thus have been easier to recall than their form, as the participants were unlikely to encounter the words in other settings after having finished playing the game, as one would do in the case of 'real' words. Results from Task 3, however, suggest that this only applies to production of the words and that receptive knowledge of these is acquired through playing video games, as 81.8% of the participants were able to recognize at least two of the words in the task. This tendency is also seen in the study by Vahdat and Behbahani (2013:66), where an experimental group, who played an adventure video game outperformed the control group, which received what the researchers called traditional vocabulary classes (Vahdat and Behbahani 2013:61). In their study, word knowledge was assessed through a multiple-choice test, thus testing their receptive knowledge of word meanings. Although the current study did not test receptive knowledge of meaning, a combination of the findings by Vehdat and Behbahani (2013) and the current thesis seems to suggest that receptive knowledge in general can be acquired through gaming. Some comparisons can be made regarding receptive and productive tasks, even though just one task measured the participants' receptive knowledge. Out of the 75 points that were awarded for form in the current study's vocabulary test, 60 belonged to the receptive task. A possible explanation to this is that the players are never required to produce the words while playing Bastion, and thus do not get to practice productive knowledge.

Although the findings presented in this section provide limited grounds for comparing productive/receptive knowledge, the three tasks that measure both form and meaning supply data supporting the claim that meaning is acquired more readily than form through gaming.

Results from these tasks, and especially Task 1a and 1b, which elicited the meaning and form of the same words, showed a clear tendency in which the participants were able to produce the meanings and still not recall the words' forms. Future research that focuses more specifically on this distinction by including more tasks of each type, as well as productive and receptive tasks for both, would be able to provide a clearer image of the types of vocabulary knowledge that are gained from playing video games.

5.2. Gaming proficiency and vocabulary acquisition

The research set out to examine whether there was a connection between the participants' test scores and their perceived difficulty of the game, based on an assumption that those who struggled with the gameplay would be able to acquire fewer vocabulary items than those who did not. This assumption was based on research done by deHaan (2005a, deHaan et al. 2010) and Chen and Yang (2013), who found that the interactivity of video games acted as a hindrance in the vocabulary acquisition process. The assumption of the current thesis was that the interactivity might not be the real hindrance, but rather the perceived difficulty level for individual gamers. However, the notion that interactivity was not a hindrance at all for vocabulary acquisition was disproved in the above section that discussed the results for Task 4. Similarly to the way experienced readers will have an advantage over less frequent readers in the sense that they are able to read faster and comprehend more of what they are reading, the gamers might learn skills through different video games. These skills range from technical skills including mastering the use of controllers such as a computer mouse and keyboard (in order to move the in-game-character the way they want) (Przybylski et al. 2010:156), strategy, and knowledge of the process of upgrading a character and items in role-playing games. If a gamer has already acquired these skills through playing a large quantity of video games, they will not have to re-learn them when they start playing a new game, and can focus more of their attention on understanding the plot of the game by listening to the dialogue and reading the text. A less experienced gamer, however, might need to split their focus between learning all these new skills in addition to understanding the plot, which in turn means less focus on reading and listening.

As was seen previously, there seems to be a connection between how difficult the game was perceived to be by the participants and the scores they were able to achieve on the vocabulary test. Those who thought the game was easy achieved a higher average test score

than those who perceived it to be a bit difficult. These results confirm the statements by several researchers who suggested that the difficulty level of video games needs to be matched to the gaming proficiency levels of the students (Chen and Yang 2013:38; deHaan 2005a:280; Gee 2005a:36). In addition, the participants' reasons for not finishing the game were compared with their test scores, which showed that the five participants who stopped playing due to the game being too difficult achieved the lowest average score (5.20) on the vocabulary test.

Additionally, a connection was found between test scores and shrine activation, where those who activated shrines scored significantly higher on the vocabulary test than those who did not. This connection was also found to exist within the different perceived difficulties. Within the category of those who thought the game was easy, the one participant who scored below seven points was also the one who did not activate any shrines. Additionally, among the participants who thought the game was a bit difficult, those who activated shrines achieved an average score of 7.0, while those did not scored 5.17 on average. These scores suggest that there might be an additional sub-division: those who thought the game was difficult by itself, and those who found it challenging because they had activated shrines, thus further increasing the difficulty. If this is the case, even more evidence supports the claim that the proficiency level and vocabulary acquisition are linked, but the limited number of participants within each category means that these are merely tentative conclusions.

Interestingly, even those who thought the game was easy, and achieved full scores for Tasks 1a, 1b, 2 and 3, were not able to provide the two monster names elicited in Task 4, and thus achieve the maximum score of 13 points. The possible reasons for this were discussed in section 5.1.2, and implied that the situations in which the players encountered these monsters had an interactivity that was not conductive to language learning (deHaan et al. 2010:84), as it diverted the attention of the players away from the language. Since the participants had to focus on how to defeat the monsters, and employ specific strategies for each monster (e.g. stay out of the blue slime that the Scumbag shoots out), their focus seemed to be diverted completely from the language, as evident in the 2.3% total score for the monster names.

The one participant who reported that the game was easy and scored just four points suggests that other factors might also influence the acquisition process, and this deviation demonstrates the difficulty of drawing conclusions from small samples.

5.3. Student attitudes

The third research question aimed to investigate the students' attitudes toward using video games for learning purposes. In the focus group interviews, this was addressed by three questions which queried the participants about whether they thought video games could be used in school, what they thought they learned from playing video games, and how video games could be used in school.

Although all six groups interviewed for this thesis believed that video games had potential for use in school, five of the groups thought that the video games would have to be made specifically to teach something. These attitudes are consistent with the general view of video games as detrimental to learning, as well as similar to those of the participants in the study by Squire (2005:2) when he introduced Civilization III as a learning tool. Additionally, the attitudes of the current study's participants align with the results presented in much of the research reviewed in this thesis, which showed that gaming might actually not be as effective as more traditional teaching methods (Chen and Yang 2013; deHaan 2005a; deHaan et al. 2010; Ranalli 2008). In contrast, research on serious games (educational games) put gaming ahead of learning through texts (Ritterfeld et al. 2009). Additionally, a commercially produced adventure game that the researchers had chosen based on its usefulness for learning language (Vehdat and Behbahani 2013:64) generated higher scores on a vocabulary test than the recipients of traditional vocabulary instruction.

Group A was the only group who believed that the video games they played for fun could be used in school. While they thought that video games that were made for learning would produce the best learning outcomes, they also mentioned that there was value in playing games such as Assassin's Creed and driving games in order to learn history and car-specific vocabulary.

Most of the participants said that they had improved their English from playing video games, major improvements being in relation to vocabulary and oral English. While all groups mentioned that they learned new words from video games, only those who played online games felt that their oral English improved through gaming, and some of the participants that played FPS games also mentioned that they speak more English at home than in school. Based on the numbers by the Norwegian Media Authority (2014:18), which show that Norwegian youth spend almost two hours a day playing video games, the notion that those who play online games get more practice communicating in English at home than in school does not seem to be far-fetched at all. Assuming that those who play online games

spend at least one hour talking with others in English, and that some students might speak very little or no English at all during school, the advantage that gamers can gain over non-gamers is potentially huge in relation to oral skills. Multiplayer games present rich oral contexts, and while the students' interview responses revealed that not all those who play online games actually speak English while playing, teachers could exploit these contexts, for instance by assigning speaking English while gaming for at least 20 minutes every week as homework.

In FPS games, a popular genre among this study's participants, players often have a set of terms for different parts of the map (such as 'pillars', 'patio' and 'courtyard'), which they have to learn consciously in order to communicate efficiently. Using these, they convey information such as where the enemy is, how many they are, and where they are headed. This use of English to convey information means that they receive authentic English practice while playing these video games, as the language has a specific function. In the interviews, some participants mentioned that games should require the player to learn in order to progress, and in the case of these games, one definitely needs to learn these words in order to be able to communicate, which is a prerequisite for acquiring the highest proficiency levels.

Another interesting finding in relation to this research question is that although all the groups mentioned several ways in which out-of-school gaming had improved their English, they did not believe that the same kinds of non-educational games that they play at home could be used in school. This might be a result of the students' attitudes toward incidental language acquisition, and although their opinions on this matter were not explicitly elicited through the interviews, some participant responses suggested that they were not accustomed to thinking about this as learning. Group E reported to never read novels in or out of school as part of their English classes. Responses from interviewees within all six groups indicated a view of video games and books as dichotomous, with games being entertaining and books educational. If students in general were to be made aware of educational gains through approaches similar to extensive reading, and thus experience improved language through incidental acquisition, they might as a result think differently about using 'fun' video games in education.

5.4. Learning strategies

The final research question that will be discussed is that concerned with the students'
vocabulary learning strategies used while playing video games. Language learning strategies
are roughly defined as steps or behaviors used to improve proficiency of a language (Oxford
1994:1). Derived from the four major vocabulary learning strategies as presented by Nation
(2005), guessing from context and using dictionaries have been identified by previous
research to be the most commonly used strategies when playing video games (deHaan 2005a;
Ranalli 2008). Bytheway (2011) extended the list by including 15 learning strategies in her
study, of which three additional strategies are of interest in relation to the current study:
information/pop-ups, requesting/giving information, and equating image/actions to words. It
is important to note that different games will enable separate sets of learning strategies. In an
online game, for instance, players can ask each other for definitions. On the other hand, this
would not be possible in a single-player game such as Bastion.

During the focus group interviews, all groups said that they understood words from the
context in which they appeared when playing Bastion. This finding was not surprising, as
Bastion is an RPG and consists of primarily fantasy words, thus reducing the value of
dictionary use. However, if the participants were unsure what a word meant, they could have
opted to google the words, which is a strategy they mentioned using for other games.
Learning words from context is consistent with the findings from the similar studies reviewed
above (deHaan 2005a; Ranalli 2008), and was most likely the only learning strategy adopted
in this case due to its non-intrusive nature, which is also why the strategy is preferred during
extensive reading (Day and Bamford 2002). Additionally, knowledge of the words was not
required to progress the story, which in turn might have caused the participants not to value
understanding all the words.

Participants reported in the interview that all the words were easy to understand, which
suggests that the overall language level of the game was appropriate for this particular group,
and well within the required 98% of words that the reader needs to understand in order to be
able to guess words from context (Nation 2005:590). However, test scores showed that just
63.6% of the participants were able to score above 50% of the maximum points. This can be
understood based on Lawson and Hogben (1996:130), who distinguish between understanding
a word in its context and acquiring meaning from context. For the receptive task, however,
81.8% of the participants scored more than 50% of the available points, which suggests that

they were in fact able to understand the words receptively, while they were not always able to produce the words' definitions or spellings.

While all six groups agreed that learning from context was the preferred strategy when faced with the fantasy words in Bastion, a participant in group A gave a slightly more thorough explanation of his process.

> [I] understood the meaning eventually, when you know what it [the fantasy word, item] does, and is kind of explained eventually.

As suggested by this quotation, the fact that 'you know what it does' provides an additional learning strategy that can be employed while playing video games, and is similar to the strategy 'equating images/actions to words' as presented by Bytheway (2011). When playing video games, experiences of how weapons and abilities work, and what enemies do, might lead to an understanding of their meaning. This strategy is similar to learning from context, which implies observing a word and understanding its meaning based on the context in which it appears. In the vocabulary test, two tasks rewarded use of this learning strategy: Task 2, which asked the participants to describe two weapons from the game, and Task 4, which asked about a property of one monster encountered in the early stages of the game. 81.8% of the participants were able to score at least 50% of the available points or higher in Task 2, which suggests that this is a highly effective learning strategy. Additionally, 12 participants (over 50%) were able to produce the meaning elicited by Task 4. As seen in the results for Task 4, just one of the participants was able to remember the names of one monster, which suggests that this strategy is more effective when the players use an item than when they simply observe an object or monster in the game.

The participants' responses were more diverse when asked about whether they used dictionaries or similar strategies when playing games other than Bastion. The inclusion of this question was based on the idea that different games would enable their own sets of learning strategies, as those used while playing an online game, for instance, would not be applicable to a single player game. Additionally, it was of interest to see whether games that have more real-world vocabulary would cause the participants to use other learning strategies than games with fantasy words such as Bastion. One interesting finding from this category is that no groups reported to use dictionaries, but rather look up words in Google. This is consistent with the findings in Bytheway's (2011:41) study, and was expected, as searching for a word on the internet can be argued to be considerably easier than browsing through a dictionary.

However, one issue with this strategy is that the definitions found on websites such as Urban Dictionary, which some participants said that they used for definitions, are not as reliable as those found in published dictionaries.

Another aspect to note about their use of Google is that it often seemed to be a kind of last-resort effort if the other learning strategies did not result in an understanding of the word. The vocabulary learning process of one participant in group C was described as follows.

I mostly try to figure it out myself, read the sentence and such. In relation to what happens in the game. I look the word up if I am unable to understand it, because I often stop and am unable to do anything because I do not understand what I am supposed to do. That is when I look it up, because there are many words than you cannot understand. […] It is no fun if you do not understand the story, then you are unable to progress.

This example demonstrates an awareness of learning strategies, and suggests the act of looking up a word as a last resort when the player is unable to progress the game due to not understanding the language. Similarly to books, and perhaps often to a larger extent, video games are immersive environments that the players are drawn into, and the act of looking up words in dictionaries or on the internet would disrupt the immersion, as they would have to stop their gaming in order to look up the words. This is consistent with one of the principles of the extensive reading approach as outlined in chapter 2, which encourages fluent reading without the use of dictionaries (Day and Bamford 2002:138). Additionally, gaming is often fast-paced. In action games such as first person shooters (FPS), the players are not able to pause the game until a match has ended, and by then, they might have forgotten which word they wanted to look up.

Another example from the interviews demonstrated the use of multiplayer-specific strategies by a participant in group B.

There are often other people who tell you what they [the words] mean. You usually play with others. But you learn from someone else. Sometimes dictionaries, well, not dictionaries, but google. Especially before, when you did not know English very well.

This learning strategy is made possible due to there being other players in the multiplayer environments, and is similar to looking words up on the internet, but less disruptive in nature. As was found in the study by Bytheway (2011), requesting/giving info was an oft-used learning strategy for her participants. In the current study, group B said that they played survival games such as DayZ, and in these games, players can often communicate with others, both friends and unknowns, by either typing or the use of microphones. MMORPGs such as World of Warcraft also have chat channels in which there are several hundred people at all times, which causes this to be quite an efficient method, as a player can simply ask about the word in question in the chat, and then resume their playing while waiting for a response.

Interview responses showed that guessing from context was a major vocabulary learning strategy employed by the learners when playing video games. In the case of Bastion, the participants used this strategy exclusively. These findings are consistent with one of the principles of the extensive reading approach, which encourages fast, fluent reading. Although some other strategies were reported to be used in other games, such as use of Google and asking for explanations from other players, guessing from context was by far the most common strategy among the current study's participants. This is likely due to two reasons. First, other learning strategies would disrupt the gameplay, and since the story is often perceived as less important than the actual gameplay, understanding the words is not always necessary. Additionally, the language in video games is often simple, which means that Norwegian youth, who have had English education in school since the first grade of primary school, might be able to understand most of the contexts in these games.

5.5. Limitations

Still, there are a number of limitations to this study. First, the number of participants is relatively low (22), which means that all the comparisons that have been made between groups, such as those regarding difficulty level, were conducted with between 5 and 10 participants within each group, some groups containing even fewer participants. Thus, the conclusions that have been drawn from these comparisons require further research in order to make any definite conclusions. Secondly, the participants' grades were not collected, which would have allowed for another dimension of comparison, by providing insight into which kinds of learners profit the most from gaming. However, the wide variation in test scores, in

addition to the random nature of the participant selection, at least suggests that the participants had varying degrees of English proficiency. Additionally, no steps were taken to ensure that the participants spent an equal amount playing the game, which resulted in some only playing for a couple of hours, while others completed the game in its entirety. As a result, the vocabulary test showed a great variation in scores. A fourth limitation is that there was an imbalance between productive and receptive test items, resulting in a shallow comparison of the two types of knowledge.

The study had two additional limitations in regards to its execution. First, the busy schedules of the two initial classes resulted in the necessity of a re-scheduling, which resulted in 14 participants taking the test 6 weeks after the game was distributed, while the remaining 8 completed the test 4 weeks after having received the game. Finally, the study was not piloted, as a result of the low number of available participants. As was mentioned previously, however, the two participants in interview group A were originally intended to be used as a pilot, had their results shown that there were flaws in the research design. These two ended up being included in the final sample, as their responses showed that this was not the case. Despite these limitations, the thesis made contributions to a relatively new research area, although further research is required in order to build on these implications.

6. Conclusion

The current thesis aimed to answer four research questions related to vocabulary acquisition through gaming. A four-week study of 22 Norwegian 10th graders was conducted, where the participants played Bastion at home, without any instructions to focus on language. Three data collection tools were used to address the research questions: a vocabulary test, a questionnaire, and six focus group interviews.

6.1. Major findings

First, the thesis investigated whether the 22 Norwegian 10th graders were able to acquire English vocabulary through playing video games in a non-educational setting. Results from the vocabulary test showed that the participants scored 6.77 out of 13 points on average (52.1%), which implied that a substantial amount of vocabulary was indeed acquired through playing the game Bastion over a four-week period. While an acquisition rate of six and a half vocabulary items over a period of four weeks might not seem that impressive, it needs to be stressed that the aim was not to evaluate the efficiency of video games as language acquisition vehicles. Rather, the thesis aimed to investigate whether out-of-school gaming with no learning prompts could result in vocabulary acquisition at all, since research on this particular area is scarce. As the tasks tested different kinds of knowledge, an examination of which knowledge types the participants were most likely to acquire was also conducted. Although the number of tasks eliciting the different types was limited, two implications were drawn from the data: 1) more meaning than form was acquired in the case of these particular participants, and 2) the participants acquired significantly more knowledge of receptive than productive form. Thus, video games, or at least the kind used for the current study (RPG) might not be suited for acquiring productive knowledge of word form, although this might not extend to games where production of words is required. However, the fact that tasks eliciting the different kinds of knowledge were not uniform in task type, as well as the difference in how the players were exposed to the words in the game, make it difficult to come with strong claims regarding this. In addition, the study confirmed the notion by deHaan et al. (2010) that high degrees of interactivity that diverted the players' attention away from the language would lead to less vocabulary acquisition.

Furthermore, the thesis examined whether there was a connection between how well the participants performed in the game and the vocabulary they were able to acquire. This was done through a combination of the vocabulary test scores and two questionnaire items, which asked the participants about their perceived game difficulty, and whether they had activated a feature called shrines in the game. In the results, a connection was found between perceived game difficulty and vocabulary test scores, where the participants who thought that the game was easy scored higher than those who perceived it as being difficult. Additionally, it was believed that those who opted to further increase the difficulty by activating shrines would be more experienced with video games, and following the assumption that higher gaming proficiency would lead to more vocabulary acquisition, these were expected to score higher on the vocabulary test than those who did not activate any shrines. This was confirmed by the test results, which found that among the participants who thought the game was a bit difficult, those who activated shrines achieved a higher average score than those who did not.

As for the students' attitudes toward use of video games for learning purposes, two attitudes were common across all groups: 1) most participants reported to improve their English in terms of vocabulary and/or oral English through playing video games and 2) video games would have to be made for learning in order to be used in school. It was not surprising that a majority of the participants thought that video games had improved their English, as the notion that gaming leads to language acquisition is the foundation of this thesis. More surprising was the fact that the participants did not think that the video games they play for fun could be used in school, especially considering the various ways in which they reported video games to have improved their English. Some reasons for this were that the participants felt that video games would need to communicate clearly what they were expected to learn, as well as require learning in order to further the plot.

Finally, the thesis investigated the learning strategies that the participants used when encountering new words while playing video games. As was expected, most participants said that they usually understood new words based on the context they appeared in, using tools such as Google if guessing from context did not result in an understanding of the word. Additionally, a third learning strategy was used by the participants who played online games: asking others for explanations. In terms of the research questions, the participants did indeed use learning strategies when faced with new words while gaming, and some had more conscious approaches to strategies than others.

6.2. Suggestions for further research

The current study drew four tentative conclusions that need to be built upon by further research. First, the participants of the current study were able to acquire more knowledge of the target words' meaning than of their form. Furthermore, significantly more receptive than productive knowledge of form was acquired by the participants. As a low number of tasks elicited each knowledge type, in addition to the lack of receptive tasks that measured definition knowledge, more research is required before any conclusions can be drawn on which type of knowledge is more likely to be acquired through gaming. Further research that focuses on this distinction by including more tasks measuring each type of knowledge, as well as making sure that the amount and type of exposure is similar for the different knowledge types, would be able to build on the implications from the current thesis. Additionally, the difference in knowledge acquisition between extensive reading and video games might be researched further by studies that compare the two.

Another observed pattern was that the perceived difficulty level was connected to acquired vocabulary, where those who thought the game was easy achieved higher scores than those who did not. As the current study relied on the participants' self-reports concerning game difficulty, it is impossible to claim that their reports were truthful. Further research might be able to provide more definite conclusions on this, by placing a more specialized focus on the participants' previous gaming experience, perceived difficulty of the current game, and by monitoring their gaming and thus achieving a more objective view of their proficiency. In doing so, a clearer image of the link between proficiency level and vocabulary acquisition might be achieved.

Additionally, as was seen in the discussion of Scumbag and Gasfella (section 5.1.2), the situations in which the players are exposed to words might influence their acquisition. Only one participant was able produce the name of one of these monsters, and even those who thought the game was easy did not acquire these vocabulary items. Thus, difficulty might not be the only issue in vocabulary acquisition, and further research might investigate this relationship by comparing the outcomes of different types of exposure within video games. For instance, words exposed during puzzle segments might be compared to those the participants are exposed to in combat-heavy instances.

Finally, the vocabulary items that were tested in the current study were quite simple, and a comparison with previous research revealed that video games might not be as effective when learning advanced vocabulary (Ranalli 2008). Further research might thus investigate

the acquisition of more advanced vocabulary items, as it is important to see whether video games can provide sufficient language input for acquiring these incidentally.

6.3. Implications for teaching

Some implications as to how video games can be used in school can be drawn from the findings of the current thesis, although its main aim was to investigate the language outcomes of out-of-school gaming. Previously, research has shown that the amount of reading that students did often correlated with their scores on vocabulary tests (Krashen 1989:441). Similarly, more recent research has illustrated that there might be a correlation between time spent playing video games and vocabulary test scores (Sundqvist 2015:71), where more frequent gamers achieved the highest scores in both the productive and receptive tests. While the extensive reading approach attempts to get students interested in reading, just 6% of Norwegian children aged 9-16 said that they never play video games in the survey by the Norwegian Media Authority (Medietilsynet 2014:37). In other words, video games are already being played by Norwegian students, they just need to be taught what they can learn from the games they play.

While research has shown that video games can be used as part of a lesson (Ranalli 2008; Vahdat and Behbahani 2013), another way to implement games in school might be to teach the students what can be learned from the games they already play, and show them appropriate learning strategies for use while gaming. Learner autonomy is an important part of the English subject curriculum in Norway (Utdanningsdirektoratet 2006), in which the competence aims after year 10 include 'select different digital resources and other aids and use them in an independent manner in own language learning'. Learning strategy teaching is concerned with educating self-directed learners (Oxford 1990:8), and providing learners with appropriate strategies for use when gaming could facilitate learner autonomy during a major spare-time activity.

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Appendix 1. E-mail sent to teachers

Hello. My name is Fredrik Løkke, and I am a lector student currently writing my MA thesis at UiS. Ion Drew at the university referred me to you.

My thesis is about video games and their role in vocabulary acquisition. Video games enjoy a steady increase in popularity among Norwegian children, and Medietilsynet's survey from 2015, 'Barn og Medier', shows that as many as 94% of Norwegian children play video games, with over half of these doing so daily. The same survey shows that these children spend more than twice the amount of time playing video games as reading books, and it therefore seems relevant to find out whether video games can have the positive effects on children's language development that books have.

In order to conduct my study, I need teachers that are willing to cooperate by letting me use their classes for the research. I will need two whole class periods of 45 minutes each, plus one or two half an hour-classes for assessment. One class will be spending two periods playing a video game, while the other class will spend the two periods learning vocabulary from the game by use of 'traditional' vocabulary lessons. In addition to these two periods, I also need one for the vocabulary test, which will assess the learning of the two different groups. If possible, I would also like to conduct the test on the classes again a month later, to see if there is any difference in knowledge retention between the two groups (this is however not that important, and can be omitted if you do not have that much time to spare)

During this period, I also want to conduct a short group interview with some students. Here, I will ask them about their relationship to video games, attitudes towards them (and learning through them), how much they play games, if they have any strategies for learning new words that they encounter in the games, and possibly some other questions related to the study.

I was hoping that this is something that you could help me out with, or maybe refer me to someone that might be interested. Please email me any questions or concerns you might have about the study.

Thank you for your time, I hope to hear back from you soon.

Best,
Fredrik Løkke

Appendix 2. E-mail sent to parents

Hei. Mitt navn er Fredrik Løkke, og jeg holder på å skrive masteroppgave i engelsk ved Universitetet i Stavanger, og barnet ditt har meldt seg som deltaker i studien. Oppgaven handler om hvorvidt det å spille dataspill på fritiden kan føre til forbedret engelsk.

For å finne ut av det vil deltakerne spille et spill kalt 'Bastion' over 4 uker, for så å ta en 20 minutters prøve og fylle ut et kort spørreskjema. Gi beskjed om dere ønsker å se prøven eller spørreskjemaet på forhånd.

Spillet er et rollespill, og går ut på å kjempe seg gjennom forskjellige verdener, utvikle karakteren sin, og forhåpentligvis redde spillets verden fra ødeleggelse. Om du ønsker å lese mer om spillet kan en anmeldelse finnes her http://www.gamer.no/artikler/anmeldelse-anmeldelse-bastion/100433. Det vil ta ca. 7-8 timer å fullføre spillet.

Jeg legger ved samtykkeskjemaet som deltakerne må signere på, slik at du kan se nøyaktig hva barnet ditt samtykker til å delta i. Send gjerne mail om du har noen spørsmål angående studien.

Mvh.
Fredrik Løkke

Appendix 3. Consent form

Forespørsel om deltakelse i forskningsprosjekt

Fredrik Løkke   E-mail:

Mitt navn er Fredrik Løkke, og jeg er en masterstudent ved Universitetet i Stavanger. Masteroppgaven min handler i grove trekk om å lære språk av å spille dataspill. Formålet med dette arket er å informere om studien, og å be om deltakernes samtykke.

Hva innebærer deltakelse i studien?

Deltakerne i studien vil spille et dataspill kalt 'Bastion' over fire uker. Spillet er et action-rollespill med stort fokus på spillets historie. Aldersgrense er 12 år. En anmeldelse av spillet kan leses på http://www.vg.no/rampelys/spill/spillanmeldelser/spillanmeldelse-bastion/a/10089033/ om mer informasjon er ønskelig. Spillet vil ta omtrent 7-8 timer å fullføre, så to timer hver uke må settes av til spilling. Etter fire uker vil deltakerne møtes for å ta en test som vil ta 20-25 minutter, samt svare på et kort spørreskjema.

Hva skjer med informasjonen om deg?

Ingen personopplysninger vil bli samlet inn til studien, bortsett fra en liste over navn på deltakere og deres e-mail adresser. Navnelisten vil holdes adskilt fra datamaterialet, og det vil ikke være mulig å kjenne igjen enkeltpersoner i oppgaven. Navn og kontaktopplysninger vil bli slettet ved prosjektets slutt den 15.05.2016

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet. Hvis du har spørsmål om studien må du gjerne kontakte meg på [e-mail]

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Samtykke til deltakelse i studien

Jeg har mottatt informasjon om studien, og er villig til å delta

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(Signert av prosjektdeltaker, dato)

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Appendix 4. Vocabulary test and questionnaire

Svar på alle oppgavene og spørreskjemaet på slutten. **Besvarelsen skal være på engelsk**. Lykke til!

[Answer all the tasks, as well as the questionnaire at the end. **Use English for your responses.** Good luck!]

Oppgave 1: består av to spørsmål, besvar både a og b.

[Task 1: consists of two questions. Complete both a and b.]

In this image, we see the Kid standing next to a circle of people who appear to have turned to ash, with a shining blue object in the middle.

a) What caused the people in the image to turn to ash? Give a short explanation of the event.

   (Svaret bør: 1) gi navnet på hendelsen, 2) forklare hva hendelsen gjorde med spillets verden, <u>i tillegg til å gjøre menneskene til aske</u>)

   [The answer should: 1) provide the name of the event, 2) explain what the event did to the game's world, <u>in addition to turn the people to ash.</u>]

b) What is the shining blue object in the middle? Why do you need to collect them in the game?

(Svaret bør: 1) gi navnet på objektet, 2) forklare hva objektet brukes til i spillet)

[The answer should: 1) provide the name of the object, 2) explain the object's use in the game]

2) In Bastion, the player can choose between many different weapons. Give a short description of the **2** weapons you used the most. Why did you prefer those two? How do they work? In what situations are these the best weapons to use?

(Svaret bør: 1) forklare hva du liker med våpnene, 2) beskrive kort hvordan de fungerer, 3) gi eksempler på situasjoner der det er best å bruke de to ulike våpnene)

[The answer should: 1) explain why you like the weapons, 2) give a short description of how they work, 3) provide examples of situations where these two weapons are preferred]

Below is a list of all the weapons in the game. **Write about 2 of these.**

- Cael Hammer   - Fang Repeater   - Breaker's Bow   - War Machete

- Scrap Musket   - Dueling Pistols   - Brusher's Pike   - Army Carbine

- Fire Bellows   - Galleon Mortar   - Calamity Cannon

3) In this image, we see some of the objects that the player encounters in the 'Bastion'. Draw lines to connect **four of the words below to their correct object in the image.**

(Objektene er markert med røde sirkler)

[The objects are marked by red circles]

- Arsenal   - Distillery   - Shard   - Pecker   - Forge

   - Squirt   - Shrine   - Skyway   - Monument

4) The next image shows The Kid fighting two of the most common enemies during the first levels of the game. What are they called? What happens when you hit the big one on the right side of the image?

Questionnaire (mark your answers with X)

- Which difficulty did you choose for the game?

  Non-sweat mode ( )   Normal mode ( )

- Did you activate any shrines?

  Yes ( )   No ( )

- How difficult did you think the game was?

  Very easy ( )   Easy ( )   A bit difficult ( )   Very difficult ( )

- Did you finish the game?

  Yes ( )   No ( )

- If no, why not?

Appendix 5. Interview guide (in Norwegian)

Generelt: erfaring med dataspill

1. Spiller dere spill?
2. Spiller dere mye?
3. Hvilke sjangre spiller dere vanligvis?
    a. Rollespill, actionspill, skytespill, simulasjonsspill (sims, etc), mmorpgs (WoW), mobilspill… **MERK** spill til læringsstrategier.

Generelle tanker om å lære gjennom dataspill

4. Mener dere at dataspill kan bli brukt for læring i skolen?
    a. Hvorfor/hvorfor ikke?
5. Tror dere at dere lærer språk fra spillene dere spiller i fritiden hjemme?
    a. Hvis ja, hva mener dere at dere lærer fra å spille dataspill? Engelske ord, grammatikk, bedre muntlig engelsk?
6. Tror dere at dataspill etter hvert kan få den samme statusen som bøker når det kommer til å lære språk?
    a. Synes dere det er likhetstrekk mellom dataspill og bøker?
        i. Hva er likt/ulikt?
    b. Hva ville dere helst ha hatt i hjemmelekse? Les en valgfri bok 1 time hver uke, eller spill et dataspill i 2 timer hver uke?
        i. Hvorfor?

Tanker om Bastion

7. Synes dere at Bastion funket bra for å lære språk?
    a. Var språket i spillet greit å forstå? Noen vanskelige ord? Vanskelig uttale hos forteller?
8. Synes dere at spillet var for vanskelig?
    a. Gjorde vanskelighetsgraden at det ble vanskeligere å fokusere på språket i spillet?

Læringsstrategier

9. Hva gjorde dere i møte med nye ord i spillet? Forsøkte dere å finne ut hva de betydde?

    a. Hvordan? Gjettet ut fra konteksten? Brukte ordbok?

    b. Klarte dere å finne ut hva ordene betydde på den måten?

10. Bastion har mange 'fantasiord' som det ikke finnes noen ordbokdefinisjon på. Bruker dere andre hjelpemidler når dere spiller spill som har mer vanlige ord?

    a. Ordbøker? Google?

    b. Kom med eventuelle eksempler fra spill som de aktuelle deltakerne spiller..

        i. Multiplayer spill?

11. Baserte dere dere mest på å høre eller på å lese teksten? Skrudde dere på undertekster?

    a. Hvorfor/hvorfor ikke?

Appendix 6: Interview guide (translated to English)

Experience with video games

1. Do you play video games?
2. If so, how often?
3. Which genres do you play?

Thoughts on learning through video games

4. Do you think that video games can be used in school?
    a. Why/why not?
5. Do you think that you learn language through the video games you play at home?
    a. If yes, what do you learn from video games?
6. Do you think that video games might eventually earn the same status as books in relation to language learning?
    a. Are there similarities between books and video games?
        i. What is similar/different?
    b. Which of the following homework assignments would you prefer: reading a book of your choice for one hour each week, or playing a video games for two hours each week?
        i. Why?

Tanker on Bastion

7. Did you think that Bastion was a good game for learning language?
    a. Was the language of the game understandable? Any difficult words/pronunciation?
8. Was the game too difficult?
    a. Did the difficulty level cause it to be harder to focus on the language of the game?

Læringsstrategier

9. What did you do when encountering new words in the game? Did you attempt to figure out what they meant?
    a. How?

       b.   Were you able to figure out the meaning through that strategy?

10. Do you use other aids when playing games that have more 'real-life applicable' words?

       a.   Dictionaries/Google?

           i.   Present examples from the games played by the participants

11. Did you place more focus on reading or listening to the text?

       a.   Why?

Appendix 7. Images used for discussion

Image 1. First encounter with Scumbags
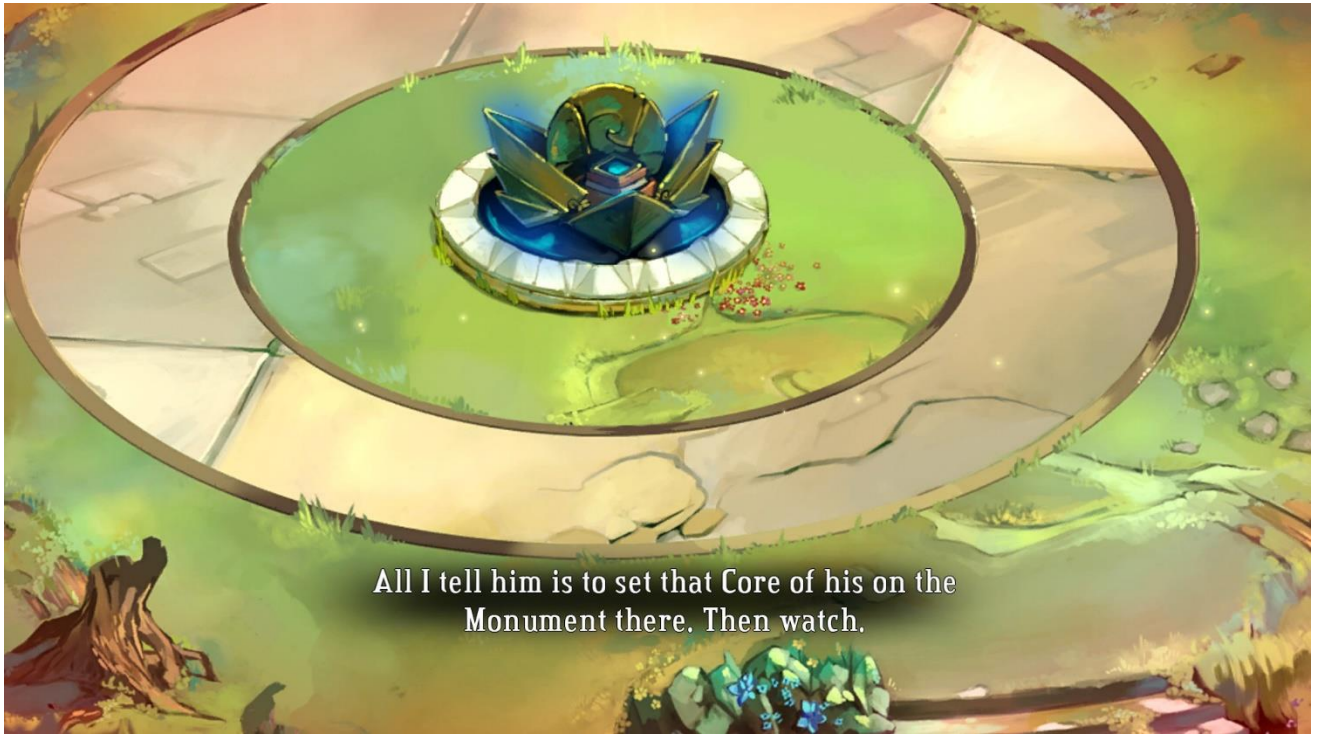

Image 2. First encounter with a Gasfella

Image 3. What is a Core?