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Learning by Gaming

Investigating the Influence of Playing Video Games on Vocabulary Level among Swedish ESL Learners

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Abstract

The video game industry is one of the fastest growing markets in the world today. The fact that playing video games has become such a popular recreational activity among youths and adolescents has created a need for research investigating the effects of video game playing. Because of the role of the English language as a global lingua franca, most video games are released in English. Since most video games are released in English, many believe that the utilization of video games can help learners of English to improve their knowledge of how to utilize the English language. The aim of this study is to investigate whether video game playing does positively influence the English receptive vocabulary level of ESL learners. In addition, the present study also investigated the influence of other factors, such as the utilization of online communication tools, the average time spent playing video games, and the type of video games played, on English receptive vocabulary level. The study was conducted using quantitative research methods. Since the aim of the study was to investigate the relation between two separate aspects, the study had to utilize two separate elicitation methods for the data collection: one questionnaire (that was supposed to determine each informant's video game habits) and one vocabulary test (that was supposed to get an approximation of each informant's receptive vocabulary level). When the data had been collected, the tests were corrected, and the participants were categorized according to the previously mentioned variables. The mean scores of the categories were later examined and compared to each other. Differences between groups that were of high importance were further examined, with a t-test, to determine whether the difference was statistically significant or not. The results of the study show that the vocabulary level difference between ESL learners that do play video games and ESL learner that do not play video game is insignificant. The results further show that the utilization of online communication tools while playing video games positively influences vocabulary level, as the mean score difference on the vocabulary test between OCT users and OCT non-users was revealed to be significant by the t-test. The analysed data thus show that the influence of the utilization of online communication tools on English receptive vocabulary level are more significant that the influence of playing video games.

Keywords

Video games, Online Communication Tools, ESL, Receptive, Vocabulary Level, Influence.

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1 Introduction

The digital revolution has, in many ways, changed our society. Many professions and lines of work have been influenced by the digitalization of society, as many professions of today require an extensive amount of digital knowledge. Digitalization has also contributed to a globalization of cultures, which in turn has resulted in, what Modiano (2009: 73) describes as an "international monoculture". The Internet has become a platform which allows individuals from different geographical locations to interact and communicate, and thus subsequently also influence each other, which has led to a globalization of cultures, lifestyles and trends which previously has remained local and national (Modiano 2009: 74). The digital revolution has also, due to the arrival of digital media, provided new ways to communicate and interact with others, and has thus changed society's conception of the notion of communication. One of the most popular digital media platforms in society today is video games, in which individuals have the ability to interact and communicate with other individuals. The video game industry is one of the biggest industries in today's society, and it is continuing to evolve and expand. Because of the fact that the video game industry is constantly growing, the number of studies investigating the effects of playing video games has increased considerably during the last couple of years. This study aims to examine the claim that playing video games may have a positive influence on the player's English vocabulary level.

A majority of the studies that have been conducted in the field have focused on the negative effects of playing video games. One example is Anderson's (2004) study, which investigates the correlation between playing violent video games and aggressive behaviour. Based upon the data collected, Anderson concludes that there seems to be an existing correlation: individuals that utilize violent video games are more likely to display an aggressive behaviour than individuals who do not (Anderson 2004: 121). Another example is Turel et al. (2016: 52), who investigated the correlation between playing video games and different health outcomes, among adolescents. Based upon the data collected in their study, Turel et al. (2016: 64) conclude that extensive utilization of video games seems to increase the risk of suffering from sleep deprivation and obesity. Within the educational science field, video game utilization is considered by many (both researchers and teachers) to have negative effects on learning and education, as it, apart

from the previously mentioned negative effects, also evidently prevents students from studying (Psych Central 2015).

However, the effects of video games and video game utilization are not only negative. Even though the number of studies investigating the positive effects of video game utilization is quite limited compared to the number of studies investigating the negative effects, contemporary research on the subject is far from non-existent. One popular hypothesis within the field, which has been investigated by various researchers, is the fact that video game utilization can improve an individual's cognitive abilities. One example is Dye et al. (2009: 321) who investigated the supposed correlation between utilization of video games and reaction time. Based upon the collected data, the researchers conclude that the average reaction time of individuals that play video games frequently is significantly shorter than the average reaction time of those who do not (Dye et al. 2009: 325). Eichenbaum et al. (2014 2014: 57ff) state that video game utilization can help individuals to improve various cognitive abilities, such as memorizing ability, coordinative ability, visual attentional ability, and concentrative ability.

The digital revolution has consolidated the role of the English language, as a language for global communication. Because of the role of the English language as a global lingua franca, most video games are released in English. This had led to many believing that the utilization of video games can help learners of English (both native speakers as well as English as a second language (ESL) learners) to improve their knowledge of how to utilize the English language. Many games contain an extensive amount of dialogue between different characters, and in some cases, video games require the player to comprehend spoken and/or written instructions of the objectives, in order to progress in the game. Video game utilization can thus help to exercise the receptive abilities of the learner's English. During the last couple of decades, online games have become mainstream. Online games allow individuals to communicate with each other, both verbally (using voice chat in voice channels within the game or in external applications) and in writing (through text messages within the game or in external applications). Video games can thus help the learners to develop their receptive (listening and reading) and productive (speaking and writing) skills in English. The listening ability is practised through spoken communication between players online, but also through the game itself. The reading ability is exercised through written

communication between players, but also through reading texts within the game itself. Similarly, the productive abilities (writing and speaking) are exercised within video games, mostly through spoken and written communication between players, but in some cases also in the actual game.

1.1 Purpose of the Study and Research Questions

The purpose of the present study, as previously mentioned, is to examine the claim that playing video games has a positive influence on the player's English vocabulary level. The research on the application of video games as tools for learning the English language is quite limited. A majority of the existing studies within the field have investigated the matter through qualitative interviews and observations. Even though the data collected in most of the contemporary qualitative studies have indicated that video games can help to improve the learners' knowledge of the English language, there is a lack of quantitative studies reaffirming these claims. The purpose of this study is to investigate whether video game utilization does improve the video game utilizers' ability to understand and utilize the English language, using quantitative research methods. Due to the fact that the overall level of a specific learner's English can be divided into several different aspects, and thus requires extensive research methods (long-term observations) to measure, this study will focus specifically on the correlation between video games utilization and vocabulary level, since vocabulary level is much easier to estimate quantitatively. Because of the fact that this study was conducted in Sweden, Swedish ESL learners in upper secondary school were chosen as the learners for examination. The objective of this study is thus to investigate the supposed correlation between video game utilization and English vocabulary level among Swedish ESL learners in upper secondary school.

The research questions that this study aims to answer is:

- Do recreational video-game-players have a higher vocabulary level than non-video-game-players?
- Does the amount of time spent playing video games influence the video game player's vocabulary level?
- Does the utilization of online communication tools while playing video games have an influence on the player's English vocabulary level?

- Are certain types of video games better for English vocabulary acquisition than others?

2 Literature Review

In this section, previous research of the influence of video games on English language learning will be presented, along with other studies relevant for the context of this study.

2.1 The Influence of Video Games on Motivation and the Willingness to Communicate in English

There are many factors that affect the rate with which a learner acquires a second language. Mitchell & Myles (2004) present a list of different factors that have an influence on ESL learners' ability to learn the English language. Two of the factors that Mitchell & Myles present in their book are the learners' willingness to communicate in the target language and their motivation for learning the language (Mitchell & Myles 2004: 26). The authors further state that the language anxiety and self-confidence of the learner are important factors when it comes to language learning, as the unwillingness to speak in class and to engage within the target language may affect the learning of the language negatively, and thus prolong the language acquisition process (Mitchell & Myles 2004: 27). Recent studies have shown that anxiety and confidence levels do heavily influence the language learning process, which has resulted in the construction of the overarching notion "willingness to communicate" being utilized for studies within the field (Mitchell & Myles 2004: 27).

Reinders & Wattana's (2011) study investigated the correlation between playing video games and the acquisition of English, utilizing quantitative research methods. Based upon the observations that they had made within their study, Reinders & Wattana could conclude that playing video games had a positive effect on the quantity of second language interaction, as the observations indicated that the participants produced more words and took more conversational turns in video game interaction than in face-to-face interactions (Reinders & Wattana 2011: 14). The data collected in Reinders & Wattana's study also indicated that video games have a positive effect on the learners' willingness to communicate in English (Reinders & Wattana 2011: 19). Reinders &

Wattana (2011) also employed an evaluative questionnaire in their study. In that questionnaire, 44 per cent of the participants claimed that the video game sessions employed in the study had had a positive effect on their English communicative skills, because of the fact that "(the) game play had made them feel relaxed, confident, and in turn more willing to use the target language" (Reinders & Wattana 2011: 22).

In 2014, Reinders and Wattana conducted a qualitative study, investigating ESL learners' experiences of video games as tools for acquiring skills in the English language. In their study, Reinders & Wattana (2014) had thirty participants play and interact in English with each other within a video game, and following the video game sessions, the researchers conducted qualitative interviews with the participants to investigate the participants' experiences of the influence of the video game sessions on their English production (Reinders & Wattana 2014: 43). Based upon the data collected in the interviews, the researches could conclude that video games can help to decrease the players' communicative anxiety levels, boost the perceived communicative competence of the players, and increase the players' motivation to interact and communicate in English (Reinders & Wattana 2014: 47ff.). The researchers concluded that all of the participants in the study experienced that video game interactions had had a positive effect on their willingness to communicate. The informal, and thus more laidback environment, and the anonymity that digital communication brings, resulted in the participants being less anxious, and more willing to communicate in the target language (Reinders & Wattana 2014: 50). A majority of the participants also stated that the informal environment made them more fluent in their speech and that it enabled them to take more risks, because of the decreased amount of concerns about failure and miscommunication (Reinders & Wattana 2014: 48). The researchers could also conclude that all of the participants perceived a boost of motivation for learning English when playing the game, claiming that "the fun and engaging environment in the game kept them motivated to try using English despite their imperfect use and understanding of the language" (Reinders & Wattana 2014: 49).

The fact that Reinders & Wattana's (2011, 2014) studies indicate that playing video games can affect the learners' motivation and willingness to communicate positively, can be interpreted as one of the reasons why learners who play video games supposedly have a better understanding of the English language than learners who do not. The informal and anonymous environment of digital communication makes the learner more

likely to take risks (try out new words and grammatical phrases), as the consequences of failure within a digital interaction are perceived as less severe than the consequences of making mistakes in a more formal classroom or face-to-face environment. In one of Gardner & McIntyre's (1993) publications, they state that a motivated individual can be defined as the "one who wants to achieve a particular goal, devotes considerable effort to achieve this goal, and experiences satisfaction in the activities associated with achieving this goal" (Gardner & McIntyre 1993: 2). The increase of motivation among the participants in Reinders & Wattana's (2011, 2014) studies could be linked to the fact that the context of video games provides the players with an actual reason for communication: the learners have to utilize the English language in order to be able to interact with each other and thus be able to progress within the game.

2.2 Incidental Vocabulary Learning within Video Games

Within the research field of second language acquisition, vocabulary learning is often divided into two separate types of learning: intentional vocabulary learning and incidental vocabulary learning. According to Ghanbaran & Ketabi (2014), intentional vocabulary learning is the type of learning that occurs during an "activity which is intended for committing lexical information" (Ghanbaran & Ketabi 2014: 490). Intentional vocabulary learning could for example be the learning that occurs when a learner is completing activities in a workbook or when trying to study a set of target words out of a vocabulary list. Incidental vocabulary learning, on the other hand, is, according to Gass & Selinker (2008), the type of learning that occurs when "learners are focused on comprehending meaning rather than on the explicit goal of learning new words" (Gass & Selinker 2008: 463). Incidental vocabulary learning can therefore be considered to be a by-product, that is acquired through the process of trying to comprehend a certain aspect (Gass & Selinker 2008: 463). Incidental vocabulary learning could for example be the learning that occurs when a learner is trying to comprehend the events of a novel or a television show.

During the last decades, the number of studies investigating incidental vocabulary learning has increased significantly and research has shown that incidental vocabulary learning is possible (Gass & Selinker 2008: 463). Vidal (2011) investigated and compared the effects of reading and listening on incidental vocabulary learning. Based upon the quantitative data collected in her study, Vidal concludes that reading has a

higher probability to lead to vocabulary gains, as the post-test mean scores of the reading group were significantly higher than the mean scores of the listening group on the same test (Vidal 2011: 247). Vidal also points out the fact that even though reading has a higher probability to lead to vocabulary gains than listening, incidental vocabulary learning can occur during listening as well (Vidal 2011: 249). However, research has also proven that incidental vocabulary learning is not as effective as intentional vocabulary learning in terms of vocabulary gains when compared to each other (Ramos 2015: 160).

There are several factors that affect vocabulary gains that can be acquired through incidental vocabulary learning (Gass & Selinker 2008: 464). One of the factors that influences the overall effectiveness of incidental vocabulary learning is, according to Laufer & Hulstijn (2011), learner involvement. In their empirical study, Laufer & Hulstijn conclude that learner involvement appears to be one of the most important factors that influence the effectiveness of incidental vocabulary learning, as multiple studies have shown that there is a positive correlation between learner involvement and the vocabulary gains made by learners (Laufer & Hulstijn 2011: 18ff). As a part of the framework that they provide within the "Involvement Load Hypothesis", the researchers define involvement as a construction that consists of three main components; the two cognitive components "search" and "evaluation" and the motivational component "need" (Laufer & Hulstijn 2011: 20). The "need" criteria is met when a word is relevant to, and thus also needed by, the learner. The "search" criteria is met when the learner has a possibility to discover the meaning of the word. The "evaluation" criteria is met when the learner has an opportunity to assess whether the word is suitable in the current context. If all three criteria are met, the possibility of the learner achieving vocabulary gains will increase.

The fact that learner involvement has a positive effect on vocabulary gains in incidental vocabulary learning might suggest that playing video games can have a positive effect on the player's vocabulary level. Purushotma (2005) states that "entertainment-focused video game(s) (…) can be modified to not only fulfil each of these criteria, but do so in a manner that minimizes extraneous effort and stress on part of the learner, provides repeated interactive exposures to words, and automatically generates rich contexts for associations" (Purushotma 2005: 86). Video games can thus be utilized in classrooms for educational purposes. Purushotma further states that video games can help the player

to develop their language skills by two separate means; partly through the input (text and speech) that the player receives from the game itself (conversations between characters, in-game text), but also from interactions with other players in online games (Purushotma 2005: 86). In terms of the application of video games as educational tools, Purushotma states that:

> Besides merging international editions to form bilingual versions, another almost effortless modification game designers could make to interest language learners would be to create incentives and ways in which players could find and partner with native speakers of their L2 trying to learn their L1. This would (…) provide learners with an L2 native from whom to learn about culture and language while performing a series of entertaining tasks requiring communicative exchanges (Purushotma 2005: 86).

Even though his article centres around the application of video games as a platform for intentional vocabulary learning, the points made by Purushotma can be used to highlight the fact that playing video games recreationally can result in vocabulary gains, as it can result in incidental vocabulary learning.

In 2016, Løkke investigated whether there is a possibility of incidental vocabulary acquisition through recreational play of video games. In his study, Løkke had fourteen ESL learners play an Action Role-playing Game (called "Bastion") to determine whether playing the game would result in vocabulary gains among the learners (Løkke 2016: 35ff.). Within his study, Løkke used a mixed methods research approach, collecting and analysing data from interviews with learners of English (qualitative), as well as from questionnaires and tests (quantitative) (Løkke 2016: 33). Based upon the data collected from qualitative interviews with the participants, Løkke concludes that "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" (Løkke 2016: 89). Another relevant aspect that was highlighted in the interviews was the fact that several of the participants that did play video games recreationally at home stated that they spend more time speaking English at home than they do in school (Løkke 2016: 89). Løkke concludes that "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" (Løkke 2016: 89).

The data collected from the tests employed in Lökke's study indicated that the learners had made vocabulary improvements (Løkke 2016: 96). Due to the fact that the game utilized in the study, Bastion, is a single-player-game, the vocabulary improvements that the participants made during the test period can be assumed to be acquired from the game itself, and not from online communication. Løkke also concludes that "the participants acquired significantly more knowledge of receptive than productive form" (Løkke 2016: 96), which he attributes to the fact that Bastion is a single-player-game, and thus does not require any written or spoken input from the player. Online communication can lead to both receptive and productive improvements of the player's knowledge of English, while interaction with the game itself mostly leads to receptive improvements (Løkke 2016: 96). Løkke's study thus showcases the fact that recreational play of video games in a non-educational setting can lead to the acquirement of English vocabulary, which thus proves that incidental vocabulary learning within video games is possible. The fact that the skills of utilizing English acquired from in-game activities seem to differ from the skills acquired through online-communication could imply that the utilization of online communication tools while playing video games can have a positive effect on the amount of knowledge that is learned through playing video games.

2.3 Video Games as Tools for Acquisition of Words and Grammatical Knowledge

Even though the number of studies investigating the application of video games as tools for vocabulary and grammatical improvements is quite limited, there are a few studies that have touched upon the subject. One aspect that several of the previously mentioned studies have pointed out, is the fact that the learning of the English language that occurs when playing video games can be divided into two separate categories: the learning that occurs through gameplay (such as interactions with non-playable characters[1] and reading or listening to the instructions) and the learning that occurs through online communication with other players (such as text message exchanges and voice chat). As

[1] A non-playable character is a character controlled by the CPU of the game.

well as being two separate forms of learning, these two methods also seem to provide the player with different forms of knowledge. In-game activities often require the player to listen and read, and thus help the players to improve their English receptive skills. Online communication, on the other hand, requires the player to interpret (listening, reading) and produce (speaking, listening) English, and thus helps the players to improve their receptive skills, as well as their productive skills. In the following sections, these two methods of learning English will be discussed further, separately.

2.3.1 Learning English through Gameplay

In da Silva's (2014) article, he discusses the influence of video games on English language ability, and states that "video games offer opportunities for the development of receptive skills (…) and expressive skills" (da Silva 2014: 159). Da Silva compares video games to texts, stating that "video games are a semiotic domain similar to other texts that circulate in society, mainly in virtual environments, such as websites" (da Silva 2014: 158), but he also points out the fact that video games could be regarded as better mediums for learning, partly because of their interactivity, but also because they provide a context for the learned content, by putting the content in action (da Silva 2014: 158). Da Silva also points out that many video games require the player to pick up and understand what is said within the game to be able to progress (da Silva 2014: 161). Video games thus do not only provide the player with new sets of words, but, in some cases, also require the player to be able to interpret and understand them, in order to be able to complete the game.

Chen & Yang's (2013) study is another example of a study that focuses on the learning of English that comes from the game itself. In their study, they investigated the influence of adventure video games on ESL learning (Chen & Yang 2013: 129). In their study, they had 11 ESL learners play a single-player adventure video game (called BONE), and investigated whether the gameplay had a positive effect on the players' vocabularies, by employing a pre-test and a post-test (Chen & Yang 2013: 132). Based upon the data collected within their study, the researchers conclude that gameplay within a single-player game does seem to have a positive influence on the player's vocabulary (Chen & Yang 2013: 135ff). The researchers also employed an evaluative questionnaire, in which a majority of the EFL learners that had participated in the study stated that "the game helped them improve their listening ability, reading ability, and

vocabulary knowledge the most" (Chen & Yang 2013: 135). The students also stated that the enhancement of their receptive abilities could be explained by the large amount of written and spoken input provided by the game (Chen & Yang 2013: 135). The results of Chen & Yang's (2013) study do seem to correspond to the results in the previously mentioned studies: game-playing can result in (incidental) learning of the English language. However, due to the fact that game-play only provides the player with a linguistic input, and does not require any linguistic (spoken or written) output from the player, it only exercises the receptive abilities of the player, while the productive abilities remain untested.

2.3.2 Learning English through Online Communication and Interaction

Rudis & Poštić (2018) conducted a study investigating ESL learners' attitudes and experiences of the influence of video games on learning the English language. In their study, the researchers employed a questionnaire containing a set of questions related to the utilization of video games and the possible impact that video game utilization has on English-language acquisition (Rudis & Poštić 2018: 119). One of the questions included in their interview was what medium had been most helpful for the participants in the process of learning English. 28 per cent (20 out of 71) of the participants answered that "video games were the main or one of the main influences that helped them learn the language" (Rudis & Poštić 2018: 121). When the participants were asked to explain how video games had helped them to improve their knowledge of English, one of the most frequent answers was that the "textual and audible information" provided by video games allowed them to pick up and learn new words, and thus expand their vocabulary (Rudis & Poštić 2018: 122). Based upon the data collected in their study, Rudis & Poštić (2018) conclude that video game utilization seems to have a positive influence on learning the English language. The researchers also point out that when compared to other forms of media, video games can be considered the best platform for English learning, because of the fact that video games contain a number of elements that other forms of media might lack (Rudis & Poštić 2018: 124). The researchers state that "video games provide visual cues alongside words in order to tell the player the name of an object, which is not something one can find in a movie or a book. Interactivity is another important feature of video games that help with language acquisition, since proper understanding of what is going on and how to achieve objectives is crucial" (Rudis & Poštić 2018: 126). Another aspect that separates video games from other

forms of entertainment media, is the fact that video games allow for online interactivity with other players, which thus allows players to exercise their English productive abilities while cooperating to progress within the game (Rudis & Poštić 2018: 120).

The conclusions regarding online-communication provided by Rudis & Poštić (2018) seem to correspond to the conclusions of previously mentioned studies. The online interactivity and online communication provided by video games, and other types of online communicative tools, allow the players to communicate with each other, and thus exercise their oral skills. Playing online games often leads to the player making new acquaintances with other players from around the world. Due to the position of the English language as a global lingua franca, the English language is often used for communication with other players. Because of this, the players' English productive skills can be exercised through communication with other players. Da Silva (2014) also points out that online gaming does exercise the player's receptive skills as well, as it does provide the player with a large amount of written and spoken input (da Silva 2014: 161). Based upon the research presented in this section, it is possible to assume that online gaming is a better platform for English learning than offline single-player gaming, as it provides the players with the ability to improve their productive skills, as well as their receptive skills.

2.4 Summary of Literature Review

Based upon the previously conducted research, a couple of conclusions can be drawn. Video games can function as platforms for learning of English language, since they provide the player with a relatively high amount of linguistic input (and in some cases also require the player to produce English). Because of this, playing video games recreationally could certainly, as some of the previously mentioned studies (Puroshotma 2005, Løkke 2016) have suggested, result in incidental learning. This would further suggest that the average English vocabulary level among ESL learners that play video games recreationally would be higher than the average English vocabulary level among learners that do not play video games, since the video-gamers could be interpreted to receive an increased amount of time to learn the English language. The fact that video games can be seen as learning platforms could arguably suggest that there is a positive correlation between the amount of time spent playing video games and vocabulary level

among ESL learners, simply because of the reason that learners that spend much time playing video games get more exposure to the English language.

Another aspect that should be highlighted is the fact that the amount of learning that does occur through playing video games does seem to depend on a couple of different factors. One of the most important factors is the game type. Some video games are to be considered as better platforms for learning English than others (da Silva 2014). Video games that contain a limited amount of spoken and written English (such as "Tetris") will have a limited effect on the player's English proficiency, while video games that contain a high amount of spoken and written English (such as "Skyrim") arguably could serve as learning platforms for the English language. Another factor that does seem to have an influence on the learning that occurs while playing a video game is whether the game is played individually or with other players. Previous studies suggest that there seems to be a distinct difference between the learning that occurs through in-game activities and the learning that occurs through online communication. Although single-player-games do seem to have a positive effect on the player's vocabulary level, gameplay-based learning is quite limited since it most often only leads to improvements of the player's receptive abilities. Online communication and online interactions, on the other hand, seem to exercise the player's receptive and productive abilities (Rudis & Poštić 2018, da Silva 2014). This could further be interpreted to suggest that ESL learners that utilize online communication tools (OCT) while playing video games do have a higher English vocabulary level than ESL learners that do not, since the utilization of OCT could be interpreted to have a complementary effect in terms of English vocabulary acquisition.

3 Method

In this section, the methodology that was utilized when conducting the present study will be presented.

3.1 The Study

The objective in the present study was, as previously mentioned, to investigate the influence of video games on vocabulary level among Swedish ESL learners. One of the most important aspects to consider while doing research is whether to utilize qualitative

or quantitative research methods. According to Rasinger (2010: 52), qualitative studies are inductive, and produce theory, while quantitative studies are deductive and thus test theories. Because of the fact that the objective of the present study is to test a set of hypotheses, quantitative research methods were utilized for the investigation of the study. In order to be able to investigate the influence of video games on vocabulary level, two aspects had to investigated for each informant in the study; (1) the informant's video game habits, and; (2) the informant's vocabulary level. Because of this, the study was divided into two separate parts; one questionnaire (that was supposed to determine each informant's video game habits) and one vocabulary test (that was supposed to get an approximation of each informant's vocabulary level).

The questionnaire (see section 3.3) and the vocabulary test (see section 3.4) were handed to respondents in paper form, and there was no time limit: the respondents were given as much time as they needed, but none of the respondents required more than fifteen minutes to complete both of the forms. One of the reasons why the questionnaire and the test were in paper form, was that it made it easier to monitor the respondents during the time they took the test. If the test was digitalized, it would have been more difficult to ensure that the respondents did not cheat (by for example utilizing software that provides a spelling or grammar checker) in the test. After the data had been collected, the tests were corrected manually. After the correction process, each participant's answers on the questionnaire were transcribed into a summarizing Microsoft Excel document, along with their respective test results. The test was divided into three separate parts, which thus generated three subtotal scores, and one total score. During the analysis, both subtotal scores and the total score were analysed.

Before an analysis could be conducted, the participants were categorized according to a number of different variables (whether they played video games or not, whether they used OCT while playing video games, the amount of time they spent playing video games per week and the type of video games they normally played). After the categorization process was finished, the mean scores of the categories were examined, and compared to each other. Differences between groups that were of high importance were further examined, by the conduction of a Welch two sample t-test, to determine whether the difference could be considered statistically significant or not.

3.2 Participants

The participants of the study were first-year students at Swedish upper-secondary school (Swedish *gymnasiet*) and all of the participants were around sixteen years old (either they had turned sixteen by the time of their participation, or they would turn sixteen before the end of the year). All of the participants were also currently taking the English 5 course. The choice only to include first-year-students was made to ensure that all of the participants had received approximately the same amount of education (the same amount of intentional English learning), so that differences regarding amount of education would not be a significant factor that could skew the results of the study. The students had not been informed of the study beforehand, but they were told, before their participation, that participation was optional. The students were also told, both through the written instructions within the forms as well as from the oral instructions given at the time of their participation, that the forms (questionnaire and test) were to be filled in and answered anonymously. A total of 97 students choose to participate in the study, but only 96 results could be used for the analysis of the study, since one of the participants had English as his/her native language.

3.3 Questionnaire

Because of the fact that the objective of the study was to investigate the correlation between playing video games and vocabulary level, each participant's video game habits had to be analysed and categorized. Due to the fact that this study aimed to elicit data from a relatively high number of participants, the data concerning the participants' video game habits was collected with the help of a questionnaire (see appendix A). A questionnaire can consist of either open questions, which allow respondents to produce their own answers, or closed questions, which allow the respondents to choose an answer that corresponds to their situation, out of a list of alternatives (Rasinger 2010: 63). One important aspect to consider while constructing a questionnaire is thus whether to include open questions or closed questions. Rasinger (2010: 63) states that closed questions are preferable in quantitative studies, since the data produced by closed questions is relatively easy to process. Due to the relatively high number of participants in this study, the questionnaire in this study consisted of only closed questions.

Rasinger (2010: 63) states that, when designing answer options for a closed question questionnaire, the researcher must provide the participants with a group of answers that jointly covers all possible answers to the specific question, in order to achieve accuracy in the participants' responses. In some cases, the number of possible answers was too high to include every single option (for example the question regarding the participants' native language). In those specific cases, an extra category, "other", was added, where the participants could write their own answer if the alternative that corresponded to their situation was not included in the set of answers provided in the questionnaire. Since the study was conducted in Sweden, the questionnaire was written in Swedish, to ensure that the participants did not misinterpret any of the questions. The participants were also told that they were allowed to ask for clarification if they had problems comprehending any of the questions.

3.4 Vocabulary Test

In Gyllstad's (2013) article, he concludes that the understanding of a word can be divided into three different forms of understanding; understanding of the word's form, understanding of the word's meaning and understanding of the use of the word (Gyllstad 2013: 18). Coombe states that "vocabulary knowledge is multifaceted" (Coombe 2010: 122), and that vocabulary tests require several different forms of vocabulary assessment in order to provide a reliable result regarding the test-takers' actual vocabulary levels. When constructing the vocabulary test for this study, an attempt was made to try to incorporate questions that examined the different forms of understanding of a word that Gyllstad (2013) mentions in his article. The test utilized for the vocabulary assessment in this study can thus be divided into three separate sections; (1) a meaning in context test; (2) a synonym recognition test and; (3) a yes/no test.

The first section of the test, the meaning in context test (see appendix B), which makes up the first five questions of the text, is meant to assess the knowledge of the students regarding the utilizations of the words. The meaning in context test is a type of multiple-choice question test (MCQ). In these types of tests, the test-takers are presented with a sentence or a paragraph where one word or a set of words have been removed and replaced with an empty space. The objective of the test is to substitute the empty space with the word or set of words that grammatically completes the sentence or

paragraph from a list of possible alternatives (Coombe 2010: 118). Gyllstad suggests that the "use" aspect of word understanding can be assessed by asking questions such as "in what patterns does the word occur?" (Gyllstad 2013: 18). The purpose of incorporating a section with "meaning in context" based question was to assess the participants' knowledge of grammatical functions.

The second section of the test, the synonym recognition test (see appendix C), which corresponds to questions six to ten, is meant to assess the students' understanding of the meaning of the words. In the synonym recognition test, the test-takers are presented with a word, and are asked to choose a synonym to that specific word from a list of four different alternatives (Coombe 2010: 117). Coombe (2010) states in her article that the words presented in synonym recognition tests can either be presented in isolation, or with a stem that provides context (Coombe 2010: 117). In the test that has been utilized for vocabulary assessment in this study, stems have not been utilized. In Gyllstad's article, he suggests that the "meaning" aspect of word understanding can be examined by asking questions such as "What other words could we use instead of this one? (Gyllstad 2013: 18). The purpose behind incorporating a synonym recognition section within the vocabulary assessment test is to investigate the respondents' understanding of the meaning of the words, by evaluating their ability to connect words of identical or similar meanings.

The third and final section of the test, the yes/no test (see appendix D), which corresponds to questions eleven to twenty, is meant to assess the students' understanding of the form of the words. The yes/no test is a relatively new type of vocabulary test. In the yes/no test, the test-takers are presented with a number of words and pseudowords and are asked to indicate whether they know if the words are existent word, or if they are made-up words (Mochida & Harrington 2010: 74). The purpose of the yes/no test is to determine the vocabulary size of the respondent, by evaluating how many of the actual words that the respondent know. In Gyllstad's article, he suggests that the "form" aspect of word understanding can be tested by asking questions such as "what does the word look like?" (Gyllstad 2013: 18). The purpose of incorporating a yes/no segment within the vocabulary test is to examine the respondents' knowledge of word forms, by investigating whether they know if the form of a word is grammatically correct (does exist) or not (does not exist).

The twenty questions that were utilized in the vocabulary test were collected from various existing standardized vocabulary tests that can be found on several Internet websites[2]. The decision to extract the questions from other, already existing tests was made because of two distinct reasons. The decision was partly made because of the fact that standardised tests most often are constructed by professional test constructors, and thus contain well formulated questions, in terms of variety and degree of difficulty. The second reason behind this choice was to make sure that the questions were not influenced by the nature of this study. If the questions of a test are formulated solely by the researcher, there is a chance that some of the questions might be influenced by the nature of study, which thus might affect the data, which in turn might result in the test results being misrepresentative. Rasinger (2010: 63) states that one common error that new researchers commit when utilizing a test or a questionnaire in their study, is that they tend to design questionnaires and tests so that they provide them with results that are in accordance with their arguments and hypotheses.

3.5 Reliability and Validity

One important aspect to consider while conducting a study, is to ensure that the results of the study are reliable and valid. Rasinger states that "reliability refers to our measure repeatedly providing the same (or near same) results" (Rasinger, 2010: 55). The study contained a relatively high number ($N = 96$) of participants. The choice of including such a high number of participants was made consciously, in order to ensure that the results were not skewed by individual merit or shortcomings in the vocabulary test. Due to the relatively high number of participants in the present study, the results of the study should be indicative of the wide-scale situation. During the analysis of the data, a certain amount of attention was also given to ensure that the sample sizes of each category were large enough, so that the samples of each category could be perceived as representative of that specific category. Black (1999) states that one way of checking the reliability of a test is "to compare the responses of a set of subjects with those made by the same subject on another instrument that tests the same concept" (Black, 1999: 277), and that this re-test should preferably be conducted the same day. The choice to have the vocabulary test consist of three different subtests was made to ensure that the

[2] The questions in the meaning in context test were taken from Oxford Online English and Exam English, the questions in the synonym recognition test were taken from A Real Me and Merriam-Webster, and the questions in the yes-or-no test were taken from Lextutor and Vocabulary Ugent.

results of the study were reliable, as the application of several different subtests is one method that can be utilized to re-test the same concept repeatedly. Before drawing any conclusions regarding differences in overall test scores, the scores on sub-tests have been considered as well, to determine whether the sub-tests indicate the same pattern as the overall test.

Validity, on the other hand, can often be a bit more problematic to achieve in a study. Rasinger (2010: 56) states that the validity of a study is the degree to which it measures what it is supposed to measure. Rasinger (2010: 56) further states that validity especially can be an issue when utilizing questionnaires. However, since the questionnaire utilized in this study measured relatively concrete concepts, such as the respondents' video game habits, the data provided by the questionnaire should be valid. Some of the questions within the questionnaire (the questions regarding age and native language) were included to ensure that the participants were a part of the target group that the study was set to investigate (to ensure that they were around sixteen years old, and that they were ESL learners). The other questions on the questionnaire that were related to the participants' video game habits, were quite unambiguous, and should thus provide valid results. The vocabulary test used for this study had a relatively small number of questions (twenty), which could be used as an argument against the validity of the study, since an individual's receptive vocabulary level cannot be fully charted by a test consisting of twenty questions. However, the objective of the study was not to provide a complete overview of all the informants' receptive vocabulary levels, but rather look at systematic vocabulary level differences between different categories. Even though the test is quite limited in terms of questions, possible differences among the different categories, in terms of average test scores, should indicate that there are systematic differences between the different categories. The formulation of the questions is one aspect that, if done incorrectly, can diminish the validity of a study (Rasinger 2010: 63). The questions of the test were, as previously mentioned, retrieved from existing, standardised tests, in order to avoid biased or leading questions and thus achieve more valid and reliable results.

4 Results and Discussion

In this section, the results of the study will be presented. This section will also provide a discussion of the results in relation to the theoretical framework provided in the

literature review. The raw data used in the tables and graphs presented in this section can be found in Appendix E. Due to the fact that this study aims to examine four different research questions (see section 1.1), the results have been categorised into four different subsections; (4.1) differences in English vocabulary level between video-gamers and non-video-gamers; (4.2) the influence of the utilization of online communication tools on English vocabulary level; (4.3) time spent playing video games in relation to English vocabulary level, and; (4.4) the influence of different types of video games on English vocabulary level.

4.1 Differences in English Vocabulary Level between Video-gamers and Non-video-gamers

One aspect that did become apparent from the analysis of the extracted data was the fact that there seems to be a slight difference in vocabulary level between video-gamers and non-video gamers. The group of participants that did play video games had slightly higher test scores on the vocabulary test than the group of participants that did not play video games. A summary of the results extracted from the study can be found in Table 1.

Table 1: Mean scores on the vocabulary tests of the group of participants that did play video games and the group of participants that did not play video games.

Test group	MiC[3] test	SR[4] test	YoN[5] test	Total score[6]
Video-gamers	4.20	3.30	6.37	13.87
Non-video-gamers	4.07	2.95	6.29	13.31
All participants	4.15	3.15	6.33	13.63

As can be seen in Table 1, the group of participants that did not play video games achieved a mean score of 13.31 on the vocabulary test, while the group of participants that did play video games achieved a mean score of 13.87 on the same test. The mean score of the learners that did play video games recreationally were thus approximately 4.2 per cent higher than the mean score of the learners that did not play video games[7]. Another aspect worth noting is the fact that this difference applied to all of the subtests,

[3] Meaning in Context.
[4] Synonym Recognition.
[5] Yes or No.
[6] The total score on the vocabulary test, accumulated from all of the subtest.
[7] The percentage is calculated by dividing the numerical difference in mean scores between the video-gamers and non-video-gamers (0.56) with the mean score of the non-video-gamers (13.31).

which could be interpreted to indicate that there is a systematic difference between video-gamers and non-video-gamers in terms of English vocabulary level.

Although the data indicate that there is an existing difference in terms of vocabulary test scores between video-gamers and non-video-gamers, which is in line with the findings of previous studies (Rudis & Poštić 2018, Chen & Yang 2013), the difference between the groups found in the present study was relatively minor. To follow up on this matter, a t-test was conducted to determine whether the difference between the mean test scores was statistically significant or not. The t-test revealed that the difference between the groups was not significant (Welch two sample t-test: $t = -1.41$, $df = 79.85$, p-value = 0.16). The difference, in terms of English receptive vocabulary level, between video-gamers and non-video-gamers found in this study is considerably less significant than the differences observed in previous studies (Rudis & Poštić 2018, Chen & Yang 2013). The fact that there is a slight difference that can be observed in all of the subtests could arguably be used as support for the claim that the average ESL learner that does play video games have a slightly better English vocabulary than the average ESL learner that does not play video games. However, the fact that the difference observed in the present study was deemed statistically insignificant implies that the difference could just be a coincidence. Although more research has to be conducted within the field before any major conclusions can be drawn, the results of the present study shows that if there is a difference in English vocabulary level between video-gamers and non-video-gamers, it is relatively minor.

4.2 The Influence of the Utilization of Online Communication Tools on English Vocabulary Level

Based upon the analysis of the collected data, it can be concluded that the utilization of online communication tools while playing video games appears to influence English vocabulary level positively. The results extracted from the data can be found in Figure 1 and Table 2.

Figure 1. Distribution of test scores across groups.

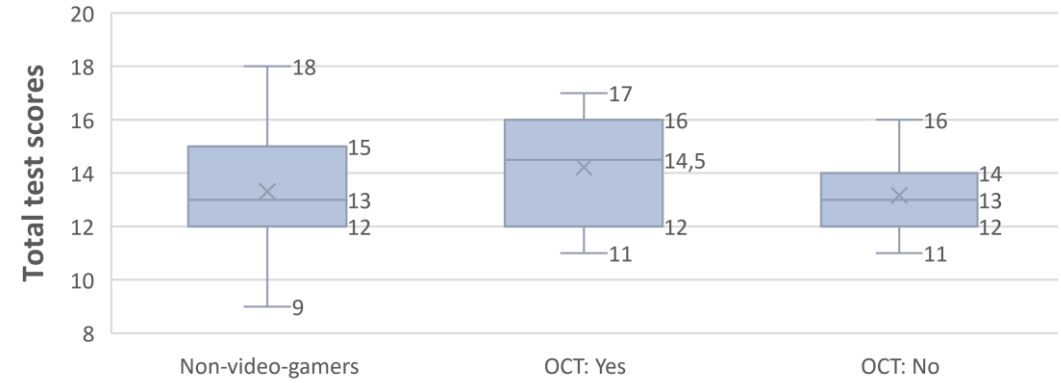

Table 2: Mean score across groups.

Test group	MiC test	SR test	YoN test	Total score
OCT: Yes	4.36	3.39	6.47	14.22
OCT: No	3.89	3.11	6.17	13.17
Non-video-gamers	4.07	2.95	6.29	13.31

As can be seen in Figure 1 and Table 2, the utilization of OCT while playing video games does appear to have a positive effect on the player's vocabulary level. The mean score of the groups of participants that utilized online communication tools while playing video games was approximately 6,9 per cent[8] higher than the mean score of the group that did not play video games. Perhaps more interesting, is the fact that the group that used online communication tools while playing video games had an approximately 8 per cent[9] higher mean score than the group that did play video games but did not communicate with others online. To follow up on this matter, a t-test was conducted to investigate whether the difference between the samples was statistically significant or not. The t-tests revealed that the difference between the OCT group and the non-OCT group was significant (Welch two sample t-test: t = -2.41, df = 44.51, p-value = 0.02). The analysed data thus show that the influence of the utilization of online communication tools on English vocabulary level is more significant that the influence

[8] The percentage is calculated by dividing the numerical difference in mean scores between OCT users and non-video-gamers (0.91) with the mean score of the non-video-gamers (13.31).
[9] The percentage is calculated by dividing the numerical difference in mean scores between the group that did use OCT and the group that did not use OCT (1.05) with the mean score of the group that did not use OCT (13.17).

of playing video games. These systematic differences could arguably be attributed to the fact that ESL learners that utilize OCT while playing video games receive a higher amount of input of the English language in comparison to ESL learners that play video games but do not communicate with others (Rudis & Poštić 2018). The higher amount of input of English in turn leads the receptive abilities being exercised to a higher degree, which, in turn, leads to a higher probability of the learner experiencing improvements of its receptive abilities.

4.3 Time Spent Playing Video Games in Relation to English Vocabulary Level

Based upon analysis of the collected data, the number of hours spent playing video games could also be a factor that affects vocabulary level. A summary of the data extracted from the study that demonstrates this can be found in Table 3.

Table 3: Mean scores on the vocabulary test in relation to the average number of hours spent playing video games per week.

Number of hours	MiC test	SR test	YoN test	Total score
0	4.07	2.95	6.29	13.31
1 - 5	4.13	3.13	6.37	13.63
6 - 10	4.08	3.38	6.23	13.69
11 - 15	4.22	3.33	6.11	13.66
16 - 20	4.33	3.33	6.17	13.83
21+	4.46	3.36	6.82	14.64

As can be seen in table 3, there seems to be a positive relation between the number of hours spent playing video games and vocabulary level. Based upon the data provided in Table 3, we can see that the mean score gets higher as the number of hours played increases, with the only exception being that the group that played one to five hours per week had a higher average score than the group that played six to ten hours a week. The fact that the group of participants that spent at least twenty-one hours playing video games had a mean score that was almost 10 per cent higher[10] than the group of participants that did not play video games at all further indicates that playing video games recreationally can lead to vocabulary gains. A couple of the differences were

[10] The percentage is calculated by dividing the numerical difference in mean scores between the 21+ hours group and the group that did not play video games that (1.33) with the mean score of the group that did not play video games (13.31).

later investigated for significance, by the conduction of a t-test. For the first t-test, the categories were merged into two main groups, participants that played video games for 0-10 hours per week and participants that played video games for 10 hours or more per week, in order to determine whether the difference between the groups was significant. The t-test revealed that the difference in terms of test scores between the 0 - 10 hours group and the 10+ hours group was insignificant (Welch two sample t-test: t = -0.98, df = 49.94, p-value = 0.33). However, another t-test revealed that the difference between non-video-gamers and the groups of participants that spent 21+ hours on video games each week was significant (Welch two sample t-test: t = 2.29, df = 17.56, p-value = 0.035). This thus indicates that spending an extensive amount of time on playing video games can lead to vocabulary gains. Even though the differences between the groups are quite minor, it appears as if there is a correlation between playing time and English vocabulary level. However, since the sample sizes of some of the target groups were relatively small, the data could not be used to test for possible correlations. One possible explanation to the supposed positive relation between video game playing time and vocabulary level could be the fact that the number of hours spent playing video games could influence the probability of utilization of OCT, or vice-versa, as displayed in Figure 2 and Table 4.

Figure 2. The percentage of OCT users in relation to the average number of hours spent playing video games each week.

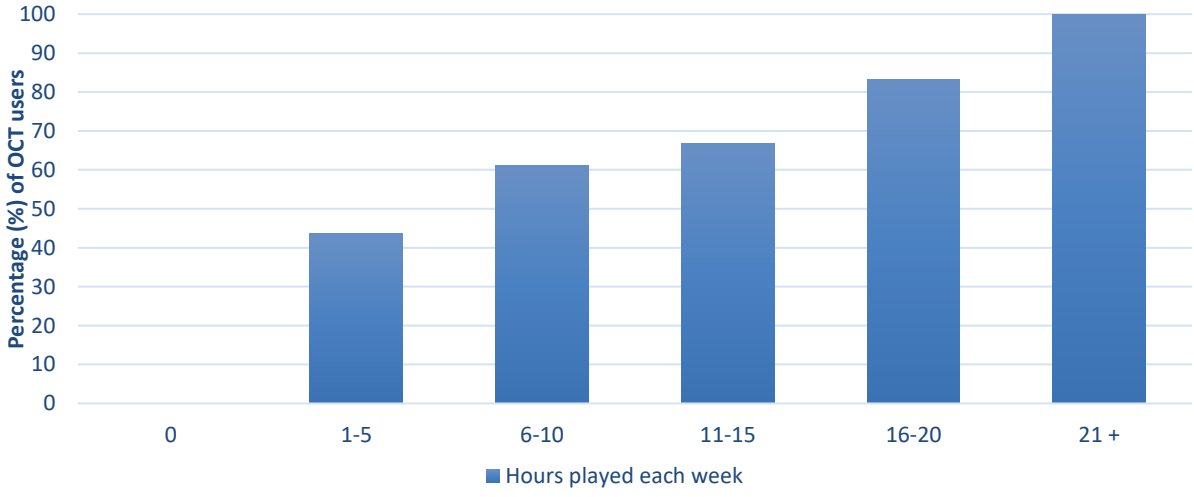

Table 4: The number of OCT users in relation to number of hours spent playing video games on average each week.

Number of hours	Sample size	Number that uses OCT	Percentage (%) that uses OCT
0	42	0	0
1 – 5	16	7	43.75
6 – 10	13	8	61.15
11 – 15	9	6	66.67
16 – 20	6	5	83.33
21 +	10	10	100
Total	96	36	37.5

As can be seen in Figure 2 and Table 4, it does appear as if playing time and the possibility of utilization of OCT are somewhat related, as the learners that spend more time playing video games are more likely to utilize OCT. Based upon the data presented in table 4, we can establish that the percentage of OCT users seem to increase as the number of hours played increases.

4.4 The Influence of Different Types of Video Games on English Vocabulary Level

Another aspect that was investigated in the present study was whether certain types of video games could be considered better for English vocabulary acquisition than others. This was investigated by comparing the mean score in relation to the type of video games played by the participants. A summary of the results that demonstrates this can be found in Table 5 below.

Table 5: Mean scores on the vocabulary test categorised by the type of games the participants played.

Game type	Mean score: MiC test	Mean score: SR test	Mean score: YoN test	Mean score: total
Action	4.23	3.23	6.40	13.86
Adventure	4.34	3.27	6.27	13.88
Role-playing	4.43	3.52	6.43	14.38
Simulation	4.00	3.00	6.67	13.67
Strategy	4.45	3.45	6.37	14.27
Sports	4.10	3.15	5.95	13.20

As illustrated in Table 5, the average scores of the groups of participants that played action, adventure and simulation games seem to be quite identical, while the average scores of the groups of participants that played role-playing and strategy games are

slightly higher, and the average score of the group of participants that played sports games is slightly lower. One possible explanation to these differences could be that some video game types are more likely to be played while utilizing OCT than others. This possible explanation was examined through an analysis of the collected data, and the results of said analysis can be found in Table 6.

Table 6: The number of OCT users in relation to type of video games played.

Game type	Sample size	Number that uses OCT	Percentage (%) that uses OCT
Action	39	29	74.36
Adventure	14	12	85.71
Role-playing	23	21	91.30
Simulation	3	3	100
Strategy	11	9	81.80
Sports	20	11	55

As displayed in Table 6, the groups of participants that did perform better than average on the vocabulary test does seem to have a high percentage of OCT users (the percentage for role-playing games was 91.30 and the percentage for strategy was 81.8), which could indicate that OCT could be one possible explanation to the differences between the categories. However, the fact that the groups of participants that played simulation and adventure games also had relatively high percentages of OCT users (100 and 85.71 percent) may disprove said thesis. Another observation that can be made upon comparing Tables 5 and 6, is the fact that the group of participants that represented the video game type that had the lowest percentage of OCT users (sports games), also had the lowest average score on the vocabulary test. One aspect that has to be pointed out, however, is the fact that the participants were allowed to tick several boxes when answering which type of games they usually played, which makes it hard to draw any sort of conclusions regarding possible connections between video game type preference and OCT use, since it is impossible to determine whether the participants constantly use OCT when playing video games, or if they only use OCT when playing one specific type of video game. Another possible explanation, however, could be the fact that role-playing games and strategy games typically provide the player with a large amount of linguistic input, as they often contain a large amount of non-playable-characters. Sports games, on the other hand, typically provide the player with a small amount of linguistic input, which thus could help to explain why the group of participants that did play sports games performed slightly below average.

4.5 General Discussion of the Results

Many of the previous studies that have investigated the influence of video games on English vocabulary learning in an ESL context have had the participants play video games (as an experiment) as a part of the main study (Chen & Yang 2014, Reinders & Wattana 2014). However, this method could be considered a bit problematic to use to investigate whether incidental vocabulary learning from video games is possible, as the type of game-play that occurs in a research-oriented setting might be slightly different from the type of gameplay that occurs in a recreational setting. In this study however, the participants had not been informed of the actual test beforehand and were thus required to utilize the knowledge that they possessed at that moment. The difference between video-gamers and non-video-gamers, in terms of vocabulary level, found in the present study was significantly lower than the difference observed in previous studies.

The participants that did play video games recreationally had a higher average score than the participants that did not play video games, but the difference was relatively limited, and was found to be insignificant by a Welch two-sample t-test. One factor that does influence English vocabulary level, however, is whether the learner utilizes OCT while playing video games. Furthermore, it appears as if there are other factors (the number of hours spent playing video games and the type of video game played) that possibly does influence the extent of the vocabulary gains that the player achieves through playing video games. However, due to some of the sample sizes of the target groups being quite limited, these variables were not tested for significance.

From an English didactic standpoint, these results could be considered relevant, as they do illustrate that video games can be applied as educational tools. However, it is also important to point out the fact that most of the systematic differences found regarding vocabulary level within the study are relatively minor. As a final note, it is also important to emphasize the fact that more research needs to be conducted in the field before drawing any major conclusions, since some of the sample sizes in this study have been relatively small, which could provide misleading results.

4.6 Suggestions for Future Research

Even though the present study has answered some questions, there are still many questions left unanswered within the field. One aspect that could be examined further is

whether there is a correlation between the time spent playing video games and the utilization of OCT. Based upon the data collected in this study, it does appear as if individuals who spend much time playing video games are more likely to utilize OCT than individuals who spend a limited amount of time playing video games. However, the data collected in the present study concerning this matter is quite limited, and thus need to be investigated further. Another suggestion for future researchers would be to investigate the influence of video games and OCT on productive vocabulary learning. Measuring productive vocabulary level is quite complex, and would require another type of research method, but more research definitely needs to be conducted in the field. Another suggestion for future research is to replicate this study in a bigger scale. Even though this study contained a relatively high number of participants (96 participants), some questions remained unanswered, due to some of the sample sizes of the target groups being too small.

5 Conclusion and Summary

During the last couple of decades, playing video games has become a normalized recreational activity. For many individuals, playing video games is a part of the daily routine. Since video games is such a popular activity among adolescents in society today, the possible (positive and negative) effects of video playing are important to identify and chart out. Most of the research that has been done in the field has concentrated on the negative effects of video games. However, the positive effects of video game playing are perhaps of a higher importance, as they can help us understand how we can use video games constructively.

The objective of the present study was to investigate whether playing video games can result in vocabulary gains (through incidental vocabulary learning), by using quantitative research methods. The study was divided into two parts; one questionnaire and one vocabulary test. 96 samples were collected, and analysed, using quantitative analysis. Based upon an analysis of the collected data, a couple of conclusions could be drawn.

The data of the study indicated that the influence of video game playing on vocabulary level for ESL learners is insignificant. The average score of the group of ESL learners that did play video games was approximately 4.2 per cent higher than the average score of the group of EFL learners that did not play video games. Although the difference

might seem significant at first glance, a Welch t-test revealed that the difference between the groups' distributions was insignificant (as the t-test generated a p-value of 0.14). Even though the t-test found the difference to be insignificant, the hypothesis that ESL learners that play video games have a higher English receptive vocabulary level than ESL learners that do not play video games does not necessarily have to be considered disproven. Although the difference between the groups was not statistically significant, it should be noted that there was a difference between video-gamers and non-video-gamers in terms of test scores, and that this difference was evident in all of the three sub-tests. The sample sizes have a high impact on results of a t-tests, and the fact that the sample sizes of the target groups were relatively limited could possibly be one of the reasons as to why the t-test found the difference to be insignificant. More research thus needs to be conducted investigating the difference in terms of English receptive vocabulary level between video-gamers and non-video-gamers, as larger sample sizes or different types of tests might produce a significant effect. The present study does however verify that if there is a difference in vocabulary level between video-gamers and non-video-gamers, it is relatively minor, and not as significant as previous studies has indicated.

The study also investigated whether the utilization of online communication tools while playing video games influenced vocabulary level. Interestingly, the data showed that the utilization of online communication tools has a significant effect on vocabulary level among ESL learners, as the group of OCT users had an average score that was 6.9 per cent higher than the group of non-video-gamers, and almost 8 per cent higher than the average score of the group video gamers that did not utilize OCT while playing video games. The difference between OCT users and OCT non-users was examined further, by the execution of a Welch t-test. The t-test revealed that the difference between the distributions of the groups was significant (the t-test generated a p-value of 0.02). The data thus show that the utilization of OCT has a higher effect on vocabulary level than the actual video game playing. The OCT factor (whether you utilize OCT or not) is thus found to be a more important factor than the video game factor (whether you play video games or not). This could possibly be explained by the fact that the type of English language skills that is acquired through game-play is different to the type of English language skills that is acquired through the utilization of OCT. The utilization of OCT thus functions complimentary in terms of English language learning.

The study also investigated whether the average time spent playing video games had an influence on vocabulary level. The results of the study show that the average time spent playing video games and English vocabulary level appear to be correlated, as comparisons showed that the mean scores on the vocabulary test got higher as the number of hours played increased. These systematic differences could possibly be explained by the fact that ESL learners that spend more time playing video games receive a higher degree of incidental vocabulary learning. Another explanation could be that learners that spend more time playing video games are more likely to utilize OCT, which in turn leads to an extended amount of exercise in utilizing (listening, reading, speaking, writing) the English language.

The study also tried to examine whether certain types of video games are better for English receptive vocabulary acquisition than others, by comparing mean scores between test groups formed according to the type of video games they normally played. Based upon an analysis of the data, it could be concluded that the highest mean score (generated by the group of participants who played role-playing games) was 9 per cent higher than the lowest mean score (generated by the group of participants who played sports games), which is a relatively significant difference. These differences could possibly be attributed to the fact that certain types of video games provide the player with more input of the English language (through conversations with NPCs, instructions, and so forth) than others.

The results of the present study indicate that video games can affect the player's English receptive vocabulary positively. However, the results also indicate that the influence of playing video games on English vocabulary level is relatively limited, as the systematic differences found in the present study are minor. Still, the results of the present study illustrate the fact that video games can be applied as tools for English language learning. Because of the fact that the video game industry is only continuing to evolve, and video games are becoming a bigger part of adolescents' everyday life, more research needs to be conducted on the application of video games as educational tools. The video game industry is becoming one of the biggest industries in society, so perhaps it is better to investigate how video games can be applied constructively, instead of trying to oppose them.

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Appendix A – Questionnaire

Enkät

*Detta formulär innehåller dels en enkät (sida 1 och 2), och ett mindre test som undersöker din vokabulärsnivå i engelska (sida 3, 4 och 5). Dessa formulär ska besvaras anonymt (du ska alltså **inte** ange namn, och du kommer inte bli bedömd på detta). Läs igenom varje fråga noggrant, och svara så ärligt som möjligt på frågorna. Om du har några frågor, så räck upp handen, så hjälper jag dig. Lycka till och tack för hjälpen!*

/Joacim

---

1. Hur gammal är du?

a. 16 år eller yngre

b. 17 eller 18 år

c. 19 år eller äldre

2. Vilket är ditt modersmål (förstaspråk)?

a. Svenska

b. Engelska

c. Annat, vänligen specifiera: _____

3. Spelar du TV-spel/datorspel? (om ditt svar är nej så kan du hoppa över följande frågor och börja med testet som börjar på sida 3)

a. Ja

b. Nej

4. Hur många timmar i veckan spelar du i genomsnitt TV-spel/datorspel?

a. 1 - 5

b. 5 -10

c. 11 – 15

d. 16 - 20

e. över 20

5. Vilken konsol använder du när du spelar TV-spel/datorspel? (om du använder flera olika konsoler, markera samtliga)

a. Dator
b. Playstation (PS2, PS3, PS4, PSP)
c. Xbox (Xbox 360, Xbox One)
d. Nintendo (Switch, DS, 3DS, Wii, WiiU, etc.)
e. Mobiltelefon
f. Annat, vänligen specifiera: _____

6. Vilken typ av spel spelar du när du spelar TV-spel/datorspel? (om du spelar flera olika typer av spel, markera samtliga)

a. Actionspel
b. Äventyrsspel
c. Rollspel (RPG)
d. Simulationsspel
e. Strategispel
f. Sportspel
g. Annat, vänligen specifiera: _____

7. Spelar du spel online som kräver, eller tillåter för kommunikation med andra spelare?

a. Ja
b. Nej

8. Om ditt svar på fråga 7 var ja - brukar du kommunicera med andra spelare, och i så fall hur?

a. Jag kommunicerar med andra spelare genom textmeddelanden (i spelet eller genom externa applikationer)
b. Jag kommunicerar med andra spelare genom röstkanaler (i spelet eller genom externa applikationer)
c. Jag kommunicerar med andra spelare genom både textmeddelanden och röstkanaler
d. Jag kommunicerar inte med andra spelare

Appendix B – Meaning in context test

Fill in the blanks

In this section, your objective is to fill in the blank in each sentence. You are given 4 alternatives, but only 1 of them is correct. Indicate which word that should be used to fill in the blank by marking the correct alternative (put a ring around the corresponding letter: a, b, c, or d).

1. **What time do you go to _____ every day?**
   a. work
   b. workplace
   c. office
   d. job

2. **Happy is the _____ of sad**
   a. oppose
   b. opposed
   c. opposition
   d. opposite

3. **_____ to popular belief, Pluto is not a planet**
   a. Contrary
   b. Compared
   c. Opposite
   d. Conversely

4. **I don't like my job very much. I'm going to _____ and look for another one**
   a. retire
   b. finish
   c. resign
   d. fire

5. **Our teacher doesn't _____ us use mobile phones in class**
   a. make
   b. allow
   c. let
   d. forbid

Appendix C – Synonym recognition test

Synonym test

In this section, you are presented with one word (marked in **bold**), and your objective is to find a synonym (a word with identical meaning) for that word. You are given 4 alternatives, but only 1 of them is correct. Indicate which of the 4 words that is a synonym to the word by marking the correct alternative (put a ring around the corresponding letter: a, b, c, or d).

6. The synonym of **deal** is:

   a. sale
   b. recoup
   c. claim
   d. agreement

7. The synonym of **correlation** is:

   a. equivalence
   b. explicit
   c. termination
   d. imbalance

8. The synonym of **provoke** is:

   a. resist
   b. attack
   c. challenge
   d. frighten

9. The synonym of **halo** is:

   a. corona
   b. holy
   c. hay
   d. throne

10. The synonym of **concede** is:

    a. obey
    b. announce
    c. admit
    d. contradict

Appendix D – Yes or no test

Yes or No test

In this section, you are presented with one word for each question, and your objective is to determine whether the word is an actual English word (the word does exist), or if it is a made-up word (the word does not exist). The words are marked in **bold**. If the word is real, mark the alternative “yes”, and if the word is made-up, mark the alternative “no”

11. organise

a. yes

b. no

12. farther

a. yes

b. no

13. democrazy

a. yes

b. no

14. twose

a. yes

b. no

15. highjack

a. yes

b. no

16. indescretely

a. yes

b. no

17. disluck

a. yes

b. no

18. misrepresentative

a. yes

b. no

19. delimiter

a. yes

b. no

20. bodelate

a. yes

b. no

Appendix E – Raw data

Participant number	Does the learner play video games?	How often[11] does the learner play?	Which type[12] of videogames?	Does the learner use OCT?	Testscore: MiC	Testscore: SR	Testscore: Y/N	Testscore: Total
1	yes	B	A,B, C	yes	4	3	7	14
2	no	-	-	-	5	3	5	13
3	yes	C	B,C	yes	4	3	5	12
4	no	-	-	-	4	2	4	10
5	no	-	-	-	4	4	7	15
6	yes	A	F	no	3	3	6	12
7	yes	E	B,C,D,E	yes	4	3	6	13
8	yes	B	C	yes	4	4	7	15
9	no	-	-	-	5	3	7	15
10	yes	D	A,B,C	yes	3	3	5	11
11	no	-	-	-	4	4	6	14
12	yes	B	E	no	4	3	9	16
13	yes	C	A	yes	4	3	5	12
14	no	-	-	-	4	4	3	11
15	yes	C	A,C,G	no	4	3	7	14
16	no	-	-	-	5	2	6	13
17	no	-	-	-	4	4	8	16
18	no	-	-	-	5	3	6	14
19	yes	A	F	no	4	3	5	12
20	yes	D	A,F	yes	5	4	7	16
21	no	-	-	-	4	3	5	12
22	yes	B	A	yes	4	3	5	12
23	yes	C	B,F	no	5	3	6	14
24	no	-	-	-	4	3	6	13
25	no	-	-	-	5	3	6	14
26	yes	B	A,B,C,F	yes	4	2	5	11
27	yes	A	A	no	4	3	7	14
28	yes	B	C	yes	5	5	7	17
29	no	-	-	-	3	2	8	13
30	yes	B	A,F	no	4	3	6	13
31	yes	C	A,F	no	3	3	6	12
32	no	-	-	-	4	5	7	16

[11] The categories used were:
A = 1-5 hours, B = 5-10 hours, C = 10-15 hours, D = 15-20 hours, E = 20+ hours.
[12] The categories used were:
A = Action, B = Adventure, C = Role-playing, D = Simulation, E = Strategy, F = Sports, G = Other.

Participant number	Does the learner play video games?	How often does the learner play?	Which type of videogames?	Does the learner use OCT?	Testscore: MiC	Testscore: SR	Testscore: Y/N	Testscore: Total
33	no	-	-	-	4	3	6	13
34	no	-	-	-	3	3	4	10
35	yes	E	A	yes	3	3	7	13
36	yes	C	A,C	yes	5	4	6	15
37	yes	A	A,F	no	4	4	5	13
38	yes	B	A	no	4	4	6	14
39	no	-	-	-	4	3	7	14
40	yes	E	C	yes	5	4	7	16
41	no	-	-	-	4	4	9	17
42	no	-	-	-	4	5	5	14
43	no	-	-	-	3	4	3	10
44	yes	B	A,B,F	no	4	3	5	12
45	no	-	-	-	3	3	4	10
46	yes	E	A,B,C	yes	5	3	8	16
47	no	-	-	-	4	2	7	13
48	no	-	-	-	5	4	5	14
49	yes	E	A,B,C,D,E	yes	3	3	6	12
50	no	-	-	-	4	2	7	13
51	no	-	-	-	3	4	6	13
52	yes	C	A,C,F	yes	4	3	5	12
53	yes	B	F	no	3	4	6	13
54	yes	A	A	no	4	3	4	11
55	no	-	-	-	5	4	7	16
56	yes	B	F	yes	4	3	5	12
57	yes	A	F	no	5	3	6	14
58	no	-	-	-	4	5	7	16
59	no	-	-	-	2	2	7	11
60	yes	E	A,C,E	yes	5	4	7	16
61	yes	A	A,F	yes	4	2	6	12
62	yes	B	A,F	yes	4	4	6	14
63	yes	C	A,C	yes	4	5	8	17
64	yes	A	A	no	4	3	8	15

Participant number	Does the learner play video games?	How often does the learner play?	Which type of videogames?	Does the learner use OCT?	Testscore: MiC	Testscore: SR	Testscore: Y/N	Testscore: Total
65	no	-	-	-	4	1	9	14
66	yes	D	A,C,E	no	5	3	6	14
67	yes	D	A	yes	5	3	8	16
68	yes	A	A	yes	4	3	7	14
69	no	-	-	-	4	0	7	11
70	yes	A	A,B,E,F	yes	5	4	6	15
71	yes	A	B,C,E	yes	5	5	6	16
72	yes	A	A,B,F	yes	5	4	7	16
73	yes	B	A,F	yes	5	3	7	15
74	yes	D	A,F	yes	3	3	6	12
75	no	-	-	-	4	1	8	13
76	no	-	-	-	5	4	9	18
77	yes	E	A,B,C	yes	5	4	8	17
78	no	-	-	-	5	3	7	15
79	no	-	-	-	4	2	6	12
80	no	-	-	-	4	3	5	12
81	no	-	-	-	4	2	3	9
82	yes	E	A,C	yes	5	4	6	15
83	no	-	-	-	5	3	8	16
84	no	-	-	-	4	3	7	14
85	yes	D	A,C,E	yes	5	4	5	14
86	yes	A	A,D	yes	5	3	8	16
87	yes	E	A,B,C,E	yes	5	3	6	14
88	yes	A	E	no	3	3	7	13
89	no	-	-	-	4	2	7	13
90	yes	A	A,F	yes	4	2	8	14
91	no	-	-	-	5	2	5	12
92	no	-	-	-	3	1	8	12
93	no	-	-	-	4	4	7	15
94	yes	C	A,C,E	yes	5	3	7	15
95	yes	A	A	no	3	2	6	11
96	yes	E	A,B,C,E	yes	4	3	8	15