

Acquiring English Through Virtual Worlds

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Abstract

This article presents the results from an MA thesis published at the University of Agder in Norway in 2019 (Dasic, 2019). It studies the connection between Norwegian lower secondary pupils' gaming habits and their essay grades and lexical richness in their L2 English, as well as their attitudes towards gaming and language learning. Data were collected from 14 Norwegian lower secondary pupils, with a total of 20 essays. Three methods were used to answer the research questions. First, statistical tests were run in SPSS to discover possible differences in grades in correlation to time spent gaming. Following, a qualitative corpus analysis of 12 texts was conducted to see what lies behind the quantitative numbers. Finally, six semi-structured interviews were conducted with the aim to elicit the participants' attitudes toward gaming and language learning with their longitudinal aspects in mind.

The results revealed that there is a statistically significant positive correlation between the amount of time the participants spent gaming and their English essay grades. The findings also suggest that large amounts of time on spent gaming are beneficial to other aspects of the student's English proficiency, such as greater self-confidence when speaking English and creativity when writing. In addition, findings concerning the motivation behind gaming suggest that teachers of L2 English should be aware of the possibility to implement activities either in the classroom or as homework to enhance some of the pupils' motivation for learning English. Furthermore, some of the informants in the interviews reported a desire for more gaming centered or open-school writing tasks, as they believe it would give them a greater opportunity to show knowledge gained by gaming.

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Keywords

Virtual worlds, Second language learning, Vocabulary acquisition, Learning strategies, Learner motivation, L2 English.

1. Introduction

Because playing digital games is considered a social activity (Gee, 2000), the possible potential it has for benefiting the language learning process is of great interest. Reinhardt and Thorne (2016) point out that “[t]he language use in, around, and about games has increased in quantity, quality, and diversity, as game playing has become a truly global, interactive, multiplayer, and often multilingual practice” (p. 416). Language learning is a complex term that cannot be measured by looking solely at one component. The Norwegian curriculum of English suggests four main areas that should be part of the English subject (Utdanningsdirektoratet, 2013¹, p. 2). Not surprisingly, as words are considered the main building blocks of a language (Read, 2000, p. 1), one component that can be found in all four areas is vocabulary. Therefore, the present study, which is a revised version of an MA thesis published in 2019 at the University of Agder (Dasic, 2019), taps into the fields of gaming and vocabulary acquisition. The purpose of the study is to investigate the connection between Norwegian lower secondary pupils’ gaming habits, their essay grades, and their lexical richness, as well as to offer the gamers’ attitudes towards gaming and language learning. The study will employ the following research questions:

RQ1: Is there a correlation between the amount of time Norwegian teenagers spend on gaming, their English essay grades, and their lexical richness?

RQ2: What are the Norwegian gamers’ attitudes towards gaming and language learning?

2. Theoretical framework

2.1 Motivation

According to Ortega (2009), motivation may be the deciding factor when it comes to acquiring a second language. She defines motivation as “the desire to initiate L2 learning, and the effort employed to sustain it” (p. 168). In his Affective filter hypothesis (1982, p. 29), Krashen explains how, if negative, emotional factors can hinder the acquisition of a second language. He

¹ The MA study on which this article is based was published in 2019, when the 2013 version of the curriculum was still current.

further notes that the aspect of motivation is important, claiming that language teaching that fails to inspire motivation leads to boredom and affects the acquisition negatively. To understand motivation in video games, Przybylski, Rigby and Ryan created a model saying that the players meet several basic human needs through gaming (2010, p. 155). They further focus on three needs particularly found in video games: autonomy, competence, and relatedness. Today's games are designed to meet the players at their level of skill and challenge them as they go. In addition, players can play and chat with players at the same level, and many games reward trophies as the players advance. Their competence is continuously challenged and improved. Games are also designed to give room for players to solve problems and make their own important decisions. Minecraft, which has been a popular game among teenagers in the past years, is an example of a game that allows for total autonomy. The only goal is to survive in an enormous world of monsters. If a player dies, he needs to start over by collecting new resources and building shelters, but he is free to make his own choices (Duncan 2011, p. 7). According to the theory of Przybylski et al. (2010), this autonomy should be highly motivating. In recent years, many single-player games have been released as multiplayer versions, suggesting that the developers of the games are aware of the motivation brought by social interaction.

Gee (2007) defines several learning principles encouraged by gaming, which he claims can be applied to language learning. Although he does not focus on L2 learning, his work can be transferred to second language acquisition and should not be left unmentioned. The Practice Principle, for example, is about the time learners spend on gaming, without the focus being merely on learning. He writes, "learners get lots and lots of practice in a context where the practice is not boring" (Gee, 2007, p. 68). Another of his twenty-six principles is The Principle of Competence, suggesting that when gaming, learners can "Operate within, but at the outer edge of, his or her resources, so that at those points things are felt as challenging but not 'undoable'" (Gee, 2007, p. 68). We can then assume that, while gaming, learners can practice and acquire language in a space that is challenging, but not overwhelming. Additionally, Gee continues, students need to experience the actions to which the words apply. When this is done over time, the ability to build simulations in the student's mind of how the words are used in different contexts will improve. The ideal place to practice this understanding of situated meanings is in video games, as they are "action-and-goal-directed preparations for, and simulations of, embodied experience" (Gee, 2007, p. 205).

In video games, players are interactive, meaning that the player does something and the game does something in return. This encourages action and decision-making, giving the players the role as co-creators of the world they are engaging in. Furthermore, deep learning requires a

prolonged commitment, one that can be acquired when people get heavily invested in a new identity (diSessa, 2000). Games often offer the possibility for the players to project their own fantasies and desires onto the character, giving them a new life in the game world. This commitment to a new identity is highly motivating, and motivation is an essential factor for language learning.

2.2 Knowledge of a word

Although there are several components to knowing a word, researchers do not agree upon a universally accepted model of vocabulary knowledge. The issue of what is considered knowledge of a word has been addressed by Nation (2001), who has developed a model that separates the knowledge of a word into three main areas: the form, the meaning, and the use. These are further divided into three subareas each, followed by nine areas that can be known receptively or productively. This is the distinction between a learner's ability to recognize and understand a word when reading or hearing it (receptive knowledge), and a learner's ability to use the word independently (productive knowledge). According to Nation, the latter requires a higher level of knowledge. He further states that knowing a word according to these idealized measurements applies only to a small proportion of total vocabulary, rather than being a realistic description. This was also noted by Meara (1996a, p. 46), who says, "it might be possible in theory to construct measures of each of these types of knowledge of particular word; in practice, it would be very difficult to do this for more than a handful of items".

Other researchers describe vocabulary knowledge in three dimensions located in a "lexical space" (Daller, Milton & Treffers-Daller, 2007). The first dimension is referred to as lexical breadth or size, and represents the number of words a learner knows, without considering how well these are known. This is the concern of the second dimension, called lexical depth. The third dimension considers how quickly a learner can manage to use the form or meaning of a particular word from memory and is called lexical fluency. Palmberg (1987, as cited in Laufer, Elder, Hill & Congdon, 2004, p. 400) gives yet another explanation of what it means to have word knowledge. He states that there are progressive levels of lexical knowledge, starting with the learner only being familiar with the given word and ending with the learner being able to use the word in free production and correctly. This distinction between receptive and productive vocabulary knowledge seems to be common in the discussion about what it means to know a word, although the understanding of these terms seems to vary. Receptive knowledge, sometimes referred to as passive knowledge, is in most cases interpreted as the learner being able to

recall the meaning of a presented word form. Productive, or active, knowledge is usually interpreted as the capacity to use the right word to convey the desired meaning (Nation, 2001; Laufer et al., 2004). However, productive knowledge can be interpreted in two different ways (Laufer, 1998). When a learner is using a word in spoken or written language at free will, productive knowledge is free. On the other side, if the learner is forced to produce the right words in, for example, a translation test, this is called controlled productive knowledge. Because the present study deals with free written production, the focus will be on the free productive vocabulary knowledge. The term lexical richness will be applied in connection to free written production and function as an umbrella term for more specific measurements (see Section 2.4 below).

2.3 Word frequency

Researchers have been publishing reports of systematic attempts to measure vocabulary size for over 100 years (Schmitt and McCarty, 1997). Although their motivations are many, the assumption is that a large vocabulary reflects how much education or knowledge a learner has (Nation and Waring, 1997). When attempting to measure vocabulary size, they assume that learners acquire the words used most frequently in the given language first and the less frequent words later in the process. Because of this, the tests are often centered on word lists created using a corpus of written texts. Generally, this seems to be valid as measurement and research done so far have confirmed that word frequency is effective when evaluating English learners' vocabulary size (Daller et al., 2007). The General Service list with 200-word families has for a long time been considered the most concise list and is widely used by researchers (Browne, 2014, p.1). However, word lists based on the British National Corpus have, in the later years, also gained an important position in the field. It is expected that a native speaker has a foundation of 20.000 known word families of their language, and at the same time gains approximately 1.000 new per year (Nation, 2001, p. 9). For learners of a second language, however, it is considered appropriate to have a vocabulary consisting of the 2,000 most frequent words used in the given language to be able to read and understand (Thornbury, 2002, p. 21). According to Nation, these high-frequency words are mainly learned in the classroom (2005, p. 582). Other words that are typically acquired out of school are called mid and low-frequency words (Nagy, Anderson, Pearson & Herman, 1987, p. 3)

2.4 Measuring lexical richness

Although there is little agreement among researchers about which methods might be considered most suitable when measuring vocabulary knowledge (Milton, 2009, p. 125), we can generally

say that the number of distinctive words used is a measure of lexical richness. Simply counting the types in a text can provide us with this information. However, because texts are of different lengths it would be difficult to compare this number. Another approach is counting the different tokens for each type in a text, a well-known method called the type token ratio (TTR). The problem related to text length, however, remains the same. Either regulating the time of collection or the number of words in samples or making the already collected texts equal by cutting the length could solve this problem (McCarthy, 2005). However, each of these suggestions can question the validity of our data collection. If we choose to interfere during the collection, this might have an impact on the data material we finally get. On the other hand, if we choose to cut the text to a given number of words, we might end up looking at one whole text and only parts of another (McCarthy, 2005).

The measurements described above (TTR) do not consider the word frequency but focus solely on counting types and tokens. This is called lexical diversity, and some researchers believe that it is not a good indication of vocabulary knowledge (Laufer and Nation, 1995). Including word frequency and focusing mainly on low-frequency words would, according to Laufer and Nation, be a better indication. They hence developed measures of lexical sophistication and designed the Lexical Frequency Profile (LFP), a tool for testing learners' vocabulary. In addition to measuring lexical diversity and lexical sophistication, Daller et al. (2007) and Read (2000) point out additional aspects to the measurement of lexical richness. They mention lexical density (LD), which is the proportion of all lexical words in the text, as another significant measurement. In addition, it is possible to measure lexical individuality (the number of unique words applied by one person compared to the group). There is, however, not one generally accepted definition of the term "lexical richness", as the terms are used differently among researchers. McCarthy (2005), for example, considers lexical richness to be more specific, such as the description of lexical sophistication given above. In this study, lexical richness will be divided into three parts: measures of lexical diversity, lexical sophistication and lexical density.

2.5 Previous studies

In 1991, Hubbard brought computer games and learning together by focusing on whether the linguistic quality of interaction through games is rich enough to provide learning or not. Subsequently, many studies have focused on incidental language learning, and Cheung and Harrison (1992) found that the participants acquired game-specific words thanks to a great amount of time spent gaming. In later years, a much greater number of studies have been published on

this topic. Amongst others, Thorne, Black and Sykes (2009) wrote a review of the existing research discussing learning not only in connection to gaming, but also to Internet communities. These communities are often referred to as virtual environments and are created by players who play multiplayer online games (MMOs) (p. 808). To progress in these types of games, players are often forced to communicate with other players. It is, however, unknown if the language of communication in virtual environments is transferable to other contexts (Thorne et al., 2009, p. 810–811). As Gee (2007) mentions in his book, incidental learning, for example, through communicating, is what is encouraged through digital games. Such investigations are relevant to the present study, and several have been done in the past years. In 2011, Cobb and Horst (p. 25) instructed Francophone L2 English learners in Canada to play a mini-game and found an increased speed of lexical access and improved vocabulary. They concluded that the time spent gaming was vital and claimed that a 90-days long period of gaming was needed to provide progress. In another study in the US, English L3 university students played *EverQuest 2*, a multiplayer online game where students have their virtual identities. In this study, Rankin, Gold and Gooch (2006) found positive results regarding vocabulary acquisition, likely because of the interactions with non-playing characters in their virtual rooms. In Asia, Reinders and Wattana (2011) recorded Thai students while they were playing the MMO *Ragnarok* and looked for how much and how good the L2 interaction was, as well as the learners' eagerness to communicate. Over the course of three sessions, they found positive effects, as the participants spoke more, as well as more comfortably. However, they did not see any significant improvement in the quality of the interactions (2011, p. 14–23).

A study done in Norway by Sletten, Strandbu and Gilje (2015) found a connection between students' grades in English and gaming. They did an analysis of a national survey involving over 4000 students between the ages of 13-16 and found that, although frequent gamers had lower scores in Norwegian and Math, they outperformed the non-gamers in English. In a similar study in Sweden, Sundqvist and Wikström (2015) also found a positive link between the amount of time spent on gaming and the students' English proficiency. With 80 students between the ages of 15-16 who did a national writing test, Sundqvist and Wikström found that students who reported playing games a minimum of five hours per week wrote more complex words than their peers who reported no time spent gaming. A more recent study done by Sundqvist (2019) found that teenagers who play computer games in their spare time receive a large English vocabulary and are especially good at difficult words compared to peers who do not play. In addition, Sundqvist (2019) found that the time young people spend playing proves to be of greater importance for vocabulary than what kinds of computer games are being played. The study was

carried out for three years and comprised 1,069 ninth grade students around Sweden. The pupils did two different word tests in English. In one, their productive word skills were tested, which meant that they were supposed to write the right words in English in a given sentence. In the second test, the students' receptive vocabulary was tested, and the task was to pair words in English with the correct explanation in English. The pupils also had to answer a survey about how they usually use English outside school hours, and habits around computer games were specifically addressed. The researcher studied the tests in detail and saw that the word knowledge extended beyond typical game terms and expressions, including words from different frequency levels (K2: wealth, lack; K3: acid, lawn; K5: oath, cavalry and academic: saturated) (Sundqvist, 2019, p. 99). The word frequency programs used in this study operate with four-word lists: K1 (1-1000) are the most frequent words, followed by K2 (1001-2000), K3 (2001-2802) and NAWL (963 lemmas). Additionally, words can be marked as off-list if they are not found in any of the lists mentioned above. The study also included a small qualitative study with 16 students. They answered the same questionnaire and were also interviewed about extramural English. They got questions about computer games and about how often and actively they take part in English activities via various media, for example, through movies and YouTube clips. Sundqvist (2019) also collected the students' essays from the national test in English to map the use of advanced and unusual words and expressions through frequency lists; the study of the essays confirmed the results of the larger selection. The participants who were used to playing games were good at using advanced words in writing. Some of the non-players were also very good, but only those who described themselves as big consumers of English in their spare time.

3. Material and Methods

3.1 Context of study and participants

In total, 14 pupils from one class participated in this study during school year 8 (6 pupils, 5 male and 1 female) and year 9 (14 pupils, 6 male and 8 female), when they were from 13-14 years old. Questionnaires were used to collect data about student's L2 habits and demographic information. In such information-gathering surveys, there is a chance that respondents give responses that are safe, and not necessarily true (Ary, Sorensen & Walker, 2014). This might happen if the respondents are afraid that their answers will not be anonymous, or if they give responses, they think the researcher wants to obtain (p. 436). Although it is difficult to know if

all answers were given truthfully and this could be a potential invalidity, all informants were assured total anonymity. In addition, the interviews conducted aimed to strengthen this validity.

Tables 1 and 2 present the pupils' gender, English grade (from 1-6 where 1 is the lowest and 6 is the highest grade), first language (L1), languages they comprehend in addition to L1, level of EE (extramural English) engagement (gaming excluded) and time spent on gaming. The level of EE engagement was established based on total self-reported data about how many hours weekly they read English (Internet, books, Magazines etc.), write English (chatting, emails, texting etc.), talk English (in person, online, on telephone etc.), watch (series, movies etc.) with English speech (with and without Norwegian subtitle) and listen to English (audiobooks, radio programs, podcast etc.). Total hours were counted, and the division was made between low (below 5 hours), medium (between 5-10 hours) and high (over 10 hours) levels. In the quantitative corpus analysis, the pupils were grouped according to their weekly gaming hours, starting from non-gamers (0-1 hours) and low frequent gamers (1-4 hours) to moderate gamers (5-10 hours) and high frequent gamers (10+ hours). Such divisions have earlier been used by Sundqvist and Wikström (2015).

Table 1: Information about the year 8 participants' backgrounds

Pupil	Gen-der	Grade	L1	Languages in ad-dition to L1	Level of EE engagement	Time per week spent on game-play
P60203	M	2+	Norwegian	English	Low	1-4
P60204	M	5-	Norwegian	English	High	5-10
P60206	M	4	Norwegian	English	High	5-10
P60208	F	4	Norwegian	English	High	1
P60211	M	5-	Norwegian	English	High	5-10
P60215	M	4-	Kurdish	English/Norwegian	High	1-4

Table 2: Information about the year 9 participants' backgrounds.

Pupil	Gender	Grade	L1	Languages in addition to L1	Level of EE engagement	Time per week spent on gameplay
P60200	F	4-	Norwegian	English, German	Medium	0
P60201	M	3+	Norwegian	English	Medium	1
P60202	F	4-	Norwegian	English	Medium	0
P60203	M	4	Norwegian	English	Medium	5-10
P60204	M	5	Norwegian	English	High	10+
P60205	F	4	Norwegian	English/German	High	0
P60206	M	4-	Norwegian	English	High	1
P60207	F	4	Norwegian	English/Icelandic	High	0
P60208	F	4	Norwegian	English	High	1-4
P60209	F	4	Norwegian	English/Mandarin	High	0
P60211	M	6-	Norwegian	English	High	5-10
P60212	F	4	Norwegian	English/French	High	0
P60213	F	6	Norwegian	English/French	High	1-4
P60215	M	4+	Kurdish	English/Norwegian	High	5-10

3.2 Data collection and material

The texts were compiled as part of the TRAWL (Tracking Written Learner Language) corpus (Dirdal et al., 2022). Further, the subcorpus utilized in the present study consists of six L2 English texts written by pupils in year 8 and 14 texts written by the same pupils in year 9 at one lower secondary school. The collected texts were all written in the second semester of the respective year. The texts were written as part of the mandatory English mock exam in 2017 and 2018. All aids except the Internet and communication were allowed. This is considered a weakness because the present study is focused on vocabulary knowledge, and the participants had the chance to use a dictionary during the data collection. However, as this is the norm for writing test in Norway, it could also be considered a strength that the testing situation was not artificial or felt unusual for the participants. In addition, the testing time was limited, and all factors were the same for all participants, making them comparable even though they had the possibility to make use of different aids. Not all texts are answers to the same questions, but through a manual reading process, only texts of the same genre for each year were included in the study. To improve the validity of comparison, two of a total of 16 texts were removed from the data due to their distinction in genre and thus terminology. All texts had been anonymized and cut to a length of 300 words.

To answer the second research question, an open or semi-structured interview was considered most suitable. According to Dörnyei (2007), this is a good choice when the researcher is familiar with the “domain in question” (p. 136). The information about the pupils and their profiles conducted beforehand provided insight into the informants’ gaming routines, and background questions such as gender and age were not necessary. An open-ended interview guide was constructed with the aim of eliciting the pupils’ thoughts and attitudes towards the use of digital gaming in connection to language learning. It consisted of five questions with bullet points containing keywords or sub-questions attached to each question (see Appendix 1). Depending on how the interviews developed, the bullet points were assumed to function as cues or follow-up questions.

Although the pupils were in year 10 at the time of the interview, the same six pupils who took part in the corpus analysis by year 8 and 9 agreed to participate in the interviews. Because they already had agreed and signed consents to participate in the TRAWL project, only an oral confirmation from both their teacher and all participants was required. However, they were all informed about the topic of the conversations and assured total anonymity prior to the interviews. Because it was assumed the informants would feel most comfortable expressing their opinions in their first language, all interviews were conducted in Norwegian. The interviews were 15-20 minutes long and completed in March 2019. During the interview, the researcher took notes and although not used consecutively, the interview guide was brought and functioned as a guide. In total, the informants consisted of five male and one female student and were all given fictitious names in the present article. Except for Martin, all informants were categorized as “high” on the level of EE engagement scale both in year 8 and 9. Martin went from low in year 8 to medium by year 9. Their time gaming ranged from 1 to 10+ weekly hours and varied from year 8 to 9. Table 3 gives an overview of information about the informants employed in the interviews.

Table 3: Information about the interview informants

Informant name (fictitious)	Gender	Time spent gaming Y8	Time spent gaming Y9
Martin	Male	1-4	5-10
Frank	Male	5-10	10+
Casper	Male	5-10	1
Andrea	Female	1	1-4
Jens	Male	5-10	5-10
Simon	Male	1-4	5-10

3.3 *Data analysis*

The corpus analysis was implemented both in a quantitative and qualitative manner. In the quantitative analysis, the focus was on numbers that could be significantly tested, validated, and compared, whereas the qualitative analysis intended to find emergent patterns and common occurrences in the texts.

All texts were cut to 300 words, and lemma was chosen as the definition of a word. Lemma is the base of a word and its inflections, and it was assumed to be closest to what the students know. Word family was considered but was deemed to give a faulty picture of the students' knowledge, because assuming knowledge of both the derived and inflected word form is considered too advanced. In addition, the version of VocabProfile (v.2, 2019) (Cobb, 2019) used in this study defines a word as a lemma. The transcripts were put into Cobb's (2019) Compleat Web VP v.2 to generate counts of tokens and types. However, spelling errors, proper nouns and occasional Norwegian words were corrected or deleted to assure that the counts only represent English words. This has previously been done by several researchers in the field of SLA (Laufer and Nation, 1995, p. 315; Horst and Collins, 2006; Helness, 2012, p. 149).

Because the decision of whether the participant misspelled or did not know the word was taken by the researcher, it was a minor concern regarding validity. However, from the context, it was mainly clear whether the word was used right and misspelled, or if the participant clearly did not understand the word. In addition, students' use of advanced or infrequent vocabulary was assessed with the help of frequency lists. For each text, the lemmas were counted, and the lexical density was measured in the Compleat Lexical Tutor tool. This tool creates a lexical frequency profile for each text, sorting the lemmas into a frequency list and calculating TTR and lexical density. Although the program offers several different word lists, the New General Service List (NGSL) is intended for secondlanguage learners of English (Browne, 2014, p. 1). Therefore, the NGSL was most suitable for the present study.

Although numbers are not usually used in qualitative corpus analysis, there seems to be value in combining findings from the qualitative analysis with numerical frequencies. This is called a side-by-side approach, where the researcher first presents one set of finding and then the other, before the findings are compared and discussed (Creswell, 2014, p. 215–223). However, this comparison does not always yield a clean convergent situation. In the present study, the constructs of the quantitative corpus analysis are possibly limited, because a larger collection of data is needed to conduct meaningful statistical tests.

All statistical tests were conducted in SPSS for Macintosh (v. 25; SPSS Inc, Chicago II, USA). Independent Kruskal-Wallis tests were used to calculate significance and effect size for

tests with numeric variables because there were more than two gaming groups involved (Robson, 2002, p. 443). The correlation of Spearman's rank order was used in the analysis of correlations involving ordinal data. The numbers from the quantitative data were analyzed using inferential statistics, whereas the qualitative corpus analysis is presented with chosen parts of the student's texts, which show patterns and support the quantitative data.

The second research question was based on interviews and analyzed in an inductive manner. Although the goal of qualitative research is not to generalize (cf. Ary et al., 2013), it can be argued that the transferability is strengthened because many of the findings from the interviews corresponded with the corpus data. However, as the study only included 20 essays and there were only six informants in total, it is difficult to generalize the results.

4. Findings

4.1 English essay grades and time spent gaming

To calculate the correlation between the amounts of time the Norwegian learners spent on gaming and their L2 English grade, and because the data was not normally distributed, a Spearman's correlation test was performed. The relationship between grades and gaming is shown in a scatterplot in Figure 1. Generally, there is a moderate positive relationship, as grades go up as the amount of time spent on gaming goes up. There are two outliers, but they were, in this case, not considered extreme enough to be a data entry error. Additionally, the monotonic relationship was deemed valid because Spearman's correlation is not very sensitive to outliers (Robson, 2002, p. 423).

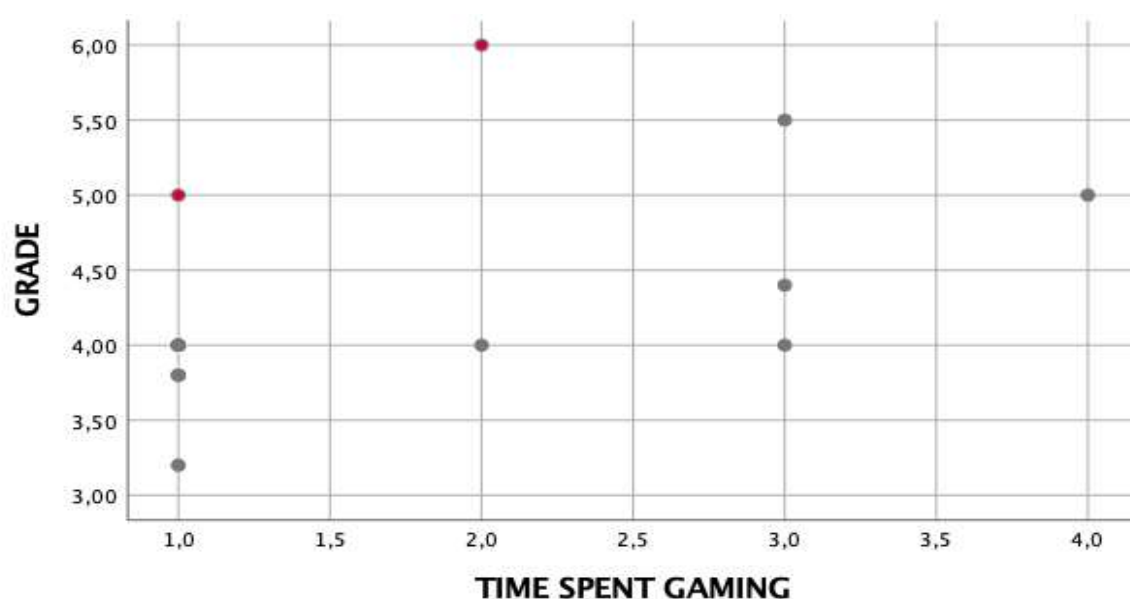


Figure 1: The relationship between grades and gaming

Spearman's rho measures the strength of association between two variables and was run to determine the relationship between the 14 students' English grades and the time they spend gaming. Presented in table 4 is a strong, positive correlation between gaming time and English grades, which was statistically significant ($r_s(8) = 0.715, p = 0.004$).

Table 4: Spearman's rank-order correlation between gaming time and English grades

		Grade	Gaming Time
Spearman's rho	Grade	Correlation Coefficient	1,000
		Sig. (2-tailed)	.
		N	14
	Gaming Time	Correlation Coefficient	0,715 ²
		Sig. (2-tailed)	0,004
		N	14

Presented in Table 5 is information about the students along with their English habits, grades and TTR, LD and LFP scores for each text.

Table 5: Information about the participants' English habits, grades and TTR, LD and LFP scores for each text

Pupil	Martin	Frank	Casper	Andrea	Jens	Simon
Gender	M	M	M	F	M	M
Time spent on gameplay Y8	1-4	5-10	5-10	1	5-10	1-4
Time spent on gameplay Y9	5-10	10+	1	1-4	5-10	5-10
Grade Y8	2+	5-	4	4	5-	4-
Grade Y9	4	5	4-	4	6-	4+
Level of EE engagement Y8	Low	High	High	High	High	High
Level of EE engagement Y9	Medium	High	High	High	High	High
TTR Y8	0.46	0.43	0.43	0.55	0.58	0.46
TTR Y9	0.46	0.48	0.42	0.50	0.53	0.47
LD Y8	0.44	0.40	0.38	0.45	0.48	0.40
LD Y9	0.44	0.41	0.47	0.45	0.46	0.45
LFP Y8	7	11	11	16	28	10
LFP Y9	12	17	21	12	19	18

4.2 Behind the numbers

What follows is a short analysis and comparison of a part of the students' essays (300 words) from year 8 and 9, linked to information from table 5. Two illustrations are included in what follows. All NGSL_3, NAWL and Off-List are marked yellow in the text.

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

Example 1, Martin (Y8)

it was early in the morning and I woke up by someone saying you need to wake up. it was my little sister that woke me up. I saw out the opening of the tent and that people were already awake and began making the breakfast. here in our tribe we have breakfast together. I got my clothes on and walked out. when I walked out I saw my father with the fire making corn with bread. I walked over and met him with a smile. But he did not smile back. I asked what is wrong. He answered the other tribe hours away has been attacked. by who He answered I do not know with a sad face. I walked away and was on my way to my tent again. but I did not come that far before one of the scouts that was on the north ridge came down screaming they are coming! the people in our tribe started panicking. But my father got everyone to calm down. He said we do not know if they know we are here, maybe they just walk past our camp. Nevertheless he was wrong. Suddenly I heard gunshots and people screaming. I grabbed my sister and ran. My friend that ran beside me got shot in the head and fell right in the ground. I turned around and saw the camp on fire. I saw how the white men cut of the hair to the women and shot people. But then I got a gun stuck in the face and passed out. I woke up and saw around me. I saw the camp, or what was left of it. almost everything was burned down and there were dead people lying on the ground everywhere. I stood up and then I realised

Example 2, Martin (Y9)

Hi my name is i am years Old. I live With my dad, mom and Brother. I play on my pc. One day i played a Player did come over to Me and Said hi. I said hi back, we played together for years and now he wants me to meet him. He asked if I wanted to join him on the Holiday. week after, they were right out side the house. I said bye to my mom and dad, my brother were on his room. after a hour we stopped, I saw a nice cabin. said there are we gone live. Yes i said. We ran out of the car and stopped at the cabin. I saw his parents walking another way. I asked were they are going. He said they have their own cabin, This is mine. I have two computers, we can play or. But I do not have. No problem I have. We walked is side and it was big. We began to play, we played the whole night. After that we heard a strange noise. It was like someone was scratching on the door. Then the light went dark and we heard the door opened. I said Where are you, I said it very low. He said right over here. I slowly began to walk over. Than I saw a creature that I have never seen. It had long big eyes and a long body. I was on the floor. The thing saw me and made a big noise. It punched me and everything went black. I woke up in my bed. It was a dream. But then I saw the door was open and was on the floor. I saw that half of my body was gone. And after that creatures came in and

In year 8, Martin reported spending 1-4 hours on gaming every week and his final essay was graded 2+. However, in year 9, he reported 5-10 hours of gaming per week, and his essay received a grade of 4. No difference appeared in the two texts' type-token ratio or lexical density. However, in year 9, Martin used a higher number of advanced words in his text compared to year 8. In addition, his level of EE engagement went from low to medium, meaning that he got more English input during year 9 compared to year 8. Interestingly, his essay from year 8 is a story about gaming and how the main character meets up with a friend he met through the game and with whom he has been playing for years. Additionally, in his year 9 essay, Martin has several words marked yellow which are particularly interesting in terms of gaming, such as: *scouts*, *tribe*, *gunshots*, *screaming* and *ridge*. Although it is beyond the scope of this study to draw connections between words used in the students' texts and the games they have engaged in, some findings from the texts will be discussed in relation to the interviews.

During year 8, Frank reported 8-10 gaming hours per week and his essay was graded a 5-. However, he increased his gaming to 10+ hours a week the next year and received a 5 on his final essay. He did not report any other changes in his EE activity, and the level was deemed to be high in both years. Remarkably, Frank improved his type-token ratio from 0.43 to 0.48 from year 8 to 9. His lexical density also increased and his essay in year 9 consisted of more advanced words compared to year 8.

As reported by Casper, his gaming time went from 5-10 hours a week during year 8 to only one hour a week during year 9. His overall EE activity otherwise remained high during both years. His essay score by the end of year 9 year was slightly lower compared to year 8, as he went from 4 to 4-. The type-token ratio score decreased from year 8 to 9, notably, the score was 0.42, which is the lowest score among his peers. However, Casper increased his lexical density and scored higher at lexical proficiency using more advanced words by year 9. Nevertheless, when analyzing Casper's essay from year 9, it was found that many simple verbs were repeated throughout the text. This might be the reason for his low TTR score, and at the same time, the increased LD score. Because lexical density only measures lexical words divided by the total number of words, the issue of repetitive word use is not considered.

Andrea was considered a non-gamer during year 9, but as she increased her gaming from one hour to 1-4 hours, she joined the low frequent group of gamers. Her overall EE activity level was reported as high during both years. Her essay grade scores were equal, and her lexical density did not change. However, her high TTR of 0.55 decreased to 0.50 by year 9. In her essay written in 8th grade, 16 advanced words were found, whereas 12 were found in 9th grade.

Arguably, in both her essays, numbers (*two, five, seven, six, two, three*) are counted as advanced words according to Cobb's (2019) Compleat Lexical Tutor tool.

During both 8th and 9th grade, Jens reported spending 5-10 hours gaming each week. In addition, he was highly active in other EE activities. His essay received a score of 5- in year 8, and by year 9 his essay grade went up to 6- Remarkably, his TTR, LD and LS scores decreased from year 8 to 9. When reading the texts, it was noticed that many of the sentences Jens wrote in his 8th-grade essay repetitively started with the word "The" and "I". By year nine, Jens showed a greater variety in his sentence structure, including linking words such as *suddenly, however, during* and *while*. This provides both better structure and flow to the text, which is interesting in terms of how Jens describes his own L2 English writing practice through the interviews. This will be further discussed in the next chapter.

Simon reported an increase in gaming time from 1-3 hours a week in 8th grade, to 5-10 weekly hours during year 9. Following the increase in gaming time, his TTR, LD and LS score all improved from year 8 to year 9. His overall EE activity remained high during both years, and his essay grade went from 3+ to 4+.

4.3 Norwegian pupils' attitudes towards gaming and English proficiency

It is important to note that the informants knew that the focus of the interviews was on gaming, and that they were chosen because they had reported a change in their gaming time from year 8 to 9. Because the interviews were conducted in Norwegian, all utterances presented are translated into English by the author. The results will be presented based on themes emerging from the qualitative analysis. In addition, connections will be drawn to the results from the qualitative analysis presented above.

4.3.1 English acquirement

When asked where they believed to acquire most English, there was an overall agreement among the informants. They all answered that most of the learning happened in their spare time at home, but they varied somewhat as to which activities they assumed to be most beneficial to English language acquisition. Martin was convinced that most of his English competence was gained through gaming. He said:

I play CS:GO, usually two-three hours a day. In 8th grade I didn't have a gaming PC, and therefore I couldn't game as much as I wanted to. After my confirmation I spent all my money to buy one (computer), and then I started gaming a lot. I subsequently bought a professional headset, because it is all about communication.

The lack of a PC and headset explains the findings from the qualitative corpus analysis, where it was found that Martin increased his game time notably from year 8 to year 9. Martin further explained that he usually spends two-three hours gaming a day with his team, where many of the players are from the US.

Both Frank and Casper also thanked their gaming effort for their English skills but focused their attention on a communication platform called "Discord". Frank said, "I usually join different chat rooms, depending on what game I decide to play. Before, we used to chat, but now, as the communication needs to be immediate for us to win, we usually only talk". Casper added that it was easy to pick up words and phrases, especially from his friends from the US. He said, "You kind of adapt your language to theirs. The pronunciation as well. I usually play PUBG, it is the best game".

Andrea, who is not as big of a gamer as the other informants, reported learning as much through gaming as through watching Netflix and movies with English subtitles. Additionally, she enjoyed watching her brother play; meanwhile, she felt that her language abilities in English improved. She added:

At school I feel like I'm learning a nice English language, I mean, like, proper language. But through gaming you learn to talk like the natives. Like, phrases that you can use in everyday talk. I've learned a lot of cool expressions through Minecraft, and a lot through Netflix.

Jens also agreed with his peers about where he thinks he acquired most English. Like Frank, he also spent a lot of time on the communication platform Discord. "It's kind of like Skype, but you can choose different rooms to join. The servers are divided into themes and different games". Additionally, he described his aspiration to reach a high level in the game:

I do a lot of gaming research on YouTube. If you want to be at a high level, you need to learn tips and tricks from others. I've noticed that my self-confidence in talking English has improved a lot, because I've been forced to both listen and talk in order to be really good [in games].

Simon stated that he thought he learned the most from YouTube, but a lot from Netflix and gaming as well.

Before, I used to chat a lot when gaming, so I learned to write English really fast. It has helped me during the tests [at school]. I always finish fast. Now I mostly talk so I don't learn as much writing, but my talking, or what is it called, pronunciation? It is much better.

4.3.2 Skills gained through gaming

When asked what they think about gaming and learning in general, and what they think they have gained through playing, several different theories emerged. Martin emphasized the fact that playing games is, above all, very motivating.

I usually can't wait to play. So, it's not like I put it off like I do with my homework sometimes. I count the hours until I can play again. I guess because I do it a lot, like the frequent repetition, made me safer in talking English. Also, my responsiveness, I think it is much faster now than when I started playing.

He further explained how good cooperation is essential if you wish to succeed in a game, saying it took him some time to learn because he is a bit shy. However, when he got to know his teammates, he found it much easier to cooperate with them.

After giving his answer some thought, Casper answered that he believed he is much more creative. "Often, I write about some gaming experience in my school texts, or something I wish would happen in a game. It's a world beyond the boring everyday life, and I think it has given me some new perspectives". He added that he believes he is much faster thanks to the frequent gaming, both in his reactions in general but also when he writes on his computer. His wish is for the schools to implement a subject where the pupils can learn to write on the computer, saying, "I feel bad for those who still write with only the index finger". Andrea once again mentioned her brother. "I think he has developed his brain because of all the gaming. Like (laughing), he is much smarter now. I mean, it makes sense, you have to think a lot and very fast".

Jens believes that there is a subconscious motivation that he finds important. "I play a game that requires you to be very strategic, and you need to be into politics. It's called Atilla Total

War”. He explained how the game is about war and politics, and that he has done a lot of historical research. He continued, “And I don’t look at it as learning if it is to advance in the game. Then, it is kind of part of the game, even though I probably learn a lot”. Simon emphasized the communication that he believes is essential to both gaming and language learning.

You don’t really have a choice but to communicate in English. And yes, of course, you learn a lot by doing that for several hours each day. You can see what they [the other players] write and respond to, or nowadays, we mostly talk. Isn’t it obvious [that language learning is happening]?

4.3.3 *Strategies*

As a follow-up question to the communication part, all informants were asked what kind of strategies they had for the communication to flow. The question was further explained and formulated in this manner: “Do you ever find yourself not understanding parts of the communication and if so, what do you do?” Although some answered that it was rarely a problem because the English they use is considered simple, interesting tactics to ensure there is flow in the communication emerged. One strategy they use is to assume the meaning of the given words from the context. One reason for this tactic seems to be the lack of time, as Casper noted: “... I sometimes do a search on Google translate, but often there is no time. We must play fast and so I just assume what they mean out of the contexts”. However, both Frank and Simon reported using some of the strategies recognized by Gee (2007). Frank said:

... Oh, yes, it’s not a big deal. I just ask, like, what do you mean, or can you reword that, and then they quickly do”. Similarly, Simon reported, “... If some of my mates say words that I don’t understand, I just ask them what that means. They always explain or find another way to say it, so that it makes sense to me.

In addition, Google was mentioned by several of the informants, but rather as a tool to be used before the game starts. In order to know exactly what to do, Google was also the goto tool for Andrea: “... When I used to play Minecraft, I had to Google some words, either before or during the game. But not too many, just some that would tell me exactly what to do”.

When asked if the participants believed that their gaming-habits attributed specifically to their English language knowledge, they all firmly agreed that they did. Interestingly, all informants revealed that they had more self-confidence and felt safer talking English in the classroom

thanks to their gaming experience. Martin said that he felt like his overall English knowledge had improved thanks to gaming, but especially his ability to express himself orally. “I’m sure, because of the servers where we talk to other players, that my speaking skill has improved a lot”. Frank also expressed that the most noticeable improvement was the oral part. “Although I feel like my vocabulary is larger, I don’t notice it as much when I am writing, but when I speak, I feel more confident. I feel safe because that is what I do every day, I guess.” Andrea stressed that the repetition, both when gaming and watching Netflix, made her remember new words and expressions. “Yes, I’ve picked up words both from Minecraft and shows that I watch frequently. The words and phrases that I encounter over and over again are easy to remember.” Jens noticed that his ability to build sentences had improved during his gaming time.

It has helped me a lot to listen to people that have English as their mother tongue. I’ve learned to structure my words, and my sentences have improved both when I write and talk. When I write, I usually have to say the sentences in my mind to hear if they are correct, though.

Interestingly, when reading Jens’ two texts, it was noticed that he had a better structure and flow in year 9, avoiding repetitive words such as *I* and *The* and including several linking words. Simon did not notice any improvement in his written proficiency, but he feels much safer talking English in class.

I used to be afraid to say something in English class, and my teacher said that I had to be more active. I hated it before. Now it’s a piece of cake. I know how to answer questions and I don’t need to prepare.

He pointed out the improvement has been clear to him during the last year, also shown by the qualitative corpus analysis where he reported to have increased his gaming from 1-3 hours a week in 8th grade, to 5-10 weekly hours during year 9. However, even though he said that he could not notice any improvement in his written proficiency, his essay grades went from 3+ in year 8 to 4+ by year 9.

4.3.4 Transferable skills and knowledge

The informants were asked if they felt like they could use what they learned from gaming in their writing tasks and if they were interested in learning English to succeed or advance in

gaming. When asked for an example of words that he gained from gaming, Martin said that he used the term “GG” (*good game*) a lot when gaming, but it has now transferred to, for example, the soccer court or to the classroom: “If a mate of mine finishes a task or scores a goal, I can just say GG, and everybody understands it”. In addition, the word “camp” is used as a strategy when playing games, as in “camp by the stairs” (watch the stairs). In real life, Martin explains, “camping by the stairs” means that is where they meet or hang out. “I also use words from gaming like my tribe, guns and shoot, because they often make part of the story I’m writing”, he continued. This is noteworthy, as the qualitative analysis found words such as *scouts*, *tribe*, *gunshots*, *screaming* and *ridge* in the essay Martin wrote by year 9.

Frank claims that his writing tasks are at a higher level because he no longer needs to translate from Norwegian, but rather thinks in English. “It just comes automatically. I can hear in my mind what is the correct formulation, so when I write, I feel that the language is authentic because I’ve listened to real English conversations for so long”. He was also asked if he had an example, and said:

Before, I would write like, “There is no need for that”, whereas now I would say “That’s not necessary”. It’s not, like, Norglish (laughing), if you know what I mean. I feel like I need fewer words to say more.

Casper was not sure whether he could use what he learned from gaming in his writing tasks specifically, but he confirmed that he wished to learn English to succeed in gaming. Andrea felt like she could use a lot of her language acquisition from gaming in her texts.

I write dialogues in my texts as often as I get the opportunity to do that, because then I can use different authentic expressions or like slang from the gaming world. I wish I could do that in all tasks.

Jens gives his gaming experience credit for his improvement in structuring sentences in his writing tasks at school. “When you spend a lot of time daily listening to English experts, you get a better feeling of how things should be written, you know”. Simon, in contrast to Jens, did not focus on the language aspect, but rather the plot.

Not long ago, we had a task about internet bullies. I got inspiration from gaming and the chatting-rooms I used to be part of. Sometimes, there is some bullying going on, but rarely. I made the real case a lot more dramatic in my text, but I got the inspiration from gaming.

Simon further added that he wished that the writing tasks at school were more open or centered towards gaming. He agreed with both Andrea and Jens, who expressed their wishes for more open or game-centered school writing tasks.

4.3.5 Motivation

Lastly, findings from the interviews suggest that for the frequent players, the interest in learning English to advance in a game was “absolutely one of the biggest motivations” (Martin). They are motivated and inspired by the other player whose mother tongue is English and would like to communicate with the same ease. The less frequent gamers also found motivation in the opportunity to talk fluently while traveling or the ability to watch movies or YouTube clips while understanding every single word. In one of the essays written by Martin, it was found that the plot was inspired by a game he played at the time. When asked if they felt that they could use what they had learned from gaming in writing tasks at school, Martin said:

... I always bring with me words and expressions from the gaming world to the real life, you know. Sometimes, we joke around with the abbreviations, but honestly, I use a lot of what I learn in the writing tasks as well. Sometimes the story reflects a game I play.

5. Discussion

This section discusses the findings in relation to previous research. The first research question asked: *Is there a correlation between the amount of time Norwegian teenagers spend on gaming, their English essay grades, and their lexical richness?* As asserted, Sletten, Strandbu and Gilje (2015) found a connection between students’ grades in English and gaming among 4000 students between the ages of 13-16 in Norway. They reported that although frequent gamers had lower scores in Norwegian and Math, they outperformed the non-gamers in English. The present study found similar results both in the quantitative and qualitative corpus analysis. There was a statistically significant positive correlation between gaming time and English grades, with two outliers. Again, because of the lack of more data, it is important to note that

no regression analysis was conducted, meaning that we cannot trace if other factors were responsible for the gamers scoring higher on the essays. An analysis of regression is considered appropriate for this kind of study if the dataset is larger and it would be particularly interesting if information about what kind of games the pupils engage in is provided. However, because of the self-reported information gathered before the conduction of the study, the results regarding the correlation between gaming and grades is deemed valid. In addition to being supported by earlier studies, the correlation was strong with the $p = .004$. Nevertheless, it is beyond the scope of this study to discuss the reasons for the correlation, as it does not consider the assessment of written production.

In the qualitative analysis, it was noted that the participants who increased their time gaming also improved their grades from year 8 to 9. Martin and Simon, who went from 1-4 hours of gaming in year 8 to 5-10 hours in year 9, improved their grades significantly. Frank went from 5-10 hours to 10+ and had a small improvement from 5- to 5. Andrea, who went from 1 to 1-4 hours, did not experience any change in her essay grade. These results can again be linked to Sundqvist (2019), who found the most important factor for L2 vocabulary acquisition to be the amount of time spent gaming. Cobb and Horst (2011, p. 25) found similar results when they instructed Francophone L2 English learners in Canada to play a mini game. They found increased speed of lexical access and improved vocabulary but concluded that the amount of time the learners spent on gaming was vital for the progress. Furthermore, theories about deep learning say that it requires a prolonged commitment, one that can be acquired when people get heavily invested in a new identity (diSessa, 2000). We can thus assume that if Andrea had a bigger jump in her gaming time, a higher grade could be expected. Additionally, Jens, who reported to game 5-10 hours both years, improved his grade from 5- to 6-, whereas Casper, who went from 5-10 to 1 hour of gaming by year 9, subsequently achieved a lower grade. Based on these results, which are also supported by the students' beliefs gathered through the semi-structured interviews, we can conclude that there is a positive correlation between the amount of time Norwegian teenagers spend on gaming and their English essay grades.

The examination of the six pupils' essays revealed that those who increased their gaming time from year 8 to 9 either improved or maintained the same scores both when it comes to TTR, LD and LFP and vice versa, with two exceptions. However, repetitive words are not included in the measures of LD, providing a wrong picture of lexical richness. Although the LD score is high, we do not know if this is due to the frequent repetition of the most frequently used words, such as nouns and verbs. As stated earlier, there is no generally accepted definition of the term "lexical richness", nor is there an overall agreement on how it should be measured.

In her latest study, Sundqvist (2019) found that time spent playing mattered more than what types of games the participants played when it comes to L2 vocabulary acquisition, where the knowledge of advanced words was measured using frequency lists. Similar results can be drawn from this qualitative corpus analysis, as those who reported to increase their gaming time to more than 5-10 or over 10 hours gaming from year 8 to 9, outperformed those who decreased or spent the same amount of time gaming in the use of advanced words. Although speculative, this could mean that frequent gamers have an overall higher number of advanced words in their essays. However, in the qualitative corpus analysis interesting results regarding advanced words were found. Although Andrea increased her gaming time from 1 to 1-4 hours, her LPF score decreased from 16 to 12 words. Her essays were examined, and it was found that many of the words marked as advanced were numbers (*two, five, seven, six and three*), as well as words such as *mom* and *hello*. Because numbers are some of the first words Norwegian pupils are taught, it is considered odd that the spelling of these is counted as advanced. Although comparable, this should also be noted regarding further quantitative vocabulary research operating with frequency lists. No clear trends appeared through the corpus analyses regarding the type-token ratio in correlation to gaming. Because all texts were cut to 300 words, McCarthy (2005) points out that a comparison of one whole text with only half of another could occur. Therefore, the validity of the results provided might be questioned.

The second research question asked: *What are the gamers' attitudes towards gaming and language learning?* From the pupils' perspective, gaming is considered one of the activities where they believe to acquire the most English. This is in line with how Gee (2007) defines good learning, as the students are not passive consumers, but feel actively engaged in the process while gaming. Furthermore, as evidenced by the interview quotes in the Findings section, the pupils seemed to be highly motivated to win in their respective games and they all aspired to reach a high level in the game. This eagerness to win is an essential factor for language learning, as it brings motivation to the process. As mentioned earlier, Ortega (2009) states that motivation may be the deciding factor when it comes to acquiring a second language. Her explanation of how motivation is the desire to start the learning process as well as the effort that sustains it is in line with the affective filter hypothesis put forward by Krashen (1982), who further claims that language teaching that fails to inspire motivation leads to boredom and affects the acquisition negatively.

Another interesting implication of the findings was the participants' view on what kind of English they believed to acquire at school as opposed to in their spare time. Their overall understanding is that they learn grammar and "proper" English language at school, whereas they

believed to acquire native-like pronunciation and cool expressions that can be used in everyday talk through the communication they participate in through gaming. This perception can be interesting for teachers to be aware of when planning both lessons and homework in L2 English classes.

When asked what they think they have gained through playing games in general, several different theories emerged. Again, motivation played a central role and was recognized as one of the main reasons for the learning. Interestingly, Jens reported that if a game required him to do research on his own, he considered it as a part of the game. This statement about how learners spend time on gaming without the focus being on learning is defined by Gee (2007) and explained in section 2.1. He writes, “learners get lots and lots of practice in a context where the practice is not boring” (Gee, 2007, p. 68). Interestingly, the participants report doing research or watching YouTube clips to advance in the game, without considering it as learning. Furthermore, the participants reported that gaming was not something they “put off”, like their homework, but rather looked forward to. From the teacher’s perspective, this is considered remarkable, as gaming can be implemented either in the classroom or as part of the homework given to enhance pupils’ motivation.

Other factors, such as faster responsiveness, cooperation, greater creativity, and inspiration, emerged from the interviews. All the informants also mentioned communication with other players as an important element. Obviously, they found it to be essential to both gaming and language learning. Simon concluded, “Isn’t it obvious (that language learning is happening)?” In fact, according to Gee (2007), the only way to acquire situated meanings is when words are heard and used in interactional dialogues with people at a higher level than the student. Additionally, Gee continues, students need to experience the actions to which the words apply. When this is done over time, the ability to build stimulations in the student’s mind of how the words are used in a different context will improve. The ideal place to practice this understanding of situated meanings is in video games, as they are “action-and-goal-directed preparations for, and simulations of, embodied experience” (ibid., p. 205). Games are a good area for language to be situated, because they give the verbal information “just in time” (ibid., p. 206), that is, when the player is ready to use it through meaningful action. Furthermore, both the SLA interaction hypothesis and Krashen’s input hypothesis claim that the effectiveness of the input is increased when, during the interactions, the student receives input above their current level. Gee explains how such scenarios often lead the student to ask questions, request paraphrasing or use other strategies to overcome the difficulties and progress in communication. According to Gee,

connecting words to specific actions in this manner improves the student's ability to build stimulations in their mind of how the words are used in a different context.

All participants in the present study agreed that gaming habits attributed specifically to their English language knowledge. However, the emphasis was on oral proficiency and self-confidence when it came to talking in class. Considering the numbers from the Norwegian Media Barometer (2017) that show that a total of 75% of men and women between the ages of 9-15 have played games daily between 2013-2017, this emphasis is not far-fetched. If we assume that those who report playing digital games daily communicate orally for at least one hour a day, it is likely to believe that they will outperform those who simply receive English input or communicate only in class. The responses provided from the interviews suggest that the frequent gamers believed to improve their oral skills and self-confidence, and the advantages gamers might have over their non-gaming peers can be of great importance for teachers to exploit. Previous research on oral proficiency and gaming focuses on the virtual environments that are created by players who play multiplayer online games (MMOs) (Thorne et al., 2009, p. 808). To progress in these types of games, players are often forced to communicate with other players. Reinders and Wattana (2011) found positive effects regarding the quality and eagerness of students' L2 interaction in the MMO Ragnarok. However, it is not yet clear if the language of communication in virtual environments is transferable to other contexts (Thorne et al., 2009, pp. 810–811). Nevertheless, the findings from the semi-structured interviews in the present study suggest that the participants believe to gain both confidence and skill through frequent oral communication in gaming, and that they can transfer these skills to other contexts. Interestingly, only one of the informants mentioned the impact gaming had on his writing skills, but even he had to hear the construction in his head before he wrote it down.

One of the pupils, Casper, viewed gaming as “a world beyond the boring everyday life”, and several of the other pupils believe their virtual identities have given them new perspectives and increased their creativity. In their study in the US, Rankin et al. (2006) found similar results, as English L3 university students played EverQuest 2, a multiplayer online game where students have their virtual identities. Positive results regarding vocabulary acquisition were found, likely because of the interactions with non-playing characters in their virtual rooms. According to Gee (2007), gaming encourages action and decision-making, giving the players the role as co-creators of the world they are engaging in. This possibility for the players to project their own fantasies and desires onto the character, and the commitment to a new identity is highly motivating. Findings from both the interview and the qualitative corpus analysis suggest gamers are able to transfer the creativity from gaming onto their writing tasks.

6. Conclusion

The present study aimed to investigate the correlation between Norwegian lower secondary pupils' gaming habits, lexical richness, and essay grades, as well as the gamers' attitudes towards gaming and English as a Second Language (L2) language learning. The result from the quantitative analysis showed that there was a statistically significant positive correlation between gaming time and English grades. Due to the lack of more data, we cannot trace if other factors were responsible for the gamers scoring higher on the essays. Nevertheless, findings from the qualitative analysis of the longitudinal corpus data also suggest that there is a positive correlation between time spent gaming and English essay grades, as the grades followed the pattern of either increased, equal or decreased gaming time from year 8 to 9. Based on these results, which have also been found in previous research (cf. Section 5 Discussion) and are further supported by the pupils' beliefs gathered through the semi-structured interviews, we can assume that there is a positive correlation between the amounts of time Norwegian teenagers spend on gaming and their English essay grades.

As for the pupils' attitudes towards gaming and language learning, gaming is considered one of the activities where they believe to acquire the most English. The findings from the semi-structured interviews in this study suggest that the participants believe to gain both confidence and skill through frequent oral communication in gaming, and that they can transfer these skills to other contexts. To that, they add several other benefits, such as faster responsiveness, cooperation, greater creativity, and inspiration. They are motivated and inspired by the other players whose mother tongues are English and would like to communicate with the same ease.

Some of the informants in the interviews reported a desire for more gaming-centered or open school writing tasks, as they believed it would give them a greater opportunity to show knowledge gained by gaming. Considering the pedagogical perspective, this is remarkable, as such construction of tasks could be an easy way to enhance motivation and give room for gamers to show their knowledge.

6.1 Limitations and further research

Given the fact that all student information is subjective, caution in the interpretation of the results should be taken, as the participants themselves reported all EE activities and gaming habits. Even though the pupils are honest, it could be hard to recall how much time was spent on different activities in the past. For further studies, a language diary is suggested, as it provides a daily update for a couple of weeks and can possibly create a more correct picture.

Additionally, data from the interviews suggest that the communication form in the gaming culture has developed from being primarily written to becoming mainly oral. Although the impact gaming can have on pupils' lexical richness is interesting, further research on how gaming may potentially be related to pupils' oral proficiency would also be of great interest.

It is also important to note that this study does not differentiate between different games, which may provide different amounts of input, both text and speech. This is possibly a limitation, as neither the English input nor output can be measured accurately. Further studies investigating players' interaction in different game types in a qualitative manner are recommended, as the broad gaming category makes it challenging to connect different language gains to different factors. It would also be interesting to explore the specific vocabulary used in different digital games.

Although the results from the quantitative analyses are not conclusive due to the sample size, they can certainly be a consideration for further research. The qualitative data, although there are only six informants, is important in the discussion about how gaming activities can potentially improve English proficiency. Not only did the informants have positive things to say about their own gaming experience in correlation to learning, but they did not distinguish between gaming and other activities that can be related to the game. They talk to other players in English, do research to advance in the game and watch English videos on YouTube, considering it part of the hobby. In other words, they are seeking opportunities to improve their English skill while they are having fun. Greater insight into this culture that reaches far beyond the game itself could provide a better understanding of how Norwegian pupils acquire English through gaming.

Additionally, several learning strategies used by the pupils' when encountering new words during gaming were identified. Although most of them understand the words based on the context, other tools such as Google or asking for paraphrasing or explanations were also mentioned in the interviews. This suggests that these gamers are good at reflecting upon their own language learning, which is a skill that L2 English teachers seek to implement in their pupils.

Findings from the interviews regarding motivation propose that L2 English teachers in Norway should be aware of the possibility to implement gaming-related activities either in the classroom or as homework to enhance some of the pupils' motivation for learning English as a second language. However, further research is needed and it would be a welcome contribution to the field.

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Appendix 1

Interview guide:

1. Hvor opplever du at du lærer mest engelsk?

- På skolen
- På fritiden
- Netflix, gaming, lesing?

2. Hvilke tanker har du om digitale spill og læring generelt?

- Har du lært noe av å spille?

3. Hvilke strategier tar du i bruk for å kommunisere i forskjellige spill?

- Hvordan foregår kommunikasjonen og bruker du hjelpemidler?

4. Opplever du at gaming bidrar til at du mestrer det engelske språket bedre?

- På hvilken måte?

5. Får du brukt det du har lært ved å game når du skriver engelsk på skolen?

- Føler du at oppgavene gir rom?
- Hvordan kunne du fått vist mer kunnskap?

6. Er du interessert i å lære engelsk for å bli bedre i spill?