Extramural gaming and English vocabulary

*Extramural gaming and receptive L2 English vocabulary knowledge
in 321 vocational students in Norway*

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Abstract

The aim of this study is to investigate the connection between gaming outside of school and English vocabulary knowledge in vocational students in Norway, for the purpose of describing what characterizes some key aspects of this connection. The overarching research question of the study is: *What characterizes the connection between extramural gaming and receptive L2 English vocabulary knowledge in vocational students in Norway?*

In order to answer the research question, the study employs quantitative methods and uses data collected with an anonymous online survey. The survey asked participants ($N = 321$) from VG1 and VG2 (aged 16-18) in a large county in Norway to complete a shortened, adapted version of the vocabulary levels test (VLT) (Nation, 1983), and asked questions about their extramural gaming and first language (L1). This study is a partial replication of Sundqvist (2009). The study outlines relevant theory and prior research which has been used in the development of the research design, and which is drawn upon in the discussion of the findings.

This study found a statistically significant positive correlation between extramural gaming and receptive L2 English vocabulary ($r_s = .424$, $p = < .001$). Further, the participants were divided into four groups based on the number of hours they reported spending on gaming during a regular week. The non-gamers, who reported spending zero hours on gaming per week, had the lowest mean VLT score. The mean score increased as the amount of time spent on gaming increased, the highest mean score being that of the frequent gamers, who reported spending nine hours or more on gaming per week. Additionally, there were no differences in extramural gaming and VLT scores depending on the participants' L1(s). Finally, an investigation of the words participants reported to recall having learned from gaming revealed that the majority of the words were from the high word frequency levels K1-K3. However, very infrequent (and thus, advanced) words from levels K12 (*melee*), K15 (*indubitably*), and K16 (*pickaxe)* were also reported.

In terms of didactic implications, the positive correlation between extramural gaming and receptive L2 English vocabulary knowledge suggests that there is potential in gaming as a resource for vocabulary learning and teaching. The statements from participants indicate that the vocabulary learned from extramural gaming can be both high-frequent (simple) and low-frequent (advanced), and both general and gaming-specific.

Sammendrag

Målet med denne studien er å undersøke koblingen mellom gaming utenfor skolen og engelsk ordforråd hos yrkesfagelever i Norge, med det formål å beskrive hva som karakteriserer noen nøkkelaspekter ved denne koblingen. Det overordnede forskningsspørsmålet til denne studien er: *Hva kjennetegner koblingen mellom ekstramural gaming og reseptivt L2 engelsk ordforråd hos yrkesfagelever i Norge?*

For å svare på forskningsspørsmålet har studien brukt kvantitative metoder og brukt data samlet med en anonym, nettbasert spørreundersøkelse. Spørreundersøkelsen ba deltakerne (*N* = 321) fra VG1 og VG2 (16-18 år) fra et stort fylke i Norge om å gjennomføre en forkortet, tilpasset versjon av en *vocabulary levels test* (VLT) (Nation, 1983), stilte spørsmål om deres ekstramurale gaming, og spurte dem om førstespråket deres (L1). Denne studien er en delvis replikasjon av Sundqvist (2009). Studien gjennomgår relevant teori og tidligere forskning som har blitt brukt i utviklingen av forskningsdesignet, og som er trukket inn i diskusjonen av funnene.

Studien fant en statistisk signifikant positiv korrelasjon mellom ekstramural gaming og reseptivt L2 engelsk ordforråd (r_s = .424, p = < .001). Deltakerne ble deretter delt inn i fire grupper basert på antall timer de rapporterte at de brukte på gaming i løpet av en vanlig uke. Gruppen *non-gamers*, som rapporterte at de brukte null timer på gaming i løpet av en uke, hadde den laveste gjennomsnittlige scoren på VLT. Den gjennomsnittlige scoren økte i takt med tiden deltakerne brukte på gaming, og den høyeste gjennomsnittlige scoren ble funnet hos gruppen *frequent gamers*, som rapporterte at de brukte ni timer eller mer på gaming i løpet av en uke. I tillegg var det ingen forskjell i ekstramural gaming eller VLT-score avhengig av deltakernes L1. En undersøkelse av ordene deltakerne oppga å ha lært gjennom gaming fant at de fleste ordene var fra de høye ordfrekvensnivåene K1-K3, men ord med svært lav frekvens (altså avanserte ord) fra nivåene K12 (*melee*), K15 (*indubitably*) og K16 (*pickaxe*) ble også oppgitt.

Når det gjelder didaktiske implikasjoner, tilsier den positive korrelasjonen mellom ekstramural gaming og reseptivt L2 engelsk ordforråd at det ligger et potensial i gaming som en ressurs for læring av, og undervisning om, vokabular. Utsagn fra deltakerne indikerer at vokabular lært gjennom gaming kan være både høyfrekvensord (enkle) og lavfrekvensord (avanserte), samt både generelle og spesifikke for gaming.

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1 Introduction

This thesis investigates what characterizes the connection between extramural gaming and receptive L2 English vocabulary knowledge in vocational students in Norway. The term *extramural English* was coined by Sundqvist (2009), with *extramural* meaning "outside the walls", referring to the school walls. Extramural gaming is one of many extramural English activities.

My motivation for choosing this as the topic of investigation in my MA was multifaceted. As an avid gamer myself, I have often felt that gaming has improved various aspects of my English proficiency, from vocabulary and spelling to pronunciation and intonation. For that reason, a scientific investigation of this anecdotal experience interested me greatly. Additionally, as a teacher in training, I wanted to see how an investigation into this aspect of students' extramural English language learning could inform my future teaching of English.

In addition to extramural gaming, I was also interested in researching vocational students. This interest in vocational students' L2 English proficiency was sparked by observations I made during my first teaching job. Teaching English in one information and communication technology (ICT) class and one child and youth worker class (both VG2), there was a noticeable difference in English proficiency between the students in the two classes. This prompted the question "Why?". When I asked the students in the two classes if, and how, they learned English outside of school, the big difference between the two classes was the value ascribed to extramural gaming as a source of language learning, which was very limited in the child and youth worker class and quite extensive in the ICT class. This inspired me to use my MA study as an opportunity to investigate the topic of extramural gaming and receptive L2 English language proficiency.

The choice to focus specifically on vocabulary was made mainly for practical reasons. Vocabulary has seen great research interest for decades (Nation, 1983, 2013), which has led to the development of reliable tests that can quickly and easily be scored objectively. Additionally, with the Covid-19 pandemic affecting all aspects of society at the time of data collection, it was crucial to choose to investigate something which it would be possible to collect data on during a time of social distancing and home-schooling. As vocabulary levels tests can be administered digitally, and without the researcher having to be present, this seemed like a sensible choice.

1.1 Background and relevance

The English school subject in Norway is undergoing a big change. Firstly, due to the development of the English language in Norway over the last decades, and secondly, due to the gradual implementation of a new curriculum. This implementation started in 2020 and the new curricula will be fully implemented for all grade levels and school subjects in 2022.

In addition to the substantial changes to the core curriculum and individual subject curriculums, the new curriculum has also changed the structure of some programs. For vocational study programs, to which my sample belongs, the structure of the English subject instruction was changed, from 84 hours per year in VG1 and 56 hours per year in VG2, to all 140 hours taking place in VG1 (Udir, 2022b, 2022d). The use of English in Norway today reflects how high the average English proficiency level is, particularly among adolescents (Rindal, 2020, pp. 27-32). Research has shown that English is more than a foreign language to these adolescents, transitioning to becoming a second language (Rindal, 2020, pp. 27-32).

This thesis uses the term *English as a second language* (L2 English) in line with the field of second language acquisition research, where the term *second language* can be used to refer to any language other than the learner's mother tongue (Ellis & Barkhuizen, 2005), meaning it can refer to the second, third or any other language a person learns. In the Norwegian context of this study, *L2* refers to English.

The new curriculum of 2020 underscores the importance of English for Norwegian students as citizens of Norway as well as citizens of the world (Udir, 2022a). According to the core curriculum, teaching shall ensure that students are confident in their language proficiency, and should enable them to use language to think, create meaning and communicate with others (Udir, 2022a). Students should have the opportunity to experience that being proficient in multiple languages is a resource for learning, both inside and outside school (Udir, 2022a).

Additionally, compared to the old curriculum (Udir, 2022d), the new curriculum encourages a much greater degree of learner autonomy and metacognition about learning. The new curriculum encourages students to become active learners of English, connecting their own learning of the language to the bigger picture and thinking about their own language acquisition both inside and outside school (Udir, 2022a). Furthermore, gaming has seen increased relevance with the new English subject curricula for general and vocational studies alike, as gaming is included as one of the cultural forms of expression of which students

should discuss and reflect on form, content, language features and literary devices, along with music and film (Udir, 2022c).

For these reasons, I argue that an investigation into what characterizes the connection between Norwegian vocational students' extramural gaming and their receptive L2 English vocabulary knowledge can shed valuable light on students' learning outside school. Additionally, the didactic implications of this investigation might help to inform teachers about how they can draw on their students' out-of-school learning as a resource when teaching L2 English.

1.2 Research questions

This study investigates the connection between gaming outside of school and English vocabulary knowledge in Norwegian vocational students, with the aim of describing what characterizes some key aspects of this connection. Based on primary data which I have collected, I will examine the connection between extramural gaming (EE) and receptive L2 English vocabulary knowledge.

The connection between EE and L2 English proficiency has been extensively researched in Sweden (Sundqvist, 2009, 2019; Sundqvist & Sylvén, 2014, 2016; Sundqvist & Wikström, 2015; Sylvén & Sundqvist, 2012). In the Norwegian context, researchers have investigated the relationship between EE and students' reading proficiency (Brevik, 2019). Several MA studies have examined how EE in general or gaming specifically relates to language proficiency (Nordnes, 2021), reading proficiency (Garvoll, 2017), English learning in and out of school (Holm, 2020), teacher beliefs and attitudes to gaming as a tool for language learning (Israelsson, 2020), and L2 English language use and attitudes (Abelvik, 2021; Garvoll, 2017). However, a study examining extramural gaming and vocabulary would contribute new information to the field.

Based on the contextualization above, my overarching research question is: *What characterizes the connection between extramural gaming and receptive L2 English vocabulary knowledge in vocational students in Norway?* To answer this overarching research question, I have formulated the following four research questions:

RQ1: *To what extent is there a connection between extramural gaming and receptive L2 English vocabulary knowledge?*

Based on the investigation of RQ1, the participants were divided into four groups, depending on the amount of time they reported spending on gaming during a regular week. These four groups are elaborated upon in section 4.2, and were investigated further:

RQ2: *To what extent is there a connection between the four gaming groups and receptive L2 English vocabulary knowledge?*

RQ3: *How can the four gaming groups be described in terms of gender, language background, and school level?*

RQ4: *Which words do vocational students in Norway report to recall having learned from gaming?*

The method employed to answer these research questions is an anonymous online student survey, the data from which has been analyzed statistically using the software Statistical Package for the Social Sciences (SPSS), version 28. A portion of the data material, regarding the words the participants reported to recall learning from gaming, was subject to both quantitative and qualitative analysis. The participants in my study comprise 321 Norwegian vocational students from 14 different schools located in a large county in Norway. Since this sample was not selected randomly, it cannot be considered to be representative of the larger population of vocational students in Norway, but the results can nevertheless shed light on trends in this population, which in turn might inspire further research.

1.3 Thesis outline

Following this introduction in Chapter 1, Chapter 2 provides a presentation of the theoretical framework of this MA study and an overview of relevant prior research. The methods used for data collection and analysis are accounted for in Chapter 3. In Chapter 4, the findings of my study are presented. Then, in Chapter 5, I discuss the findings in light of the theory and prior research presented in Chapter 2. In the final chapter, Chapter 6, I offer my concluding remarks, discuss the didactic implications of my study, and state some suggestions for further research.

2 Theory and prior research

In this chapter, I will present the theoretical framework of my study and a review of relevant prior research. As my study examines the relationship between extramural gaming and receptive L2 English vocabulary knowledge, theory about learning English outside of school is applicable, along with theory about vocabulary learning in English as a second language. The examination of prior research will be limited to research from Norway and Sweden, because of the special status English has in these countries, fitting not entirely into either of the categories *English as a foreign language* (EFL) or *English as a second language* (ESL) (Rindal, 2020, pp. 27-32). Studies from Sweden are relevant to the present study because Norway and Sweden are very similar, being neighboring countries and having very similar life expectancy at birth, percentage of adults with upper secondary or tertiary education, education spending, and gross domestic product (OECD, 2022a, 2022b, 2022c, 2022d).

This thesis uses the term *English as a second language* (L2 English, ESL) to describe what the field of second language acquisition (SLA) refers to as "the learning of another language (second, third, foreign) after the acquisition of one's mother tongue is complete (Ellis & Barkhuizen, 2005, p. 3). The term *second language* (L2) thus may refer to any other language than the learner's first language, but in the Norwegian context this study examines, it refers to English.

In the field of SLA, *English as a foreign language* (EFL) is sometimes used to describe English that is mainly learned through in-school instruction rather than out-of-school encounters with the language (Viberg, 2000, p. 28). *English as a second language* (ESL), on the other hand, would be used to describe English taught to students with another mother tongue than English in countries where English is a dominant language (Sundqvist, 2009, p. 10). This distinction is difficult to maintain in 2020s Norway, because although English is not an official language, it can be very easily accessed outside the classroom. Thus, in line with Sundqvist (2009) and Ellis and Barkhuizen (2005), I use *second language* (L2) to refer to any language other than the learner's mother tongue, so when I refer to "L2 English", English could have been the second, third or any other language the participant acquired. The term *first language* (L1) is used to refer to the participants' mother tongue or mother tongues, which, for the majority of the participants in the present study, was Norwegian.

The presentation of my theoretical framework and prior research will be intertwined to avoid repetition. To present the theoretical framework employed in this study, I start by outlining

sociocultural theory and the zone of proximal development (2.1). Then, I go on to address the concept of *extramural English* (EE) and research investigating EE (2.2). Next, I examine how to measure vocabulary knowledge (2.3), and lastly, there is a section outlining relevant previous MA studies (2.4).

2.1 Sociocultural theory and the zone of proximal development

According to Vygotsky (1978), language is a human process that is personal and at the same time social, involving interaction with others. He demonstrated that reflection on and elaboration of experiences occur in a relationship between the individual and society in a dialectical process, mediated and regulated through language (Vygotsky, 1978). In other words, each individual learns from the people around them. As Vygotsky (1978) viewed learning as a social process, he emphasized dialogue in these interactions, and he also underscored the historically important role of tools in human development.

> The effect of tool use upon humans is fundamental not only because it has helped them relate more effectively to their external environment but also because tool use has had important effects upon internal and functional relationships within the human brain. (Vygotsky, 1978, p. 133)

Whereas tools historically have been things such as carving tools and weapons, Vygotsky is referring to two things when he says "tools", one being language, as it is used to comprehend and process the environment, and the other being artifacts, as they mirror the external environment of contemporary society and history alike (Vygotsky, 1978). In the context of the present study, the artifacts are gaming and digital games.

A core concept of sociocultural theory is mediation. Lantolf (2000) argues that the role of mediation is to establish contact between an individual and the surrounding world, and Lantolf et al. (2015) suggest that artifacts work as buffers between the individual and the environment, mediating the relationship between the two.

Vygotsky (1978) stated that for mediation to result in development, it must be sensitive to the individual's zone of proximal development (ZPD), which is another core concept of sociocultural theory. The ZPD is "the distance between the actual development level in independent problem solving, and the level of potential development determined through problem solving with adult guidance or collaboration with more capable peers" (Vygotsky, 1978, p. 86). In other words, the ZPD is the figurative space between an individual's current understanding and the things they cannot understand, in which new knowledge is available to them with the help of someone else (illustrated in Appendix 14).

2.2 Extramural English and vocabulary knowledge – concepts and research

The term *extramural English* (EE) was coined by Sundqvist (2009) and refers to the English learners encounter outside the classroom, with *extramural* being Latin and meaning "outside the walls" (p. 24). EE can include contact or involvement with English with a deliberate intent to learn English, or for any other reason (Sundqvist, 2009, p. 25; Sundqvist & Sylvén, 2016, p. 6), but the contact must be learner-initiated and cannot be initiated by a teacher or someone else working in an educational institution (Sundqvist & Sylvén, 2016, p. 6). Examples of typical EE activities include watching movies or TV-series, reading books or blogs, listening to music, and playing video games (Sundqvist & Sylvén, 2016, p. 7).

In the dissertation in which the term was coined, Sundqvist (2009) examined how EE affected oral proficiency and vocabulary knowledge among 80 Swedish L2 English learners in ninth grade (aged 15-16). The dissertation makes a distinction between receptive and productive vocabulary (see 2.3). Productive vocabulary was measured with a shortened productive levels test (PLT), while its receptive counterpart was measured with a shortened vocabulary levels test (VLT) adapted not to include infrequent vocabulary beyond the 5,000 level (Sundqvist, 2009, p. 97). The shortened VLT was adapted from the original VLT by Nation (see 2.3) Additionally, a rational cloze test from a Swedish national English test from 2007 was also used to measure vocabulary (Sundqvist, 2009, p. 106). The PLT and VLT were both scored (one point for each correct answer), and for the rational cloze test, the score was obtained from each student's national test scoring profile (Sundqvist, 2009, p. 106). The present study measures receptive English vocabulary with the same adapted VLT used in Sundqvist (2009) (see 2.3).

The results from Sundqvist (2009) showed a positive correlation between EE and oral and vocabulary proficiency, with the correlation between EE and vocabulary being stronger (Sundqvist, 2009). Furthermore, the study found that the type of EE activity mattered significantly. Activities where participants tend to be more passive, such as watching movies or listening to music, had a lesser impact on oral proficiency and vocabulary knowledge than activities where participants tend to be more active, such as playing video games and reading (Sundqvist, 2009, p. 156). The present thesis is a partial replication study of Sundqvist (2009), drawing on parts of the research design of the dissertation to investigate the relationship between extramural gaming and receptive L2 English vocabulary knowledge in a different sample and at a different time. This partial replication sheds light on what characterizes the connection between extramural gaming and receptive L2 English vocabulary knowledge, but

instead of Swedish students aged 15-16 in the late 2000s, the present study investigates Norwegian vocational students aged 16-18 in the early 2020s. This will allow for an investigation of any differences and similarities between the two countries, age groups and times.

The findings from Sundqvist (2009) were corroborated by Sylvén and Sundqvist (2012) in a study where extramural English and its impact on learners' listening and reading comprehension and vocabulary was investigated with 86 young English language learners (YELLs) aged 11-12 as participants (2012, p. 308). This study measured vocabulary using 25 word-definition pairs from the VLT's 1,000 and 2,000 levels, as well as 12 items from the PLT. The results showed a positive correlation between EE and reading comprehension, listening comprehension, and vocabulary. That study grouped participants based on time spent on gaming, with the best results being achieved by participants in the *frequent gamers* group, who spent five or more hours per week on gaming, the boys in the study outperforming the girls regarding L2 vocabulary (Sylvén & Sundqvist, 2012, pp. 312-315). In addition to frequent gamers, this study also included the groups *non-gamers* and *moderate gamers*, these groups spending zero hours or less than five hours on gaming per week, respectively (Sylvén & Sundqvist, 2012, pp. 312-315).

Sundqvist and Sylvén (2014) investigated young Swedish English language learners (YELLs), aged 10-11, examining these learners' L2 English language-related activities outside of school (EE), particularly their use of computers and engagement in digital games. Additionally, this study examined if there was a relationship between playing digital games and gender, L1, motivation for learning English, self-assessed English ability, and self-reported strategies for speaking English. This study divided participants into three digital game groups: non-gamers (spending zero hours on gaming per week), moderate gamers (< 4 hours/week), and frequent gamers (> 4 hours/week). The study found that the participants were extensively involved with EE, the differences between genders being statistically significant. Additionally, the study found that YELLs with an L1 other than Swedish were overrepresented among the frequent gamers, causing the authors to call for further investigation of the connection between extramural gaming and L1.

Furthermore, the relation between extramural English and advanced vocabulary in writing and grades in the English school subject was investigated by Sundqvist and Wikström (2015). That study used data from Sundqvist (2009), so to measure vocabulary, it used a productive levels test (PLT), the same adapted vocabulary levels test (VLT) as employed in my thesis, as

well as graded student essays. The study found that *frequent gamers* (spending five hours or more per week on gaming) received higher grades than *non-gamers* (zero hours of gaming per week) and *moderate gamers* (hours of gaming per week is more than zero and less than five) (p. 72). Additionally, the study found that "for both vocabulary tests, there were statistically significant correlations at sample level, though these were more pronounced for the boys" (p. 72), indicating that spending more time on digital gaming can have a positive impact on L2 vocabulary (Sundqvist & Wikström, 2015, p. 72).

Reinhardt (2017) outlined the history of digital gaming in L2 teaching and learning (L2TL) as a research field and presented three useful heuristics for interpreting research on games in computer-assisted language learning (CALL): metaphor, research object, and research orientation. Reinhardt (2017) stated that studies from as early as 1990 recognized the potential digital games had for L2TL, and more recent research has continued the investigation of this potential. According to Reinhardt (2017), several studies have found that digital games can be used effectively as resources for vocabulary learning activities, and can be a source of incidental vocabulary acquisition.

In Norway, Brevik (2019) investigated a sample ($N = 21$) of outlier students with higher reading proficiency in their L2 than their L1, identifying dimensions of individual language use in L1 Norwegian and L2 English. This was a mixed-methods study using data from test results, surveys, language logs, focus groups and interviews. The findings revealed that these students accredited their English proficiency to their extensive use of English outside school. Three student profiles were identified according to how the students interacted with English outside the classroom: the gamer, the surfer, and the social media user. The gamers were all boys, and they reported that "playing online games varied between 0–3 hrs. (16%), 3–5 hrs. (51%), and more than 5 hrs. (33%)" (Brevik, 2019, p. 601). That study built on Garvoll (2017) (see 2.4).

Recently, Sundqvist (2019) investigated the connection between commercial off-the-shelf (COTS) games and L2 English vocabulary among 1,069 Swedish ninth-graders (aged 15-16). The study investigated productive and receptive vocabulary (see 2.3), using the same adapted vocabulary levels test (VLT) as used in the present study. To distinguish between different game genres or types, Sundqvist (2019) used the scale of social interaction (SSI). The SSI was introduced in Sundqvist (2013) and is a model for categorization of games where games exist on a continuum of social interaction, ranging from small-scale (single-player games) to large-scale (MMOs). Sundqvist (2019) coded participants based on hours spent gaming per week,

into *non-gamers* (0 hours/week), *low-frequent gamers* (< 3 hours/week), *moderate gamers* (3-9) and *frequent gamers* (> 9). The same time options were used in my study. The results from Sundqvist (2019) indicate that the frequent gamers scored higher than any other group on tests of both productive and receptive vocabulary (Sundqvist, 2019, p. 95). Additionally, while time spent on gaming was found to predict L2 vocabulary, the type of game appeared to only have a mediating effect in this study, the author calling for more research which categorizes games differently (Sundqvist, 2019, p. 105).

2.3 Measuring vocabulary knowledge

My study examines *receptive* vocabulary knowledge in L2 English learners by testing so-called form recognition with a vocabulary levels test (VLT). In discussions of learner vocabulary, a distinction can be made between receptive and productive vocabulary. The most general level of knowing a word involves the form, meaning, and use of the word (Nation, 2013, p. 26). A learner's *receptive* knowledge of a word implies that they can recognize the word in speaking and writing, and they know what the word means in a specific context (Nation, 2013, p. 26). A learner's *productive* knowledge of the same word implies that they can say or write it and are able to use appropriate and correct forms of the word in speaking and writing, as well as use it in different contexts (for a thorough description of characteristics of receptive and productive knowledge of a word, see Nation (2001, pp. 26-30)).

There are many ways to measure vocabulary, with variations in what word knowledge is given and what word knowledge is tested. The word knowledge given is either the meaning or the form, and the word knowledge tested is either recall or recognition (Laufer & Goldstein, 2004; Schmitt, 2010), with recall testing productive vocabulary and recognition testing its receptive counterpart. The word knowledge given and tested interact to create four ways to measure vocabulary, illustrated in Table 1, adapted from Gyllstad et al. (2021). The adapted vocabulary levels test used in the present thesis measures meaning recognition, highlighted in Table 1.

Table 1 Different ways of measuring vocabulary

		Word knowledge <u>tested</u>	
		RECALL	**RECOGNITION**
Word knowledge <u>given</u>	**FORM**	Form recall (supply the L2 item)	Form recognition (select the L2 item)

		Meaning recall	Meaning recognition
	MEANING	(supply definition/L1 translation, etc.)	(select definition/L1 translation, etc.)

Several empirical studies conclude that learners' receptive vocabulary size is greater than their productive vocabulary size, and as vocabulary increases, the proportion of receptive vocabulary becomes greater at the lower-frequency levels (Nation, 2013, pp. 370-371). This means that as learners' vocabulary knowledge increases, a greater proportion of these words, particularly lower-frequency words, are known receptively, but not productively. Additionally, a learner's vocabulary size is not necessarily reflected in vocabulary use (Nation, 2013, p. 371), and although different kinds of vocabulary knowledge are related to each other, they develop differently (Sundqvist, 2009, p. 60).

This study uses a vocabulary levels test (VLT) to measure receptive vocabulary. The VLT used in this study is monolingual, meaning it is entirely in English. The VLT was introduced by Nation in 1983 as a tool to determine whether learners had gained mastery of high-, middle-, and low-frequency words (Stoeckel et al., 2021, p. 6). The VLT uses a matching format and each test item, called a cluster, contains six words and three definitions (Stoeckel et al., 2021, p. 6) (Figure 2 in Chapter 3).

The VLT does have some limitations. According to Stoeckel et al. (2021, p. 9), three of these are the item format, the word-grouping principles used in the lists from which words are sampled, and the target word sample size. The VLT used in my study has a meaning-recognition format, where learners select each target word's definition from a list of six options. Firstly, a commonly argued limitation of this item format is that a correct coupling of word and definition is interpreted as a known word for the test-taker, but meaning-recognition items can be correctly answered by guessing or using test strategies. This means that there is a chance that a test-taker's correct response is the result of a lucky guess or strategic choice, creating some room for error in the test results (Stoeckel et al., 2021, pp. 11-12).

Secondly, the VLT is limited by the word-grouping principles used in the lists from which the test words were selected. The VLT's target words are selected from lists where word forms are grouped together into lemmas, flemmas or word families (Stoeckel et al., 2021, p. 17). This means that each test word represents a larger group of words. However, "learners are assessed on just one member of the lemma, flemma or [word family], and a correct response

is assumed to indicate knowledge of the entire group of related word forms" (Stoeckel et al., 2021, pp. 17-18). These terms are technical, but it is enough to conclude that it is possible for learners to be assumed to have knowledge of an entire word family when, in reality, they might only know one or a few words from the word family in question.

Lastly, the target word sample size is a limitation of the VLT. The target items in vocabulary tests are sampled from large sets of words, and in the case of the VLT, the target words are picked from 1,000-word frequency-based groups (Stoeckel et al., 2021, p. 28). The adapted VLT used in my study has a target word sample size of 30 items from each of the frequency levels 2,000, 3,000 and 5,000. A target word sample size of 30 items appears to be sufficient in order to "achieve high estimates of internal reliability and a strong correlation with a criterion measure" (Stoeckel et al., 2021, pp. 28-29). However, Stoeckel et al. point out that how well a sample represents the population of words from which it was drawn is a separate question, which means that "there are limitations regarding the inferences which can be made from knowledge of a random sample taken from a larger set of words" (Stoeckel et al., 2021, p. 29). Stoeckel et al. (2021, p. 29) state that it is important to maintain this distinction between the sample and the larger population of words because, if the tested sample is significantly more or less likely to be known than the population from which it was sampled, the results will systematically over- or underestimate vocabulary knowledge.

With these limitations taken into consideration, I still decided to use the adapted VLT. Firstly, because the meaning-recognition format is considered a good choice in research, as it allows for wide sampling, is quick to score objectively, and it produces high estimates of reliability (Stoeckel et al., 2021, p. 11). Additionally, the VLT has seen extensive use in research investigating extramural English, gaming, and L2 English vocabulary (see 2.2), and as this study is a partial replication of Sundqvist (2009), it was integral to replicate the relevant parts of that study's research design as closely as possible.

2.4 Prior MA studies

In the following, I present prior MA studies in the field of vocational education in Norway, related to the English subject and English didactics. I have identified five MA studies of relevance, written between 2017 and 2021. These MAs were found by conducting systematic searches in Oria and the University of Oslo's publication library Duo, using keywords such as "English", "didactics", "gaming", "gamers", and "vocabulary" in various combinations.

One study examined what characterizes English use in and out of school for upper secondary students with better reading proficiency in their L2 than their mother tongue (Garvoll, 2017). Another investigated what characterizes bridging activities in English lessons (Holm, 2020), while a third investigated teacher beliefs and attitudes to gaming as a tool for language learning (Israelsson, 2020). A fourth examined how L2 English language use related to online gaming and attitudes to L2 English (Abelvik, 2021), while the last MA outlined in this section investigated the relationship between language proficiency and a selection of extramural English activities (Nordnes, 2021).

Garvoll (2017) conducted a study investigating what characterizes the in- and out-of-school use of English for upper secondary vocational students who read significantly better in L2 English than in L1 Norwegian. This was a mixed-methods study using data from interviews, surveys and student logs. The findings indicate that this sample's ($N = 5$) high reading skills in English could be explained by their out-of-school use of English. Garvoll (2017) identified three profiles to explain the sample's English reading proficiency: the gamer, the surfer, and the social media consumer, based on how they interacted with English outside school, as established through two rounds of interviews, a student survey and a log. In terms of didactic implications, Garvoll (2017) argues that it is important for teachers to learn about their students' use of English outside school, because this knowledge might help teachers design English lessons that feel relevant to vocational students who might identify with the gamer, surfer or social media consumer profiles. This study is relevant to mine because it identifies extramural gaming as an important source of English language learning.

Holm (2020), considering Norwegian adolescents' increased learning of English outside school through technology and online platforms, investigated what characterizes bridging activities in English lessons in two vocational classes. This was a qualitative MA study examining teacher beliefs, student perspectives and observable classroom practices, using data from a semi-structured interview with a teacher, video recordings and classroom observation, analysis of student surveys and logs, and semi-structured interviews with students. The results of this study suggest that the teacher's active efforts to show interest in the students' out-of-school interests increased the empowerment of both teacher and students, which in turn increased learner autonomy in the classroom. The didactic implications of Holm (2020) are that there are many benefits to constructing the English lessons around competence the students have acquired outside school. This MA is relevant for my study because it

investigated connections between the classroom and out-of-school learning of L2 English, focusing on vocational students; that is, the same sample as in my study (see 3.2).

Israelsson (2020) conducted a mixed-methods study investigating current pedagogical beliefs about and attitudes towards gaming, based on survey data from and interviews with English teachers in Norway. Israelsson (2020) found that many teachers were eager to use gaming in their teaching but were held back by a lack of information about how to do this, meaning information about gaming as a language learning tool is necessary. Some teachers were skeptical about gaming and favored more traditional teaching activities instead. Israelsson (2020) is relevant to my thesis because it informs the discussion of gaming as a learning tool in L2 English classrooms, which is relevant when considering the didactic implications of the present study.

Abelvik (2021) conducted a study focusing on two vocational students. In his study, he investigated how their L2 English language use related to attitudes to L2 English and online gaming. This was a qualitative study using data from semi-structured interviews, video observations from the classroom, screen recordings with video and audio from the participants' gaming at home, stimulated recall interviews, and an auditory analysis of the video observations and screen recordings. The results indicated a connection between L2 English language use and L2 English language attitudes and suggested a direct relationship between online gaming and oral English skills for the two participants. In terms of didactic implications, the findings of this study suggest that L2 English teachers can benefit from familiarizing themselves with their students' attitudes to L2 English, as well as making their students aware of how these attitudes might influence their motivation to learn English. Abelvik (2021) is relevant for my study because it examined possible connections between L2 English and gaming among vocational students.

Nordnes (2021) conducted a quantitative study with the aim of investigating how a selection of extramural English activities influenced vocabulary knowledge. The extramural activities examined were reading, watching TV, watching movies and videos, and gaming, and a test of receptive vocabulary size was used to measure language proficiency. The study found that the three biggest predictors of language proficiency were reading, playing multiplayer games, and watching audiovisual media with English subtitles or no subtitles, in that order. The study also found a significant gender difference, with multiplayer games being the biggest predictor when looking exclusively at the males in the sample. Additionally, a significant curved linear relationship was discovered between multiplayer gaming and vocabulary size, with

vocabulary size being positively affected by multiplayer gaming until a certain point, after which is stagnated and started to decline. This study is relevant for my MA because it examines the relationship between, among other extramural activities, gaming and vocabulary, although Nordnes' MA investigated vocabulary size and the present study investigates vocabulary levels.

These five prior MA studies have examined extramural English and its possible connections to five focal areas. These are reading proficiency, teacher and student empowerment and learner autonomy, teachers' attitudes to gaming as an English language learning tool, attitudes to L2 English, and extramural English and L2 English vocabulary size. None of these studies focused specifically on extramural gaming and receptive L2 English vocabulary knowledge, meaning there is a knowledge gap to fill. My study aims to contribute to the closing of this gap.

In summary, extramural English (EE) refers to the English learners encounter outside the classroom. The term was coined by Sundqvist (2009), in a study which found a positive correlation between EE and oral and vocabulary proficiency. Extramural English has since been investigated in numerous studies, examining the relationship between EE and listening comprehension, reading comprehension, vocabulary, English subject grades, and more. My study is a partial replication of Sundqvist (2009) and uses the same adapted vocabulary levels test (VLT) to measure participants' vocabulary knowledge. When measuring vocabulary knowledge, distinctions can be made between what word knowledge is given and what word knowledge is tested, with the present study testing meaning recognition, providing participants with English words and their meanings, and asking them to couple them correctly. The VLT has some limitations, but I decided to use it in this study because it allows for wide sampling, can easily be scored objectively, and produces high estimates of reliability, making it a good choice in research (Stoeckel et al., 2021, p. 11). Extramural English and its relationship with various variables have been investigated in several prior MA studies, However, none of these studies focused specifically on extramural gaming and L2 English receptive vocabulary knowledge, leaving a knowledge gap for my study to investigate. The methodology employed to investigate this is detailed in the next chapter.

3 Methodology

In this chapter, I present the methodology employed to answer my overarching research question: *What characterizes the connection between extramural gaming and receptive L2 English vocabulary knowledge in vocational students in Norway?* First, I describe the chosen research design (3.1). Next, I present my sample and the sampling procedures used in the selection of participants (3.2). Then, I address how the data collection was carried out (3.3), before I describe how the data was analyzed (3.4). Lastly, I will discuss research credibility and ethics (3.5).

3.1 Research design

In my MA study, I employ a quantitative research design, utilizing an anonymous online student survey for data collection. A quantitative approach is well suited for examining a large sample, and because all participants choose from the same answer options when completing the survey, statistical analysis of the data is possible (Gleiss & Sæther, 2021, p. 30). Quantitative methods are very common in extramural English research, especially when large samples are used and the relation between extramural English and vocabulary knowledge is examined, as outlined in Chapter 2.

As I wanted my study to allow for statistical comparison of scores on a vocabulary levels test (VLT) from a large sample of gamers and non-gamers, I found a quantitative research design to be best suited to shed light on my research question. Additionally, because this is a partial replication study of Sundqvist (2009), the relevant parts of the research design in that study had to be replicated as closely as possible and these were quantitative.

Table 2 gives an overview of the project, including research question, research design, data material, and data analysis.

Table 2 Project overview

Research question	Research design	Data material	Data analysis
What characterizes the connection between extramural gaming and receptive L2 English	Quantitative research design using an anonymous online survey.	Participants' answers to an anonymous online survey.	Statistical analysis in SPSS 28. Qualitative analysis with inductive coding.

vocabulary knowledge in vocational students in Norway?			

The procedure for data collection and analysis in the present study can be divided into six stages, starting in August of 2021, and ending in February of 2022, as illustrated in Figure 1. In stage one (August 2021), I created a first draft of the online survey. This draft was sent to my supervisor for feedback, the feedback informing the development of the second draft of the online survey, which underwent technical piloting by my supervisor. Then, in stage two (September 2021), a third draft of the online survey was developed based on feedback from the technical piloting. This third draft was then piloted on a small group of people belonging to the planned sample, and the feedback from these pilot participants led to the establishment of the final design of the survey (see 3.1.4).

In stage three (October 2021), potential participant schools were contacted (see 3.2.2), and data collection started, leading to stage four (November 2021) when data collection ended, and analysis started. After this, in stage five (January 2022), all data was input into Statistical Package for the Social Sciences (SPSS) version 28, before data analysis was conducted in stage six (February 2022). The anonymous online survey used for data collection was divided into three parts: the vocabulary levels test (VLT), questions about extramural gaming, and demographic questions. Each part is elaborated upon in their respective sections below.

Figure 1 Data collection and analysis timeline

Aug 2021	• First draft of online survey created • Second draft of online survey underwent technical piloting
Sep 2021	• Third draft of online survey piloted • Final survey design established
Oct 2021	• School recruitment • Data collection started
Nov 2021	• Data collection ended
Jan 2022	• Data input in SPSS
Feb 2022	• Data analysis in SPSS
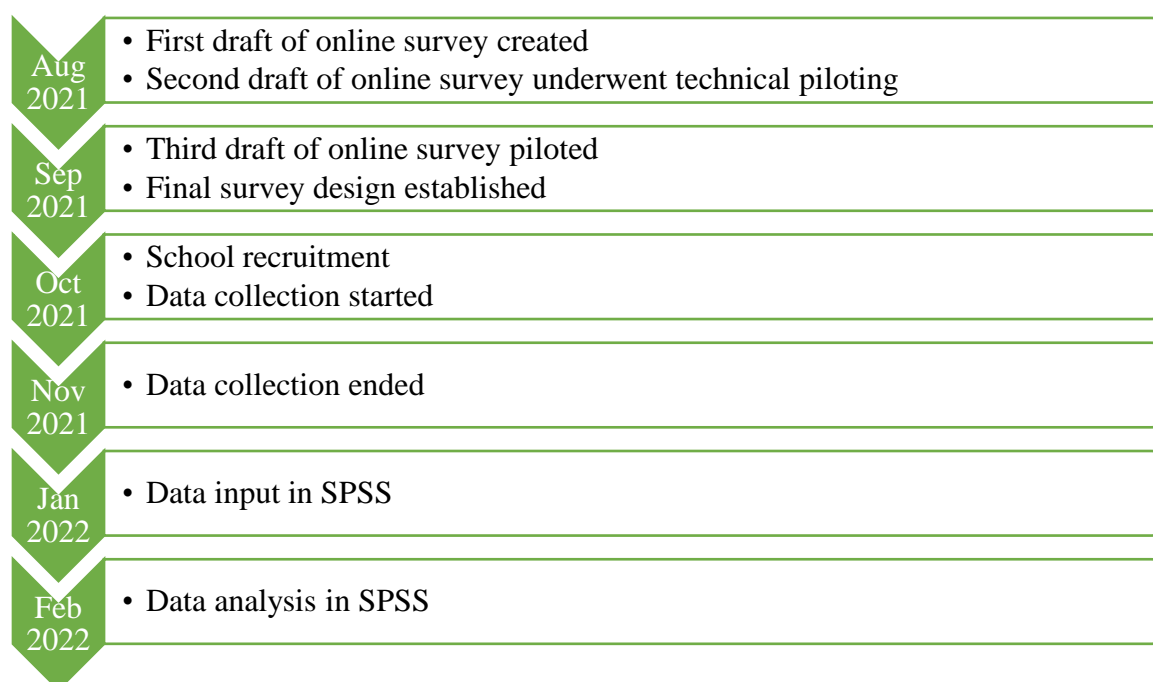
3.1.1 The vocabulary levels test (VLT)

As this project is a partial replication study of Sundqvist (2009), the parts of that study's research design which examined extramural English activities and receptive L2 English vocabulary knowledge had to be repeated as closely as possible. For that reason, the survey administered in my study consists of the same vocabulary levels test (VLT) that was used in Sundqvist (2009), which is an adapted version of the original VLT by Paul Nation (Nation, 1983, pp. 19-24; Sundqvist, 2009, p. 97). This adapted VLT was also used in Sundqvist and Wikström (2015), as well as Sundqvist (2019).

Each item of the VLT consists of a cluster of six words and three definitions, and test-takers are supposed to match these correctly. Figure 2 illustrates what a VLT item looked like in Nettskjema and how it should be filled out by participants. In Nettskjema, the rows held the definitions, and the columns held the six words participants could choose from. The example in Figure 2 was included at the beginning of the survey, to provide the participants with instructions on how to complete the VLT.

Figure 2 Example VLT item

	business	clock	horse	pencil	snow	wall
part of a house	○	○	○	○	○	⊙
animal with four legs	○	○	⊙	○	○	○
something used for writing	○	○	○	⊙	○	○

The VLT used in the present study consists of 30 items with three definitions in each section, making for a total of 90 words tested (Appendix 1). Each word in the VLT belongs to a certain word frequency level (Nation, 1983, p. 14). Whereas the original VLT measured word frequency levels 2,000, 3,000, 5,000 and 10,000, as well as specialized vocabulary used in university textbooks (Nation, 1983, p. 14), the adapted VLT from Sundqvist (2009) used in the present study contains words from only the 2,000, 3,000 and 5,000 levels. The adapted VLT tests 90 word-definition pairs, whereas the original tested 150.

The 2,000 and 3,000 levels contain high frequency words, and the 5,000 level is on the boundary of high and low frequency words (Nation, 1983, p. 14). The choice to exclude the specialized university textbook level and the 10,000 level in the VLT used in Sundqvist (2009) was made because there was no reason to test the age group extensively on vocabulary from the 10,000 level and beyond (p. 97). This choice was continued in the present study for the purpose of a close replication. In the shortened VLT, sections 1-10 belong to the 2,000 level, sections 11-20 belong to the 3,000 level, and sections 21-30 belong to the 5,000 level (Sundqvist, 2009, p. 106). When scoring the VLT, a correct answer grants one point, making the maximum test score 90 points. Thus, the higher a participant's test score, the more advanced their receptive English vocabulary is.

3.1.2 Questions about extramural gaming

To inquire about the participants' extramural English, Sundqvist (2009) used a language diary and a questionnaire (p. 89). In the language diary, participants were supposed to fill out how much time they spent on various extramural English activities (Sundqvist, 2009, p. 89). The questionnaire asked participants about their mother tongue, visits to English-speaking

countries, whether they speak English in their free time, a wide range of demographic questions, and questions about their extramural English activities.

My survey asked questions about the participants' gaming habits. The decision to focus on gaming only, instead of extramural English in general, was made for three reasons. Firstly, several studies (see Chapter 2) have found connections between extramural gaming and L2 English language proficiency, but the two variables extramural gaming and receptive L2 English vocabulary knowledge have not been investigated to any large extent in upper secondary schools in Norway. Thus, I was interested in investigating this. Secondly, I am a gamer myself and wanted to dedicate my MA to researching something that interests me. Finally, because of my extensive experience with gaming, I believe there is unrecognized didactic potential in extramural gaming, and my MA was a chance to investigate this belief scientifically.

Because my study was focused on gaming only, adjustments were made to tailor the questions from Sundqvist (2009) to a research project with a smaller scope. Sundqvist (2009) asked participants to fill out two one-week language diaries detailing how much time they spent on a variety of extramural English activities (p. 89), one of the activities being gaming ("video games") (p. 117). As my study only wanted to examine gaming and no other extramural English activities, the language diary was exchanged for two survey questions about gaming. The first question, "How often do you game in your free time?", asked about frequency of gaming. The second question, "How many hours do you spend on gaming during a regular week?", asked about time spent on gaming. These two questions were modeled after Sundqvist and Wikström (2015), which found that participants could be divided into the digital game groups (DGGs) non-gamers, moderate gamers and frequent gamers, based on the number of hours they spent on gaming per week. Similar questions and divisions were used in Sylvén and Sundqvist (2012), as well as Sundqvist (2019), where participants were divided into non-gamers, low-frequent gamers, moderate gamers and frequent gamers.

It was important to have questions distinguishing frequency and time, firstly because these are not the same and should be examined independently of each other, and secondly, because the results of these two questions can be compared, increasing the validity of this study. I increased the number of hours required to qualify as a frequent gamer, from five hours or more in Sundqvist and Wikström (2015), to nine hours or more in my study, based on feedback from my pilot survey (see section 3.1.4) and in accordance with Sundqvist (2019).

The participants in Sundqvist (2019) are 15-16 years old, meaning they are close in age to the 16-18 year-old participants in the present study.

My survey also asked participants about which genres of games they play, allowing them to choose as many answers as they wanted from a list of game genres, as well as offering the option of "Other" with an open text box. Participants were allowed to choose multiple answers because they might play games from a variety of genres, and because "it has been considered difficult to categorize digital games according to genre" (Sundqvist, 2019, p. 90). Each option provided examples of game titles belonging to that game genre. Participants could choose from the following options (explanations in parentheses were not included in the survey):

1. Action
2. Adventure
3. RPGs (role-playing games)
4. MMORPGs (massive multiplayer online role-playing games)
5. MOBAs (multiplayer online battle arenas)
6. Battle royale
7. Simulation
8. Strategy
9. Sports
10. Other

These game genres and the example titles were chosen by comparing two sources of information. According to Reinhardt (2017), traditional game genres include action, adventure, role-playing games, strategy, and simulation. These game genres were all included. The online content distribution platform Steam, a digital game store and online community with millions of users worldwide (Valve, 2022), supported the inclusion of these genres, and the addition of MMORPGs, strategy, and sports. The game genre MOBAs was included because a pilot participant suggested it (see 3.1.4), and battle royale was included based on my own experience as a gamer, because this genre has seen a vast growth in popularity in the recent years. The option "Other" was included in case participants were uncertain about which genres to choose or felt that none of the provided options were fitting. Example titles were picked by accessing each game genre on Steam and selecting "top sellers" to view popular titles within each genre.

There was also a question asking participants to write down any English words they could recall learning from gaming. The purpose of this question was to see if participants could

remember specific words they had learned while gaming, how advanced these words were, and if they were mostly gaming-related or part of general vocabulary.

3.1.3 Demographic questions

Participants were asked to indicate what gender they are, selecting from the options "Male", "Female", "Other" and "I would prefer not to answer". As this was an obligatory question, it was important to provide all participants with an option they would feel comfortable choosing. Additionally, a question about mother tongue(s) asked participants to choose the option which described their mother tongue(s) best, the options being "Norwegian is my mother tongue", "Norwegian is one of my mother tongues", or "Norwegian is not my mother tongue". For the two latter options, open text fields were provided, asking students to write down what their (other) mother tongue(s) was/were. As some participants might have more than one mother tongue, it was important to include these three answer options. This question about mother tongue was included because prior research has called for more gaming studies that take language background into account (Sundqvist & Sylvén, 2014, p. 17).

3.1.4 Pilot survey

The survey used in this study was piloted prior to data collection, and adjustments were made based on the comments and feedback from pilot participants. A first and second draft of the survey were consulted upon with my supervisor, the second draft becoming the pilot survey. Then, two different versions of the pilot survey were distributed as URLs to five people aged 16-18, which is the same age as the participants in the real study would be. Version A asked participants to take the vocabulary levels test (VLT) first and then answer questions about gaming and demographics afterwards, while Version B asked them to answer questions about gaming and demographics first, followed by the VLT. Three participants completed version A and two completed version B. They were asked to complete the survey at a comfortable pace and write down any comments they had about the order of questions, wording of questions, answer options and anything else that came to mind (Appendix 3).

The participants who completed version A were pleased with the order of the questions, and one participant said they liked that the VLT came first because it was the most difficult part, while the other questions were easier. One participant suggested that Multiplayer Online Battle Arena (MOBA) should be added as a game genre, which was done in the final version of the survey. Out of the participants who completed version B, one was pleased with the order of the questions, and one said it would have been better if the VLT came before the

other questions, the latter participant providing the reasoning that the VLT was more difficult than the other questions. Considering these participant comments about the order of questions, along with recommendations to place demographic questions towards the end in surveys (Dörnyei & Taguchi, 2010, p. 21), I made the decision to have the VLT first and the questions about gaming and demographics last.

When asking the participants "How many hours do you spend on gaming during a regular week?", the pilot survey had the following answer options: "None, because I don't game", "Less than 3 hours per week", "3-5 hours per week" and "More than 5 hours per week". These options were based on Sundqvist and Wikström (2015), where the non-gamers played zero hours, moderate gamers played some but less than 5 hours, and frequent gamers played five or more hours (p. 312). Three of my pilot participants indicated that these options might be too low, one of them stating that although they did not consider themselves a frequent gamer, they would still fall in the "More than 5 hours per week" category. As this could make it difficult to distinguish between non-gamers, moderate gamers, and frequent gamers, I decided to increase the last two answer options to "3-9 hours per week" and "More than 9 hours per week", in accordance with Sundqvist (2019, p. 92). The pilot survey results supported this.

Two of the pilot participants commented that they found the questions about gender and mother tongue to be sensitive. They appreciated that the survey allowed them to choose "I would prefer not to answer" to the question about gender and suggested that similar consideration be taken for the question about mother tongue. To encourage participants to answer the question about mother tongue without forcing them to, I made the decision that the open text boxes accompanying the mother tongue questions would be voluntary to fill out, allowing participants to leave them blank if they preferred. Nettskjema allows the creator of a survey to choose which items are mandatory and not.

The pilot participants spent an average of 33 minutes [22-27-31-37-45 minutes] answering the survey, which laid the foundation for me to tell teachers, when recruiting participants, that the survey would take approximately 40 minutes for students to complete.

3.2 Sample

In this section, I start by explaining the criteria students had to fulfill in order to participate in the study (3.2.1), before I detail the process of recruiting participants and participant attrition (3.2.2). Lastly, I provide detailed information about the sample (3.2.3)

3.2.1 Criteria for participation

The sample consists of VG1 and VG2 vocational students from schools in a large county in Norway. Students in VG1 and VG2 are usually 16-18 years old. As I have a particular research interest in vocational students after having worked as an English teacher for two vocational studies classes, I wanted this student group to be the focus of my study. To limit the geographical scope of the study, only vocational students from schools in one county were invited to participate.

3.2.2 Participant recruitment process and participant attrition

Getting in contact with participants was organized in three stages. In the first stage, I emailed the department heads of all high schools in the selected county that offered at least one vocational studies program, providing them with information about the study and asking them to disclose the contact information of the head teachers in their school's vocational classes (Appendix 4). In the second stage, I reached out to these head teachers, providing them with some information and asking them if they wanted to invite their students to participate. They received information about the purpose and content of the survey, how much time they should set aside for completion of the survey, and the deadline for participation (Appendix 5).

The head teachers who agreed to invite their students to participate each received a PowerPoint file with a one minute long instructional video (Appendix 6) about the project and survey, written instructions for survey completion, and a unique link for each teacher to the survey in Nettskjema. The decision to have the links be unique for teachers rather than classes was made because each teacher is only head teacher for one class, and it was easier for me to connect the survey results to a specific teacher rather than a class. The teachers were asked to provide information about which vocational studies program and year of school their students belonged to, as well as how many students the class consisted of. In this third stage, 336 students were invited to participate, and 321 (95.5%) agreed to participate. All 321 (100%) completed the entire survey. The external attrition rate (4.5%) and the internal attrition rate (0.0%) were very low, meaning participation was high.

3.2.3 Sample details

The sample in the present study (Table 3) consists of 321 students from 16 different VG1 and VG2 vocational studies programs spread throughout 14 different high schools in a large county in Norway. The sample includes 122 female participants (38.0%), 181 male participants (56.4%) and 18 participants (5.6%) who picked the gender options "Other" or "I would prefer not to answer", grouped together under the label "Other" in Table 3 and in subsequent analyses, in order to avoid either group being very small.

Table 3 Sample overview

| School	Year	Gender			Total	
		Female	**Male**	**Other**	*N*	**%**
School 1	VG2	8	2	0	10	3.1
School 2	VG1	4	14	5	23	7.2
School 3	VG1	7	25	3	35	10.9
School 4	VG1 VG2	5	34	0	39	12.1
School 5	VG2	7	1	1	9	2.8
School 6	VG1 VG2	4	27	0	31	9.7
School 7	VG1	15	17	3	35	10.9
School 8	VG1	2	5	2	9	2.8
School 9	VG2	0	7	3	10	3.1
School 10	VG1 VG2	15	10	0	25	7.8
School 11	VG1 VG2	38	12	0	50	15.6
School 12	VG1	15	4	1	20	6.2
School 13	VG2	2	11	0	13	4.0
School 14	VG2	0	12	0	12	3.7
TOTAL		**122**	**181**	**18**	**321**	**100**[1]

[1] *Note: The rounded numbers do not add up to 100.*

The distribution of participants on schools varied, with the lowest number of participants from a single school being nine (2.8%) and the highest being 50 (15.6%). The sample comprised

210 participants (65.4 %) in VG1 and 111 participants (34.6 %) in VG2. The distribution of participants on study programs was also varied, with the lowest number of participants from a single study program being two participants (0.6%) from each of the study programs VG1 Hairdressing, floral, interior, and retail design and VG2 Agriculture and horticulture, and the highest number being 52 participants (16.2%) from VG1 Healthcare, childhood and youth development (for details, see Appendix 7).

The participants in the sample were divided into four groups based on their time spent on extramural gaming (Figure 3), and I will report findings based on these gaming groups (see Chapter 4). The first group were the non-gamers, 90 participants (28%) who reported spending zero hours per week on extramural gaming. The second group were the infrequent gamers, a group of 54 participants (16.8%) who stated they spent less than three hours per week on extramural gaming. The third group were the moderate gamers, comprising 83 participants (25.9%) who reported spending 3-9 hours on extramural gaming per week, and the fourth group were the frequent gamers, which consists of 94 participants (29.3%) who stated spending more than nine hours on extramural gaming during a regular week.
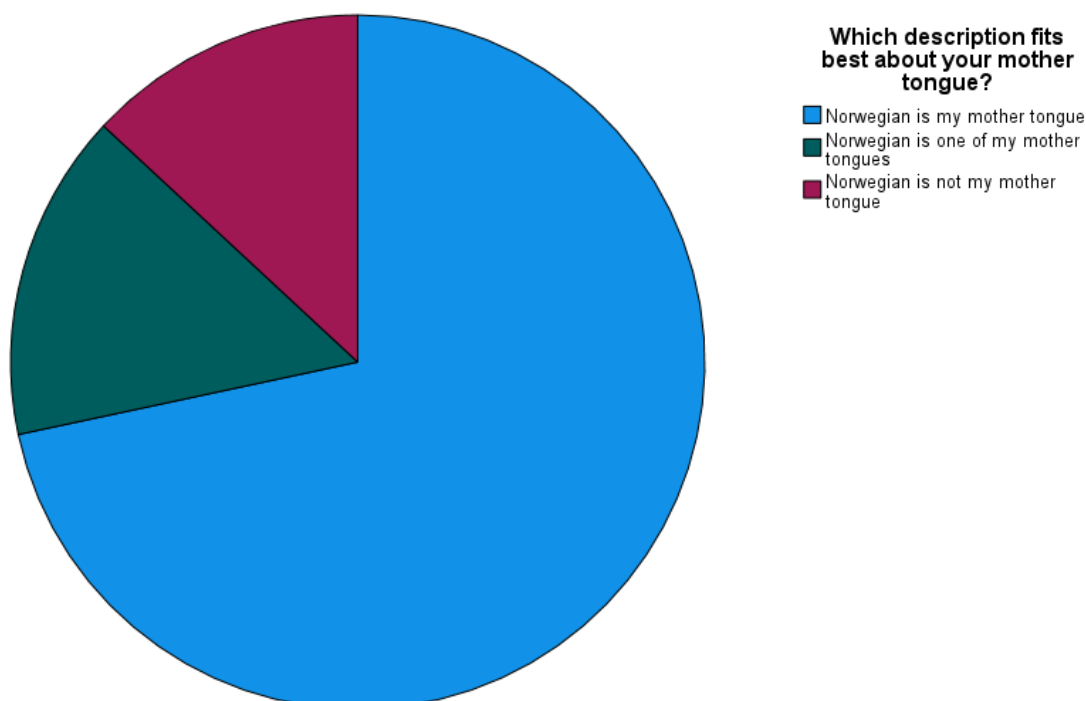
Figure 3 Participant distribution in groups of hours spent gaming during a regular week
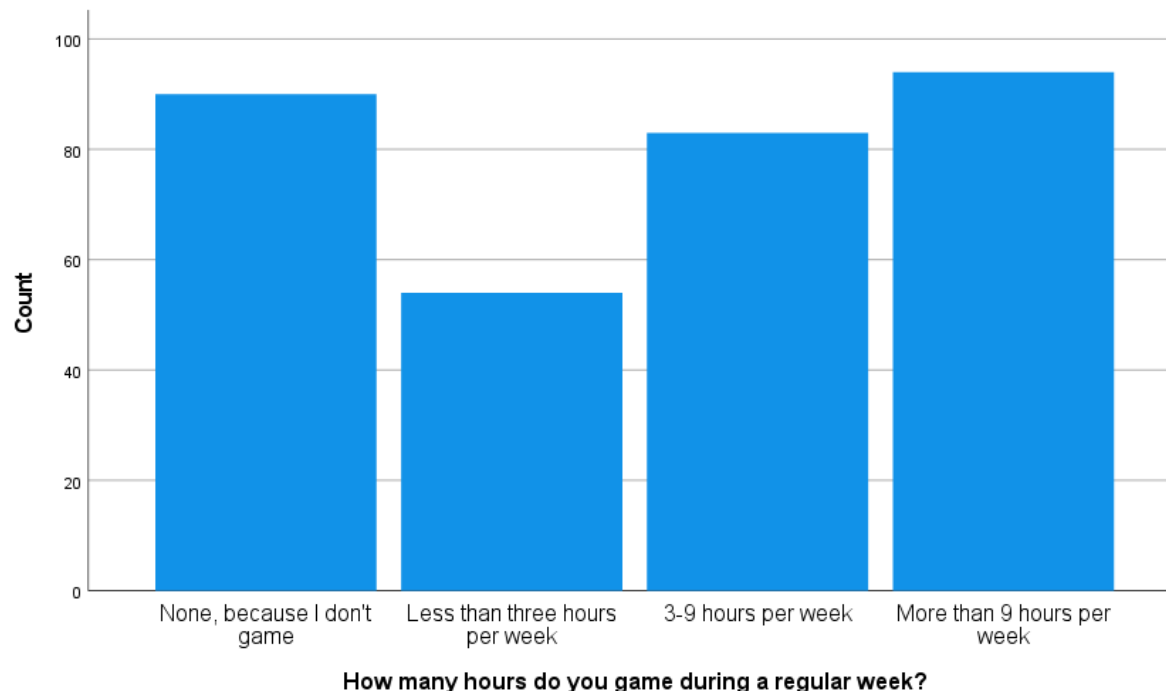
A question asking participants to check all the game genres they play reveal that the most popular genres among the gamers in this sample are MMORPGs ($n = 285$), MOBAs ($n = 284$), sports ($n = 283$) and RPGs ($n = 260$).

The sample consists of participants with a variety of different mother tongues (L1s). A majority of the participants ($n = 230$, 71.1%) stated that their L1 is Norwegian, while 49 participants (15.3%) answered that Norwegian is one of their L1s, and 42 participants (13.1%) stated that Norwegian is not their mother tongue (Figure 4). Among participants stating that Norwegian is one of their L1s or not their L1, the most common L1s were Arabic, English, Polish, and Somali (all $n = 7$), Albanian ($n = 6$) and Kurdish ($n = 5$). A total of 17 languages were listed as an L1 by one participant only (Appendix 8).

Figure 4 Participants' language background

Which description fits best about your mother tongue?
- Norwegian is my mother tongue
- Norwegian is one of my mother tongues
- Norwegian is not my mother tongue

3.3 Data collection

The data collection was initiated in September 2021, with six weeks of preparation and piloting conducted before the survey was distributed to participants in October 2021. The data collection was completed in Nettskjema, with each teacher who agreed to invite their students to participate receiving unique links for their classes, making it possible to distinguish between the different schools and study programs. It is a survey tool made available for students and employees at the University of Oslo. Nettskjema allows the survey creator to choose the option "I want anonymous answers", in which case no participant metadata will be available to the survey creator (Universitetet i Oslo, 2021). This option was selected for my survey, so no personal data or participant meta data was collected. Collection of personal data was not necessary for this study, as the research question only required inquiries into

participants' VLT scores, gaming habits, language background and gender, and there was no need to be able to tie these data to specific individuals.

The survey started with a page asking students if they wanted to participate, and only those who chose "Yes, I want to participate" were asked to complete the survey. Those who agreed to participate were then asked to complete the 30 VLT items from Sundqvist (2009), spread across five pages to provide participants with a sense of progress as they could see the progress bar in Nettskjema move forward. The participants were then asked three questions about their gaming habits and a question about whether they could recall any English words or phrases they had learned through gaming. Finally, the participants were asked to indicate their gender and state whether Norwegian is their mother tongue, one of their mother tongues, or not their mother tongue (for details, see Appendix 2). The participants who selected the option "No, I do not want to participate" on the first page of the survey were sent directly to a closing page, meaning no information was collected about them beyond their wish to not participate.

3.4 Data analysis

In this section, I present the procedures I used to analyze my data. As my research design, with its anonymous online survey, was made to collect quantitative data, analysis was done through statistical analysis using the software IBM Statistical Package for the Social Sciences (SPSS), version 28. A combination of quantitative and qualitative analysis was used to analyze the answers participants gave when asked to report words they could recall having learned from gaming.

This section starts by detailing the analytical procedures used to determine normality (3.4.1). Then, there is a section dedicated to an explanation of how participants could be grouped together based on their extramural gaming (3.4.2), followed by an explanation of how statistical analysis of my data was conducted in SPSS (3.4.3). Finally, the last section is dedicated to explaining the analysis of the words the participants reported to recall learning from gaming (3.4.4).

3.4.1 Determining normal distribution

Multiple normality tests were conducted on the participants' total VLT scores to see whether they were normally distributed. These tests would serve as a foundation upon which to base the decision to treat the data as either normally distributed or skewed. One such test was a

histogram with a black line indicating normal distribution, which allows the researcher to see how their data compare to the normal distribution. Another test was a quantile-quantile plot (Q-Q plot), which lets the researcher see how each participant's score compares to the expected normal value. Additionally, a test of skewness and kurtosis was conducted, which makes it possible to see if the skewness and kurtosis of a given dataset are within normal parameters. Furthermore, a one-sample Kolmogorov-Smirnov test and Shapiro-Wilk test were conducted, both of which are tests of normality. Finally, a residuals test was conducted to see if the residuals were normally distributed. The results of each of these tests are detailed in Chapter 4.

3.4.2 Grouping participants based on extramural gaming

In order to present my findings in a clear and consistent way, participants have been divided into four groups according to their extramural gaming, specifically their time spent on extramural gaming during a regular week. The four groups are non-gamers (0 hours), infrequent gamers (< 3 hours), moderate gamers (3-9 hours) and frequent gamers (> 9 hours). Findings relating to other variables will thus be presented for each of these four groups, and the four groups will be compared. Why I grouped participants according to time spent on gaming rather than frequency, is explained in Chapter 4.

3.4.3 Statistical analysis in SPSS

A selection of different analyses were employed to generate descriptive and inferential statistics from my data. Firstly, to investigate variables independently, frequencies and descriptives were generated and analyzed. Crosstabulations were created for some variables to see whether their different values corresponded with each other in some way. Additionally, a variety of different bar graphs and pie charts, either presenting individual variables or multiple variables together, were generated to analyze the data visually, as well as present the data. The means, medians, modes, standard deviations and ranges of multiple variables were also generated, for the purpose of describing the variables and comparing them to each other where relevant.

Secondly, to generate inferential statistics, a number of parametric and non-parametric tests were run. One of the parametric tests was a bivariate correlation analysis with Spearman's correlation coefficient, which was used to investigate possible relations between time spent on gaming, frequency of gaming, and total vocabulary levels test (VLT) scores. A simple scatter plot with a fit line was also used for this purpose. Additionally, one-way analysis of variance

(ANOVA) was used to investigate variance between dependent and independent variables, to compare the total VLT scores for the four gaming groups. In terms of non-parametric tests, a Kruskal-Wallis was run. The Kruskal-Wallis test is a non-parametric counterpart to the one-way analysis of variance (ANOVA) and compares mean ranks for multiple groups.

3.4.4 Analyzing words learned from gaming

The analysis of the responses participants gave when asked to write down any words or phrases they could recall learning from gaming was conducted in multiple stages, because the responses were not uniform. The survey provided participants with a large text box, allowing them to write long answers. These open answers were analyzed both quantitatively and qualitatively.

An initial examination of the responses participants provided in this text box revealed that some participants had not listed words. Thus, I decided to code the responses inductively, allowing the codes to emerge from the data. When coding inductively, the researcher creates categories based on the data material, as opposed to deductive coding, where previously established categories are used, and different from abductive coding, which combines the two types of categories (Gleiss & Sæther, 2021, pp. 170-171). The inductive coding revealed four response categories: lists of words learned from gaming (sometimes with explanations of the words included), testimonials, a combination of words learned from gaming and testimonials, and "other". Testimonials are statements from participants about L2 English language learning from gaming which do not list specific words. The "Other" category housed the responses which did not fit in any of the other three categories. This category ended up comprising very few answers and was thus excluded in the second stage of analysis.

The three remaining response categories were subsequently analyzed according to the type of response. All words listed by participants were comprised in a list and were analyzed using a vocabulary profiler (VP) (Cobb, 2022) to determine each word's frequency level. The testimonials were analyzed qualitatively, with the aim being to describe how these students relate their extramural gaming and L2 English language learning. Participant responses comprising lists of words and testimonials were taken apart, the two types of answers being analyzed separately.

3.5 Research credibility

In this section, I start by addressing the reliability of my MA study (3.5.1). Then, I discuss the validity of my study (3.5.2), before reviewing the ethical considerations of this research

project (3.5.3). According to Johnson (2013), research reliability refers to "the consistency, stability, or repeatability of the results of a study" (p. 279). Research validity is described as "the correctness or truthfulness of an inference that is made from the results of a study" (Johnson, 2013, p. 279).

3.5.1 Reliability

Johnson (2013) states that a study's reliability is concerned with how, and if, the results obtained are repeatable. Gleiss and Sæther (2021) explain that reliability has to do with the evaluation of quality in research. A study's reliability is often evaluated by reflecting on how the data material may have been influenced by the method of data collection, and whether the research results could be replicated by other researchers (Gleiss & Sæther, 2021, p. 202). Researcher reflexivity, which is the researcher's reflections on how they may have impacted the research process, is an important part of a study's reliability.

The method of data collection in this study was an anonymous online survey. There are a number of different ways in which this method may have influenced the data material. Firstly, anonymity can affect how participants answer. It may encourage them to answer more truthfully than they would feel comfortable doing if their identity was known, but it might also make some participants lie or not answer to the best of their ability, because their anonymity protects them from any consequences following untruthful or abysmal answers.

Secondly, this study's survey was administered to students by their teachers, and I was never present in the classroom at any point before, during, or after data collection. The survey being administered by the teacher may have made some students feel less inclined to participate, or it could potentially have made them feel that they had no choice about participation. This, in turn, may have influenced how participants replied. The fact that I, the researcher, was not present during data collection, may have caused participants who were uncertain about how to answer the survey or how to interpret a question to answer incorrectly, or choose an answer at random because of their uncertainty. If I had been present during the data collection, my presence may have influenced the students' willingness to participate, based on their impression of me. A number of steps were taken to counteract the method's potential influence on the data material, detailed in section 3.5.2.

To enable other researchers to evaluate the trustworthiness of my study, and replicate it if they should want to, I have made strenuous efforts to describe my methodology in great detail.

This transparency is intended to enable readers to make their own evaluation of the quality of this research project.

3.5.2 Validity

In this section, I give an account of which strategies I have employed to enhance the validity and trustworthiness of my study. For a study to be deemed valid, it has to be "plausible, credible, trustworthy, and therefore defensible" (Johnson, 2013, p. 299). Validity does not refer to the data itself, but rather to the researcher's judgement and thoroughness throughout the research project, and if the conclusions and inferences drawn from the data are trustworthy and defensible (Brevik, 2015). Validity can be divided into internal and external validity, where the former refers to how I as a researcher am able to make valid and reasonable interpretations of the data, while the latter refers to the degree to which the results can be generalized to a wider population (Cohen et al., 2011).

One strategy employed to increase my study's validity, was the use of the adapted vocabulary levels test (VLT), because VLTs can easily and efficiently be scored objectively (Stoeckel et al., 2021). There is only one correct answer for each test item, and the key is provided by the test developers, leaving no room for me as a researcher to inaccurately interpret what constitutes a correct answer. This ensures an objective evaluation of every participant's VLT score.

Another strategy used to increase validity was control coding a portion of the data and examining any differences. After having completed data input of all participants' survey responses in Excel, 10% of participant entries were control coded, selected by using an online random number generator to select lines in the spreadsheet. The entries from the initial input was then compared to the second input. There were no differences, meaning the accuracy of the data input was very high.

However, there are still certain threats to be aware of regarding validity. For example, survey questions may be interpreted differently by different participants (Creswell, 2014), meaning there is a certain risk that they will not answer the questions honestly or correctly. This threat was met by piloting the survey before data collection, on a group of pilot participants in the same age bracket as the planned sample. The instructions for the pilot participants (Appendix 3) asked them specifically if there were any questions they did not understand or were uncertain about whether they had interpreted correctly.

There is also a risk that participants may find the answer options to not fully encompass what they want to answer, or they might want to answer somewhere between two of the provided options, which is not possible in Nettskjema. This threat was also met by piloting the survey in advance, with the instructions for the pilot participants asking them if there were any questions for which they felt the answer options did not offer an alternative in line with what they wanted to reply. Additionally, most of the questions offered an "Other" option, often accompanied by an open text box, allowing participants to formulate their own answer if they wanted to.

3.5.3 Ethical considerations

Throughout data collection, data processing and the writing of this thesis, research ethics has played a major role in ensuring the privacy and well-being of the participants. To ensure participant anonymity, the option "I want anonymous answers" was selected in Nettskjema. When this is selected, each participant's answers are only identified by an eight-figure number, and there is no metadata connecting this answer to participant name, time of answer or IP address (UiO, 2021).

Although no personal data was collected in this survey, participants were still asked to consent to participation before submitting any data. The first page of the survey provided potential participants with information about the purpose of the survey, where the results would be published, and the anonymity of their data. Those who chose not to answer were taken directly to a closing page thanking them for their input, ensuring that no data was collected without the participant's informed consent. In addition to ensuring participants' informed consent to participate, this step was also intended to increase the likelihood that those who did participate in the survey would answer truthfully and to the best of their ability. I can only speculate, but hopefully this ensured they did not feel forced to participate.

4 Findings

In this chapter, I present my main findings, based on the analyses of the data material. The chapter starts by detailing the findings leading to the decision to treat my data as normally distributed (4.1). Then, there is a section where I explain the creation of the four gaming groups which all other variables will be examined in relation to (4.2). Following that, I have sections detailing the findings in relation to my four research questions (RQs). My first main finding, relating to RQ1, indicates a significant positive correlation between extramural gaming and receptive L2 English vocabulary knowledge (4.3). In section 4.4, I present my second main finding, which relates to RQ2 and suggests a significant positive correlation between the four gaming groups and receptive L2 English vocabulary knowledge. My third main finding, presented in section 4.5 and relating to RQ3, revealed that language background did not appear to impact the participants' VLT scores. Finally, section 4.6 pertains to RQ4, and my main finding indicates that while the majority of the words participants report to recall learning from gaming were from frequency levels K1 to K3, they also reported words from several higher levels, and participant testimonials suggested that gaming had been an impactful source of L2 English language learning for many of them. This chapter closes with a summary of the findings.

4.1 Determining normality

To find out how to analyze my data, it was essential to know whether it was normally distributed. The normality of my data was determined by performing several relevant normality tests, using the combined results of these tests to decide whether to interpret my data to be normally distributed (see 3.4.1). The first normality test, a histogram of the participants' total vocabulary levels test (VLT) scores with a normal curve superimposed on it (Figure 5), revealed that the data appeared skewed to the left. This indicated that there were many participants with very high test scores, which created a so-called ceiling effect. Salkind (2010) explains that "the term ceiling effect is a measurement limitation that occurs when the highest possible score … on a test or measurement instrument is reached, thereby decreasing the likelihood that the testing instrument has accurately measured the intended domain". In other words, the ceiling effect in the present study suggests that including items from word frequency levels beyond 5,000 may have created a different, more normal distribution of total VLT scores.

Figure 5 Histogram of participants' total VLT score with normal curve
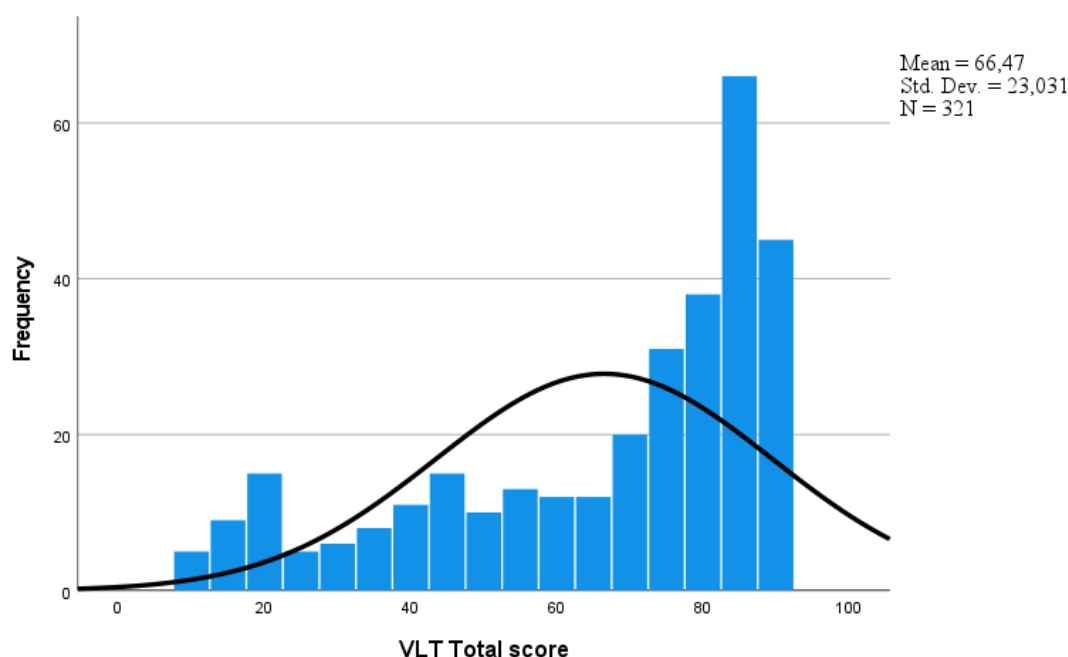

Next, a test of skewness and kurtosis was performed (Table 4). The participants' total VLT scores had a skewness of - .961 and a kurtosis of - .313. The negative value of skewness indicates that there are too many high scores in the distribution, and the negative value of kurtosis indicates a light-tailed distribution (Field, 2013, p. 185), as seen in Figure 5. However, skewness and kurtosis should only be used as criteria for normality in small samples (Field, 2013, p. 184). In larger samples, such as the one in the present study, the shape of the distribution should be examined visually, and the value of skewness and kurtosis should be interpreted, but these do not necessarily constitute a reason to worry about normality (Field, 2013, p. 184).

Table 4 Skewness and kurtosis of participants' VLT scores

Statistics

VLT Total score

N	Valid	321
	Missing	0
Skewness		-,961
Std. Error of Skewness		,136
Kurtosis		-,313
Std. Error of Kurtosis		,271

Additionally, a quantile-quantile plot (Q-Q plot) of the data (Figure 6) showed how each participant's VLT score (the observed value) compared to the expected normal value. When interpreting a Q-Q plot, "any deviation of the dots from the diagonal line represents a deviation from normality" (Field, 2013, p. 185). The Q-Q plot indicated that the distribution was skewed, and there were some clear outliers, seen as the solitary dots on either end of the Q-Q plot, having either very high or very low scores.

Figure 6 Quantile-quantile plot of participants' VLT score
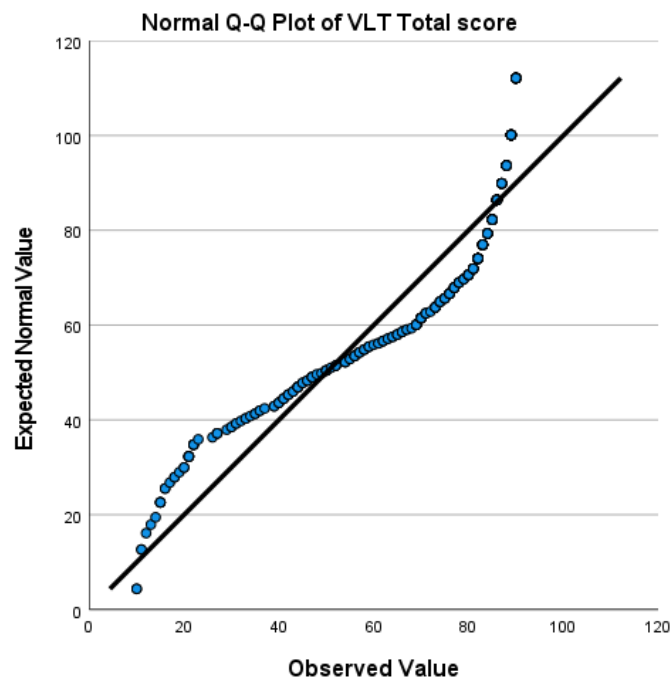
Furthermore, a one-sample Kolmogorov-Smirnov test and a Shapiro-Wilk test were run (Table 5). Field (2013) explains that these tests "compare the scores in the sample to a normally distributed set of scores with the same mean and standard deviation" (p. 185). In these tests, a non-significant result ($p > .05$) indicates that the distribution of the sample is not significantly different from a normal distribution, whereas a significant test result ($p < .05$) indicates a distribution significantly different from normal distribution (Field, 2013, p. 185). In the case of my data, the Kolmogorov-Smirnov test and Shapiro-Wilk test both had a significance of $p < .001$, which suggested that the data differed from a normal distribution.

Table 5 Kolmogorov-Smirnov and Shapiro-Wilk normality tests

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VLT Total score	,172	321	<,001	,853	321	<,001

a. Lilliefors Significance Correction

Finally, a residuals test was performed on the participants' VLT scores. The residuals test, displayed as a histogram with a normal curve (Figure 7), indicated that the data was largely normally distributed. The histogram bars largely aligned with the normal curve, although there were more high scores than what would be expected in a normal distribution.

Figure 7 Total VLT score residuals test histogram with normal curve
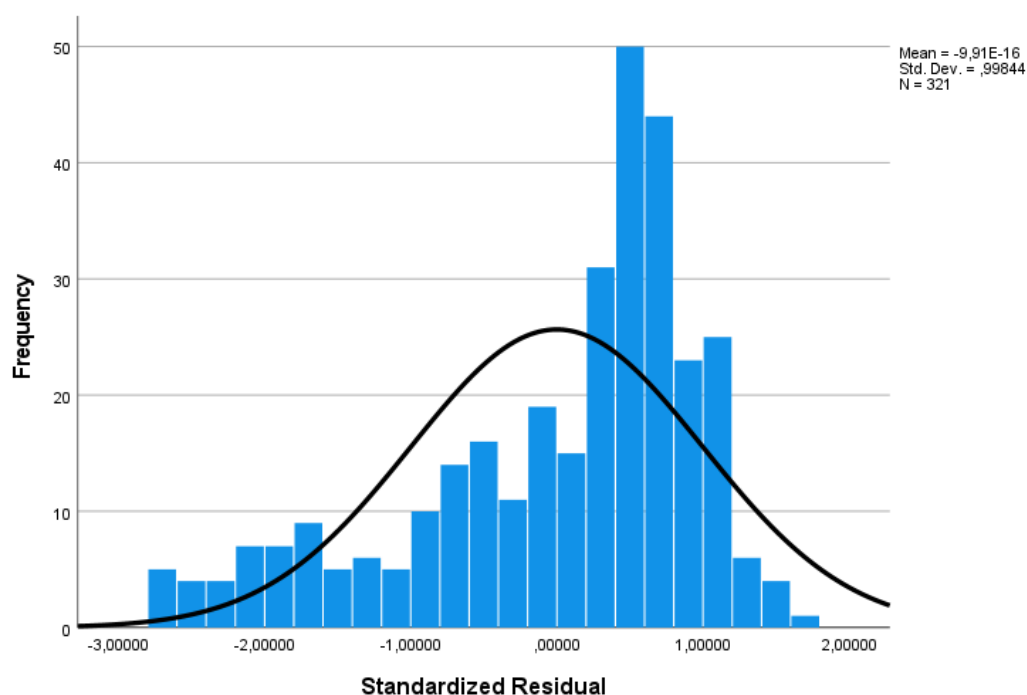
To decide how to interpret the distribution of my data, the results from the various normality tests detailed above were considered. Field (2013) states that "as sample sizes get larger, the assumption of normality matters less because the sampling distribution will be normal regardless of what our population (or indeed sample) data look like" (p. 184). Field (2013) goes on to state that if a sample is large, one should not use significance tests of normality; "in fact, don't worry too much about normality at all" (p. 184). Thus, the fact that my sample consists of 321 participants, which is a large sample, along with the compiled results of the

above-mentioned normality tests, led to the decision to interpret the data to be normally distributed, and thus analyze them as such.

However, determining normal distribution is a matter of interpretation. When data are normally distributed, it is possible to run parametric tests, as parametric tests assume the data is normally distributed. When data cannot be considered normally distributed, non-parametric tests are used. After careful consideration of the histogram and the other normality tests, I decided to treat my data as normally distributed, so my main focus would be on parametric tests. However, to be on the safe side, I wanted to examine the data using non-parametric tests as well, to investigate whether or not the different interpretation of normality, and the subsequent use of different tests (parametric and non-parametric, respectively), reveal substantially different findings.

4.2 Grouping participants: Frequency of and time spent on extramural gaming

This section explains how the participants were divided into four groups based on how much time they spent on extramural gaming during a regular week. This section starts by detailing this study's findings about participants' frequency of and time spent on extramural gaming respectively, before examining to what extent there is a positive correlation between frequency and time.

Frequency of gaming was the first survey question after the vocabulary levels test (VLT), asking participants to select between the options "Never/almost never", "A few times per month", "A few times per week", or "Daily" (see Q1 in Appendix 2). Time spent on gaming during a regular week was the second question after the VLT, asking participants to select either "None, because I don't game", "Less than three hours per week", "3-9 hours per week", or "More than 9 hours per week" (see Q2 in Appendix 2).

In terms of frequency, 88 participants reported that they never or almost never game, 36 stated that they game a few times per month, 71 participants said they game a few times per week, and 126 participants stated they are daily gamers. Among the participants who stated they never or almost never game, 69 are female and 14 are male. The number of female participants was almost identical for participants who game a few times per month, a few times per week, and daily, in contrast to the number of male participants in these groups, which increased from a few times per month to a few times per week, and then doubled among those who reported gaming daily. These findings are detailed in Table 6.

Table 6 Sample distribution across gaming frequency, including gender

Frequency of gaming	Total		Gender					
			Female		Male		Other	
	N	%	*n*	%	*n*	%	*n*	%
Never/almost never	88	27.4	69	56.6	14	7.7	5	27.8
A few times per month	36	11.2	18	14.8	17	9.4	1	5.6
A few times per week	71	22.1	18	14.8	49	27.1	4	22.2
Daily	126	39.3	17	13.8	101	55.8	8	44.4
TOTAL	**321**	**100**	**122**	**100**	**181**	**100**	**18**	**100**

Looking at time spent on gaming, 90 participants reported spending zero hours on gaming during a regular week, 54 stated they spend less than three hours per week on gaming, 83 said they spend between three and nine hours per week on gaming, and 94 reported spending more than nine hours per week gaming. The gender distribution across time spent on gaming followed a similar pattern to that seen for frequency, with the number of female participants being highest in the zero hours group and decreasing as the number of hours increasing, while the number of male participants increased with the increasing number of hours spent on gaming.

Table 7 Sample distribution across time spent on gaming, including gender

Hours of gaming/week	Total		Gender					
			Female		Male		Other	
	N	%	*n*	%	*n*	%	*n*	%
0	90	28	72	59	13	7.2	5	27.8
< 3	54	16.9	23	18.9	29	16	2	11.1
3-9	83	25.9	16	13.1	63	34.8	4	22.2
> 9	94	29.2	11	9	76	42	7	38.9
TOTAL	**321**	**100**	**122**	**100**	**181**	**100**	**18**	**100**

Dividing a sample into groups based on time spent on gaming has been done in previous research, examples including Sylvén and Sundqvist (2012), Sundqvist and Wikström (2015), and Sundqvist (2019). The participants in my sample were divided into groups based on time spent on gaming during a regular week, creating non-gamers (zero hours), infrequent gamers

(less than three hours), moderate gamers (between three and nine hours), and frequent gamers (more than nine hours). Henceforth, these four participant groups will be used when reporting findings relating to various variables.

A crosstabulation (Table 8) illustrated how the participants' reported frequency of gaming and time spent on gaming corresponded. The crosstabulation showed that among the participants who reported a low frequency of gaming ("Never/almost never"), the majority also reported spending zero hours on gaming. Similarly, among the participants who reported a high frequency of gaming ("Daily"), the majority stated they spend more than nine hours per week on extramural gaming. This is logical, as serious gamers will invest a lot of time in this activity, and they will do so often.

Table 8 Crosstabulation of participants' gaming frequency and gaming hours per week

How often do you game in your free time? * How many hours do you game during a normal week? Crosstabulation

Count

		How many hours do you game during a normal week?				
		None, because I don't game	Less than three hours per week	3-9 hours per week	More than 9 hours per week	Total
How often do you game in your free time?	Never/almost never	81	7	0	0	88
	A few times per month	6	27	3	0	36
	A few times per week	2	17	40	12	71
	Daily	1	3	40	82	126
Total		90	54	83	94	321

The relation between frequency and time was investigated further by correlating these two variables. Spearman's correlation coefficient was used since the data were ordinal (Field, 2018, p. 344). The results showed that the correlation coefficient of frequency of extramural gaming and time spent on extramural gaming was high ($r_s = .870$, $p = < .001$) (Table 9). This means that, when this study henceforth refers to four groups of participants divided according to their reported *time* spent on extramural gaming, this aligns with the reported *frequency* of gaming as well. The high correlation between these two variables added to the reliability of this study's sample, because they answered similarly on these two questions, which is logical (3.1.2).

Table 9 Spearman's correlation coefficient of gaming frequency and gaming hours

Correlations

			How often do you game in your free time?	How many hours do you game during a normal week?
Spearman's rho	How often do you game in your free time?	Correlation Coefficient	1,000	,870**
		Sig. (2-tailed)	.	<,001
		N	321	321
	How many hours do you game during a normal week?	Correlation Coefficient	,870**	1,000
		Sig. (2-tailed)	<,001	.
		N	321	321

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

4.3 RQ1: Extramural gaming and receptive L2 English vocabulary knowledge

This section relates to research question 1, "To what extent is there a connection between extramural gaming and receptive L2 English vocabulary knowledge?". This study used participants' total score on an adapted vocabulary levels test (VLT) as its measurement of receptive L2 English vocabulary knowledge. The minimum score is 0, the maximum is 90. In the present study, the mean VLT score was 66.47. The median was 76 and the mode was 85. The minimum score of any participant was 10 ($n = 2$), and the maximum score of any participant was 90 ($n = 15$), meaning the range was 80. The standard deviation was 23.031. These statistics are summarized in Table 10, which, in addition to the total VLT scores, also includes data for the three different word frequency levels tested with the adapted VLT.

Table 10 Participant VLT score statistics, total and individual frequency levels

	2,000 level	3,000 level	5,000 level	Total VLT score
Mean	24.71	22.34	19.40	66.47
Median	28	25	23	76
Mode	30	30	29	85
Range	27	28	28	80
Minimum	3	2	2	10
Maximum	30	30	30	90

Std. Deviation	7.163	7.854	9.242	23.031

The comparison of the three individual word frequency levels revealed that the mean and median got lower as the tested vocabulary level got "higher", because the 5,000 level is more difficult than the 3,000 level, which, in turn, is more difficult than the 2,000 level. The "higher" levels are more difficult because more infrequent words are tested at the "higher" levels (see 2.2). This meant that the number of correct answers decreased as the difficulty of the words tested increased. The mode remained practically unchanged, which meant that 30, 30 and 29 were the most common scores at each tested level. That is, the ceiling effect was apparent, since many of the participants had the maximum score on each level. The minimum and maximum scores were almost identical for the three levels.

To examine the relation between extramural gaming and receptive L2 English vocabulary knowledge, the two variables were correlated (Table 11). The results showed a fairly high correlation coefficient (Spearman's rho) between hours spent on gaming and the total VLT score ($r_s = .424$, $p = < .001$). This meant that there was a statistically significant positive correlation between hours spent on gaming and receptive L2 English vocabulary knowledge.

Table 11 Spearman's correlation coefficient of gaming hours and VLT total score

Correlations

			How many hours do you game during a normal week?	VLT Total score
Spearman's rho	How many hours do you game during a normal week?	Correlation Coefficient	1,000	,424[**]
		Sig. (2-tailed)	.	<,001
		N	321	321
	VLT Total score	Correlation Coefficient	,424[**]	1,000
		Sig. (2-tailed)	<,001	.
		N	321	321

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

4.4 RQ2: The four gaming groups and receptive L2 English vocabulary knowledge

This section answers research question 2, "To what extent is there a connection between the four gaming groups and receptive L2 English vocabulary knowledge?". This section uses the

previously established division of participants into four gaming groups and examines the connection between these four groups and their VLT scores.

Investigating the means, medians and standard deviations of the four gaming groups (Table 12) shed additional light on the connection between extramural gaming and receptive L2 English vocabulary knowledge. The non-gamers had the lowest mean VLT score (54.07), the highest score being that of the frequent gamers (75.56). This was corroborated by the medians, which increased from 57.5 among the non-gamers to 84 among the frequent gamers. The standard deviation is higher for the non-gamers (23.157) than the frequent gamers (19.902).

Table 12 Total VLT score statistics distribution across the four gaming groups

Report

VLT Total score

How many hours do you game during a normal week?	N	Mean	Median	Std. Deviation	Minimum	Maximum
Non-gamers	90	54,07	57,50	23,157	10	89
Infrequent gamers	54	63,15	69,50	23,280	11	90
Moderate gamers	83	71,80	80,00	19,717	16	90
Frequent gamers	94	75,56	84,00	19,902	14	90
Total	321	66,47	76,00	23,031	10	90

These results were corroborated by a scatterplot of the total VLT scores for each group, with an added fit line displaying how the total VLT scores were lower for the non-gamers and increasingly higher for the infrequent gamers, moderate gamers and frequent gamers, respectively (Figure 8).

Figure 8 Scatter plot with fit line of VLT total score and the four gaming groups
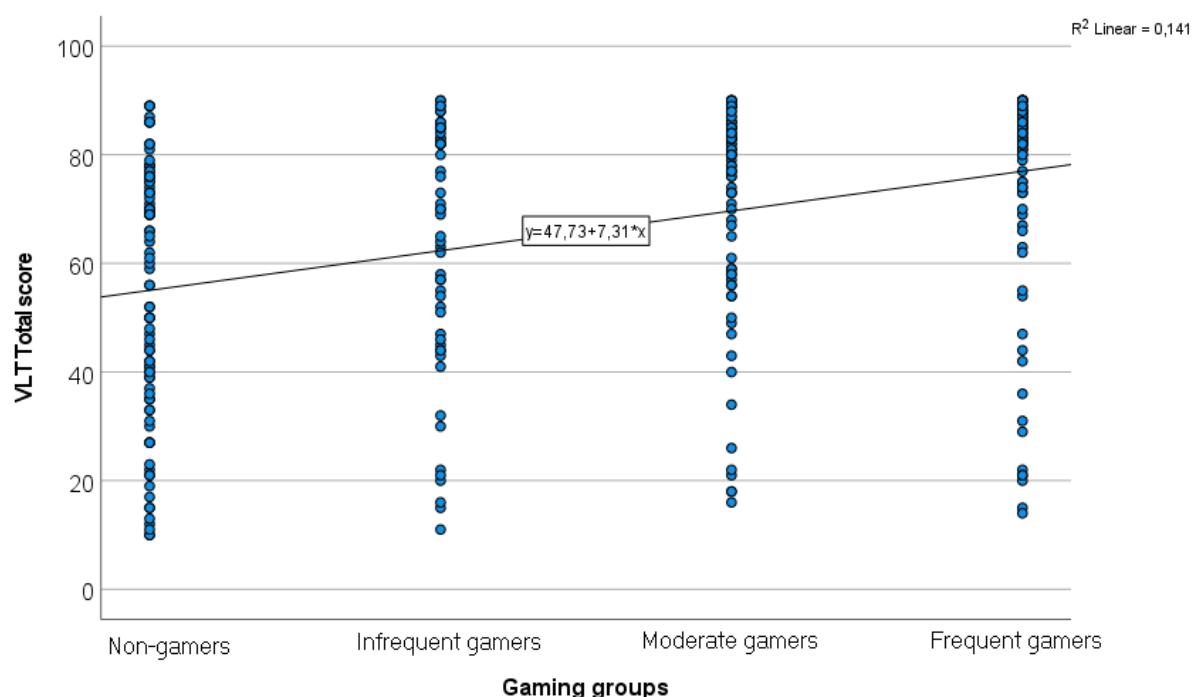
The significance of the difference between the four gaming groups was tested with a one-way analysis of variance (ANOVA). The ANOVA showed a statistically significant difference between the four gaming groups ($p = < .001$) (Table 13).

Table 13 ANOVA: VLT score difference between the four gaming groups

ANOVA

VLT Total score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	24568,975	3	8189,658	17,884	<,001
Within Groups	145163,050	317	457,928		
Total	169732,025	320			

Additionally, the difference in VLT scores between the four groups was examined using a Kruskal-Wallis test, a non-parametric equivalent to a one-way ANOVA. The Kruskal-Wallis test compares mean ranks for multiple groups, reporting the difference between them. In order to analyze data using a Kruskal-Wallis test, four assumptions about the data must be met, detailed in Table 14.

Table 14 Kruskal-Wallis required assumptions

Assumption	My data
The dependent variable is measured at the ordinal level.	The dependent variable is the vocabulary levels test score, and the participants' scores are in rank order.
The independent variable consists of two or more categorical, independent groups.	My independent variable is the four gaming groups.
There should be independence of observations, meaning there is no relationship between the observations in each group or between the groups themselves.	There is no relationship between the observations in each group or between the four gaming groups.
It must be determined whether the distributions in each group have the same shape.	Histograms showing the distribution of each gaming group indicate that the distributions are close to their respective normal curves (Appendix 13).

The necessary assumptions being met, the Kruskal-Wallis test showed a *p*-value of < .001 between the four gaming groups, corroborating that there was a statistically significant difference between the VLT scores of the four gaming groups.

In other words, the participants who reported being frequent gamers had higher VLT scores than those who reported being non-gamers, with a gradual increase of mean and median scores from non-gamers to frequent gamers. The differences between the four gaming groups were statistically significant, shown for both the ANOVA and Kruskal-Wallis.

4.5 RQ3: The four gaming groups - gender, language background, school level

This section answers research question 3, "How can the four gaming groups be described in terms of gender, language background, and school level?". The section starts by examining gender distribution across the four gaming groups (4.5.1), then investigates language background (4.5.2) and school level (4.5.3) across the same groups.

4.5.1 Gender

Investigating gender distribution across the four gaming groups revealed substantial differences in gender distribution, as illustrated in Figure 9. The sample comprised 122 female participants, 181 male and 18 others (see 4.2). Examining the four gaming groups, the proportion of male participants increased significantly with increased reported time spent on gaming, with 13 male participants being non-gamers, as opposed to 76 being frequent gamers. Similarly, the number of female participants decreases, with 72 female participants being non-gamers, as opposed to 11 being frequent gamers. The "Other" gender category was very small, comprising 18 participants.

Figure 9 Gender distribution across the four gaming groups
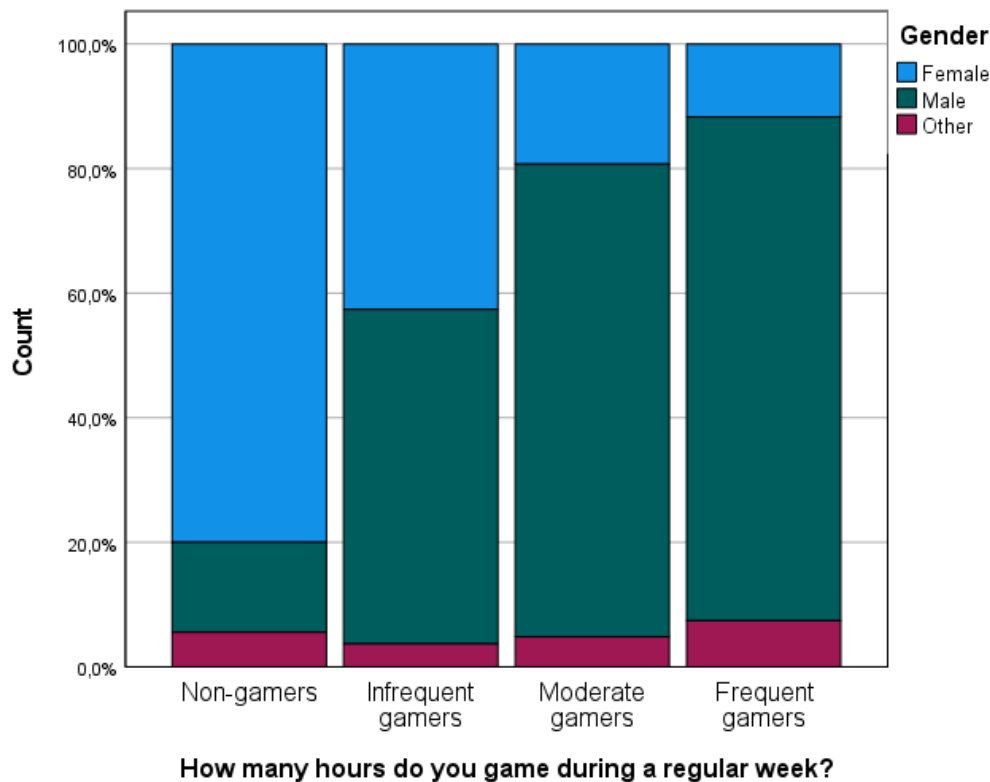
4.5.2 Language background

The participants were asked to choose one of three options in response to the question "Which description best describes your mother tongue?". The participant replies were "Norwegian is my mother tongue" ($n = 230$, 71.5%), "Norwegian is one of my mother tongues" ($n = 49$, 15.2%) and "Norwegian is not my mother tongue" ($n = 42$, 13%). The two groups who reported not having Norwegian as their only L1 were approximately the same size, and they comprised just over a quarter of the sample when combined (Figure 10). Henceforth, the three

L1 groups will be referred to as "L1 Norwegian", "L1 Norwegian+", and "L1 not Norwegian".

Figure 10 Sample distribution across language background
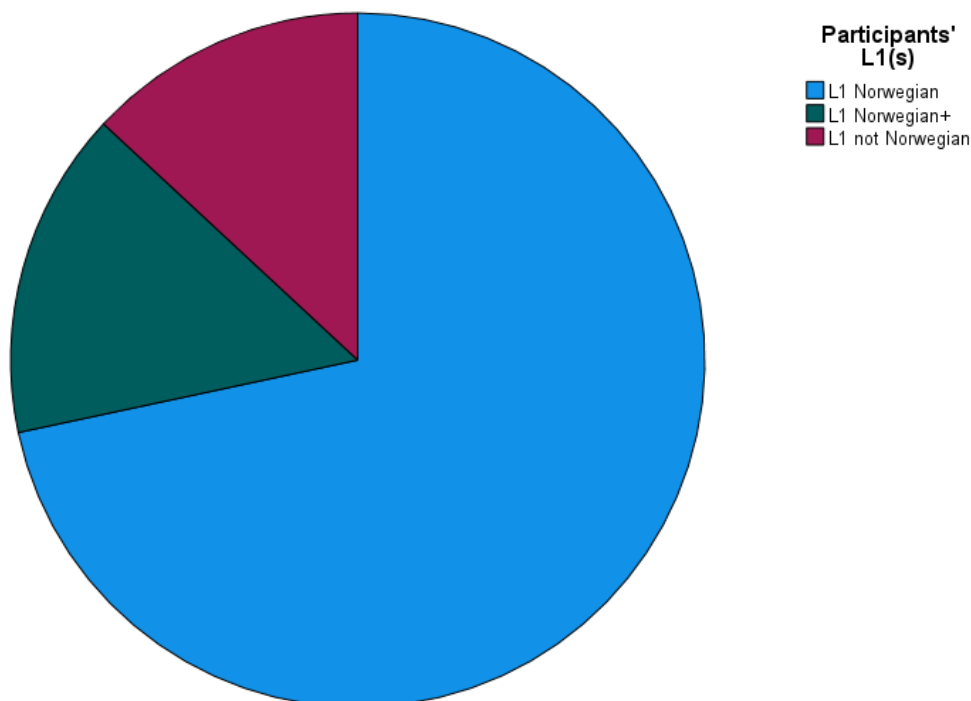
The L1 Norwegian+ and L1 not Norwegian groups were asked what their (other) L1 or L1s were. They listed 32 different (additional) L1s, not counting Norwegian. Out of the 91 participants who stated that Norwegian was not their (only) L1, ten did not mention what their (other) L1 was. The most common L1s were Arabic, English, Polish, and Somali (all $n = 7$), Albanian ($n = 6$) and Kurdish ($n = 5$). A total of 17 languages were listed as an L1 by only one participant. The languages listed by L1 Norwegian+ and L1 not Norwegian groups are illustrated in a word cloud in Figure 11 and detailed in Appendix 8. In the word cloud, the size of the letters reflects frequency.

Figure 11 L1s listed by participants

Examining the four gaming groups in light of participants' language background, the findings showed that the L1 Norwegian+ and L1 not Norwegian groups were very close in size for all four groups. Even when combined, these two groups were smaller than the L1 Norwegian group, with the difference being biggest among the frequent gamers. These findings are illustrated in Figure 12 and Table 15.

Figure 12 L1 distribution across the four gaming groups
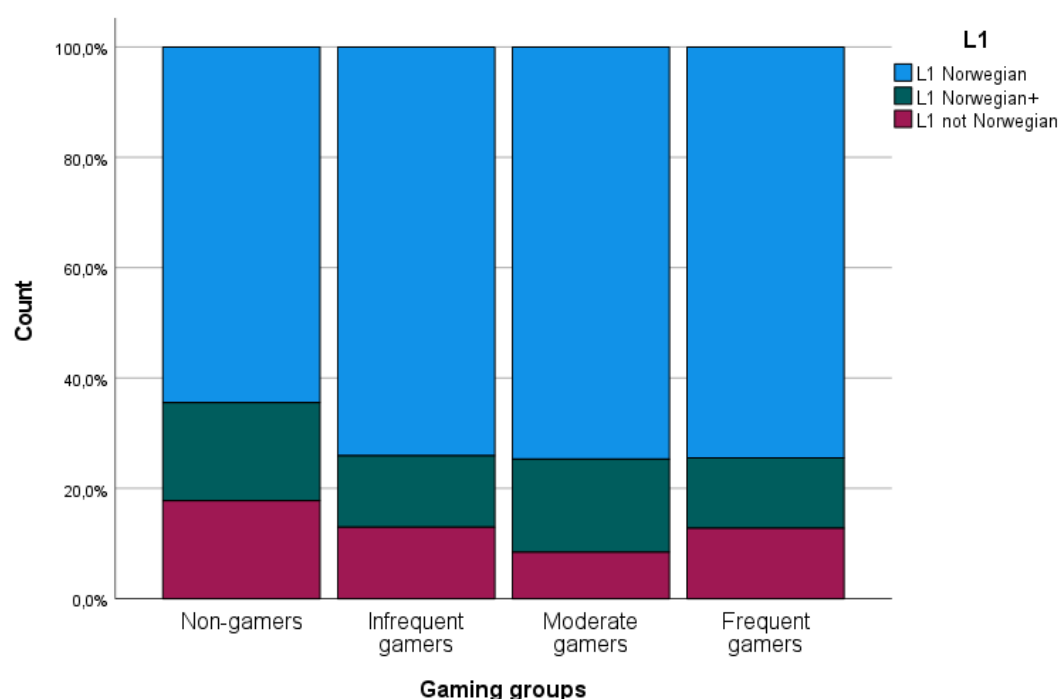
Table 15 L1 distribution across the four gaming groups

Group	Total		Non-gamers		Infrequent gamers		Moderate gamers		Frequent gamers	
Language background	*N*	%	*n*	%	*n*	%	*n*	%	*n*	%
L1 Norwegian	230	71.5	58	26.3	40	36	62	37.3	70	36.5
L1 Norwegian+	49	15.2	16	34	7	29.5	14	39.6	12	29.3
L1 not Norwegian	42	13	16	39.7	7	34.5	7	23.1	12	34.2
TOTAL	**321**	**100**	**90**	**100**	**54**	**100**	**83**	**100**	**94**	**100**

These findings suggested that language background did not impact receptive L2 English vocabulary knowledge for this sample, although an effect study has not been carried out. As the distribution of participants from the three different language background groups was consistent across all four gaming groups, and the moderate and frequent gaming groups had the highest VLT scores regardless of language background, participants' language background does not appear to have influenced their receptive L2 English vocabulary knowledge in this study.

4.5.3 School level

In investigating the four gaming groups in relation to school level, the study found that more students from VG1 participated than from VG2, but that participants from the two school levels were fairly evenly distributed across the four gaming groups. The non-gamers ($n = 90$, 28%) consisted of 59 participants in VG1 and 31 participants in VG2. The infrequent gamers ($n = 54$, 16.9%) comprised 35 from VG1 and 19 from VG2, while the moderate gamers ($n = 83$, 25.9%) were divided into 53 in VG1 and 30 in VG2. Finally, the frequent gamers ($n = 94$, 29.2%) comprised 63 participants from VG1 and 31 from VG2. These findings are illustrated in Figure 13.

Figure 13 School level distribution across the four gaming groups
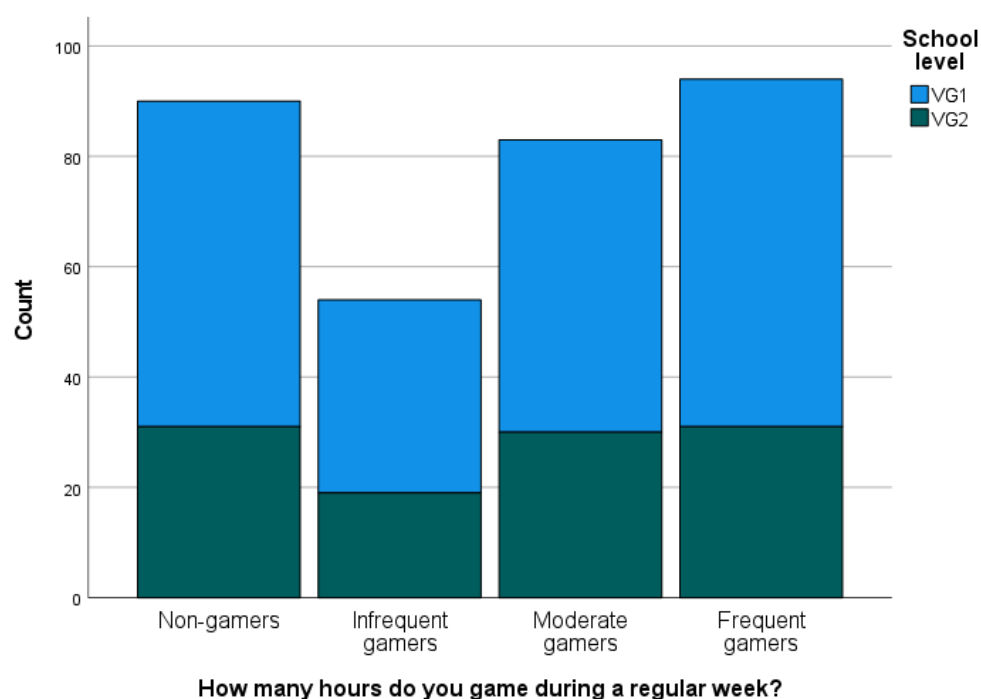
Thus, there were no substantial differences in distribution across gaming groups depending on school level, which in turn meant that there was no difference relating to the participants' age, that is, between participants who are around 16 or 17 years old (VG1) and those who are a year older (VG2).

This suggested that there were no substantial differences in distribution across gaming groups depending on school level. This is interesting because school level typically indicates age, with VG1 students usually being 16-17 years old and VG2 students being 17-18, although minor discrepancies can occur if students are delayed or ahead in their school progression.

These findings indicated that there was no substantial difference between the four gaming groups for participants aged 16-17 and participants aged 17-18.

4.6 RQ4: English words learned from gaming

This section deals with research question 4, "Which English words do vocational students in Norway report to recall having learned from gaming?". The section starts by detailing what types of answers participants gave to the question about words learned from gaming (see Q4 in Appendix 2) and how these answers were coded (4.6.1), before examining participant answers by investigating what characterizes the words participants report having learned from gaming (4.6.2) and the participant testimonials about extramural gaming and L2 English language learning (4.6.3).

4.6.1 Coding answers provided by participants

In a follow-up question, all but the non-gamers were asked to list any words they could recall having learned from gaming. The text box answers were sorted into four categories based on their respective characteristics. The four categories were determined through inductive coding, with the categories (codes) emerging from the data material (Gleiss & Sæther, 2021, pp. 170-171). Quotes from participants have been translated to English, and the original quotes are enclosed in Appendix 10 and Appendix 12.

In total, 231 participants had the opportunity to give examples, but this question was not compulsory; 94 participants chose to offer an answer. These 94 answers comprised 36 examples of *words*, 35 *testimonials*, 18 instances of *words and testimonials*, and 5 answers categorized as *other* (Table 16).

Table 16 Distribution of answers based on codes

Codes (based on type of answer)	Total	
	N	%
Words	36	38.3
Testimonials	35	37.3
Words and testimonials	18	19.1
Other	5	5.3
TOTAL	**94**	**100**

The first category of answers were those where participants listed words which they recalled learning from gaming, here called *words*. Examples of answers in this category include "Baiting, lurking, run and gun, whiff, ultimate, abilities, trash, monkey" (16814726) and "Resume, quit, load, game over, start, pause, edit" (16531572). The second category consisted of answers I decided to call *testimonials*. The testimonials were statements from the participants about their L2 English language learning in relation to extramural gaming. Examples of answers were "I have actually learned all my English from gaming and using the internet" (17049684) and "Much more than I can tell you" (16741824). The third category was *words and testimonials*, comprising answers which contained words as well as testimonials. One example of an answer in this category is:

> I have learned a lot, almost all the English I know, especially pronunciation is something I have learned from gaming. Some words I can think of: peripherals, coordination, specification, cooperation […]. But the most important thing is to be able to speak everyday English, so that I can speak fluently with friends outside of gaming. (16829350)

The fourth and final category was *other*, which holds answers that did not fit into any of the other categories. Examples included "'Idk'" (16514987), which is an abbreviation of "I don't know", and "'I can't recall anything, it's something I don't think about'" (16886624).

4.6.2 Words learned from gaming

This section examines what characterizes the words participants reported having learned from gaming. All words listed by participants were analyzed using the Compleat Web Vocabulary Profiler (VP) from Lextutor (Cobb, 2022), which sorts the words into word families based on the BNC/COCA.

The words participants reported having learned from gaming were divided into two categories: words and abbreviations. The abbreviations were all specific to gaming or online culture, examples including *GG* (good game), *GLHF* (good luck, have fun) and *LOL* (laughing out loud). Initial analysis found that the all abbreviations listed by participants were categorized as off-list by the VP. In subsequent analyses, they were thus excluded, but they are listed in Appendix 9.

Table 17 Token distribution across frequency levels

Word frequency level*	Total	
	N	*%*
K1	58	36.7
K2	27	17
K3	21	13.3
K4	13	8.2
K5	10	6.3
K6	4	2.5
K7	3	1.9
K8	6	3.8
K9	1	0.6
K10	1	0.6
K12	1	0.6
K15	1	0.6
K16	1	0.6
OFF-LIST	11	7
TOTAL	**158**	**100****

** Word frequency levels for which no participants listed words have been excluded from the table.

The list of words learned from gaming consists of 134 types, the total being 158 tokens when including repeated words (words listed by more than one participant). *Types* count the number of different words, while *tokens* count the total number of words (Oxford Reference, 2022). Most of the types listed by participants were from frequency levels K1 to K3. From each of the levels K9, K10, K12, K15 and K16, only one type was listed by the participants. These types were *indubitably, lore, melee, neurotransmitters* and *pickaxe*.

Additionally, 11 words were classed by the VP as "off-list", meaning they are not part of the corpora used. These 11 words were *artillery, coomer, cunt, customization, kneegears, multiplayer, nerf, noob, redut, shit* and *smurf*. The complete list of words analyzed with the VP and their distribution across word frequency levels can be found in Appendix 10 and Appendix 11.

4.6.3 Testimonials about L2 English language learning and extramural gaming

This section investigates the characteristics of the testimonials provided by participants when asked to report any words they could recall learning from gaming. As outlined in Table 16, 35 answers were coded as pure testimonials, and 18 were coded as a combination of words and testimonials, comprising a total of 53 testimonials to investigate. All testimonials are enclosed in Appendix 12.

Several participants reported having learned a lot of English from gaming, and a substantial number even went as far as stating they had learned most of, or even all, their English by playing digital games. One participant stated that "I have learned a lot of English expressions. If it wasn't for gaming, I wouldn't have known most of the words in this survey" (17049658). Another said that "Most of my English comes from gaming/the internet, so it's difficult to list words when almost everything I have learned is from that. … I have learned advanced expressions from gaming" (16810581). A third participant stated that "Most of what I have learned in English comes from games," (16442809) while a fourth said that "Literally everything I know in English is from games" (16531663). In sum, these testimonials suggested that gaming had been an important source of English language learning for these participants.

Several participants reported having learned English at a very young age, by playing games like Mojang's Minecraft or Nintendo's Legend of Zelda franchise and asking their parents or older siblings for explanations when encountering unfamiliar words. One participant said:

> I have played a lot of Minecraft since I was 5-6 years old. You receive items and see what they are called. For example, I could craft a door, and then it says 'Door' when I hold it. Then I learned that door = 'door'. (17034328)

Additionally, one participant stated "I was little when I started gaming. The first things I learned were probably from Zelda on my Nintendo DS. I often asked my sister, 'What does that mean'" (17034759), and a third stated that "Most of what I have learned from gaming I learned when I was very young, so it is difficult to recall most of it" (16443389). A fourth participant said:

> I learned mainly all my English from video games. I have been playing since I was five years old, so the majority of my vocabulary is from games. I didn't really learn anything new from my English teachers in school. (16454074)

In addition to vocabulary, several other aspects of English language learning were also mentioned in the testimonials. Multiple participants' answers indicated that exposure to English through gaming had improved their language proficiency, some participants stating that listening to or speaking English had improved their vocabulary or pronunciation. One participant said, "My English got better because the more I hear English, the better I get" (17034436), and another stated that "There are very few specific words I can recall, but I have learned the majority of my pronunciation and sentence structure from games" (16810496). A third participant said, "I have learned a lot, almost everything I know in English, and especially pronunciation is something I have learned from gaming" (16829350).

One participant's answer suggested they attributed their English language learning from gaming to the fact that online gaming affords language situations involving interaction with others. The participant said:

> I have learned most of [the English] I know from gaming and the internet. I believe I have learned this because in online games, you speak to other real humans, you're not just studying different words until you know them. (16454729)

The single game title mentioned most frequently was Minecraft, mentioned by eleven participants. A common thread was that they played Minecraft when they were younger. Participants stated that "Minecraft was the first game from which I learned a lot of words" (16810496), saying that "When I was little, I played Minecraft in English and learned the names of things related to nature, animals, and construction" (16889389), or that "When I was little, I learned my first English words from Minecraft, for example 'cow', 'chicken', 'grass', 'dirt', and 'shovel'" (17375422). One participant said that "Minecraft is ingenious for learning English, especially at such a young age, [because] the combination of images and words makes it very easy to learn the different words" (16810496), and one even went as far as to state that "If you didn't learn English from Minecraft, you're not a real gamer" (16531671). In my data, Minecraft definitely stood out as the title participants mentioned the most, and these participants claimed that Minecraft was very important for their reported learning of English early in life. This may suggest that Minecraft is an effective source of English language learning, especially in young learners, and that the game's combination of images and written words contributes to language learning.

4.7 Findings summary

To summarize this study's findings, as reported in this chapter; firstly, multiple analyses of normality led to the decision to treat this study's data as normally distributed, allowing for analysis through parametric tests. However, as normal distribution is a matter of interpretation, and the data could have been interpreted to not be normally distributed, the decision was made to also run non-parametric tests. When correlating relevant variables from my data, the parametric and non-parametric tests yielded the same results. Thus, the choice to treat the data as normally distributed did not alter the findings.

Secondly, frequency of gaming and time spent on gaming were strongly correlated, which suggested that the participants who reported the highest frequency of gaming were the ones who also reported spending the most time on gaming, and vice versa. This finding made it

possible to divide the sample into four groups based on time spent gaming, creating the groups of non-gamers, infrequent gamers, moderate gamers and frequent gamers.

Next, extramural gaming and the participants' total vocabulary levels test (VLT) scores were correlated, finding that as time spent on gaming increased, so did the total VLT score. Then, the previously established four gaming groups and their receptive L2 English vocabulary knowledge, measured with the VLT, was investigated. The analysis revealed that the non-gamers had the lowest mean score on the VLT, and the mean score increased from infrequent gamers to moderate gamers, to the frequent gamers, who had the highest mean score. An ANOVA found a statistically significant difference between the four gaming groups in relation to VLT scores, and a Kruskal-Wallis test corroborated this.

Furthermore, in examining how the four gaming groups could be described in terms of gender, language background and school level, the study found that the number of male participants increased as the time spent on gaming got higher, while the number of female participants simultaneously decreased. With regard to the participants' language background, the analyses revealed that the majority of participants had Norwegian as their only L1, and the participants' language background did not appear to impact their VLT score. Thus, the findings suggested that language background did not influence receptive L2 English vocabulary knowledge. Looking at school level and the four gaming groups, VG1 students comprised approximately 2/3 of the participants and VG2 students approximately 1/3, and these respective proportions applied to all four gaming groups. This suggests there were no substantial differences in distribution across gaming groups depending on school level, which in turn means that there was no difference relating to the participants' age.

Finally, examining the English words participants reported to recall having learned from gaming, the study found that the majority of the types were from frequency levels K1 to K3, with only one type reported for each of the levels K9, K10, K12, K15 and K16. Testimonials from participants about L2 English language learning and extramural gaming suggested that gaming had been an impactful source of English language learning, teaching them vocabulary and pronunciation, often from a young age, with Minecraft standing out as the single game title mentioned as a source of English language learning most often.

5 Discussion

In this chapter, I discuss my study's main findings in light of the theory and prior research detailed in Chapter 2. In the previous chapter, I presented my main findings, and in the following sections, these will be discussed in the order of the research questions. Firstly, this study found a statistically significant positive correlation between time spent on extramural gaming and receptive L2 English vocabulary knowledge. This led to a division of participants into four groups based on the number of hours they spent on gaming during a regular week, for which this study found a statistically significant positive correlation with receptive L2 English vocabulary knowledge. These two findings are discussed in section 5.1.

Additionally, this study found no connection between the participants' L1s and their extramural gaming or VLT scores, which is discussed in section 5.2. This study also found no difference in extramural gaming or VLT scores depending on the participants' school level, which is discussed in section 5.3. Finally, this study found that participants reported to recall having learned both high- and low-frequency words from gaming, and statements made by participants in their testimonials might suggest that gaming can function as a mediator in a process of social learning. This is discussed in section 5.3.

5.1 Extramural gaming and receptive L2 English vocabulary knowledge

The present study found a statistically significant positive correlation between hours spent on extramural gaming and receptive L2 English vocabulary ($r_s = .424$, p = .001). In other words, the participants who spent fewer hours on gaming during a regular week had lower vocabulary levels test (VLT) scores than those who spent a higher number of hours on gaming. Although this study has not investigated any potential causal relationship between the two variables, it seems unlikely that the participants' advanced English vocabulary caused them to spend more time on gaming. Thus, it seems plausible that the number of hours spent on gaming may have contributed to the VLT score, and not vice versa, although it is of course impossible to know for sure without additional investigation.

Sundqvist (2009) investigated extramural English activities and their influence on a number of different aspects of L2 English language learning, one such aspect being receptive vocabulary. Extramural English activities include far more than just gaming (Sundqvist & Sylvén, 2016), but gaming was a popular activity in the 2009 study. Thus, although a comparison of extramural English activities in Sundqvist (2009) and extramural gaming in the

present study is not a one-to-one comparison, it nonetheless warrants investigation. Sundqvist (2009) found that the mean VLT scores were either the same or got better as the amount of time spent on EE activities increased, with the participants who spent the most amount of time on these activities having the highest mean scores (p. 196). The study also found that "playing video games" was the most important EE activity affecting vocabulary (Sundqvist, 2009, p. 196).

Sundqvist (2009) clustered participants in five EE subsets based on the amount of time they spent on extramural English activities, with subset 1 spending the least amount of time on EE and subset 5 spending the largest amount of time on EE, and reported mean VLT scores for each subset. The sample in the present study had a mean VLT score of 66.47, which is higher than the mean score of 60.1 found in Sundqvist (2009, p. 151). Her EE subset 1 had a mean VLT score of 48.8 (Sundqvist, 2009, p. 151), which is lower than the mean score of 54.07 for my study's non-gamers. EE subset 5 had a mean score of 73.5 (Sundqvist, 2009, p. 151), which is slightly lower than the mean score of 75.56 found in my study's frequent gamers.

In Sundqvist (2009, p. 155), the correlation coefficient for EE and VLT scores was $r_s = .354$, which means that the present study has a slightly stronger correlation coefficient, although Sundqvist's (2009) investigation of EE in general and the present study's investigation of extramural gaming specifically does not make for a one-to-one comparison. The slightly stronger correlation coefficient in the present study might be due to this study's focus on gaming in particular, as opposed to extramural English in general, which is broader. It is nonetheless interesting that the correlation coefficients are so similar, considering it has been 13 years since the 2009 study, and the present study investigates students from a slightly different age group, in a different setting.

Sundqvist and Wikström (2015) used the same data as Sundqvist (2009), but focused specifically on extramural gaming. That study used the same adapted VLT as the present study and found significant correlations between extramural gaming and L2 English vocabulary at sample level (Sundqvist & Wikström, 2015, p. 72). The participants in Sundqvist and Wikström (2015) were grouped into three digital game groups (DGGs) based on the amount of time spent on gaming, DGG1 spending zero hours on gaming, DGG2 spending less than five hours, and DGG3 spending more than five hours (Sundqvist & Wikström, 2015, p. 69). This study's DGG1 had a mean score of 55.2, and is comparable to the present study's non-gamers, with a mean score of 54.07. Their DGG2 had a mean score of 58.4, compared to 71.8 for my moderate gamers, and their DGG3 had a mean score of 71.6,

lower than the 75.56 mean score of my frequent gamers. Additionally, the present study found that VLT scores had a linear correlation with the gamer groups (see 4.4), which is what Sundqvist and Wikström (2015) found as well.

Recently, Sundqvist (2019) investigated the connection between extramural gaming, L2 English vocabulary knowledge, and English subject grades. This study grouped its participants based on time spent gaming per week, into the groups non-gamers (zero hours), low-frequent gamers (< 3 hours), moderate gamers (3-9 hours), and frequent gamers (> 9 hours). The present study used the same amounts of hours as its grouping criteria. Comparing the present study to Sundqvist (2019), the 2019 study's non-gamers had a higher mean VLT score (57.25) than the same group in the present study (54.07). For the other three gaming groups, the mean scores were higher in the present study, the frequent gamers in my study having a mean VLT score of 75.56, compared to 70.34 in Sundqvist (2019).

The participants in Sundqvist (2009), Sundqvist and Wikström (2015), and Sundqvist (2019) were all one, two, or three years younger than those in the present study, which might account for the difference in mean VLT scores. The participants in my study have had additional years of in-school instruction, as well as additional years to spend on extramural gaming, both of which could account for their increased receptive L2 English vocabulary knowledge.

The correlation between hours spent on extramural gaming and mean VLT scores might indicate that spending several hours on extramural gaming per week can lead to a more advanced L2 English vocabulary, which in turn could lead to better English school subject grades (Sundqvist & Wikström, 2015), confidence in English language use inside and outside school (Abelvik, 2021), and perhaps greater motivation for the English subject.

The proportion of male participants per group in the present study increased as the time spent on gaming increased, meaning that in this sample, there were more male gamers than female gamers. The outcome of this is that the males in the sample have higher VLT scores, but this is not because males in general have more advanced receptive L2 English vocabularies or are better at taking VLTs, but rather because more males than females were gamers in this study. This tends to be the case (Sylvén & Sundqvist, 2012).

5.2 Extramural gaming, VLT scores, and L1

This study asked participants to state whether Norwegian was their mother tongue, one of their mother tongues, or not their mother tongue. This question was included in order to investigate any potential connections between extramural gaming, vocabulary levels test

(VLT) score, and mother tongue (L1). This study's findings indicate there was no connection between the participants' L1 and their amount of gaming or VLT scores.

It is interesting that the present study found no difference in VLT scores between students with L1 Norwegian, L1 Norwegian+, and L1 not Norwegian. Students who are immigrants or the children of immigrants (and thus, often do not have Norwegian as their (only) L1) have lower grade averages when enrolling in high school, and fewer of them have finished high school after five years, when comparing to the average for all students (SSB, 2017). Thus, it would be reasonable to assume that participants from this sample with L1 Norwegian+ or L1 not Norwegian would have lower VLT scores, but this study found that this was not the case.

Additionally, Sundqvist and Sylvén (2014) found that young English language learners (YELLs) with an L1 other than Swedish were overrepresented in that study's group of frequent gamers (spending more than 4 hours per week on gaming), and the article calls for further research investigating this. The authors state that, as this was a small sample in a single study, this finding might be coincidental (Sundqvist & Sylvén, 2014). Nonetheless, they speculate that it is possible the L2 Swedish YELLs find it particularly rewarding to play digital games, because these games are mediated in English, "preventing these specific individuals from standing out as non-L1 speakers, a situation they are used to being in daily, in school" (Sundqvist & Sylvén, 2014, p. 16). Although Sundqvist and Sylvén (2014) investigated younger learners (aged 10-11) than those in the present study (aged 16-18), the difference in these two studies' findings suggest further investigation is needed regarding extramural gaming and L1 in learners of various ages.

5.3 Extramural gaming, VLT scores, and school level

The present study investigated whether there was a connection between extramural gaming, vocabulary levels test (VLT) scores, and school level, and found no difference in extramural gaming or VLT scores based on what school level the participants belonged to. This study's sample comprised participants from VG1 (aged 16-17) and VG2 (aged 17-18).

The changes to the structure of the English subject for vocational students, from 84 hours of English subject instruction in VG1 and 56 hours in VG2, to all 140 hours being taught in VG1 (Udir, 2022b, 2022d), were implemented in the school year of 2020/2021. As this study's data collection took place in the subsequent school year, in the fall of 2021, it is unlikely that the lack of difference in VLT scores between the two school levels was caused by a difference in the structure of English subject teaching. The VG2 students in my study would have had all

their English subject instruction in the year prior to data collection, and the VG1 students would have had five hours of instruction per week from semester start in late August to data collection in early October. However, with the implementation of the new structure in the English subject for vocational students, further research could investigate the performance of students who were taught with the old structure compared to those who have been taught with the new structure.

Although I can only speculate, it is plausible that the lack of difference between the two school levels, and thus age groups, was caused by the ceiling effect apparent for the VLT (see 4.1). A large number of participants had maximum scores for all three levels, suggesting the test was too easy for many of them, making it impossible to distinguish between those who knew only what the VLT tested and those who would have known more if the test had been more difficult. Thus, if this study had used the original VLT in its entirety, which also tested items from the 10,000 word frequency level, as well as specialized vocabulary used in university textbooks (Nation, 1983), the findings may have been different.

5.4 Extramural gaming and learning with others

The present study asked participants to report words they could recall learning from gaming. To this open text box question, some participants replied by listing words, sometimes including their meaning, and others replied with statements about their experience with extramural gaming and L2 English language learning, referred to in Chapter 4 and the following as testimonials.

The majority of the words reported by participants to have been learned from gaming were from the word frequency levels K1 to K3, but the participants also listed several words from the levels K4 to K8, and one word was listed from each of the levels K9, K10, K12, K15 and K16. This indicates that the participants mostly learned easy, high-frequency words, but that intermediate, and more advanced vocabulary may also be learned through the medium of gaming. Additionally, the vast majority of the words were part of a general vocabulary, rather than specific to gaming or online culture. This suggests that although the words were learned from gaming, participants may use them in other contexts, both inside and outside school.

The potential for digital games to be resources for L2 vocabulary learning, either incidentally or with the support of supplementary teaching material, has been investigated by numerous studies outlined in Reinhardt (2017). For example, several studies have used *EA Games'* life simulation game series *The Sims*, where the contextualization of hundreds of everyday words

is required by the gameplay, and have discussed the game's potential as a resource for incidental vocabulary learning, and how it could be adapted to focus more explicitly on learning. Thus, the present study's finding that participants could recall having learned both high- and low-frequency words from gaming aligns with prior research on digital games and L2 vocabulary learning outlined in Reinhardt (2017).

Among the testimonials from participants, several of them mention the social aspect of gaming as a source of L2 English language learning, learning from and with others. One participant (16454729) stated they had learned most of the English they knew from gaming and the internet, and said they believed this was because in online games, they were speaking to real people. Although the participant did not specify exactly why they believed the interaction with "real people" was the reason they had learned a lot, this might suggest that online games create learning environments in line with sociocultural theories about learning.

According to sociocultural theory, learning is a social process, and all individuals learn from the people around them (Vygotsky, 1978) through a process of mediation, the role of mediation being to establish contact between the individual and the surrounding world (Lantolf, 2000). Mediation is facilitated by tools, one tool being language and another being artifacts (Vygotsky, 1978), the artifacts working as buffers between the individual and the environment (Lantolf et al., 2015). In the context of this study, gaming and digital games work as artifacts, facilitating mediation.

Thus, when this participant mentions the role "real people" have played in their L2 English language learning from gaming, this could possibly indicate that gaming and digital games can mediate a process of social learning. This participant's experience echoes theory about gaming and L2 acquisition, where one common finding is that "games of certain designs can serve as environments for peer and expert collaboration that led to increased linguistic and cultural competence" (Reinhardt, 2017, p. 206). Additionally, research has found that "many use games for foreign language practice informally, developing both autonomy and social collaboration skills" (Reinhardt, 2017, p. 206).

Another participant (17034759) stated that they started gaming when they were little, and often asked their sister to explain unfamiliar English words. This could potentially be an example of an instance where gaming mediated social learning, and could be argued to be an example of the learning in the zone of proximal development (ZPD). For mediation to result in development (learning), it must be sensitive to the individual's ZPD (Vygotsky, 1978), the

ZPD being a figurative space between an individual's current understanding and what they currently cannot understand, in which knowledge is available to them with the help of someone more experienced, like a tutor or a more experienced peer. When this participant asked their sister, a more experienced peer, to explain unfamiliar words, this could be argued to have been an example of learning within the ZPD, facilitated by gaming.

6 Conclusion

In this final chapter, I first summarize my findings and offer some concluding remarks on my study. Then, I state some didactic implications of my study and its findings (6.1), before finally offering some suggestions for further research which have emerged from the present study (6.2).

In relation to research question 1, "To what extent is there a connection between extramural gaming and receptive L2 English vocabulary knowledge?", my study found a statistically significant positive correlation between extramural gaming and receptive L2 English vocabulary knowledge. In other words, as the time spent on extramural gaming per week increased, so did the participants' vocabulary levels test (VLT) scores. This aligns with previous research in the field, which has found statistically significant positive correlations between extramural English activities, gaming being one of these, and various measurements of English proficiency, one of these being receptive L2 English vocabulary knowledge (Abelvik, 2021; Garvoll, 2017; Holm, 2020; Israelsson, 2020; Nordnes, 2021; Sundqvist, 2009, 2019; Sundqvist & Sylvén, 2014; Sundqvist & Wikström, 2015; Sylvén & Sundqvist, 2012).

This study's participants were divided into four gaming groups based on the number of hours they spent on gaming during a regular week, using the same divisions as in Sundqvist (2019): non-gamers (zero hours per week), infrequent gamers ($<$ 3 hours per week), moderate gamers (3-9 hours), and frequent gamers ($>$ 9 hours). Although the division of this study's participants was based on time, the correlation between time and frequency spent on extramural gaming was strong ($r_s = .870$, $p = < .001$) in this study's sample. This means that the participants who spent the most time on gaming were also those who gamed most frequently, which is logical. Many games demand that gamers play often, and invest a lot of time in gaming, for gameplay to be successful (Reinhardt, 2017).

Considering research question 2, "To what extent is there a connection between the four gaming groups and receptive L2 English vocabulary?", my study found a statistically significant positive correlation between the four gaming groups and their receptive L2 English vocabulary knowledge. In other words, the non-gamers had the lowest mean VLT score, and the mean score increased from the non-gamers to the infrequent gamers, moderate gamers, and frequent gamers, the latter group having the highest mean VLT score. This corroborates the findings of previous research, which grouped participants similarly based on the time they spent on extramural gaming and found that the groups who spent a lot of time on extramural gaming had higher mean VLT scores than those who spent little or no time on it (Sundqvist, 2019; Sundqvist & Wikström, 2015; Sylvén & Sundqvist, 2012).

Furthermore, in terms of research question 3, "How can the four gaming groups be described in terms of gender, language background, and school level?", my study revealed that language background did not appear to be connected to the participants' extramural gaming or VLT scores. In other words, there were no differences in VLT scores between participants with Norwegian as their L1, or one of their L1s, and participants with an L1 other than Norwegian. Additionally, the present study found that the proportion of males in each gaming group increased with the amount of time spent on gaming. This study found no differences in gaming habits or VLT scores between participants in VG1 and participants in VG2, meaning there was no difference between participants aged 16-17 and those one year older. This lack of difference between the two school levels might have been caused by the ceiling effect apparent for the VLT. A large number of participants had maximum scores for all three of the levels that were tested, making it difficult to distinguish between those who knew only words up to the 5,000 level and those who would have known words from the levels beyond. Thus, the findings may have been different if this study had used the original VLT in its entirety, which tests word frequency levels beyond 5,000.

Finally, in relation to research question 4, "Which words do vocational students in Norway report to recall having learned from gaming?", this study's findings indicated that while the majority of the words participants reported to recall learning from gaming were from the word frequency levels K1 to K3, words from levels as high as K15 and K16 were also reported. In other words, both simple and more advanced vocabulary may be learned from gaming. The words reported by participants included abbreviations specific to gaming or online culture, but the majority of the words were general, which means that participants may use them in a variety of different contexts. The participant testimonials suggested that gaming had been an

influential source of L2 English language learning for many of them, teaching them vocabulary, pronunciation, and spelling, and building their confidence as speakers of English.

6.1 Didactic implications

Firstly, as my study found a statistically significant positive correlation between extramural gaming and receptive L2 English vocabulary knowledge, it suggests that there is didactic potential in gaming as a resource for vocabulary learning. This study found that the participants' VLT scores improved as the number of hours they spent on extramural gaming per week increased. The participants who spent the highest number of hours on extramural gaming per week were the group with the highest mean VLT scores, and the VLT scores improved from non-gamers to infrequent gamers, to moderate gamers, to frequent gamers, suggesting that even small amounts of extramural gaming can have a positive impact on someone's English vocabulary, provided that there is a causal relation. As discussed above, the findings of this study suggest that such a relationship might exist, but we cannot know for sure, as causality, and the direction of this potential causality, has not been investigated in the present study.

The statements from participants indicated that the vocabulary learned from gaming could be both general and gaming-specific. While participants listed several abbreviations specific to gaming and online culture, they also listed a lot of general vocabulary. This suggests that gaming can be a source of familiarity with words which could be used in a host of different contexts, both inside and outside school.

In extension, it is worth reflecting on the difference between incidental and intentional vocabulary learning (Sundqvist & Sylvén, 2016). A hallmark of extramural English activities, extramural gaming being one of these, is that the student is not necessarily engaging in the activity for the purpose of learning English, but the learning instead happens incidentally (Sundqvist & Sylvén, 2016). However, in a classroom setting, the teacher can use their knowledge of pedagogy and didactics to create English lessons where English vocabulary learning from gaming can become more intentional. The teacher might achieve this by telling students to pay special attention to any unfamiliar words they encounter while playing, by bringing the class's attention to words in the game(s) that are particularly relevant to the current lesson topic, or by facilitating activities of consolidation and metacognition encouraging students to reflect on which new words they have added to their vocabulary

during the present lesson and of course what these words mean. For additional suggestions on how to use gaming as a resource in English lessons, see Israelsson (2020).

Secondly, as the findings of my study indicate that the participants were capable of learning L2 English vocabulary from games, this might suggest that gaming can serve as a source to other kinds of learning as well. The selection of digital games available in various online game stores is enormous, meaning teachers can find games about virtually anything, be it historical events, scientific principles, cultural displays, or ethical dilemmas. Digital games can thus serve as a jumping-off point for classroom discussions, group projects or student essays, consolidating recently acquired factual knowledge or aiding in reflection on central topics from the curriculum. To provide some concrete tips: The game *Beholder* (2016) can serve as a fundament for conversations about dictatorship and government control, which could be related to historical events such as McCarthyism, literary works like George Orwell's *1984*, or contemporary dictatorships, English-speaking or otherwise. *Bury me, my love* (2017) tells the story of two Syrian refugees on their journey to safety in Europe, allowing for a discussion of historical and contemporary cases of mass-migration. *The Witcher 3: Wild Hunt* (2015), which is an adaptation of the popular *The Witcher* fantasy novels by Andrzej Sapkowski (1993), which have recently also been adapted to for TV in Netflix's *The Witcher* (2019), allow for a comparison of storytelling, literary devices and adaptation across mediums. Readers may see Israelsson (2020) for additional suggestions.

In relation to this, many games allow the player to see the in-game world and events from the perspective of someone other than themselves, potentially facilitating reflection on how the real world also looks different depending on whose eyes are seeing it. This would be in line with, for example, the competence aim "Explore and reflect on diversity and social conditions in the English-speaking world based on historical context" (Udir, 2022c). Video games can allow students to walk a proverbial mile in the shoes of someone from a different country, culture, ethnic group or social class, see the in-game world through this character's eyes, and reflect on how people's experiences in the real world might also vary depending on these factors. This has become particularly relevant with the implementation of the new English subject curricula, where gaming is included as a cultural form of expression for students to discuss and reflect on (Udir, 2022c).

6.2 Suggestions for further research

The present study has answered several questions about extramural gaming and receptive L2 English vocabulary knowledge in Norwegian vocational students, but further research is necessary. Firstly, as this study's sample is vocational students, an investigation of students in general studies is needed, and would allow for comparison between populations. Additionally, it would be interesting to extend this research to also examine students' productive vocabulary (see 2.2.), reading proficiency, oral proficiency, oral confidence, English subject grades, and more.

Secondly, the words learned from gaming should be researched in greater detail, investigating the characteristics of the words participants report having learned from gaming. Additionally, while the present study has seen participants able to list words, sometimes accompanied by their meaning, it would be interesting to investigate if students actually use the listed words, either inside or outside school, or both. An investigation of what types or genres of games (Reinhardt, 2017) afford the greatest L2 English vocabulary learning would also be very interesting, asking if these are single- or multiplayer games (as done by Sundqvist (2019)), and if they involve reading, speaking, and/or writing in English, to suggest some areas of investigation.

Thirdly, while the results of the present study suggests that receptive L2 English vocabulary knowledge increases as the amount of time spent on extramural gaming increases, further research is required to investigate this connection. Nordnes (2021) investigated how a selection of extramural English activities affected L2 English vocabulary, measured with a receptive vocabulary size test, but an investigation into gaming specifically, using the vocabulary levels test, could add knowledge to the field.

Finally, I would suggest an investigation of Mojang's game *Minecraft* as a source of L2 English language learning. This game title was mentioned by many participants in the present study as a source of English vocabulary learning, especially in their childhood. This warrants further investigation of Minecraft, asking about its potential as a resource for L2 English language learning, which words students learn from this game, how this game teaches vocabulary, and what the didactic implications of this might be.

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Appendices

Appendix 1: Adapted vocabulary levels test (VLT)

Del 1

I denne delen av undersøkelsen ønsker vi at du gjennomfører en Vocabulary Levels Test, altså en test av ordforråd (på engelsk).

Her skal du velge det ordet som passer best sammen med meningen.

Under ser du et eksempel på hvordan oppgavene ser ut og hvordan du fyller ut.

1.

	copy	event	motor	pity	profit	tip
end or highest point *	○	○	○	○	○	○
this moves a car *	○	○	○	○	○	○
thing made to be like another *	○	○	○	○	○	○

2.

	accident	debt	fortune	pride	roar	thread
loud deep sound *	○	○	○	○	○	○
something you must pay *	○	○	○	○	○	○
having a high opinion of yourself *	○	○	○	○	○	○

3.

	birth	dust	operation	row	sport	victory
game *	○	○	○	○	○	○
winning *	○	○	○	○	○	○
being born *	○	○	○	○	○	○

4.

	clerk	frame	noise	respect	theatre	wine
a drink *	○	○	○	○	○	○
office worker *	○	○	○	○	○	○
unwanted sound *	○	○	○	○	○	○

5.

	dozen	empire	gift	opportunity	relief	tax
chance *	○	○	○	○	○	○
twelve *	○	○	○	○	○	○
money paid to the government *	○	○	○	○	○	○

6.

	admire	complain	fix	hire	introduce	stretch
make wider or longer *	○	○	○	○	○	○
bring in for the first time *	○	○	○	○	○	○
have a high opinion of someone *	○	○	○	○	○	○

7.

	arrange	develop	lean	owe	prefer	seize
grow *	○	○	○	○	○	○
put in order *	○	○	○	○	○	○
like more than something else *	○	○	○	○	○	○

8.

	blame	elect	jump	manufacture	melt	threaten
make *	○	○	○	○	○	○
choose by voting *	○	○	○	○	○	○
become like water *	○	○	○	○	○	○

9.

	brave	electric	firm	hungry	local	usual
commonly done *	○	○	○	○	○	○
wanting food *	○	○	○	○	○	○
having no fear *	○	○	○	○	○	○

10.

	bitter	independent	lovely	merry	popular	slight
beautiful *	O	O	O	O	O	O
small *	O	O	O	O	O	O
liked by many people *	O	O	O	O	O	O

11.

	bull	champion	dignity	hell	museum	solution
formal and serious manner *	O	O	O	O	O	O
winner of a sporting event *	O	O	O	O	O	O
building where valuable objects are shown *	O	O	O	O	O	O

12.

	blanket	contest	generation	merit	plot	vacation
holiday *	O	O	O	O	O	O
good quality *	O	O	O	O	O	O
wool covering used on beds *	O	O	O	O	O	O

13.

	apartment	candle	draft	horror	prospect	timber
a place to live *	○	○	○	○	○	○
chance of something happening *	○	○	○	○	○	○
first rough form of something written *	○	○	○	○	○	○

14.

	administra-tion	angel	frost	herd	fort	pond
group of animals *	○	○	○	○	○	○
spirit who serves God *	○	○	○	○	○	○
managing business and affairs *	○	○	○	○	○	○

15.

	atmosphere	counsel	factor	hen	lawn	muscle
advice *	○	○	○	○	○	○
a place covered with grass *	○	○	○	○	○	○
female chicken *	○	○	○	○	○	○

16.

	abandon	dwell	oblige	pursue	quote	resolve
live in a place *	○	○	○	○	○	○
follow in order to catch *	○	○	○	○	○	○
leave something permanently *	○	○	○	○	○	○

17.

	assemble	attach	peer	quit	scream	toss
look closely *	○	○	○	○	○	○
stop doing something *	○	○	○	○	○	○
cry out loudly in fear *	○	○	○	○	○	○

18.

	drift	endure	grasp	knit	register	tumble
suffer patiently *	○	○	○	○	○	○
join wool threads together *	○	○	○	○	○	○
hold firmly with your hands *	○	○	○	○	○	○

19.

	brilliant	distinct	magic	naked	slender	stable
thin *	○	○	○	○	○	○
steady *	○	○	○	○	○	○
without clothes *	○	○	○	○	○	○

20.

	aware	blank	desperate	normal	striking	supreme
usual *	○	○	○	○	○	○
best or most important *	○	○	○	○	○	○
knowing what is happening *	○	○	○	○	○	○

21.

	analysis	curb	gravel	mortgage	scar	zeal
eagerness *	○	○	○	○	○	○
loan to buy a house *	○	○	○	○	○	○
small stones mixed with sand *	○	○	○	○	○	○

22.

	concrete	era	fibre	loop	plant	summit
circular shape *	○	○	○	○	○	○
top of a mountain *	○	○	○	○	○	○
a long period of time *	○	○	○	○	○	○

23.

	curcus	jungle	nomination	sermon	stool	trumpet
musical instrument *	O	O	O	O	O	O
seat without a back or arms *	O	O	O	O	O	O
speech given by a priest in a church *	O	O	O	O	O	O

24.

	artillery	creed	hydrogen	maple	pork	streak
a kind of tree *	O	O	O	O	O	O
system of belief *	O	O	O	O	O	O
large gun on wheels *	O	O	O	O	O	O

25.

	chart	forge	mansion	outfit	sample	volunteer
map *	O	O	O	O	O	O
large beautiful house *	O	O	O	O	O	O
place where metals are made and shaped *	O	O	O	O	O	O

26.

	contemplate	extract	gamble	launch	provoke	revive
think about deeply *	○	○	○	○	○	○
bring back to health *	○	○	○	○	○	○
make someone angry *	○	○	○	○	○	○

27.

	demonstrate	embarrass	heave	obscure	relax	shatter
have a rest *	○	○	○	○	○	○
break suddenly into pieces *	○	○	○	○	○	○
make someone feel shy or nervous *	○	○	○	○	○	○

28.

	correspond	embroider	lurk	penetrate	prescribe	resent
exchange letters *	○	○	○	○	○	○
hide and wait for someone *	○	○	○	○	○	○
feel angry about something *	○	○	○	○	○	○

29.

	decent	frail	harsh	incredible	municipal	specific
weak *	○	○	○	○	○	○
concerning a city *	○	○	○	○	○	○
difficult to believe *	○	○	○	○	○	○

30.

	adequate	internal	mature	profound	solitary	tragic
enough *	○	○	○	○	○	○
fully grown *	○	○	○	○	○	○
alone away from other things *	○	○	○	○	○	○

Appendix 2: Anonymous online survey

Del 2

I denne delen av undersøkelsen ønsker vi å få vite litt om dine vaner rundt gaming på fritiden.

Q1: Hvor ofte gamer du på fritiden?

- o Daglig
- o Noen ganger i uken
- o Noen ganger i måneden
- o Aldri/nesten aldri

Q2: Hvor mange timer gamer du på fritiden i løpet av en vanlig uke?

- o Ingen, fordi jeg ikke gamer
- o Mindre enn 3 timer i uken
- o 3-9 timer i uken
- o Mer enn 9 timer i uken

Q3-A: Hvilken eller hvilke typer spill spiller du på fritiden?

- ☐ Action (f.eks. Red Dead Redemption, Tomb Raider, Uncharted)
- ☐ Adventure (f.eks. Terraria, Myst)
- ☐ RPGs (f.eks. Dark Souls, The Witcher, Final Fantasy, Stardew Valley)
- ☐ MMORPGs (f.eks. World of Warcraft)
- ☐ MOBAs (f.eks Leage of Legends, Dota 2, Strife)
- ☐ Battle Royale (f.eks. Fortnite, Apex Legends, PUBG, CoD: Warzone)
- ☐ Simulation (f.eks. Rimworld, Cities: Skylines, Garry's Mod, The Sims)
- ☐ Strategy (f.eks. Civilization, Age of Empires)
- ☐ Sports (f.eks. FIFA, NBA, F1)
- ☐ Annet

Q3-B: Hva slags type spill spiller du? Hva er titlene på disse?

Q4: Hvis det er noen engelske ord/uttrykk du har lært gjennom gaming, skriv dem gjerne ned her. Fortell også gjerne hvordan du lærte dette.

```
                                                                    
                                                                    
                                                                    
```

Del 3

I denne siste delen av undersøkelsen ønsker vi å vite litt mer om deg. Alle svarene er fortsatt anonyme.

Q5: Hvilket kjønn er du?

- o Mann
- o Kvinne
- o Annet
- o Ønsker ikke å svare

Q6: Hvilken beskrivelse passer best om ditt morsmål?

- o Norsk er morsmålet mitt
- o Norsk er ett av morsmålene mine
- o Norsk er ikke morsmålet mitt

Q7-A: Hva er det andre morsmålet ditt, i tillegg til norsk?

```
                                                                    
                                                                    
                                                                    
```

Q7-B: Hva er morsmålet ditt?

```
                                                                    
                                                                    
                                                                    
```

Klikk på «Send» for å levere svarene dine.

TUSEN TAKK for at du bidrar til forskning ved å svare på denne undersøkelsen!

Appendix 3: Instructions to pilot participants

Hei!

Tusen takk for at du vil være med på pilottesten av spørreundersøkelsen til masteroppgaven min, det er veldig hjelpsomt! Spørreundersøkelsen består av en Vocabulary Levels Test (VLT), altså en test av ordforråd på engelsk, samt noen spørsmål om dine gamingvaner og noen generelle spørsmål om deg. Undersøkelsen er anonym og samler ikke inn persondata om deg.

Under finner du en lenke til spørreundersøkelsen. Følg lenken og gjennomfør undersøkelsen i et behagelig tempo. Skriv ned alle tanker og kommentarer du har underveis her i dette dokumentet. Tenk gjerne spesielt over følgende spørsmål:

1. Hva synes du om rekkefølgen på spørsmålene?
2. Var det noen spørsmål du ikke skjønte eller er usikker på om du forstod riktig?
3. Var det noen steder du ikke fant et svaralternativ du følte var dekkende?
4. Har du andre tanker eller kommentarer?

Lenke til spørreundersøkelsen:

Mine kommentarer til spørreundersøkelsen:

Appendix 4: Information for school department heads

Informasjon til skoleledere/avdelingsledere

Hei,

Jeg er masterstudent på lektorprogrammet ved Universitetet i Oslo, og tar kontakt fordi jeg håper å rekruttere elever fra [navn på skole] til masterprosjektet mitt. «Extramural Gaming and English Vocabulary» er et prosjekt som ønsker å undersøke forholdet mellom gaming på fritiden og engelsk ordforråd hos elever på VG1/VG2 yrkesfag.

Prosjektet samler inn data gjennom en anonym spørreundersøkelse på nett som består av en Vocabulary Levels Test (test av ordforråd på engelsk), spørsmål om vaner rundt gaming, og spørsmål om kjønnsidentitet og morsmål. Spørreundersøkelsen er laget i på UiOs plattform Nettskjema, som sikrer at alle svar er anonyme, og at all data blir oppbevart på en sikker måte. Undersøkelsen tar omtrent 40 minutter å gjennomføre.

Lærere er ikke objekt for denne forskningen, så ingen informasjon om dem vil bli inkludert i datamaterialet eller masteroppgaven.

Masterprosjektet er helt avhengig av deltakere, så jeg håper at du kan gi meg navn og kontaktinformasjon til kontaktlærere for VG1/VG2 yrkesfag så jeg kan kontakte dem og høre om de vil invitere elevene sine til å delta. Hvis du har spørsmål, send meg gjerne en e-post, og om ønskelig kan du kontakte veilederen min, Pia Sundqvist, på e-post ▮▮▮▮▮▮▮▮▮▮ eller telefon ▮▮▮▮▮▮▮.

Beste hilsen

Christine Fossen Germundson
Student
Universitetet i Oslo

Appendix 5: Information for the participants' teachers

Informasjon til lærere 1 (første kontakt)

Hei,

Jeg er masterstudent på lektorprogrammet ved Universitetet i Oslo, og har fått oppgitt at du er kontaktlærer for en VG1/VG2 yrkesfagsklasse. Jeg tar kontakt fordi jeg håper å rekruttere elever fra klassen din til masterprosjektet mitt. «Extramural Gaming and English Vocabulary» er et prosjekt som ønsker å undersøke forholdet mellom gaming på fritiden og engelsk ordforråd.

Prosjektet samler inn data gjennom en anonym spørreundersøkelse på nett som består av en Vocabulary Levels Test (test av ordforråd på engelsk), spørsmål om vaner rundt gaming, og spørsmål om kjønnsidentitet og morsmål. Spørreundersøkelsen er laget i på UiOs plattform Nettskjema, som sikrer at alle svar er anonyme, og at all data blir oppbevart på en sikker måte. Undersøkelsen tar omtrent 40 minutter å gjennomføre.

Hva innebærer det for deg og dine elever å delta?

- Lærere er ikke objekt for denne forskningen, så ingen informasjon om deg vil bli inkludert i datamaterialet eller masteroppgaven
- Lærer får tilsendt en PowerPoint-presentasjon med skriftlig informasjon til dem om organiseringen av spørreundersøkelsen, en kort informasjonsvideo til å vise i klasserommet, og lenke til spørreundersøkelsen
- Elevene får informasjon og gjennomfører spørreundersøkelsen i en skoletime
- Man trenger IKKE å være gamer for å delta i undersøkelsen
- Undersøkelsen er anonym
- Estimert total tidsbruk (informasjon + spørreundersøkelse): 50 minutter

Masterprosjektet er helt avhengig av deltakere, så jeg håper at du vil invitere elevene dine til å delta. Hvis du har spørsmål eller ønsker mer informasjon før du bestemmer deg, er det bare å ta kontakt. Du kan også kontakte min veileder, Pia Sundqvist, på e-post ▮▮▮▮▮▮▮▮▮▮▮ eller telefon ▮▮▮▮▮▮▮ .

Uansett om du vil invitere elevene dine til å delta eller ikke, håper jeg at jeg hører fra deg innen fredag 22. oktober.

Beste hilsen

Christine Fossen Germundson
Student
Universitetet i Oslo

Informasjon til lærere 2 (lærere som vil delta)

Hei igjen [navn],

Tusen takk for at du vil invitere elevene dine til å delta i masterprosjektet mitt. Prosjektet er helt avhengig av deltakere, så dette er en uvurderlig hjelp!

Jeg trenger litt informasjon om klassen din;

- Trinn
- Studieprogram
- Antall elever i klassen

Vedlagt finner du en PowerPoint-presentasjon med informasjon om gjennomføringen av spørreundersøkelsen, informasjonsvideo til deltakere, og lenke til spørreundersøkelsen. Det er ønskelig at spørreundersøkelsen blir besvart innen 30. november 2021, men om du vil gjennomføre den på et senere tidspunkt går det også bra – fint om du sier ifra til meg, i så fall.

Hvis du har noen spørsmål, er det bare å ta kontakt. Igjen, tusen takk for at du vil invitere elevene dine til å delta!

Beste hilsen

Christine Fossen Germundson
Student
Universitetet i Oslo

Informasjon til lærere 3 (lærere som vil ha mer info)

Hei igjen [navn],

Takk for at du er interessert i masterprosjektet. Her får du litt generell informasjon om prosjektet og hva det innebærer for deg og dine elever å delta, og så får du svar på spørsmålene dine.

«Extramural Gaming and English Vocabulary» er et prosjekt som ønsker å undersøke forholdet mellom gaming på fritiden og engelsk ordforråd hos elever på VG1/VG2 yrkesfag. Dette er et relativt lite utforsket felt innen norsk forskning, så informasjonen som blir samlet inn gjennom dette prosjektet vil bidra til verdifull ny kunnskap.

Prosjektet samler inn data gjennom en spørreundersøkelse på nett som består av en Vocabulary Levels Test (test av ordforråd på engelsk), spørsmål om vaner rundt gaming, og spørsmål om kjønnsidentitet og morsmål. Spørreundersøkelsen er laget i på UiOs plattform Nettskjema, som sikrer at alle svar er anonyme, og at all data blir oppbevart på en sikker måte. Undersøkelsen tar omtrent 40 minutter å gjennomføre.

Hva innebærer det for deg å delta?

- Lærere er ikke objekt for denne forskningen, så ingen informasjon om deg vil bli inkludert i datamaterialet eller masteroppgaven
- Du vil bli bedt om å oppgi hvilket trinn og programområde klassen din tilhører, samt hvor mange elever det er i klassen
- Du vil få tilsendt en PowerPoint-presentasjon med instruksjoner om gjennomføring av undersøkelsen, informasjon du må dele med elevene (i form av en video), og lenke til spørreundersøkelsen
- Du er til stede i klasserommet mens elevene gjennomfører spørreundersøkelsen i en skoletime
- Estimert total tidsbruk (informasjon + spørreundersøkelse): 50 minutter

Hva innebærer det for elevene dine å delta?

- Det er helt frivillig å delta i spørreundersøkelsen, så elevene står fritt til å la være å delta
- Alle svar på spørreundersøkelsen er helt anonyme og kan ikke knyttes til enkeltpersoner

[Svar på spørsmål]

Jeg håper denne informasjonen har vært oppklarende og at du nå ønsker å invitere elevene dine til å delta. Prosjektet er helt avhengig av deltakere, så det vil være en uvurderlig hjelp. Hvis du har flere spørsmål, er det bare å spørre. Hvis du ikke ønsker å invitere elevene dine til å delta, er det fint om du sier ifra om det også, helst så raskt som mulig.

Jeg håper jeg hører fra deg!

Beste hilsen

Christine Fossen Germundson

Student

Universitetet i Oslo

Appendix 6: Instructional video to teachers and students

The instructional video can be viewed by following this link:

https://www.youtube.com/watch?v=1RfiCSMNcok

Appendix 7: Participant distribution across study programs

Study program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VG2 Health work	31	9,7	9,7	9,7
	VG1 Sales, service and tourism	47	14,6	14,6	24,3
	VG1 Restaurant and food processing	11	3,4	3,4	27,7
	VG1 Agriculture, fishing and forestry	10	3,1	3,1	30,8
	VG1 Electrical engineering and computer technology	25	7,8	7,8	38,6
	VG1 Information technology and media production	45	14,0	14,0	52,6
	VG2 Information technology	33	10,3	10,3	62,9
	VG2 Child care and youth work	9	2,8	2,8	65,7
	VG2 Carpentry	11	3,4	3,4	69,2
	VG1 Hairdressing, floral, interior and retail design	2	,6	,6	69,8
	VG1 Healthcare, childhood and youth development	52	16,2	16,2	86,0
	VG1 Building and construction	18	5,6	5,6	91,6
	VG2 Cookery and waiting	10	3,1	3,1	94,7
	VG2 Agriculture and horticulture	2	,6	,6	95,3
	VG2 Forestry	11	3,4	3,4	98,8
	VG2 Media production	4	1,2	1,2	100,0
	Total	321	100,0	100,0	

Appendix 8: Participant L1s

Participant L1 or L1s

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Norwegian	230	71,7	74,0	74,0
	Polish	7	2,2	2,3	76,2
	Lithuanian	3	,9	1,0	77,2
	English	7	2,2	2,3	79,4
	Korean	1	,3	,3	79,7
	Somali	7	2,2	2,3	82,0
	Pashto	2	,6	,6	82,6
	Tagalog	1	,3	,3	83,0
	Arabic	7	2,2	2,3	85,2
	CapeVerdianCreole	1	,3	,3	85,5
	Bosnian	1	,3	,3	85,9
	Serbian	3	,9	1,0	86,8
	Kurdish	5	1,6	1,6	88,4
	Vietnamese	1	,3	,3	88,7
	German	2	,6	,6	89,4
	Dutch	1	,3	,3	89,7
	Chinese	1	,3	,3	90,0
	Swedish	4	1,2	1,3	91,3
	Danish	1	,3	,3	91,6
	Japanese	1	,3	,3	92,0
	Albanian	6	1,9	1,9	93,9
	Chechen	1	,3	,3	94,2
	Turkish	1	,3	,3	94,5
	Estonian	1	,3	,3	94,9
	French	1	,3	,3	95,2
	Thai	3	,9	1,0	96,1
	Icelandish	1	,3	,3	96,5
	Italian	3	,9	1,0	97,4
	Filipino	2	,6	,6	98,1
	Cebuano	1	,3	,3	98,4
	Russian	1	,3	,3	98,7
	Tigrinya	3	,9	1,0	99,7
	Eritrean	1	,3	,3	100,0
	Total	311	96,9	100,0	
Missing	System	10	3,1		
Total		321	100,0		

Appendix 9: Abbreviations reported by participants to have been learned from extramural gaming, with meanings

Abbreviation	Meaning
AFK	Away from keyboard
AOS	Attack on sight
BRB	Be right back
DPS	Damage per second
FPS	First-person shooter, Frames per second
GG	Good game
GJ	Good job
GLHF	Good luck, have fun
GTG	Got to go
IDC	I don't care
KYS	Kill yourself
LOL	Laughing out loud
MMORPG	Massively multiplayer online role-playing game
MOBA	Multiplayer online battle arena
NPC	Non-playable character
OP	Overpowered
POG	Player of the game
RPG	Role-playing game
WTF	What the fuck

Appendix 10: Words reported by participants to have been learned from gaming

abilities	clay	empire
abilities	clutch	enchanting
advanced	clutch	endeavor
aggressive	communicate	endure
aim	continue	flank
armor	coomer	flank
artillery	co-op	furnace
ass	cooperation	game
assist	coordination	genetics
baiting	cover	grass
ban	cow	grass
barrage	cracked	halo
battle	craft	headshot
bed	crest	health
bits	crossplay	herd
block	cunt	homework
bottom	currency	indubitably
bottom	customization	jungle
boy	damage	kick
bug	defense	kill
callout	defense	kneegears
callout	diamond	lag
callout	die	level
camp	dirt	live
camper	dirt	load
camping	dirt	lockpicking
challenge	dirt	loot
cheater	dive	loot
chicken	door	lore
claim	edit	lurking

lurking

lurking

melee

microtransactions

middle

mining

modification

monkey

multiplayer

nerf

neurotransmitter

new

noob

patch

pause

peripherals

pickaxe

player

point

proning

pussy

pussy

quiet

quit

recoil

redut

redzone

reload

resume

resume

revive

revive

rush

rush

sheep

shit

shot

shovel

singleplayer

skill

skins

slamming

smoke

smurf

specification

start

thrower

time

top

toxic

trade

trash

trash

turret

ultimate

wait

whiff

whiff

Appendix 11: Vocabulary profiler output

Freq. Level	Families (%)	Types (%)	Tokens (%)	Cumul. token (%)
K-1 :	43 (36.4)	47 (35.07)	59 (37.3)	37.3
K-2 :	24 (20.3)	25 (18.66)	26 (16.5)	53.8
K-3 :	17 (14.4)	17 (12.69)	20 (12.7)	66.5
K-4 :	11 (9.3)	11 (8.21)	13 (8.2)	74.7
K-5 :	7 (5.9)	7 (5.22)	10 (6.3)	81.0
K-6 :	4 (3.4)	4 (2.99)	5 (3.2)	84.2
K-7 :	3 (2.5)	3 (2.24)	3 (1.9)	86.1
K-8 :	4 (3.4)	4 (2.99)	6 (3.8)	89.9
K-9 :	1 (0.8)	1 (0.75)	1 (0.6)	90.5
K-10 :	1 (0.8)	1 (0.75)	1 (0.6)	91.1
K-11 :				
K-12 :	1 (0.8)	1 (0.75)	1 (0.6)	91.7
K-13 :				
K-14 :				
K-15 :	1 (0.8)	1 (0.75)	1 (0.6)	92.3
K-16 :	1 (0.8)	1 (0.75)	1 (0.6)	92.9
K-17 :				
K-18 :				
K-19 :				
K-20 :				
K-21 :				
K-22 :				
K-23 :				
K-24 :				
K-25 :				
Off-List:	??	11 (8.21)	11 (6.96)	99.86
Total (unrounded)	118+?	134 (100)	158 (100)	≈100.00

Appendix 12: Participant testimonials about L2 English language learning and extramural gaming

16741176: Alt er på engelsk.

16741824: Mye mer enn jeg kan fortelle.

17034328: Jeg spiller/spilte mye Minecraft helt siden jeg var 5 - 6 år gammel. Man får ting og ser hva de heter, f. Eks jeg kunne lage en dør, også står det "Door" når jeg holder den. Da så jeg at dør = door. Sånn lærte jeg all engelsken vi lærte fra 1. - 5. Klasse. Mye av uttalen lærte jeg fra YouTube for eks. dialekter osv.

17034436: Engelsken min ble bedere fordi jo mere jeg hører engelsk jo bedre ble jeg.

17034759: Claim, revive, trade, challenge. Masse mere også. Jeg var liten når jeg begynte å spille. det første spille jeg lærte av var nok Zelda på min Nintendo DS. Jeg spurte ofte min søster- Hva betyr det. jeg hadde spilt det så mange ganger å spurt søstera mi så ofte at når jeg spilte et annet spill å noen av dem samme ordene dukket opp så skjønte jeg- Åjaaaa han vil jeg skal gå dit. Eller- Jeg må trykke på start game eller ready for å starte osv.

17035922: Clutch, flank, dive, turret, reload, recoil (recoil control), aim, abilities (i sammenheng med spill), mange navn på forskjellige typer våpen og mer; disse ordene blir ofte brukt i shooters, så jeg har lært meg det gjennom å kommunisere med venner og folk jeg møter/snakker med på internet. Multiplayer, single-player, Co-op(online og offline) og crossplay som var lette ord å plukke opp på veien da det er ord om kan være med på å beskrive så og si alle spill. NPC, fra for det meste single-player spill. Currency, ordet blir veldig ofte brukt i sammenheng med spill da majoriteten av spill inkluderer forskjellige typer currency. Skins, det er veldig mange spill som tillater spilleren å endre litt på karakteren(e) eller våpen (og mer) de spiller som/med fra deres originale design.

17049658: Jeg har lært masse Engelske uttrykk. Hadde det ikke svært for gaming så hadde jeg ikke kunnet de fleste ordene i denne spørreundersøkelsen.

17049684: Jeg har egentlig lært all engelsken min gjenom spilling og internett, skolen har egentlig bare lært meg huskeregler i engelsk. Men noen ord som jeg kommer på som jeg husker I hodet mitt som jeg har lært av å spille er: Indubitably, endeavour, neurotransmitter. Takk for at jeg fikk lov til å delta i denne undersøkelsen.

16457063: Jeg har lært mye morsomme uttrykk gjennom gaming. spesielt mye TWITCH/STREAMER språk og uttrykk gks. pepega (noe som er bare dårlig) pepe hands (dårlig aim eller at hånda di ikke funker plutselig) Omega LOL (streamer LOL) Osv det er flere. meste parten av sport kommer fra gaming. jeg lærte hvordan NBA funker gjennom det også meste parten av skating var gjennom gaming.

16457137: De fleste ord jeg har lert gjennom gaming er litt vanskelig å huske siden jeg har vel egentlig lært nesten alle engeslke ord via gaming. men, typpisk er camper, hacker/cheater, trhower, gg=good game, gj=good job, ogsåvidere

16514895: Har lært veldig mye av alle typer ord.

16810460: Lært en del men kommer ikke på noen spesielle ord/utrykk.

16810496: Det er veldig få spesifikke ord jeg kommer på, men mesteparten av uttalen min og setningsoppbygningen min er lært via spill. Minecraft var det første spillet jeg lærte mange ord av. Dette var simple ord som bed, grass, sheep og lignende. Minecraft er genialt til å lære engelsk spesielt i en så ung alder. Kombinasjonen av bilder og ord gjør det veldig lett å lære de forskjellige ordene.

16810581: Mesteparten av engelsken min kommer fra gaming/internettet. så blir vanskelig å nevne det når nesten alt jeg har lært er gjennom det. Jeg har lært det mest basic på barneskolen, men har spilt nesten hele livet mitt. Men jeg har lært vanskeligere utrykk fra gaming.

16829149: Altfor mange.

16829177: Har lært meg engelsk fra spill. jeg pleide spille timevis med folk fra andre land så min engelsk blei utrulig bra etterhvert. har nesten aldri fulgt med i en eneste engelsk time i ungdomskolen og fikk fortsatt bra karakter.

16829199: Generelt engelsk i seg selv, så på filmer og spilte spill på engelsk.

16829240: I learned the word empire because i played "for honor"

16829350: Jeg har lært masse, nesten alt jeg kan av Engelsk, spesielt uttale har jeg lært av å spille. Noen de jeg kommer på: Peripherals, Coordination, Specification, Cooperation, Assist, Customization, Microtransactions (lol), Skill, Lockpicking, Communicate, Modification, Genetics og Lore. Men det viktigeste er jo å kunne dagligdags Engelsk, så jeg kan snakke flytende med venner utenfor spill.

16829472: I learned alot of toxic words trough rust its probaly the must toxic game you can find. alot of rascial slurs etc.

16442809: Det meste jeg har lært i engelsk kommer fra spill.

16443389: Det meste jeg har lært fra spill lærte jeg da jeg var veldig ung, så det er vanskelig å huske mye av det. Ord som "Continue" og "Resume" lærte jeg fra menyer i spill. Ordet "New" lærte jeg fra "New highscore". Mye mer enn det husker jeg ikke. Det nyligste jeg har lært er for det meste slang som "Headshot", "Toxic" (en slem eller ubehagelig oppførsel) "ban", "kick" og "patch".

16814732: RPGS, MMORPGS, MOBAS, battle royale whiff, clutch , bare gaming ting som folk sier til meg når jeg spiller eller står på spillene sine sider.

16814746: Mye går gjennom kommunikasjon og samarbeid mellom lagkamerater. Ting som "callouts" lærer jeg mye av. Ting som beskriver hvor og hva folk er. "Lurking", "Aggresive", "Slamming".

16886624: Kommer ikke på noe, det er noe jeg ikke tenker over.

16886677: For mye asz hele engelsken min kom fra det.

16454009: Flank - lærte via å spille taktiske skytespill. Melee - lærte gjennom å spille spill som gir en mulighet til å bruke nærkampsvåpen. Og mange fler men kommer ikke på i farten.

16454074: Jeg lærte hovedsakelig all min engelsk fra video spill. Jeg har spilt spill siden jeg var 5 år gammel. Så mesteparten av vokabularet mitt er fra spill. Det var egentlig ikke noe så mye nytt jeg lærte fra engelsk lærerne mine på skolen.

16454101: Jeg har lært mye engelsk av å spille Minecraft. Hvis jeg skal være helt ærlig, så har jeg lært mer Engelsk av å spille å se på youtube en å ha engelsk i barneskolen, så det blir mange ord hvis jeg hadde skrevet dem.

16459610: Jeg kan umulig huske spesifike ord eller utrykk, men medier har vært den største inflytelsen min i forhold til engelsk. Om jeg skulle rangere dem: Youtube, Youtube (gaming-relatert), Gaming, TV.

16459619: Lag, bug, advanced. Jeg lærte disse ordene hved å oppleve feil i spille og gjøre noe frusterende, men også bla gjennom instillinger. Jeg opplevde også at ting ikke møtte systemrequirements.

17135238: If I would say all of them there would have been the entire dicitonary on here becuase most I what iv learned iv gotten from the internet, i would have been good at english even without school.

16375101: Clay, dirt, og slike ting har jeg lært en del av via Minecraft, men har og lært player, game, level, points, og slike typiske uttrykk som blir brukt i spill.

16440995: Nesten hele språket. Snakke med folk.

16444192: Utvidet veldig store deler av det engelske orforrådet mitt via gaming online. Kommunikasjon mellom spillerne fra hele verden påvirker mye. Men også når spillene kun er på engelsk.

16450996: Har lært meg en god del engelsk gjennom gaming, og spesielt gjennom og se på gamere spille spill jeg intereserer meg for. Kommer ikke på noen spesifike eksempler her og nå.

16477745: Furnace fordi det er en del av spillet Minecraft.

17067969: Det er for mange lærte alt engelsken av å spille.

16431848: Har lært mye engelsk og engelske utrykk.

16431912: Mye, pleide spille mye før ikke nå.

16889389: Når jeg var liten spilte jeg minecraft på engelsk og lærte navn på alt mulig av natur, dyr og byggeting. Jeg lærte også mye slang som egentlig er ubrukelig i det "virkelige livet".

16553975: Det er alt for mange til å nevne. Men jeg har lært masse ord som jeg får bruk av i ekte livet. Ikke bare det, men jeg er god til å husk ting jeg har hørt i spill og bruke som et hjelpemiddel i sånne her type spørundersøkelser.

16554032: Jeg har lært mesteparten av engelsken min på spill.

16454729: Jeg har lært det meste jeg kan gjennom internettet og spill. Jeg tror jeg har lært dette på grunn av at i online spill snakker man engelsk med andre ekte mennesker, man pugger ikke bare forskjellige ord til man kan dem. Gjennom spill som minecraft lærte jeg navn på forskjellige ting som er i spillet, f.eks Diamond, enchanting, pickaxe, og mye mer. Men det er gjennnom online spill jeg har lært mest, altså med å samtaer med venner, og fremmeder.

16889323: Det er mange ord jeg har lært igjennom gaming. har gamet hele livet og jeg har forstått engelsk siden første klasse. litt av hvordan jeg lærte det var å spille minecraft på engeslk. mye man kan lære av å gjøre det. men også kommunisere på engelsk med andre på internett.

17375422: Når jeg var mindre lærte jeg mine første engelske ord fra Minecraft, eks cow, chicken, grass, dirt og showel.

17119956: Smoke, redzone, redut, bot, osv. Snakker mye engelsk når jeg gamer, så har lært mye.

16614458: Jeg vet at en del av engelsken min har kommet fra gaming, men også videoer på youtube. Siden jeg gamer så ser jeg også på gaming der engelsk tale blir brukt. Det er ingen engelske ord eller utrykk jeg kan komme på nå, men jeg vet at gaming har påvirket engelsken min veldig.
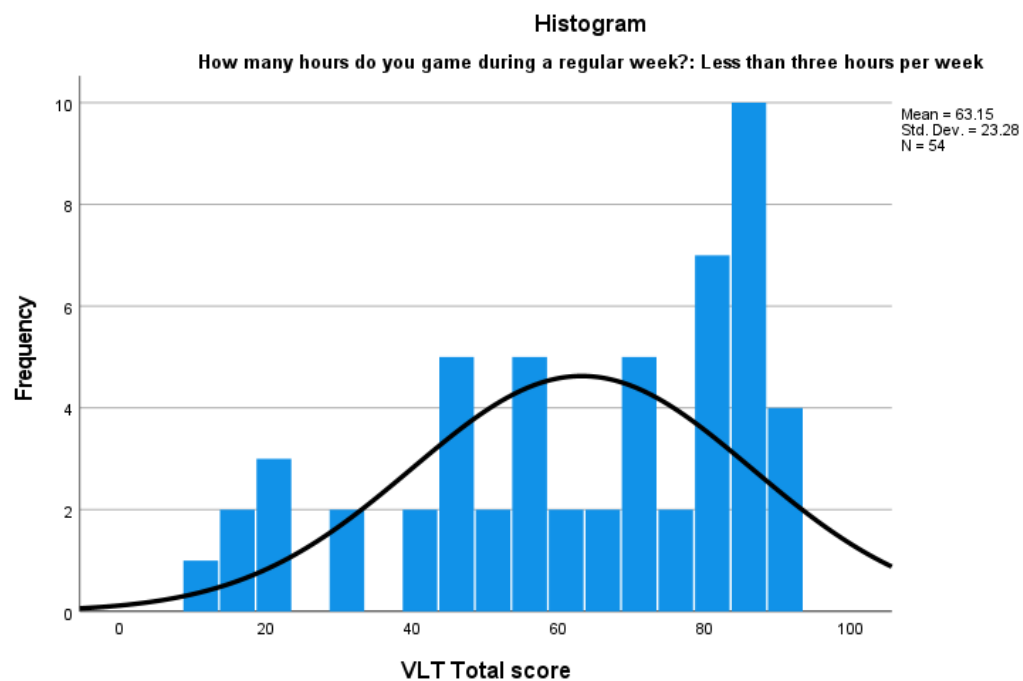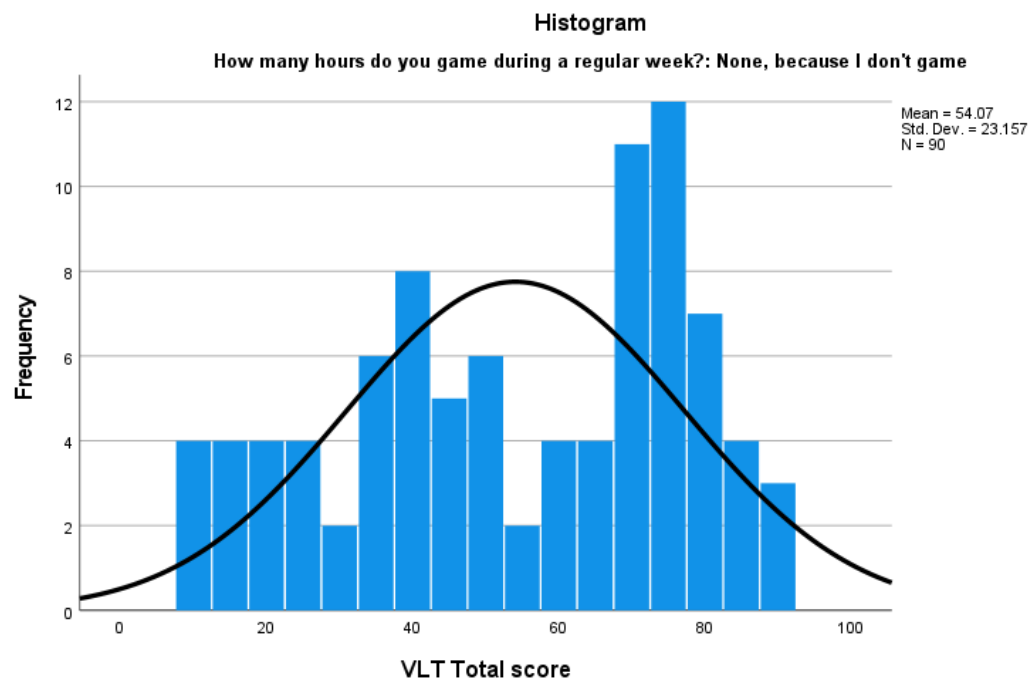
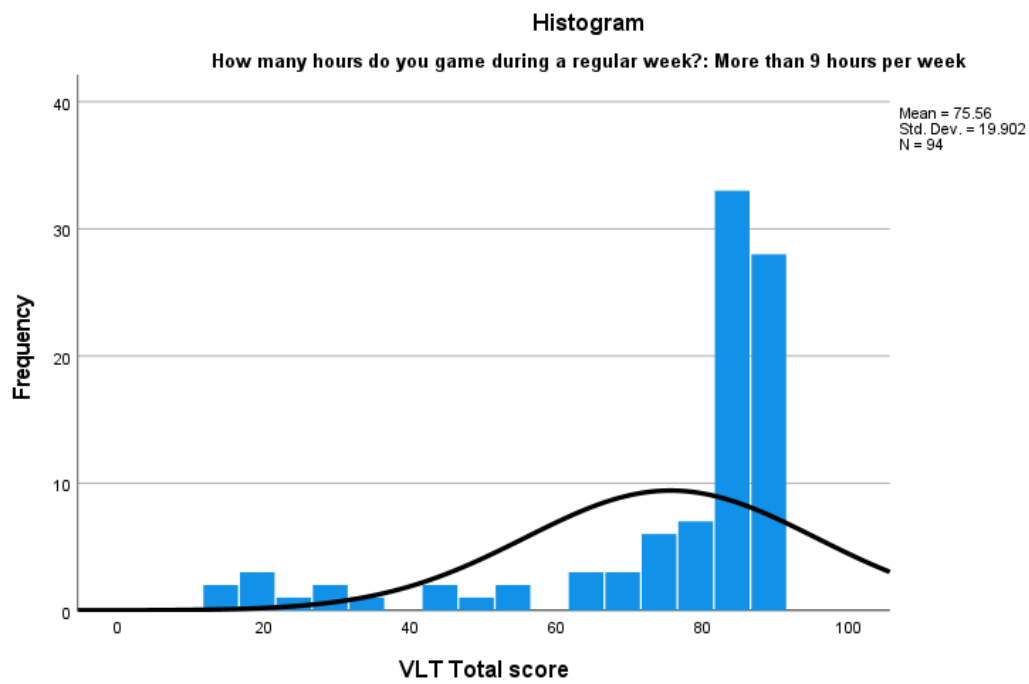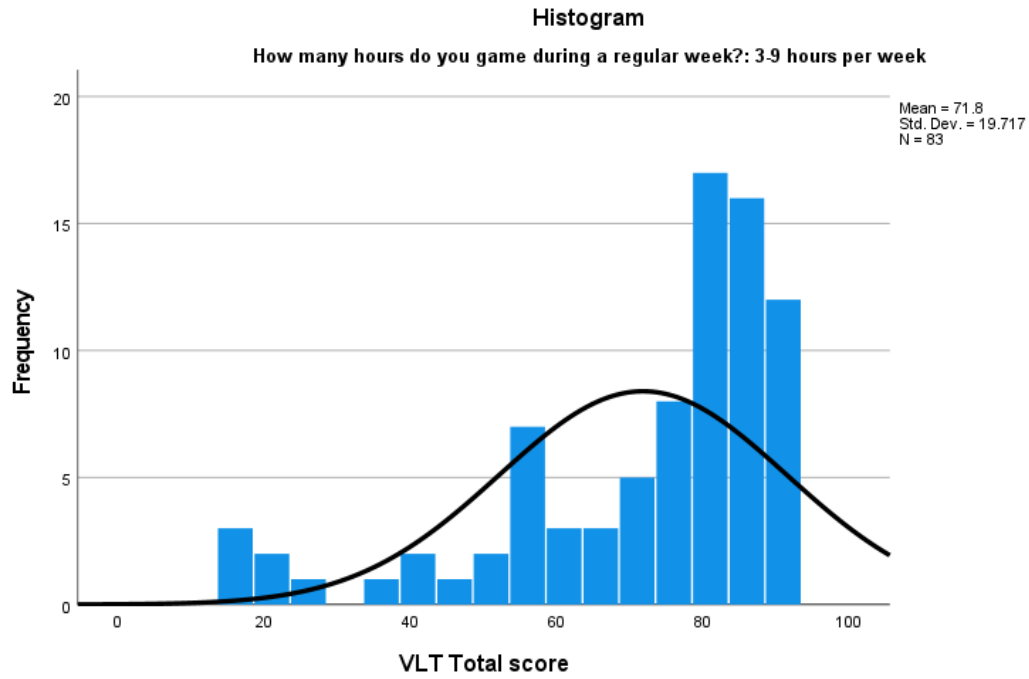16531659: Nesten all engelsken min har jeg lært gjennom spill.

16531663: Bokstavlig talt alt jeg kan på engelsk er fra spill.

16531671: Bruh, hvis man ikke lærte seg engelsk igjennom minecraft så er man ikke en ekte gamer.

16531740: Mesteparten av hva jeg kan er fra gaming, men det er ogsa en del fra å snakke/chatte til folk på engelsk i video spill.

Appendix 13: Histograms of the participants' VLT scores, presented for each gaming group

Histogram

How many hours do you game during a regular week?: None, because I don't game

Mean = 54.07
Std. Dev. = 23.157
N = 90

VLT Total score

Histogram

How many hours do you game during a regular week?: Less than three hours per week

Mean = 63.15
Std. Dev. = 23.28
N = 54

VLT Total score

Histogram

How many hours do you game during a regular week?: 3-9 hours per week

Mean = 71.8
Std. Dev. = 19.717
N = 83

Histogram

How many hours do you game during a regular week?: More than 9 hours per week

Mean = 75.56
Std. Dev. = 19.902
N = 94

Appendix 14: The zone of proximal development, illustration

Cannot understand, out of reach

Can understand with help

Zone of proximal development

Current understanding