

Digital Games and Second Language Acquisition: The Effect of  
*Gimkit!* and *Kahoot!* on Upper Secondary School Students'  
Vocabulary Acquisition and Motivation

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This empirical joint thesis examines the use of two educational games *Kahoot!* and *Gimkit!* on second language vocabulary acquisition and the games' effect on learning motivation. The aim was to discover whether educational games enhance vocabulary acquisition and the in-game features that promote learning motivation. The study consisted of 49 first year Finnish upper secondary school students. The participants were divided into two experimental groups based on the school's class division. Experimental group 1 played *Gimkit!* during their two 15-minute treatment sessions and, respectively, experimental group 2 played *Kahoot!*. Both of the digital games contained vocabulary items that were presented in the students' course book and, therefore it was meaningful for the participants to learn the target words.

The acquisition of target language vocabulary items and the effect of motivation were both studied quantitatively. Firstly, the effect of playing the digital games on vocabulary acquisition was measured with pre-, post-, and delayed post-test. The vocabulary tests measured the acquisition of 25 target language words. Secondly, the motivational aspect was measured with pre- and post-treatment motivation questionnaires. We inspected the effect of in-game features, such as competition and game mode, on learning motivation through the motivation questionnaires. The results of this study revealed that both digital games used in this study were beneficial in terms of promoting second language vocabulary acquisition. In addition, the use of digital games in formal education was perceived an enjoyable activity by the participants, and the in-game features of game mode and progress pace were meaningful in terms of learning motivation. Further research should be conducted to discover the exact elements and features in a game that facilitate vocabulary acquisition.

**Keywords:** second language learning, vocabulary acquisition, digital games, motivation, educational game

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## **List of Abbreviations**

DGBL	Digital Game-Based Learning
DGBLL	Digital Game-Based Language Learning
EFL	English as a Foreign Language
ESL	English as a Second Language
FL	Foreign Language
L1	First Language
L2	Second Language
L2SMM	L2 Motivational Self-System
SLA	Second Language Acquisition
VW	Virtual World



# 1 Introduction

Learning new vocabulary is in central position when learning a new language. Vocabulary acquisition is one of the major activities in second language (L2) classroom (Rasti Behbahani 2021, 18). In formal learning, it is expected that learners master the target vocabulary items relatively quickly and, simultaneously, they are able to use the acquired words in a versatile manner. To put the laborious task of learning many new words in short period of time in perspective, Schmitt (2010, 7) states, that for basic communication the learner needs to know at least 6,000 – 7,000 word families. Not only is the volume large, but also the process of knowing a word is complex and multidimensional.

The two dimensions of knowing a word, according to Nation (1990, 5–31), are receptive and productive. Receptive use of a word refers to listening and reading, whereas productive use refers to writing and speaking (Nation 1990, 5–31). To know a word, the learner needs to know other aspects as well, such as: the form, meaning, and use of a word (Nation 1990). Hence, it can be stated that knowing a word requires much information about the word.

Target language (TL) words can be acquired incidentally or intentionally. Incidental vocabulary learning takes place when the learner is not constantly aware of learning new vocabulary but rather learns the items as a by-product of other learning activities (Hulstijn and Robinson 2001, 272). Intentional vocabulary learning then refers to activities specifically designed to introduce and teach a certain lexical item (*ibid.*). To ensure effective language teaching and learning, both of these modes should be considered (Rasti Behbahani 2021). The purpose of our study is to exploit both of these learning modes. To reduce the learning burden, the learner's first language (L1), teaching method, and the word characteristics should be taken into consideration in vocabulary learning (Nation 1990). It can be challenging to find a pedagogically functional solution that will support and enhance the learning process while creating an enjoyable and motivating learning environment.

In recent years, interest towards the possible benefits of utilising video games in formal teaching has increased. It has been found that digital games are beneficial in vocabulary acquisition. Their potential and efficiency have been vastly studied and the learning outcomes have been mainly positive (Hung et al. 2018, Zou, Huang and Xie 2019, Lee 2019). In general, digital games often provide an environment where the players/learners can safely explore and test their skills (see for example Sylvén and Sundqvist 2012). Once the benefit of extramural gaming in L2 acquisition was discovered, the aim was to integrate that into formal education as

well. This resulted in the concept of digital game-based learning (DGBL). This refers to digital games that are designed for teaching purposes and the aim is to provide learners a language learning environment that is safe, immersive, engaging and motivating (Reinhardt 2019, 194–195, Müller et al. 2018, 850–851).

From the perspective of vocabulary learning in DGBL, it has been found that digital games enhance both acquisition and the learning process (Rasti Behbahani 2020, 15–16). In addition, they are beneficial for receptive and productive skills (for example Zou, Huang and Xie 2019, 1–22). Not only are digital games in language learning shown to be useful, but also today's teachers have easy access to various digital gaming platforms. Therefore, they are widely used in teaching due to their easiness and efficiency in many different purposes, such as introducing new vocabulary or testing vocabulary knowledge. Because digital game-based tasks are so common in formal education, it is necessary to examine the actual benefits of playing the games, and if the purpose of gamifying a certain L2 aspect can be justified. In our study, we examine the digital games' effect of vocabulary acquisition and how the different game qualities and features affect motivation.

The motivational aspect in our study examines the effect of digital game-based tasks on students' learning motivation. Motivation has been noted to carry an important role in language learning, and it can be considered one of the most affective factors in L2 learning success (Dörnyei 2005, 65). Our study focuses on the effect of the digital games in formal education, and the effect motivation was studied through the theory of L2 motivational self-system (L2MSS). This construct comprises of three aspects: ideal self, ought-to self, and L2 learning experience. The ideal L2 self represents the learner's aspirations of what they want to become (Dörnyei 2005, 101). It has been discovered that the ideal self is a very powerful motivator and thus, important predictor of L2 learning success (Ortega 2009, 107). The ought-to self, then, comprises of attributes that the learner should possess to avoid negative outcomes and to meet others' expectations. Even though, all of these dimensions have an effect on motivation, the main focus in this study is on the L2 learning experience.

The L2 learning experience is central to our study because it concerns the effect of the learning situation on motivation. As we study the effect of digital games, it is also necessary to discover which factors in the learning situation have an effect of motivation. The L2 learning experience can influence learner's motivation, performance and L2 development (Dörnyei 2005, 107, Ushioda 2014, 47). As a by-product of positive L2 learning experiences, the ideal and ought-to self can be shaped (Dörnyei 2005, 107, Singleton 2014, 92–93). In our study, we focus on the learning situation itself, as well as the in-game features and how they affect the L2

motivation, and through that the learning outcome.

Given the complex and strenuous process of learning target vocabulary and the potential of digital game-based tasks in facilitating that process, it is necessary to study the digital games in more detail to see exactly how they affect the learning process. Hence, the purpose of this study is to investigate the effect of digital games on L2 vocabulary acquisition and the role of motivation in fostering the learning process. Moreover, in our study we investigate how the two different digital games affect the learner's vocabulary knowledge as well as the game internal elements' impact on the L2 learning experience. Our contribution to the field is to provide a more wholesome picture on the exact in-game elements that foster learning and influence the learning situation. Therefore, the aims of our study are to examine how the two digital games promote vocabulary acquisition, how the learners perceive the use of digital games in formal education, and lastly, the aim is to see whether there is a correlation between the student's vocabulary knowledge and motivation.

We conducted a longitudinal study, that contained a pre-test, two treatment sessions, post-test and a delayed post-test, to achieve these aims. 49 Finnish upper secondary school's students took part in our study. The participants were divided into two experimental groups and they played two different digital games during the treatment sessions. The experimental group 1 played *Gimkit!* and the experimental group 2 played *Kahoot!*. The collected data was analysed quantitatively. The tests measured the participant's vocabulary acquisition and motivation.

This thesis is a joint thesis. Both writers had their own contribution to this study and we refer to ourselves as researcher 1 and researcher 2. Our thesis begins with a theoretical section. Chapters 2, 3 and 4 introduce and review the essentials of vocabulary acquisition, digital game-based learning, and the L2 motivation self-system. The theoretical framework on vocabulary acquisition was handled by researcher 1 and the game-related content in the theory section was written by researcher 2. The motivation section was divided evenly between the researchers. The theoretical framework focuses on main concepts in terms of our research. We also examine previous studies conducted on the field to assist the understanding of different concepts that are relative to our study. The remaining sections are written together. The methodology section, chapter 5, elaborates on the methods and materials used in our study. Moreover, the test design, the digital games (*Gimkit!* and *Kahoot!*) and the instruments used to measure our data are explained in detail. Researcher 1 was in charge of the experimental group 1 (*Gimkit!*) and researcher 2 was respectively in charge of the experimental group 2 (*Kahoot!*). In chapters 6 and 7, the results of our data analysis are presented, and the implications of the results are

discussed through our research questions. The final section, chapter 8, gives a conclusion of our study and discusses future implications.

## 2 Vocabulary in Second Language Acquisition

The role of vocabulary knowledge in second language acquisition (SLA) is vital. Schmitt (2010, 4) points out that studies concerning the correlation between vocabulary and language proficiency support this observation. According to Laufer and Goldstein's study (2004, 420–421), students' knowledge of the form-meaning links of words explained 46.2% of the total variance in participants' class grades. To support this, Schmitt (2010, 4) states that vocabulary knowledge plays an important role in overall language success, for instance, in speaking, listening, writing, reading, sociolinguistics appropriateness, grammatical accuracy, and language fluency. Rasti Behbahani (2021, 18) points out that vocabulary acquisition and teaching can be considered as one of the major activities, which take part in every foreign and L2 classroom.

According to Alderson (2005, 1919), foreign language (FL) assessment was for a long time mostly concerned with the assessment of grammar, but the focus has shifted towards the assessment of vocabulary and, more specifically, to the role of vocabulary knowledge in foreign language performance and proficiency. Alderson himself has also studied the importance of vocabulary knowledge; together with his research team Alderson (2005) developed a DIALANG test, which explores the relationship between vocabulary knowledge and language proficiency (Schmitt 2010, 4). According to the results of his test, vocabulary knowledge correlates with writing and listening skills (Alderson 2005, 205). Hence, the role of vocabulary in SLA can be considered central.

To put the role of vocabulary into perspective, it is meaningful to discuss the number of words a language learner needs. According to Nation (1990, 11), there are two different ways to approach this matter. One way is to consider the vocabulary of a native speaker as a goal for an L2 learner, and the other is to take a look at frequency counts and decide how much vocabulary learner needs in order to perform particular activities (Nation 1990, 11). Schmitt points out, that this depends also on the learner's learning goal (Schmitt 2010, 6). The learning goal can vary from native-like proficiency to simple everyday communication. Naturally, different goals require different vocabulary knowledge. According to Schmitt, the vocabulary size for educated native speakers ranges from 16, 000 to 20, 000 word families. (Schmitt 2010, 6). The term word family means words from all word classes, which can be related to a base form, for instance, *teach*, *teacher*, and *teachable* (Schmitt 2010, 190). However, if the learning goal is not native-like proficiency, the required number of word families is lower. According to Schmitt (2010, 7), recent studies suggest that in order to be conversant in English, one needs

to know 2, 000- 3, 000 word families to get a 95% coverage. If 98% coverage is needed, then the required number of word families is between 6,000 to 7,000 (Schmitt 2010, 7). Hence, it is clear that an L2 learner is facing a laborious task when beginning to study a new language.

In this chapter, we first take a look at different ways to define the term “word” and explain how we decided to define a word in this study. After that, we critically discuss what it means to know a word. At the end of this section, we explain what it means to acquire a word and explain the difference between intentional and incidental vocabulary learning. We also briefly mention learning burden, and what makes it hard to acquire some words. Throughout this section, we also critically discuss and compare studies related to this field. Most of the theoretical framework concerning vocabulary acquisition discussed in this paper is from I.S.P. Nation and Nobert Schmitt due to their widely acknowledged research in the field of SLA.

## **2.1 Defining a word**

In order to study what effect digital games have on student’s vocabulary acquisition, there needs to be a clear definition of what we mean with the term “word”. Boundaries between words affect learning (Nation 1990, 29). Schmitt (2010, 8) states that individual words are considered as the basic lexical unit and easy to work with. However, there are several ways to define words. According to Nation (1990, 29), when it comes to dictionaries, they usually distinguish several meanings of a word instead of showing common features occurring in various uses (Nation 1990, 29).

Defining a word is not a simple task. Singleton points out, that when it comes to defining the term “word”, the answer depends on three different aspects: the level of abstraction, the linguistic level, and the role of semantic content (Singleton 1991, 10). Firstly, the level of abstraction means the way one chooses to define a word, does it consist of types (items with different identities) or tokens (actual occurrences of any items) (Singleton 1991, 10). For instance, *going, going, gone* consists of three words if one counts tokens, but on a count of types, it consists of only two words: *going* and *gone* (Singleton 1990, 10) Secondly, when it comes to the linguistic level, a word can be defined as an orthographic entity, as a phonetic entity, or as a phonological entity (Singleton 1991, 11). By this he means that the word *build* consists orthographically of a series of letters, phonetically thinking it is a burst of noise with certain acoustical characteristics, and as a phonological entity, it consists of sequence of units relevant in the English sound structure (ibid.). Lastly, the division between content words (also known as full words or lexical words) and grammatical words (also known as empty words, function words or form words) have an effect on the definition of words (Singleton 1991, 11). According to Singleton (1991, 11) content words have a substantial meaning even when they

are out of context (for instance, *chair*), and grammatical words have a little or no independent meaning and they have a grammatical role (for instance, *of*).

As mentioned above, the definition of a word can also be based on the orthographical form. Carrol et al. (1971) distinguish words on the basis of their form (as cited in Nation 1990, 29). This means that, for instance, *towns*, *Towns*, *town*, *Town*, and *town's* are all counted as different words. According to Carrol, even a capital letter makes it possible to count the form as a different word, and the idea behind this division is that the count could be done by computer (as cited in Nation 1990, 29). This, however, is only one way to look at what constitutes a word. We do not use this orthographical definition of words in this thesis, since, in our opinion, capital letters do not distinguish meanings and hence, *towns* and *Towns* are not counted as separate words in this study. In addition, words like *town* and *towns* are not counted as two different words. Therefore, inflections do not distinguish meanings in this study.

There are other theories, which support the Carrol et al.'s orthographical definition. Carter (2012, 20) mentions that: "a word is any sequence of letters (and a limited number of other characteristics such as hyphen and apostrophe) bounded on either side by a space or punctuation mark". According to Carter (2012, 20) this definition is good for basic activities, such as counting the words for an essay, but it has also irregularities and it cannot be applied to spoken language. Carter (2012, 20) also mentions that orthographic definition brings up many questions, such as whether the different forms of a word are counted as separate words or not. For instance, *see*, *saw*, *seen* or *big*, *bigger*, *biggest*. It is also important to consider how we count words, which have the same form but different meaning, like for instance, a word *fair*, which can be both a noun and an adjective. To answer these questions appropriately, we need to find another perspective to approach the matter.

According to Carter (2012, 21), a more accurate way to define words is to think of a word as "the minimum meaningful unit of language". Carter (2012, 21) elaborates that "This allows us to differentiate the separate meanings contained in the word *fair* in so far as they can be said to be different semantic units." However, also this definition has its limitations. It does not explain how to analyse for instance words like *bus station* or *police car*. This could be solved with yet another definition which highlights the idea that "a word can only have one stressed syllable" (Carter 2012, 22). According to this definition, a word like *police car* would be defined as two words. It should be noted that there is variation between languages since in Finnish, for instance, the word *police car* consists of only one unit *poliisiauto*. It is also worth mentioning, that some words, as in *but*, *by*, *them* do not normally receive stress (ibid.). Thus, there is no single correct way to define a word since it appears that each definition comes with

its own limitations and challenges.

Despite the many theories of how to define a word, our definition draws from the definitions above. We consider a word to consist of combination of syllables and sounds, which have an orthographic boundary. We use the Carter's definition that the minimum meaningful unit of language shows the boundary between words. In addition, in this study words like *police car* are counted as one word. This study also focuses only on lexical words and not grammatical.

## **2.2 The aspects of knowing a word**

After considering the possible definitions of a word, one needs to take into account the aspects of knowing a word. According to Schmitt (2010, 15), it is common to think that knowing a lexical item means that an individual knows its spoken and written form and meaning. However, it is not that easy to define what it means to know a word and there are many other aspects besides form and meaning that one needs to consider. We now inspect at different ways to measure word knowledge.

Jack Richards (1976) examines knowing a word through eight different assumptions:

1. The process of knowing a word continues through life. Even native speakers continue to expand their vocabulary.
2. Knowing a word requires the learner to know the frequency of the word and possible associations of the word.
3. Knowing a word means that the learner is aware of the limitations of the use of the word according to the word's functions and context.
4. Knowing a word requires the learner to know the syntactic behavior of the word.
5. Knowing a word means that the learner must know the word's form and derivation.
6. Knowing a word requires the learner to know the word associations between other words.
7. Knowing a word means that the learner needs to know the semantic value of the word.
8. Knowing a word means knowing the different meanings the word possesses.

According to Richards, the size of our vocabulary continues to grow as we mature, and the estimated vocabulary size of college students can be even 50 times bigger than the vocabulary size of a child entering an elementary school (Richards, 1976, 78). However, Richards remarks that the primary period for vocabulary development is early childhood (*ibid.*). His second assumption highlights the fact, that knowing a word means that the learner is aware of the fact that some words are more frequent than others and, in addition to the frequency of the word,



the learner knows the word's associations (Richards, 1976, 79). Richards points out that the functions of the word and the situation in which one uses the word create limitations that the learner should know (ibid.). Thus, Richards acknowledges the importance of register.

Richards also highlights the fact that words do not exist in isolation and, thus the meaning of a word is defined through its relationships with other words, and the learner needs to understand these relationships (Richards 1976, 81). In conclusion, he regards vocabulary knowledge to consist of these range of different knowledges.

Based on these Richard's assumptions, Nation (1990) has created another approach to define what it means to know a word. Nation (1990, 5) distinguishes two different dimensions of knowing a word: receptive and productive. Receptive knowledge can be defined as the ability to recognize a word and being able to recall the word's meaning when it is met, whereas productive knowledge involves the skills needed for receptive knowledge and, in addition to that, the ability to speak or write the needed vocabulary appropriately (Nation 1990, 5). If one learns a word for receptive use, that is listening and reading, the answer to the question "What is it to know a word?" will be different compared to learning a word for productive use like writing and speaking (Nation 1990, 31). Table 1 presents the aspect of knowing a word according to Nation (1990). We now briefly present and discuss Nation's (1990) proposal of these aspects of knowing a word for receptive knowledge and after that the aspects for productive knowledge.

**Table 1** Knowing a word (Nation 1990)

<b>Form</b>	
Spoken form	<b>R</b> What does the word sound like? <b>P</b> How is the word pronounced?
Written form	<b>R</b> What does the word look like? <b>P</b> How is the word written and spelled?
<b>Position</b>	
Grammatical patterns	<b>R</b> In what patterns does the word occur? <b>P</b> In what patterns must we use the word?
Collocations	<b>R</b> What words or types of words can be expected before or after the word? <b>P</b> What words or types of words must we use with this word?

<p><b>Function</b></p> <p>Frequency</p> <p>Appropriateness</p>	<p><b>R</b> How common is the word?  <b>P</b> How often should the word be used?</p> <p><b>R</b> Where would we expect to meet this word?  <b>P</b> Where can this word be used?</p>
<p><b>Meaning</b></p> <p>Concept</p> <p>Associations</p>	<p><b>R</b> What does the word mean?  <b>P</b> What word should be used to express this meaning?</p> <p><b>R</b> What other words does this word make us think of?  <b>P</b> What other words could we use instead of this one?</p>

Knowing a word for receptive knowledge requires the learner to be able to recognize a word in two different ways: when it is heard, thus, to know what the word sounds like, and also when it is seen, thus, what does the word look like (Nation 1990, 31). This means that the learner needs to be able to distinguish the word from those words, which have a similar form and, in addition to this, the learner needs to have the ability to judge whether the word form looks and sounds right (ibid.). Nation also points out (1990, 32) that having receptive knowledge means that the learner has an expectation of the grammatical pattern in which the word occurs. This means that if a learner knows, for instance, the word *suggest* it involves the fact that the learner has an expectation that the word *suggest* will be followed by an object (Nation 1990, 32).

According to Nation (1990, 32), receptive knowledge also includes knowing the word's collocations, which mean words that occur together often, in other words, the company that the word keeps. Nation points out that knowing a word for receptive use means that the learner has at least some expectations of the words that the learned word collocates with (ibid.). This means that if a learner knows the word *sunny*, he/she knows that the word *sunny* usually collocates with words like *day* or *disposition* (Nation 1990, 32).

In addition to spoken and written form, grammatical patterns, and collocations, receptive knowledge includes knowledge of the frequency, appropriateness, concept, and associations of the word (Nation 1990, 31). This means that a learner should be able to tell whether the word is frequently occurring or rare, the typical register in which one might encounter the word, which form of the word suits best for the context, and which other words and associations the word brings to mind (Nation 1990, 32).

When it comes to productive knowledge, Nation (1990, 32) mentions that productive knowledge extends the receptive knowledge. In addition to the above-mentioned aspects of receptive knowledge, productive knowledge includes knowing how to pronounce, write and spell the word, how to use it in correct grammatical patterns with the words it collocates with, when and how often to use the word and lastly, knowing possible substituent for the word (Nation 1990, 32). However, it is good to acknowledge that Nation also points out that knowing all the above-mentioned aspect of a word “applies completely to only a small proportion of the total vocabulary of a native speaker” (ibid.).

The relationship of receptive and productive vocabulary knowledge of L2 learners has been studied a lot. According to Niitemaa, during the early stages learner’s receptive and productive vocabulary size can be about equal size (Niitemaa 2014, 143). However, this changes during the learning process: the size of receptive vocabulary is usually bigger than the size of productive vocabulary (ibid). Niitemaa also points out that there are differences concerning the size of this difference (ibid.).

There has been conducted a number of studies, which support Niitemaa’s findings concerning the difference between receptive and productive vocabulary size. Webb (2008) studied L2 learners receptive and productive vocabulary. Webb studied 110 native speakers of Japanese who had been studying English as a foreign language for a minimum of seven years (Webb 2008, 82). The participants did a receptive and productive translation test, which tested the target words Webb had chosen for the study (Webb 2008, 83). According to the results of his study, L2 learners have larger receptive vocabulary than productive vocabulary, and students’ receptive vocabulary can shed light on learners’ productive vocabulary because large receptive vocabulary is related to greater productive vocabulary (Webb 2008, 79).

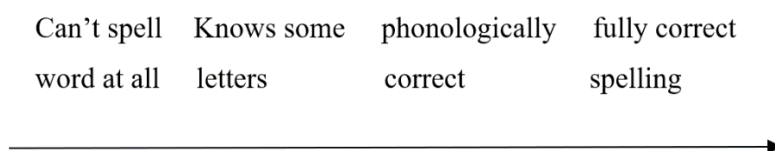
When it comes to the size of receptive and productive vocabulary, Kamil and Hiebert point out that receptive vocabulary is in general larger than productive vocabulary (Kamil and Hierbet 2005, 3). This supports the previously mentioned Webb’s study (2008) and Niitemaa’s point of view. In addition to the sizes of receptive and productive vocabulary, according to Mondria and Wiersma, it is evidenced that productive learning is more difficult compared to receptive learning (Mondria and Wiersma 2004, 86). They also point out that the division of knowing a word receptively versus knowing a word productively is not that clear and it tends to overlap, since receptive learning leads to certain amount of productive learning and vice versa (ibid.). This study examines both receptive and productive knowledge but they are not separately analysed in the results.

### 2.3 Learning vocabulary

Another aspect related to this study is to define what it is to acquire a word. In order to study vocabulary acquisition, it needs to be clear what the term acquisition means. However, there is no single correct definition. As Rasti Behbahani (2020, 27) points out, “in applied linguistics, vocabulary acquisition is defined as a gradual process during which different aspects of a word are acquired. Applied linguists also conceive vocabulary acquisition as a continuum rather than a known/unknown dichotomy”. In this thesis words acquiring and learning are used interchangeably to indicate the aforementioned process of vocabulary acquisition.

According to Schmitt, learning a word is an incremental process where different aspects of word knowledges are mastered at different rates (Schmitt 2007, 831). Schmitt points out that not all word knowledge can be learned simultaneously (ibid.). Different word knowledge aspects may develop along a cline and, thus learning of the individual word knowledge aspect is also incremental and each word knowledge aspect can be known receptively or productively regardless of the degree of mastery one has in the other aspects (ibid.). To illustrate this, Schmitt created a continuum of the incremental learning of spelling. This continuum is presented below in Figure 1.

**Figure 1** The incremental learning of spelling (Schmitt 2007)



According to Schmitt, the fact that learning a word is an incremental process means that words must be met and used multiple times in order to truly be learned (Schmitt 2007, 831). When it comes to the required amount of these exposures and usages, one needs to consider the possible affecting factors: how salient the word is, how necessary the word is for the learner, and if the word is studied explicitly or met incidentally (Schmitt 2007, 831). In his book, Nation (1990) reviews studies concerning the number of repetitions needed for a word to be acquired. According to Nation (1990, 44), studies in this field indicate that from 5 to over 16 repetitions are required to acquire a word. Nation also points out Pimsleur's (1967) suggestion that there should be increasing gaps between repetitions (Nation 1990, 45). This means that the first repetitions should take place quite quickly after the introduction of a new word, the next repetition should be a day or a more away, and the repetition after that should be on the next week, and so on (ibid.). Another important aspect Nation (1990, 44) mentions, is that the old

material from previous lessons is more important than the new material, since the learners already nearly master the old material and if not repeated, the old material will be forgotten, and all the work will be wasted. This is also supported by Schmitt who states that “it is critical to have a review session soon after the learning session, but less essential as time goes on.” (Schmitt 2007, 831).

To support Nation and Schmitt, Webb (2007) studied the benefits of repetition in Japanese university students’ vocabulary learning. He studied the vocabulary acquisition of 121 English as a foreign language (EFL) student (Webb 2007, 46). The participants were divided into four groups, in which they encountered different amount of repetition of the target words (ibid.) After the treatments the participants completed a vocabulary test. (ibid.). Webb found out that increased repetition led to greater gains in vocabulary knowledge (ibid.). Hence, repetition is a crucial part when acquiring a new language.

However, repetition alone is not sufficient enough in word acquisition process. According to Nation (2001, 98) there are three important processes, which ought to be beneficial in remembering and acquiring a word: noticing, retrieval, and generation. The first process, noticing, means that the learner gives attention to the word; the learner notices the word and is aware of its usefulness as a language item (ibid.). According to Nation (2001, 99) noticing requires decontextualization, which occurs when the learner pays attention to a language item not as a part of message but as a part of the language. He highlights two important factors which affect noticing: motivation and interest (Nation 2001, 98).

Nation’s second process is retrieval, which involves the learner to subsequently retrieve a word during a task and, hence strengthen the memory of the word (Nation 2001, 103). According to Nation (2001, 103) the retrieval of the word can be receptive (retrieving the meaning when the word is met in reading or listening) or productive (retrieving the written or spoken form of the word as is writing and speaking). It is worth noticing, that retrieval does not happen if the meaning and form of the word are presented to the learner simultaneously (ibid.). There are two important factors involved in this process and they are “the learner's vocabulary size, and the length of time that memory of a meeting with a word lasts” (Nation 2001, 103).

The third process is generation, which happens when the learner encounters previously met words which are used in ways that differ from the previous meeting the learner has had with the word (Nation 2001, 105). This new meeting then forces the learner to reconceptualize the previously acquired knowledge of that word (ibid.). Nation points out, that this generation can apply to a range of variations, for instance word meaning, inflections, collocations, grammatical context and reference (ibid.). Just like retrieval, also generation can be both

receptive and productive. It is receptive when new ways to use the word occurs in reading and listening, and productive when the learner produces new ways to use the word in new contexts (Nation 2001, 105). Joe (1998, 357) studied especially the role of generation in adult learners of English as a second language (ESL) vocabulary acquisition in New Zealand. She assigned 48 adult ESL learners to one of three treatments, in which they worked with a given text and received different amount of generative training (Joe 1998, 357). The participants completed a pre-test and a post-test. (ibid.). Joe discovered that generative processing led to enhanced vocabulary knowledge and greater vocabulary knowledge for words that were unknown (ibid.).

Mousavi, Ghafoori and Saeidi (2021) studied the role of noticing, retrieval, and generation in intermediate students' vocabulary acquisition. They divided the 120 participants into four different groups, in which they used these three processes differently (Mousavi, Ghafoori and Saeidi 2001, 1). The first group used only noticing, the second group used noticing and input-based retrieval, the third group used noticing and output-based retrieval, and the fourth group used all three of the processes; noticing, retrieval, and generation (ibid.). Each group did a pre-test and after that eight to nine treatment sessions, where they were exposed to the target words and had to use the processes assigned to their group (ibid.) After the sessions, the participants took an immediate post-test and a delayed post-test (Mousavi, Ghafoori and Saeidi 2001, 11–12). According to Mousavi, Ghafoori and Saeidi (2001, 24) combining all types of input and output practice was effective for vocabulary learning and they enhanced the learner's ability to perceive and produce the target vocabulary. However, the long-term results are vague. When it comes to the use of the different processes, the results show that the fourth group, which used all three of the processes, outperformed the other groups (Mousavi, Ghafoori and Saeidi 2001, 1).

### **2.3.1 Incidental and intentional learning**

According to cognitive psychologists, learning can be distinguished into implicit and explicit learning (Ellis 2009, 3). We now briefly discuss these terms, implicit and explicit learning, and examine how are they related to vocabulary acquisition.

Ellis (2009, 3) defines implicit and explicit learning through cognitive psychology. According to this definition, in implicit learning, the learning occurs without the learner making demands on central attentional resources and, thus the learner is unaware that learning has occurred even though it can be seen in the learner's behavioral responses (Ellis 2009, 3). The learner is not able to verbalize what has been learnt because the learning did not happen consciously (ibid). Implicit learning has raised controversial opinions among researchers, and

it has been questioned whether any kind of learning would be possible without at least some degree of awareness (Ellis 2009, 7). There is no consensus on the definition of implicit learning, although it has been generally accepted that it does not include metalinguistic awareness (ibid.). On the contrary, explicit learning happens in the opposite way. As Ellis explains, explicit learning happens consciously, it involves memorizing facts and creates heavy demands on the learner's working memory (Ellis 2009, 3). Explicit learning creates symbolic knowledge, and the learner is aware of what has been learnt and is able to verbalize it (ibid.).

As Rasti Behbahani (2021, 32) mentions, in vocabulary acquisition research, instead of using the terms implicit and explicit learning, words are acquired either incidentally or intentionally. In this case, the term incidental vocabulary acquisition means learning vocabulary as the by-product of activities, which do not explicitly gear to vocabulary learning (Hulstijn and Robinson 2001, 272). Intentional vocabulary learning refers to activities, which are aimed to commit lexical information to learner's memory (ibid.). However, Hulstijn and Robinson highlight that it is not easy to provide a clear distinction between these two terms (Hulstijn and Robinson 2001, 269). Hulstijn and Robinson point out that when it comes to L2 pedagogy, it is important to design tasks, which require the learner to focus on vocabulary learning and make the learners aware of the important role of efficient vocabulary learning strategies (ibid.).

The relationship between intentional and incidental vocabulary learning is interesting to look at. According to Rasti Behbahani "When considering the benefits and limitations of both incidental and intentional vocabulary acquisition, scholars commonly recommend that incidental and intentional modes of vocabulary acquisition are implemented simultaneously" (Rasti Behbahani 2021, 34). This observation has also been supported by a number of studies. For instance, Karami and Bowles (2019, 25) studied the effectiveness of incidental and intentional vocabulary learning of one hundred Iranian EFL students. They were interested to discover whether intentional learning, incidental learning, or a combination of the two improved 12-17-year-old EFL student's vocabulary learning and retention (Karami and Bowles 2019, 29). The participants were divided into three experimental groups and three control groups, and they completed a pre-test, a post-test, and a delayed post-test (Karami and Bowles 2019, 25). Participants in the experimental groups received intentional and incidental vocabulary learning instructions, while participants in the control groups did not receive any vocabulary learning instructions (ibid.). The results of their study indicated that students who received mixed instruction of intentional and incidental vocabulary learning performed best and they also revealed scores of higher vocabulary retention (Karami and Bowles 2019, 36).

In addition to Karami and Bowles, also Feng (2015), Meganathan et al. (2019), and Sok

and ZhaoHong (2020) have studied the effectiveness of incidental and intentional vocabulary acquisition. In Feng's study (2015, 66), 46 English business students were divided into two groups: the experimental group received incidental and intentional learning instructions, and the control group utilized incidental learning (ibid.). To test the gained vocabulary knowledge, the participants completed receptive and productive vocabulary tests after the program (Feng 2015, 71). Meganathan et al. (2019, 51) studied 99 Malaysian ESL learners in primary school. The participants were divided into two experimental groups and a control group (ibid.). The experimental group 1 received incidental instructions, while the experimental group 2 received incidental and intentional instructions (ibid.) The control group did not take part in the same activities as the experimental groups but continued to study with regular class activities (ibid.). The test design comprised a pre-test, treatments, a post-test and a delayed post-test (ibid.). In Sok and ZhaoHong's study (2020, 113), 30 adult ESL learners from various language backgrounds studied vocabulary either intentionally or incidentally, or by combining intentional and incidental learning. The participants did a pre-test, took part in the treatment, and completed a post-test (Sok and ZhaoHong 2020, 126).

According to the results of all the above-mentioned studies (Feng 2015, Meganathan et al. 2019, and Sok and ZhaoHong 2020), the combination of intentional and incidental learning turned out to be more efficient in vocabulary acquisition than using them individually. Thus, in terms of vocabulary learning, it is not meaningful to use these learning modes separately. Moreover, it should be noted that in Finnish L2 teaching, incidental and intentional learning are used simultaneously and cannot be clearly separated.

#### **2.4 Difficulties in learning a word**

Learning a word is a complex process and, therefore it is only natural that learners face difficulties while learning new vocabulary. According to Nation, the effort the learner needs to learn and remember a word is called *the learning burden* (Nation 1990, 33) The learning burden depends on three things, which are the previous experience the learner has of the target language and the learner's mother tongue, the way in which the learner is taught or how the learner learns the new word, and the target word's intrinsic difficulty (Nation 1990, 33). We now discuss these three classes and consider ways to reduce the learning burden.

According to Nation, there is a lot of evidence to support the statement that the L2 vocabulary is affected by the learner's L1, and that L1 and L2 vocabulary are stored together in an integrated whole, which encourages interference and borrowing between these two vocabularies (Nation 1990, 33–34). This interference and borrowing between L1 and L2 vocabulary is called cross-linguistic influence (Ortega 2009, 31). Nation points out that the



effect the L1 has on L2 vocabulary can sometimes lead to fossilization, which means that the learner keeps an L1 meaning for a L2 word (Nation 1990, 34). Henning (1973) studied the ways learners store vocabulary and found out that higher level learners stored words according to their meanings and learners whose proficiency levels were lower stored the words according to their forms (as cited in Nation 1990, 35). Hence, words that are similar to spelling or sounds should not be introduced too early in L2 courses because this will make the learner store the words together, which causes interference between the words (Nation 1990, 35). Thus, learners L1 affects the acquisition process of new words.

The second aspect affecting the learning burden is the way the word is being taught. Teaching can have positive or negative effects on learning, or it can also be neutral (Nation 1990, 49). According to Nation (1990, 43) “When the effect of teaching is negative, learning occurs, but this learning will upset what has been taught before, what is being taught at the same time, or what will be taught in the future”. Negative teaching is also called unteaching and it can result in increasing difficulty of learning a word (Nation 1990, 43). It has been argued whether the type of attention given to a word affects the learning more than just repetition (ibid.). The teacher should use challenging ways to draw the learner’s attention to a word in order for the learning to be efficient, because otherwise the word has to be repeated for learning to occur (ibid.). However, as previously mentioned in this paper, there is also evidence, which supports the relationship between repetition and learning, and it is important for the teacher to know whether their can rely on a coursebook to provide enough repetition.

Two other aspects related to unteaching of a word are the relationship the target word has with another words and exceptions (Nation, 1990, 33). According to Nation, similarities between words can make the learning easier or, on the contrary, more difficult (Nation 1990, 45). When two words are different in some ways but share similar features, the similarities will strengthen the association, but the differences interfere with each other (ibid.). Nation points out, that if these kinds of similar words are being taught together, the learning will be twice as difficult (Nation 1990, 46). This cross-association can be avoided by reducing similarity between the items, for instance, by teaching the words separately and using different pictures, context, or objects for conveying the meaning (Nation 1990, 47). When it comes to possible exceptions, Nation claims that the exception should not be taught before the rule itself has been learned (Nation 1990, 48). These exceptions do not follow the common rules. For instance, words *of*, *yacht*, and *blood* are exceptions to useful spelling rules (Nation 1990, 48).

Lastly, the features of the word itself can also affect the learning burden. Nation supports this aspect with Rodgers’s (1969) study, which indicated that as for the word classes, verbs and

adverbs are the most difficult to learn, while nouns and adjectives are the easiest ones (Nation 1990, 48). However, some nouns are easier to learn than others. Abstract nouns are considered to be more difficult to acquire than concrete nouns (Niitemaa 2014, 149). Also, the learning goal affects the learning burden. Learning a word productively can be 50% to 100 % more difficult than learning a word receptively and, hence words which are needed only for reading and listening should not be learned productively (Niitemaa 2014, 149). It can then be stated that the possible difficulties a language learner might face are caused by L1, how the words are being taught, and the characteristics of the word. These factors should be considered when teaching target vocabulary. Niitemaa (2014, 149) also points out that, in addition to word classes, also the phonemes, orthographical form, length and meaning of a word affect learning vocabulary. For instance, for Finnish learner of English the th-sound (/θ/) is difficult to learn because of the differences between Finnish and English phonetic sound system (Niitemaa 2014, 149).

The theoretical framework for vocabulary acquisition has now been laid. We have defined what a word means in this study and, in addition, we discussed some major theories conducted on the field of second language vocabulary acquisition and presented recent studies to support the theoretical framework. Next, we discuss the use of digital games in formal education and their benefit in vocabulary acquisition.

## **3 Digital Game-Based Language Learning and Vocabulary Acquisition**

The popularity of digital games in language learning classes has grown immensely in the past years. As an extramural activity, digital games attract interest of great variety of people. Here extramural activities refer to activities that are performed outside of school. The effect of playing video games outside the classroom has provided positive outcomes in L2 learning (see, e.g. Rama et al. 2012, Sylvén and Sundqvist 2012). Therefore, it is only natural that the factors beneficial for L2 learning are studied and attempted to be integrated into formal language learning as well. The aim in language learning is to make learning easy for learners and at the same time, effective (Reinhardt 2019, 1, Ortega 2009, 168). Playing digital games in formal learning environment can facilitate the learning process and result in a pleasant language learning experience due to the games' motivating and engaging nature (Reinhardt 2019, 1–2, Thorne, Black and Sykes 2009, 809).

In the following subsections, the topic of digital games in L2 learning is covered more in depth by looking at their theoretical background, and previous studies conducted on the field. To understand the potential of video games in learning, the game features and qualities are discussed in section 3.3. It is meaningful to inspect the digital games' features through the characteristics of learning processes. For example, the features that are essential for language learning are repetition, great amount of input, and assessment (Järvinen 2014, 89–101). These features are also characteristics for digital games when looking at their benefits as a language learning tool (Reinhardt 2019, 104–108). The potential of digital games is especially fruitful for vocabulary enhancement (see, e.g. Rasti Behbahani 2021). Since the focus in this study is on vocabulary acquisition through playing digital games, we present previous studies conducted on the topic and discuss the results in section 3.4.

### **3.1 Game definition**

The concept of a digital game needs to be clarified, as well as the dominant perception of a game in this paper. The aim is not to provide a comprehensive definition of a digital game but a definition that is relevant in our study. Digital games are an entertaining activity in a digital form (Prensky 2007, 18). They are also games that are played with consoles, PCs and mobile devices (Terveyden ja hyvinvoinnin laitos 2016). According to Juul game can be defined as:

a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player

feels emotionally attached to the outcome, and the consequences of the activity are negotiable (Juul 2005, 36).

In addition to Juul’s (2005) definition, Whitton (2010), who focuses on digital games used in higher education, presents an even more comprehensive definition of what constitutes a game. The ten-part list consists of competition, challenge, exploration, fantasy, goals, interaction, outcomes, people, rules and safety (Whitton 2010, 23–27). Table 2 (see below) illustrates the list of these game characteristics and their definitions.

**Table 2** Ten characteristics that define a game (adapted from Whitton 2010, 23)

<b>Characteristic</b>	<b>Definition</b>
Competition	The goal is to achieve an outcome that is superior to others.
Challenge	Tasks require effort and are non-trivial
Exploration	There is a context-sensitive environment that can be investigated.
Fantasy	Existence of a make-believe environment, characters, or narrative.
Goals	There are explicit aims and objectives.
Interaction	An action will change the state of play and generate feedback.
Outcomes	There are measurable results from game play (e.g. scoring).
People	Other individuals take part.
Rules	The activity is bounded by artificial constraints.
Safety	The activity has no consequence in the real world.

Whitton (2010, 31) highlights the importance of interaction and feedback as key elements in digital games. On the one hand, interaction in a game provides learners a mechanism to identify their misconceptions and test and modify their understanding (ibid). On the other hand, feedback is key factor in expanding the learners’ knowledge, improve their skills even further, and to shape their perspective (ibid.).

Furthermore, for an activity to be ‘game-like’, entertainment and engagement should be

included among other features that are game-specific (Wu, Franken, and Witten 2012). The number of these elements in a digital entertaining activity incorporates to how game-like the activity is.

Based on these definitions the digital games used in this study fulfil the requirements and can be defined as engaging learning tools that serve an educational purpose and have a pedagogically justified goal: to support and enhance learning.

### **3.2 Digital games in language learning**

The growing interest in digital games in language teaching and learning has led to an increase in terminology in digital game studies. As proposed by Reinhardt (2019, 8) the term game-based refers to the use of games that are intentionally designed for second language teaching and learning. To further elaborate the significance of the design in terms of L2 teaching and learning, the game-based learning activities have a pedagogical objective and they are educational in nature (Reinhardt 2019, 194–195). The purpose of the game elements in digital game-based learning (DGBL) is to engage, motivate, immerse, and to create an enjoyable environment for language learning (Müller et al. 2018, 850–851).

According to the view of Ermi, Heliö, and Mäyrä (2004, 62), DGBL is best categorized as an edugame. By looking at edugame from the perspective of its gameplay features and the learning goals, edugame locates between digital games and educational programmes (Ermi, Heliö, and Mäyrä, 2004, 62). Edugame contains a great number of game-like elements, and it is designed to be beneficial in terms of learning or teaching the specific language-related content (ibid.). This view of DGBL is the most accurate depiction of the two digital games used in this study. In this thesis, we use the terms digital game, educational game, and edugame interchangeably. The digital games used in this study contain game-like elements and the purpose of the use is pedagogical and, thus these terms can be used to refer to these games.

As mentioned before, there is great potential in digital games in language teaching and learning in terms of fostering L2 learning. The aforementioned gaming elements, as well as contextual elements related to the in-game situation, enhance the effectiveness of DGBL. Also, the aim is to make learning enjoyable (Ermi, Heliö, and Mäyrä 2004, 61), which is especially significant in vocabulary learning when looking at the process of acquiring new words in section 2. The use of digital game-based tasks functions as a tool for certain aspects of subject, for example vocabulary learning in L2, which can be considered to be a laborious process. Not only is learning vocabulary through gameplay especially lucrative due to its impact on quality of learning through enjoyment, engagement, and motivation, but also the possibility of manipulating game objects purposefully (Reinhardt 2019, 199). This enables associations of

form, function and meaning and the items are contextualized and represented in multiple modalities, which are especially important in terms of vocabulary learning (Reinhardt 2019, 199, Niitemaa 2014, 147).

DGBL contexts can invigorate, for example, engagement, interest, and self-efficacy, which are important factors in L2 learning as well. In addition, motivation has found to be yet another positive outcome of incorporating DGBL into L2 teaching. In theory section 4, which focuses on motivation, we also present previous studies on DGBL and motivation.

### **3.3 Digital games promoting and facilitating learning**

In this subsection, the aim is to provide a comprehensive foundation of the role of digital games in language learning. The prevailing view on the benefits of digital games in learning are divided into two schools of thought: the role of game-internal elements and the role of game-internal design (Rasti Behbahani 2020, 66). The first view, that considers the internal elements of a digital game to be the underlying reason for successful learning, focuses on the digital game's positive effect on cognition and motivation, which further boosts learning. These game internal elements are for example interactivity, challenge, fantasy, feedback, gameplay, difficulty and complexity (Rasti Behbahani 2020, 66). As for the second view, the internal design of the game (in other words, the quantity of its internal elements) is seen to mimic the constructivist view on language learning, thus improving learning.

#### **3.3.1 Game internal elements**

According to the first view, the internal game elements are argued to have an effect on motivation and, therefore, indirectly supporting the cognitive factors, which result in learning. The studies that support the view that game internal elements improve learning are discussed next. Due to the myriad studies conducted on this topic at hand, the studies discussed are selected according to either their useful insights in regards of our study, or due to their effectiveness in regards of learning through playing.

Virtual worlds (VW) in digital gaming have attracted a lot of attention in terms of language learning. Their effect as an extramural activity has been noticed and the main focus has drawn on the effect of situated learning, interaction, and narrative elements. Halmari et al. (2016, 170) posit that the learners are motivated to learn due to situated learning. Situated learning while playing digital games occurs through various processes such as: hypothesizing, probing, and reflecting upon the virtual gaming environment (Halmari et al. 2016, 170). As one of the key elements in virtual worlds from the perspective of L2 learning is interaction, the emergent of Zone of Proximal Development (ZPD) by Vygotskiï is discussed as well in this

thesis. As stated by Sandler (2012, 24), VWs are an online environment, which can either simulate the real world, or they can resemble a fantasy world. The game elements relevant to VW and learning, besides situated learning and interaction, are avatars (“in-world representations of real people who control them”) and real-time interactivity (Sandler 2012, 24, Whitton 2010, 29). Interactivity in the game concerns both interaction with the environment and the possibility to interact with other players (Whitton 2010, 29).

The ZPD concept created by Vygotskiĭ is: “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotskiĭ and Cole 1978, 86). According to the Vygotskian view of L2 learning, the process is inherently social and ZPD shows the potential of learning that emerges from interaction and collaboration (Ortega 2009, 225). By looking at the learning environment in VW, the game enables real-time interaction with other players and the whole learning process is situated and occurs through various processes. To support the view of VW proving effective learning environments, Ortega (2009, 63) posits that in order to provide optimal learning situations, there should be opportunities for meaningful language use and the situations should slightly exceed the learner’s current skill level to ensure a zone for proximal development. As it can be noted from the characteristics of VW game, the gaming environment can offer situations where the learners face problems that are slightly above their current language skills.

Another game internal element that is closely related to interaction is feedback. When interacting with other players, especially within the game world, a learner is to receive constant feedback and, in some games, assessment (Whitton 2010, 23). When taking action, the element of feedback enables opportunities for changing behaviour by using the given feedback as an advantage (Whitton 2010, 26). Through interaction, learners are provided with a mechanism through which they can identify their misconceptions, and test and modify their behaviour accordingly (Whitton 2010, 31). Naturally, undergoing this process creates opportunities for experimental learning (Whitton 2010, 48). Therefore, the provision of feedback is the key in improving players’ skills through identification of errors.

As posited by Cornilie, Clarebout, and Desmet (2012, 260), the feedback in digital games differs greatly from the feedback received in formal classroom situations. In digital games the feedback focus is on meaning since it is dependent on the game content (Cornilie, Clarebout, and Desmet 2012, 260). 83 Belgian EFL learners participated in their study of the utility of corrective feedback in DGBL (ibid.). Cornilie, Clarebout and Desmet (2012, 272) discovered that learners found the immediate and explicit feedback more useful than implicit feedback.

The explicit feedback in this game environment referred to the feedback that provided explanation of what went wrong (Cornilie, Clarebout, and Desmet 2012, 272). Whereas implicit feedback in the game was feedback delivered through game characters, which required reasoning power and were designed to invigorate autonomous inquiry (ibid.). They also discovered that optimal feedback in digital games contains a combination of both explicit and implicit feedback (ibid.). This ensures that the game remains game-like as well as useful in terms of language learning.

Alexiou and Schippers (2018, 2547) posit in their conceptual framework of digital game elements that there are three main digital game elements that are beneficial in L2 learning:

1. Game rules and mechanics (the game system)
  - These are seen to affect the development of cognitive, spatial, and problem-solving skills and creativity
2. Narrative elements (theme, story, characters)
  - provide a foundation for thought experiments and simulations for modelling behaviour
3. Game aesthetics (audiovisual elements)
  - enhances skill and knowledge transfer to real-life situations

Alexiou and Schippers (2018) have studied the effect of game aesthetics, narrative and game mechanics on learning. They posit that these core game design elements affect learners' motivation and engagement through these factors, and as a result digital games enhance learning and playing games result in higher learning outcomes (Alexiou and Schippers 2018, 2545). To support this view on the reason behind the effectiveness of digital games, Hamari, Koivisto and Sorsa's (2014) discuss similar effect in their review.

Hamari, Koivisto and Sorsa's (2014) review on the effectiveness of digital games indicates that DGBL provides positive effects on cognitive-motivational engagement, but the level of effectiveness is dependent on the context and the users. The context here refers to the activity that is being gamified. In their review, they noticed that the experience of playing digital games was positive in terms of engagement and enjoyment (Hamari, Koivisto and Sorsa 2014, 3028). These findings support the idea that playing digital games affects positively on learner's affective state and, thus promote learning.

The comprising of the three phases mentioned (game rules and mechanics, narrative elements, game aesthetics) support the learning process and evoke user engagement as well as motivation (Alexious and Schippers 2018, 2547). The effect of game mechanics, especially the



levels of challenge, are scrutinized next. The game mechanics play an important role in regulating the levels of challenge in a game (Whitton 2010, 43). Hamari et al. (2016, 170–171) state that in an ideal game setting that contains problem solving, the problems or tasks start off at low difficulty level and progressively become more difficult. The learners are on the edge of their skill level and through success, failure, and feedback they will reach higher levels (Hamari et al 2016, 170). The game element, appropriate level of challenge, keeps the learners interested and motivated to continue even after failure (ibid.). When a task or an exercise is at an appropriate level of challenge, the learners perceive themselves as competent, which further improves their motivation, and causes greater self-efficacy and self-worth (Hamari et al. 2016, 171). The appropriate level of challenge is closely related to Krashen's Comprehensible Input Hypothesis. Krashen (as cited by Ortega 2009, 59) emphasizes the importance of comprehensible input in L2 learning. The language input that the learner receives should be on a slightly higher level than their current skill level for the learning to be optimal (Ortega 2009, 59).

By looking at the results of Hamari et al.'s (2016) study, the appropriate level of challenge affected the learning outcome positively. They studied the impact of flow, engagement, and immersion on DGBL (Hamari et al.'s 2016, 170). Their study consisted of 134 US high school students who were taking courses on either physics or engineering dynamics (Hamari et al. 2016, 173). The increasing levels of challenges activated heightening levels of engagement, which boosted learning (Hamari et al. 2016, 175). They state that this particular game element affected learning directly as well and indirectly, via increased level of engagement. This supports the theory of Comprehensible Input Hypothesis and its effect on optimal level of challenge as hypothesized by Krashen in his theory. In a hypothetical situation, a digital game's starting level would be at an appropriate level when compared to the learner's current skills, and as the learner's skills improve, the game difficulty would increase simultaneously. According to the findings of Hamari et al. (2016) and the Krashen's Comprehensible Input Hypothesis, this hypothetical scenario would be the optimal learning situation for a learner. However, it must be borne in mind that appropriate level of challenge is merely one of the many game elements that are said to affect learning.

### **3.3.2 Game internal design**

As for the second view, the internal design and its association with the constructivist view of learning, the focus is on the game as whole and its comprehensive effect on learning. According to this view, the key behind the success of L2 learning through playing digital games is in the

internal game elements as a whole, not in single elements as mentioned above. The link between the effectiveness of game internal design and constructivist view of learning is fairly easy to form. As stated by Reinhard (2019, 199), players are able to manipulate game objects during gameplay, which serves a purposeful learning experience and enables the players to create associations between form and meaning. This describes the fundamental principle of constructivism, thus active learning.

Constructivism in SLA emphasizes activity-based teaching and learning, as well as the importance of learning taking place in a social context with opportunities for interaction (Keengwe, Onchwari, Agamba 2013, 888). The knowledge that a learner possess is seen as 'adaptive function' that consists of a set of conceptual structures that are applicable when facing objects that can be manipulated (ibid.). Through this process, the knowledge is actively constructed (Reinders 2012, 54). The idea is to promote learners to develop their own frames of thought and to learn through interaction and exhibiting their knowledge through demonstration (ibid.). According to Duffy, Lowyck, and Jonassen (1993, as cited by Becker 2008, 34) the learning activities in a constructivist learning environment should contain the following principles: active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective principle.

Becker's (2008) observed the constructivism in the digital game *Mario* (*Super Mario Bros* game series), and noticed that the game design can be looked as a constructivist environment. *Mario* is by no means a digital game with the purpose of L2 learning but introduced as an example for what high-quality educational games should contain in order to provide effective and engaging learning experience.

Becker (2008, 35–38) discovered that each principle of constructivist view can be discovered in this particular gaming environment. Next, we present these principles and how they appear in *Mario*. The principle of active learning, which is common in almost every digital game, takes place when learners process information brought up in the game and are responsible for their behaviour and, thus affect the end result of the game (Becker 2008, 35–36). The principle of constructive learning can be seen through the structure and progress in the game: the player gets first introduced to the basic skills and in-game elements, after which the game becomes progressively more difficult and yet achievable (Becker 2008, 37). Here the idea of constructing knowledge by connecting prior knowledge to new takes place. The idea of active and constructivist learning is can also be considered something that is tried to put into practice in formal education.

Becker (2008, 37) continues with the aspect of collaborative learning, which happens

outside the game environment, in the gaming community on the internet (websites and articles). In this instance, the learners gain support and build knowledge collaboratively around the game subject. The conversational principle also fulfils in *Mario* when looking at the online game community (Becker 2008, 37–38). In *Mario*, the aspect of intentionality comes to realization through goal setting: learners are actively trying to achieve a goal in the game, which is closely tied to the goal of improving one's behaviour and learning from the given feedback (ibid.) As stated in the constructivist learning framework, learning will be enhanced when the learning task is intentional and goal-oriented (Rasti Behbahani 2020, 70). The intentionality of learning and setting goals is also something that language learners could be missing. Thus, a game that provides opportunities for purposeful use of language could also enhance the meaningfulness of language learned and create a need for learning.

The complex principle, which deals with complex and simple problems that engage and enhance learning is also presented in Becker's (2008, 37) study. In *Mario*, this can be discovered in its problems of various difficulty levels (Becker 2008, 37). Also, the emphasis on the importance of community principle stands out during the most difficult tasks (ibid.). Last principle presented by Becker (2008) is the aspect of learning being reflective. In the constructivist view, learners are to be aware of what to do in a task, how they have achieved the end result, what strategies have worked and lastly, what goals they have achieved (Rasti Behbahani 2020, 71). In *Mario*, the importance of online game community is central to share their tips, knowledge, and experiences (Becker 2008, 38).

In sum, according to the constructivist view of learning and how it is visible in *Mario*, the learning should be situated and meaningful. What is also notable is how the challenges and tasks in the game are built. It is important that the player has opportunities to fail and succeed in order to learn and experience self-competence. Becker's (2008) findings of the relation of *Mario* and the constructivist view of learning support the main idea of DGBL, which is to provide rich and varied context for active learning with the opportunity to face information and facts in a way in which learners are enabled to extract the information and form hypotheses, thus learn. As mentioned above, the game scrutinized here through Becker's (2008) findings, is not a digital game for the purpose of L2 learning but an example of an idea how to construct a high-quality learning platform in a way that supports the constructivist view of language learning.

### 3.3.3 Previous studies on digital game-based tasks and L2 learning

Now the role of game internal elements and game internal design on learning are scrutinized. In order to provide a more wholesome view on how digital game-based language learning (DGBLL) is effective, looking at previous studies is necessary. Since the focus is on DGBLL, it is meaningful to distinguish the L2 learning focus and pedagogy focus for research and practice purposes. The purpose of DGBL in language learning is to use it as an instrument to provide and enhance learning opportunities (Reinhardt and Sykes 2012, 33). The L2 learning focus is on the specific game design creating affordances for particular L2 learner behaviours, and the L2 pedagogy focus is on the game-based environment and, especially, on how L2 pedagogical focus can be incorporated and/or complemented in that game-based environment (Reinhardt and Sykes 2012, 33). The key in game-based language learning environments is customizability as well as targeted instruction (Reinhardt and Sykes 2012, 42). This enables the advantage of creating appropriate content and language complexity according to the learners' skills and other factors that are relevant in learning (e.g. affective features).

By and large, digital game-based learning is beneficial for language learning according to a fairly recent scoping review of DGBL research by Hung et al. (2018). They discovered that in the majority of the studies they examined, the DGBL L2 learning provided positive outcomes in regard to learners affective or psychological states, and language acquisition (Hung, Yang, Hwang, Chu and Wang 2018). Also, Zou, Huang and Xie's (2019, 1–22) review of the effect of digital games in language learning and showed that digital games enhance both the receptive and productive language skills. Next, a few studies are presented that concern the effect of DGBLL on learners' receptive and productive skills.

Lee's (2019) qualitative study studied the effect of digital-game based learning on participants' writing skills. She used a digital game called *Her Story*, which is a murder mystery game that enabled learners to use target language creatively (Lee 2019, 241–243). There were 25 Korean university students taking part in this study (Lee 2019, 242–243). The data was collected through the students' creative writing papers, reflection papers and by conducting a pre-project and post-project survey (ibid.). According to the results of Lee's (2019) study, DGBL affected positively on students' creative writing skills, as well as student's motivation and engagement towards learning.

Similar findings were made in Lin et al.'s (2018) study. Lin et al. (2018) studied the effect of digital-game based approach on enhancing EFL student's business writing skills in English. Their study consisted of 68 participants from ages 18 to 22 (Lin et al. 2018, 122). The data was collected through student's essays, participation, reflections, and online learning behaviour (Lin

et al. 2018, 123). Also, pre- and post-test were assigned to examine the performance (ibid.). The results of their study showed that the DGBLL enhanced the student's writing performance (Lin et al. 2018, 126). In addition, they discovered that the experimental group had fewer writing errors as opposed to the control group (ibid.). In both of the studies mentioned (Lee (2019) and Lin et al. (2018)), the role of digital game was to do both: motivate and enhance learning performance.

As for DGBL in enhancing receptive skills, Sylvén and Sundqvist (2012) discovered that digital games facilitated reading and listening comprehension better than other approaches. They studied the effect of playing digital games on L2 proficiency. There were 86 Swedish participants in this study, aged 11-12 (Sylvén and Sundqvist 2012, 308). The data collection methods consisted of a questionnaire, a language diary, and three proficiency tests. Participants that played digital games frequently, spent more than 5 hours playing per week and this group outperformed the two other groups (those who played moderately and non-gamers) (Sylvén and Sundqvist 2012, 308–309). It was clear that the results of their test, the more the participants spent time playing the digital game, the more their reading and listening comprehension skills improved (Sylvén and Sundqvist (2012, 315). They suggested that the reason behind this lies in high frequency in target language exposure, which naturally leads to better learning outcomes (ibid.).

Ali Mohsen (2016) studied how a simulation game affected the learner's L2 listening comprehension. The study consisted of 43 Arab adult learners that were divided into two groups: experimental group and control group (Ali Mohsen 2016, 863). The test design consisted of treatment and comprehension and vocabulary recognition tests (Ali Mohsen 2016, 869). Ali Mohsen also discovered positive outcomes in terms of the experimental group outperforming the control group significantly (Ali Mohsen 2016, 863). He discovered that digital games induced greater motivation due to the game internal elements that encouraged decision-making and comparisons (ibid.).

Hwang et al. (2016) examined the effect of DGBL on both receptive and productive skills. Their study consisted of 40 students from a senior high school (Hwang et al. 2016, 639). They divided the participants into experimental group, which used a mobile system, and into a control group, which used traditional methods (ibid.). The test design was a pre-test-treatment-post-test, and they used this design to test the change in receptive as well as productive skills (ibid.). Hwang et al. (2016) discovered that digital game-based learning activities that contains a mobile system fosters learner's speaking skills (ibid.). However, the results on the listening post-test were insignificant in creating difference between the two groups (ibid.).

As it can be seen from the studies presented above, DGBL has been found to be effective in promoting both receptive and productive language skills. However, the results of Hwang et al.'s (2016) study show that in this particular study only the participants' speaking skills were improved by using the digital games but not their listening skills. It is good to keep in mind that playing the digital games for the sake of playing the games does not necessarily result in positive learning results. When the aim is to exploit digital games for enhancing the learning of a certain language aspect, the whole gaming situation (the digital game and its features, the context, the content etc.) should be considered and the pedagogical value of the game should be evaluated critically.

### **3.4 Vocabulary acquisition through digital games**

As already discussed, vocabulary acquisition is a central part of studying FL. For students, who encounter new target language words often, if not daily, the task can seem laborious and never-ending. Therefore, there is a need to find an effective approach to facilitate and enhance the word-learning process. Due to the game elements and the game design, DGBL in vocabulary acquisition is one noteworthy approach. Next, studies concerning vocabulary acquisition through DGBL are presented.

Rasti Behbahani and Shahbazi (2020) evaluated the effectiveness of digital game-based task on learner's receptive and productive vocabulary knowledge among other L2 learning related skills (e.g. recognition and recall). They recruited 124 Persian teenagers (age 11-13) lower-intermediate level students (Rasti Behbahani and Shahbazi 2020, 7). They divided the participants into two groups: experimental group, which played an adventure game and, control group, which practiced the same vocabulary as the experimental group by the help of fill-in-the-blank vocabulary task (Rasti Behbahani and Shahbazi 2020, 11–12). The test design was pre-test, treatment and delayed post-test (Rasti Behbahani and Shahbazi 2020, 9).

According to Rasti Behbahani and Shahbaz's (2020, 20) study, the group that acquired the productive-recognition of form-meaning more effectively was the experimental group. The learners in the control group acquired the receptive knowledge more effectively (Rasti Behbahani and Shahbaz 2020, 20). They speculated that the role of context was the main explanation for their positive results (ibid.). The context, as in most digital games, is a rich multimedia context that offers input in many forms and, thus has a supportive effect on knowledge acquisition (ibid.).

Continuing with recent studies, also Chen and Hsu (2020) examined the impact of playing digital games on vocabulary learning, as well as content learning. They measured the students receptive and productive knowledge of vocabulary through pre-test-treatment-post-test design

(Chen and Hsu 2020, 811). The participants in Chen and Hsu's (2020, 811) study were 66 college level EFL students. They discovered that the experimental group who played the historical game *Slave Trade* and had access to multiple online supplementary materials, made the most significant gains (Chen and Hsu 2020, 828). They suggested that the positive learning outcome was due to the gaming environment that offered rich contextual clues and repetitive exposure to the target language words (Chen and Hsu 2020, 830). They also emphasized the positive learning experience that the students reported through a questionnaire (ibid.).

Chen, Tseng and Hsiao (2018) conducted a meta-analysis that focused on the role of game design, participants age, and cognates instead of whether the effect on vocabulary acquisition was positive or not. In linguistics, cognate refers to a word pair that has the same etymological origin (Merriam-Webster, s.v. "Cognate" n.d.). The main aim of the meta-analysis was to discover the features in DGBL that create variation or difference in results. Their main discovery was that the effect of the game design was the superior explanatory factor on vocabulary learning when compared with age and cognate. Therefore, it can be suggested that the game design features create variation in vocabulary learning whereas learners' age or linguistic background does not. The game features that were the most significant moderators, according to their meta-analysis, were the relation between challenge and the learner's abilities, and the amount of adventure features in the game. They inspected effectiveness of the game design features by integrating Csikszentmihalyi's Flow Theory. Flow Theory is closely related to motivation, and it states that "sense of flow is equated to fun experience, and fun experience in task performance can be ideally realized by keeping a dynamic balance between individuals' ability and perceived task challenge." (Chen, Tseng and Hsiao 2018, 70). More on the adventure aspect in DGBL, Chen, Tseng and Hsiao (2018, 73) discovered that adventure-based games can be more interesting, motivating and stimulating since they require more critical thinking and problem solving. Furthermore, Chen, Tseng and Hsiao (2018, 74) conclude their analysis by stating that L2 vocabulary learning via DGBL is effective if the game is fun and consists of appropriate amount of challenge. This finding supports the view on challenge in DGBL as previously discussed in this section.

The following studies concern specifically the effect of DGBL through a game-based platform, which content can be and is modified by the teacher for the purpose of teaching and learning specific content related to a course or a lesson.

Sartini (2020, 41) studied the use of *Kahoot!* for teaching Maritime vocabulary to 21 Nautical Science Cadets in Sekolah Tinggi Maritim Yogyakarta. Sartini's (2020) mixed-methods study consisted of tests, observations, questionnaire, and documentation (Sartini 2020,

43–44). The treatment was done twice in a pre-action and post-action cycle (ibid.). The action here refers to Nautical Science Cadet training specific content. The results of the study showed that the Cadets' vocabulary mastery increased as well as the level of enthusiasm due to the interaction in the game and between learners, and interest towards playing the game (Sartini 2020, 49). Also, there were significant gains in Maritime English terminology (ibid.).

Vazirabad and Farrokhi (2020) investigated the effect of four different gamification methods to phrasal verb learning. Their study consisted of 174 Iranian students of English (Vazirabad and Farrokhi 2020, 28). The learners in the first group consisted of blended learning (supplementary guessing game materials and digital game play), in the second group the digital gaming apps were the main tutor, third group played the game autonomously at home and received no formal teaching, and the fourth group consisted of non-digital gamification. 174 intermediate level learners of English took part in their study (Vazirabad and Farrokhi 2020, 28–29). The study was mixed-method study that consisted of a questionnaire, game diary, and pre-test-treatment-post-test design (ibid.). The results of their study showed that in all four groups the participants improved their knowledge (Vazirabad and Farrokhi 2020, 33–34). Students in blended learning outperformed other groups (ibid.). Also, students playing *Phrasal Nerds*, which is a story-based digital game with avatars, outperformed the students using *Kahoot!* (ibid.).

Tan et al. (2019) conducted a study that examined the effect of game-based learning platform *Kahoot!* on the learners' perspective on motivation, and L2 learning in terms of vocabulary, reading comprehension, and grammar. Their study consisted of 57 Malaysian ESL students, and the participants were exposed to the game weekly during their semester (Tan et al. 2019, 62). The gaming sessions lasted less than 15 minutes and the *Kahoot!* sessions consisted of 8-14 items or questions (ibid.). Their mixed-methods study consisted of a comprehensive questionnaire and learning reports (ibid.). The finding of Tan et al.'s (2019) study suggest that the learners perceived *Kahoot!* to be beneficial to firstly, induce motivation and secondly, foster and reinforce learning (Tan et al. 2019, 65–66).

Müller et al.'s (2018) study focused on learning English idioms via an educational game. The students were surveyed for their perceptions of the game, and also tested for their English idiom knowledge before and after the treatment (Müller et al. 2018, 848). Their study consisted of 14 Iranian learners studying English (Müller et al. 2018, 853). Their English proficiency was at an upper intermediate level (ibid.). Their study also included 22 Japanese science and engineering students between the ages of 18 and 21 (ibid.). Their English proficiency level ranged from intermediate to upper intermediate (ibid.). The participants played the game 5



hours in total within the timeframe of their choosing (anything from 4 to 10 weeks) (Müller et al. 2018, 854–855). The methods used in their study consisted of a questionnaire and pre-and post-test that measured the idiom knowledge (ibid.). The results on learning new idioms were positive and the main factors affecting the learning was according to Müller et al. (2018) the effect of willingness to learn English (Müller et al. 2018, 859–861).

As for negative effect of gamifying learning content, Hadijah, Pratolo and Rondiyah (2020) and Müller et al. (2018) present an issue with the in-game pace and time limitation. In Müller et al.'s (2018) theory section, the pace of the digital game is mentioned as a downside in digital games, and in *Kahoot!* restricted answering time is one of the main features in the game. In Hadijah, Pratolo and Rondiyah's (2020, 87) study of the effect of *Kahoot!* on students' vocabulary learning, the research discovered the exact same downside to using this particular tool in teaching. Their qualitative study with five Indonesian senior high schoolers as participants, gathered data of using *Kahoot!* as a tool for vocabulary assessment (Hadijah, Pratolo and Rondiyah's 2020, 87). They investigated the student's views on using this game as the media of vocabulary test through an in-depth semi-structured interview (ibid.). They discovered that firstly, *Kahoot!* was found to be a practical tool for testing vocabulary, secondly, it attracted the student's attention and lastly, it activated the students in the classroom and made the student enthusiastic in doing the test (Hadijah, Pratolo and Rondiyah's 2020, 90). The game also improved learners' vocabulary mastery (ibid.). As a downside, the time to answer the questions was limited (ibid.). According to the participants, a partly reason for their failure or low scores, was due to the time limitation in the questions (Hadijah, Pratolo and Rondiyah's 2020, 100–101). Furthermore, Hadijah, Pratolo and Rondiyah (2020, 103) also discovered that the visibility of the scoreboard during gameplay and lack of knowledge of how the game works caused negative effects for testing. The ability to see everyone's score displayed on the leader board affected negatively on the learner's confidence, which then again affected their test results (Hadijah, Pratolo and Rondiyah 2020, 103).

Based on these studies on vocabulary acquisition in formal learning environment through playing digital games, it can be concluded that using digital games as a language learning tool can be beneficial in terms of learning results, boosting positive feelings, and arising interest towards the game and, thus learning.

## 4 Motivation and L2 Learning

In this section, the theoretical framework for L2 learning motivation and the motivational self-system is provided. Dörnyei's model of the L2 Motivational Self System (L2MSS) has dominated the field of motivation in L2 research at the beginning of the 21<sup>st</sup> century (Dörnyei, Henry and MacIntyre 2004, 367), and it is the main focus of this section. In this chapter, we first explain the Dörnyei's motivational self-system theory and then, we present relevant studies for our thesis. The aim is to connect digital game-based learning on students' learning motivation.

### 4.1 Motivation

In second language learning, motivation is one of the individual differences that has been found to affect L2 learning success significantly (Dörnyei 2005, 65). As already mentioned, the role of motivation in L2 learning is central in terms of success. According to Dörnyei (2005, 65) “[Motivation] provides the primary impetus to initiate L2 learning and later the driving force to sustain the long and often tedious learning process”. Dörnyei (2005, 65) also states that the other factors affecting the L2 learning process presuppose motivation, and that the existence of motivation towards L2 learning can make up for considerable deficiencies in for example, language aptitude.

According to Dörnyei (2005, 66), the field of motivation can be divided into three research areas: the social-psychological view, cognitive-situated view, and the process-oriented view. This thesis focuses only on the first view since it is the most relevant in terms of our study. Gardner and Lambert, who focused on the social-psychological aspect of motivation, presented the first fundamental theory of motivation in L2 learning (Dörnyei 2005, 67). Gardner and Lambert discovered that language is an inseparable part of culture and identity, which is why learning languages is different from any other school subject (Pietilä 2014, 50). It also explained why the previous theory on L2 learning had been insufficient (Dörnyei 2005, 68). After this observation, Gardner presented his Socio-Educational Model of SLA through which the importance of integrative motivation (as opposed to instrumental motivation) arose (Pietilä 2014, 50, and Gardner 1985, 11). Integrative motivation in L2 learning refers to learner's interest towards the target language and its culture whereas instrumental motivation focuses on achieving a specific goal through learning the TL (Pietilä 2014, 50). Integrativeness can be further described as “a genuine interest in learning the second language in order to come closer to the other language community.” (Gardner 2001, 5 as cited by Ortega 2009, 172). The discovery of the social aspect was ground-breaking in the field of L2 motivation since before Gardner, the view of motivation had been solely focused on the individual (Dörnyei 2005, 67).

According to Gardner (as cited by Ortega 2009, 168–170), motivation consists of three dimensions:

1. Motivational intensity
2. Attitudes toward learning the L2
3. Desire to learn

Learner's motivational intensity can be measured from the amount of effort one expends in learning an L2 (Ortega 2009, 169). Attitudes toward learning the L2 refer to the amount of enjoyment learner's encounter when learning the TL (Ortega 2009, 170). Lastly, desire to learn L2 refers to how much learners claim personal investment in succeeding in the L2, in other words: the willingness to learn (Ortega 2009, 170). The Attitude/Motivation Test Battery (AMTB) created by Gardner in 1985 is vastly known and used as the main data gathering instrument in most studies (Ortega 2009, 168). The test battery measures the motivation through these aforementioned dimensions (Ortega 2009, 169). The test is a seven-point Likert scale, and it consists of 10 questions regarding each of these dimensions to quantify motivation (Ortega 2009, 170). Even though AMTB has found to be useful and is largely adaptable in nature, it has received some criticism. For example, Dörnyei (2005, 71) states that the battery does not make a clear distinction between motivation and motivated behaviour. Also, Dörnyei's motivational self-system is based on the view of motivation as socio-psychological phenomenon, which is discussed in more detail in section 4.2. The L2MSS can be described as to present the modern view of motivation (Ortega 2009, 185, Roshandel, Ghonsooly and Ghanizadeh 2017, 330). This proposal combines the previous motivation models into one model that concerns language-specific motivation (Ortega 2009, 185).

#### **4.2 L2 motivational self-system**

This approach to motivation conceptualizes L2 learning motivation through the framework of "self", thus the L2MSS. As mentioned above, Dörnyei synthesized his model from previous motivation models. One of the most influential theory to Dörnyei's model was Higgins' (1987, 1996, as cited by Dörnyei 2005, 100–101) proposal of *ideal self* and *ought-to self* in his theory of self-discrepancy, which posits that people are motivated to reduce the discrepancy between the actual self and the ideal and ought-to self (Dörnyei 2005, 100). Ideal self refers to "the representation of the attributes that someone would ideally like to possess" that focuses on aspirations and hope (ibid.). Ought-to self refers to the beliefs of what one should possess (ibid.). Ought-to self focuses on obligations and responsibilities, which creates the main difference between the ideal and ought self.

Higgins' (as cited by Ortega 2009, 186) self-discrepancy theory has a regulatory focus that posits that human behaviour is self-regulated due to the need to balance a promotion and prevention focus, which creates the motivational distinction between the two (Ortega 2009, 186). On one hand, the promotion focus deals with ideal self and it concerns the aspirations and accomplishments through which we anticipate the gain or pleasure as a result of action (Dörnyei 2005, 101, Ortega 2009, 186). On the other hand, prevention focus concerns with the regulation of absence or presence of negative outcomes, so the anticipation of pain and shame as a result of the same action (ibid.).

The construct of Dörnyei's (2005, 105-106) L2MSS is a broad construct that consists of three dimensions:

1. *Ideal L2 Self* deals with the L2-specific view of a learner's ideal self. The Ideal L2 self can be considered as a powerful motivator in the process of learning an L2. The desire to reduce the discrepancy between the actual and the ideal self is a powerful motivator.
2. *Ought-to L2 Self* refers to the attributes that the learner believes she/he should possess to avoid probable negative outcomes.
3. *L2 Learning Experience* concerns "situations-specific motives related to the immediate learning environment and experience". The immediate learning environment and experiences are influenced by executive motives.

There are similarities to Higgins' conceptualization of the L2 selves. The distinctive difference lies in the third component, L2 learning experience, which represents the effect of the learning environment on the L2 learner. As in Higgins' model, the L2 learning motivation takes place in reducing the discrepancy between the two selves (Dörnyei 2005, 107). The focus in the ideal and ought-to L2 self is on the pre-actional deliberation, whereas the L2 learning experience is related to the association between the executive motives and the actional stage of motivated behaviour (ibid.). Ushioda (2014, 47) posits that the function of the L2 learning experience is to influence the learner-internal variables (motivation, performance, L2 development). L2 learning experiences can shape the ideal L2 self (ibid.). It is possible for motivational change to take place when the Ideal L2 Self is elaborated and the Ought-to L2 Self is internalized (Dörnyei 2005, 107). This refers to goal-orientation, more specifically visualizing L2-related goals (ibid.). Learner's attitudes towards learning the target language can

be improved by positive learning experiences and positive learning outcomes (Singleton 2014, 92–93).

As mentioned above, the construct of the L2MSS is a synthesis of previous studies on the field of L2 learning motivation. This construct takes into account three antecedents of motivation. In this context, antecedents refer to those variables that increase or decrease the motivational quantity (Ortega 2009, 170). These antecedents integral to L2MSS are level of integrativeness and instrumentality, and the amount of integrative motivation (Ortega 2009, 186–187). In this construct, integrativeness deals with self-reference, so the reconceptualization of ideal and ought-to self (ibid.). Integrativeness is the major antecedent of L2 motivation and is affected by the other two antecedents: instrumentality and attitudes towards L2 (Ortega 2009, 186). The highly motivated learner scores high in integrativeness and is also intrinsically and instrumentally motivated to learn the L2 (ibid.). The positive anticipations related to the ideal self is linked with L2 learning success and promotion focus (ibid.). When compared to ought-to self and the related anticipations, the L2 learning motivation is lower. The highly motivated learners that exhibit the pattern of scoring high in all above-mentioned antecedents have a well-developed ideal L2 self (Ortega 2009, 187). It must be borne in mind that the nature of motivation is dynamic, and the effect of time, context, and behaviour should also be considered when drawing conclusions.

There has been conducted a number of studies regarding the L2 motivational self-system. A recent study conducted by Yu Ka Wong (2020) suggests that the student's self-perceived proficiency has an effect on their L2 proficiency (Wong 2020, 1). In his study, Wong studied 121 sixth-grade Chinese language learners (ibid.). The participants did several proficiency tests which assessed the students' knowledge in listening, reading, and writing and, in addition to these proficiency tests, the participants rated their own language competence and responded to a L2MSS questionnaire (Wong 2020, 4). The results of Wong's study indicate that language proficiency and learning motivation have a positive relationship, "it was found that the students' self-perceived proficiency was substantially related to their performances, and the influence of performed proficiency on the L2 selves was mediated by self-perceived proficiency. The influence of self-perceived proficiency on the ideal self was substantial" (Wong 2020, 9).

Wong's (2020) study supports Moskovsky et al.'s (2016) study, which focused on the relationship between Saudi EFL learners' L2MSS and L2 achievement (Moskovsky et al. 2016, 641). Similarly to Wong's study, the participants (360) in Moskovsky et al.'s study also completed a proficiency test and a L2MSS questionnaire (Moskovsky et al. 2016, 646). The results of the study indicate that components of the L2MSS, especially high levels of the ought-

to self and ideal self, predicted the learners' intended learning efforts (Moskovsky et al. 2016, 649).

While Wong's (2020) and Moskovsky et al.'s (2016) studies highlighted the roles of ideal self and ought-to self, Takahashi and Im (2020) and Lamb (2012) have found positive learning experience to have a strongest impact on L2 proficiency and motivated learning behaviour. Takahashi and Im studied 545 Japanese university students of English to find out the effects of the L2MSS to learners' intended L2 learning effort and their L2 proficiency (Takahashi and Im 2020, 679). Their study consisted of a questionnaire and proficiency test scores. They found out that the ideal L2 self did not play a significant role as a predictive factor in L2 proficiency, whereas the roles of positive learning experience and enjoyment in L2 learning were crucial (Takahashi and Im 2020, 691). Similar findings have been found in Lamb's (2012) study. In his study, Lamb examined 527 Indonesian junior high school students' motivation to learn English in rural and urban settings (Lamb 2012, 997). The participants completed a 50-item vocabulary test and a proficiency test (ibid.). Lamb found out that positive L2 learning experience had the strongest effect on student's L2 proficiency and motivated learning behaviour (Lamb 2012, 997). Lamb highlights the role of teaching by summarising that:

Although these young Indonesians appear to believe strongly in the usefulness of English for their future (instrumentality), have an openness toward and interest in the world at large (international posture), and would like to see themselves as future users of English (Ideal L2 self), what makes them more likely to invest effort in learning is whether they feel positive about the process of learning. (Lamb 2012, 1014).

As mentioned above, several studies have examined the positive relationship of L2MSSS in second language learning, especially in relation to language learners' learning effort. However, there are also some contradictory results in this field of study. In the previously mentioned study by Moskovsky et al.'s (2016), there was a positive relationship between ideal self and ought-to self. However, in that same study Moskovsky et al. also found out that there was only a weak connection between the intended learning behaviour and the actual language proficiency (Moskovsky et al. 2016, 650). Surprisingly, their study indicated that the stronger the students rated their ideal self the, lower their proficiency level was (ibid.). Supporting these findings, Li and Zhang (2021, 1) also discovered a weak correlation between L2SMM and language proficiency. In their study, 198 Tibetan Chinese language learners completed a questionnaire, adapted from Moskovsky et al.'s (2016), and a language proficiency test (Li and

Zhang 2021, 4) The results of their study indicate that L2SMM strongly predicted the intended learning effort and ideal L2 self affects directly to language proficiency but ought-to L2 self and positive learning experience were negative predictors on L2 achievement (Li and Zhang 2021, 7).

### **4.3 Digital game-based learning and motivation**

The impact of using digital games in L2 learning on student's learning motivation is nowadays a popular field of study. Mohd. Elmagzoub Eltahir et al. (2021, 3251) studied the impact of game-based learning on 107 university student's engagement, motivation, and academic performance on an Arabic grammar course. In their study, the participants were divided into two groups; a control group, which used traditional learning methods, and an empiric group, in which the topic were learned through game-based language learning (Mohd. Elmagzoub Eltahir et al. 2021, 3257). The participants completed a questionnaire regarding their language skills, motivation, and engagement (ibid.). The results of their study indicate that game-based language learning had a positive impact on university students' engagement, motivation, and achievement, since the students in the empirical group showed higher levels of motivation and more improved knowledge in the target language (Mohd. Elmagzoub Eltahir et al. 2021, 3274).

The results of Mohd. Elmagzoub Eltahir et al.'s study (2021) are compatible with number of other studies conducted in the field, for instance, Kotob and Ibrahim (2019) and Sahrir and Alias (2011). Kotob and Ibrahim studied 11 Lebanese learners of Arabic in grade three classroom (Kotob and Ibrahim 2019, 191). The participants had been taught traditionally without gamification (ibid.). To study the use of digital games in educational settings, the participants received gamified activities as a part of teaching for 3 weeks (Kotob and Ibrahim 2019, 192). The study consisted of pre- and post-exams, and it included a motivational questionnaire (Kotob and Ibrahim 2019, 192). Sahrir and Alias (2011, 136) studied 133 Malaysian university learners of Arabic language. The participants in their study completed a descriptive quantitative and open-ended survey concerning the use of online games as language learning tools (ibid.). Both above-mentioned studies verified that the use of digital games in language learning improves students' engagement, motivation, and academic performance (Kotob and Ibrahim 2019, 195, Sahrir and Alias 2011, 136). However, according to Azzouz Boudadi and Gutiérrez-Colón's paper (2020, 66) it is true that gamification has a positive impact on students' engagement and motivation but there is only a little evidence of its benefits on learning outcomes and this is a subject that should be studied more.

Wichadee and Pattanapichet (2018) and Tan et al. (2019) have studied student's perceptions on the use of *Kahoot!* and its impact on learning performance and motivation. Tan

et al. (2019, 55) studied 57 Malaysian university learners of English who played *Kahoot!* weekly over a period of one semester and completed a questionnaire. According to the results of their study, participants considered *Kahoot!* to have a positive impact on their motivation and reinforcing and fostering their learning (Tan et al. 2019, 55). Wichadee and Pattanapichet (2018) found similar results. In their study, 2,645 university Students in Thailand were divided into two groups: the experimental group played *Kahoot!* as a part of teaching and the control group was taught without gamification (Wichadee and Pattanapichet 2018, 77). The study comprised of pre- tests, post-tests, and motivational questionnaires (ibid.). According to their results, students who were taught by using *Kahoot!* felt more motivated and obtained higher scores compared to a group, which did not play *Kahoot!* but was taught with conventional method (ibid.).

There are, however, some contradictory results on the effects of digital games in language acquisition. As already mentioned, Azzouz Boudadi and Gutiérrez-Colón (2020, 66) pointed out the need for more studies relating to learning outcomes and gamification. In addition, Hanus and Fox (2015) found some contradictory results as well. In their longitudinal study, 80 Midwestern university students were divided into two groups, in which the other group was taught more traditionally and the other with the help of gamification (Hanus and Fox 2015, 155). The participants took part in four surveys during a 16-week semester (ibid.). According to their results, students who attended gamified course were less motivated and scored lower scores compared to students in a non-gamified course.

This chapter has discussed the L2 motivational self-system theory by Dörnyei. This theory creates the baseline for our study's motivational aspect. This paper scrutinises especially the third dimension of the theory, the L2 learning experience, and how the use of digital game-based tasks affects this dimension. It is meaningful to study the L2 learning experience because it affects directly the ideal-self and, thus can have a profound effect on the learners' motivation. In addition, we presented some relevant studies concerning the relationship of the L2MSS theory and DGBL.

We have now covered the theoretical framework for our study. This covered three important factors in terms of our study: vocabulary acquisition, digital game-based learning, and motivation. We now move on to the empirical part of our thesis.



## 5 Methodology

The purpose of our study was to discover how DGBL affects upper secondary school students' vocabulary acquisition and learning motivation. In this study, we examined the effects of playing the educational games *Kahoot!* and *Gimkit!* in English language class. We studied especially how the games differ in their effectiveness in enhancing vocabulary acquisition through the effect of motivation. In addition, the L2MSS, especially the role of L2 learning experience, was analysed in this study. We were also interested to find out whether there was a positive correlation between high levels of motivation and vocabulary acquisition. Our research questions were:

1. How do educational games *Kahoot!* And *Gimkit!* differ in promoting upper secondary school students' vocabulary acquisition?
2. How do the students perceive the use of digital games as an L2 learning experience?
3. How do the students' vocabulary knowledge correlate with motivation?

Before conducting this study, we hypothesised that the participants would find *Gimkit!* more motivating than *Kahoot!* in L2 classroom, and that *Gimkit!* would also be more efficient in promoting the participants' vocabulary acquisition. This hypothesis derived from our own teaching experiences, where we noticed that the majority of the students were keen on playing *Gimkit!*. Based on previous research on this field, we had a hypothesis regarding our third research question. We hypothesised that there is a positive correlation between students' vocabulary knowledge and motivation. In this study, the vocabulary knowledge refers to participant's knowledge of a predetermined small set of TL words. In this section, we report the selection of participants, instruments, materials, and study design. In addition, we explain the data analysis in more detail.

### 5.1 Participants

The participants in our study were first year students in upper secondary school. We were able to find two cooperative English classes in upper secondary school in southern Finland. The students were between ages 15 and 16. It should be noted that the groups were selected for no specific qualities and, hence the groups were heterogeneous. This was beneficial for our study because we were able to better compare the groups. The language backgrounds of the participants varied even though they all attended a Finnish speaking school. It should be specified that none of the participants had English as their mother tongue. Also, there was a lot

of variation in the participants' language skills. English was a compulsory school subject for each student but their learning history was not asked in our study. The experimental group 1, which played *Gimkit!*, consisted of 23 students and the experimental group 2, which played *Kahoot!*, consisted of 26 students. Our study comprised of 49 participants in total. However, only 38 participants took part in the delayed post-test. The decrease in number of participants in the delayed post-test was due to the students' absences from school during the testing time. At the time the tests were being conducted, the absences were quite common because of the COVID-19 pandemic. Despite the small number of participants, we decided to take the delayed post-test as a part of our study. The gender of the participants was not relevant in this study and, therefore it was not asked in the questionnaire. The division of these two groups in our study did not depend on the participants' proficiency level. Both of the groups were heterogeneous and followed the school's class division.

A formal consent was requested from the cooperative school and the participants were given a chance not to participate in this study. The questionnaires were analysed anonymously. In order for us to guarantee participants' anonymity and to analyse the effect of the games in their vocabulary acquisition and motivation, the participants' answers were analysed by using code numbers instead of the participant's real names. The participants were informed that these tests did not affect their course grade and that their answers were confidential.

## **5.2 Test design and instruments**

The data was collected quantitatively and the study consisted of five parts: a pre-test, 2 treatments, a post-test and a delayed post-test. The participants were given 15 minutes to complete each test. Also, the treatments lasted 15 minutes.

In order for us to find out the participants' initial level of target vocabulary knowledge, the participants took a pre-test, which included a vocabulary test. The vocabulary test consisted of three different test items which are explained in more detail in chapter 5.2.1. This vocabulary test was also used in the post-test and in the delayed post-test. The words tested in the vocabulary test were part of the English course the participants were taking when the study was conducted and, hence learning the target words could be considered meaningful by the participants. In addition to the vocabulary test, this first test part also included a questionnaire about the L2 learning motivation.

The second and third part of the study consisted of two treatments. During each treatment the experimental group 1 played *Gimkit!* for fifteen minutes and the experimental group 2 played *Kahoot!* for the same amount of time. The first treatment took place on the following English lesson after the pre-test. The second treatment took place four days after of the first

treatment, on their next English lesson.

The fourth part of our study was a post-test, which was conducted on the following English lesson after the second treatment. The purpose of this test was to find out if the games affected the students' vocabulary acquisition. The test measured the possible differences caused by these two different digital games. This test consisted of the same vocabulary test as in the pre-test and it also included a questionnaire about motivation and digital game-based learning. (See Appendix 1).

The purpose of this study was also to find out how the games affected the participants' vocabulary acquisition in the long term. To examine the long-term effect of playing digital games on vocabulary acquisition, the participants took a delayed post-test. This test consisted of the same vocabulary test as in the pre- and post-test. Unlike in the pre- and post-test, the delayed post-test did not include a motivation questionnaire.

### **5.2.1 The vocabulary test**

The participants knowledge of the TL was measured through a vocabulary test that was designed according to Nation (1990 and 2001). The test was based on Nation's Levels tests (1990) due to his widely acknowledged research on the field. The test consisted of three vocabulary tasks, 25 items in total, which measured participants receptive and productive vocabulary knowledge. According to Nation, recognition items test the learner's ability to remember the meaning of a word when the word is seen or heard (Nation 1990, 79). As for recall items, they test the learner's ability to write or say the word when the learner sees some representation of its meaning (*ibid.*).

According to Nation, a good and reliable vocabulary test consists of test item types in which learners are required to use the TL knowledge and it is fairly easy to make and mark (Nation 2000, 560). In addition, Nation points out that a good vocabulary test has a good effect on learning (*ibid.*). It is worth noticing that according to Nation, a reliable vocabulary test consists of around 30 items (*ibid.*). Due to time restrictions and the limitations of this study, the vocabulary test used in this study consisted of 25 items only. The target words were chosen from the participants current English course unit materials. Before conducting the study, it was decided together with the teachers, which unit would be the most suitable for this study. The unit was selected due to its volume of new words, from which we elected 25 words randomly. The same words were tested in each vocabulary test. To view the tested words, see Appendix 1. The first test item type was a translation test. The participants were asked to translate an underlined word into Finnish. We chose a translation test type because, as stated by Nation



like us, they also based their motivation survey on Dörnyei's theory of L2MSS (see chapter 4.2). Taguchi, Magid and Papi's (2009) questionnaire design corresponded best to our research objectives. We used a four-point Likert scale questionnaire to collect the data of L2MSS. The Likert scale answer options were 1 strongly disagree, 2 disagree, 3 agree, 4 strongly agree. Due to the time limitations of the test, we opted for four-point scale instead of seven-point scale because it is easier and quicker to complete from the students' perspective. We adjusted the survey of Taguchi, Magid and Papi's (2009) to better match the purpose of our study. Since we were interested in the learners L2MSS, we altered the questions to match the Finnish upper secondary school student's age and learning environments (See Appendix 2). We were especially interested in how these two digital games affected the L2 learning experience and, therefore the post-treatment questionnaire was altered to correspond the game quality features and other statements related to the situation. The statements were translated into Finnish, and we opted out the questions that were not relevant in our study. (See Appendix 3).

The statements examined the participants ideal L2 self, ought-to L2 self and L2 learning experience. The pre-treatment motivation questionnaire consisted in total of 13 items. The statements about ideal L2-self and ought-to L2-self were same in both pre-test and post-test. However, the statements concerning the L2 learning experience were altered in the post-treatment questionnaire to better examine the effect of digital games played during treatments on the participant's motivation. The post-treatment questionnaire consisted of 17 items. The altered statements examined the effect of the in-game features on gaming experience and motivation. The altered statements were modified according to the game specific features and, therefore the participants in the experimental group 1 answered questions about *Gimkit!* and the experimental group 2 answered questions related to *Kahoot!*. Examples of statements related to ideal L2 self, ought-to L2 self and L2 learning experience are given below.

***Choose an alternative that best depicts your perception.***

***(Ideal L2-self) In the future...***

*I can imagine myself living abroad and having a conversation in English.*

*1 Strongly disagree, 2 Disagree, 3 Agree, 4 Strongly agree*

***(Ought-to L2-self) At the moment...***

*I learn English because my close friends think that it is important*

*1 Strongly disagree, 2 Disagree, 3 Agree, 4 Strongly agree*

### ***(L2 learning experience) In English classes...***

*I feel confident using English in front my classmates*

*1 Strongly disagree, 2 Disagree, 3 Agree, 4 Strongly agree*

#### **5.2.3 The games**

The digital games chosen for this study were *Gimkit!*'s game mode *Trust No One*, and *Kahoot!*, which was played in the *Classic 1v1* (Player vs Player) game mode. Both games are played online and with learner's digital devices, thus laptop or mobile phone. Even though there are a lot of similarities between the games, we are mainly interested in the effect of their differences.

##### **5.2.3.1 *Gimkit!***

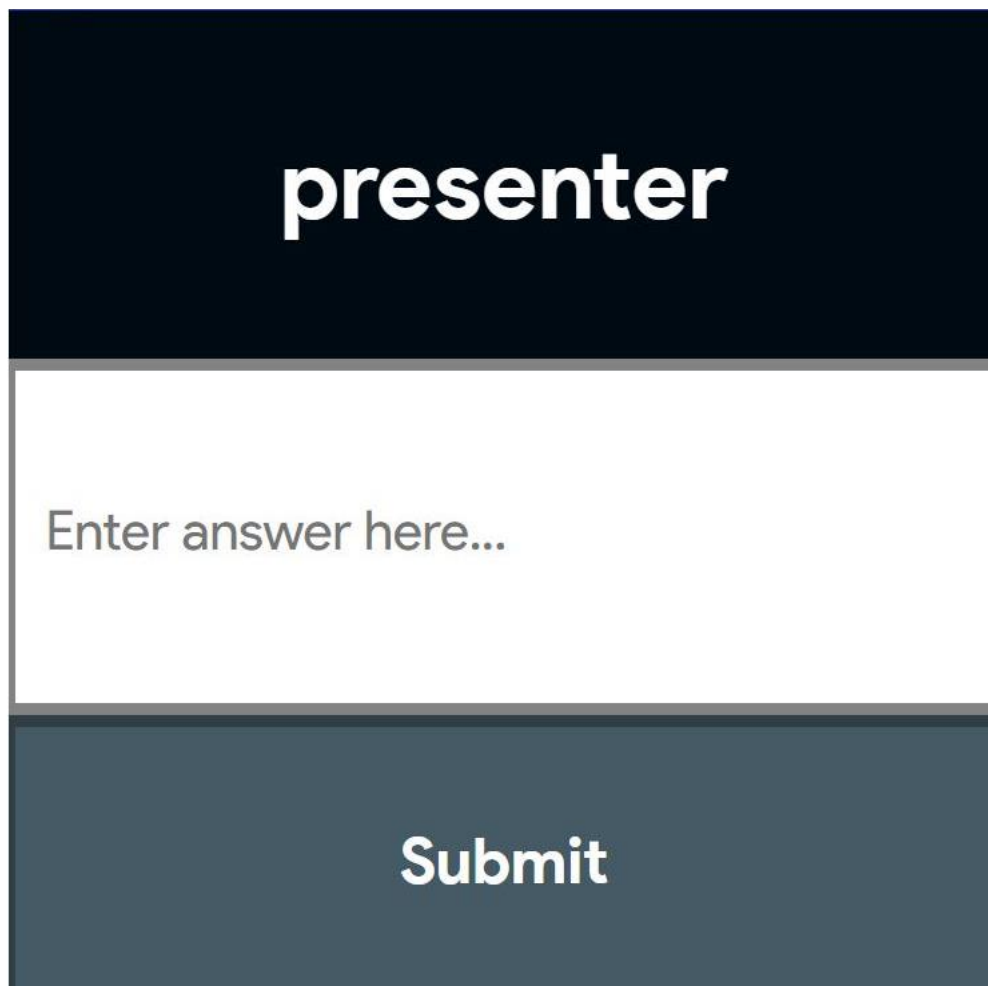
*Gimkit!*'s *Trust No One* game mode is very similar to a game called *Among Us*, which functions in many different digital platforms. *Among Us*, created by InnerSloth, has awoken a lot of interest from 2020 onwards and has been the most popular game in terms of monthly players (Nielsen 2021). Not only is the game mode *Trust No One* a copy of *Among Us*, but also contains interesting game internal elements that can positively affect the learning experience. From this point onwards, *Trust No One* game mode is referred to as *Gimkit!* for clarity.

*Gimkit!* is a group game, which means that the players play with and not against each other. The game setup takes place on a spaceship where the players are crewmates. However, a few of the players are secretly imposters. Thus, the crewmates are playing with each other to reveal the imposters by completing tasks designed by the teacher, and the imposters are trying to stay hidden by doing the same tasks. The number of imposters in the game can be selected before starting the game. In our game, we had 2-3 imposters. There are two goals in the game; the crewmates goal is to play together and figure out who the imposter is, and the imposters goal is to stay hidden as long as possible. The crewmates only have a limited number of tries to reveal the imposters. Thus, the longer the imposters can stay hidden, the better chances they have at winning the game.

Points are collected by completing tasks. In *Gimkit!* we used three different task types to test the target vocabulary. We used a translation task where the players were asked to write a translation in English or Finnish (See Figure 2). The second task type was a true or false question. In the third question type the players were to choose the right synonym for the target word from the given alternatives. The points gained from correct answers could be used for multiple purposes that lead to receiving either hints about the location of the imposter or other options that give the crewmates opportunities to discuss their findings and suspicions in the

classroom. Impostors collect points to stay hidden by giving false information on the crewmates' inspections.

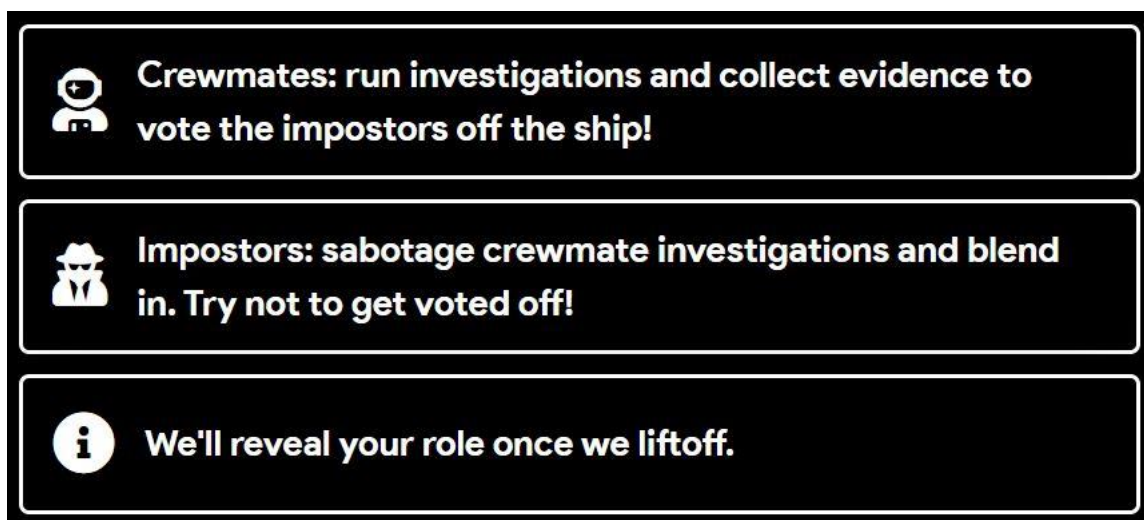
**Figure 2** Player view of the translation task in *Gimkit!*



The game internal elements are presented in section 2.3.1 and the games used in our study should be scrutinized by using these previously mentioned elements to see their potential as language learning tools. As mentioned in the theory section, the game internal elements have an effect on motivation, which is the second viewpoint in our study. Internal game elements in *Gimkit!* that are noteworthy in terms of our study are interaction, narrative elements, game mechanics and feedback. Interaction is an important part in language learning. However, in L2 learning there are many aspects that affect the interaction situation positively or negatively. In *Gimkit!* the players needed to interact with the game and with each other in order to reach the goal. The interaction would be driven by a need to succeed in the game. In order to succeed in the game, the players need to communicate with each other to receive the wanted outcome. One of the purposes of choosing *Gimkit!* was indeed interaction. This creates a situation for the learners to practice their language skills and creating an environment for situated learning.

The narrative game elements in *Gimkit!* are scarce but noteworthy when comparing to *Kahoot!*. Next, we present the game internal elements of *Gimkit!*. As already mentioned, the players are given a role when the game starts, either a crewmate or an imposter. This, again, can be fruitful in language learning environment to give the possibility to play or act as someone else. Also, there is a story, which creates a purpose for solving the vocabulary tasks but the storyline is presented only once when the players “enter the spaceship”.

**Figure 3** The main instructions of *Gimkit!*



Game mechanics, then, regulate the level of challenge in the game. We created the vocabulary questions that would appear in the game and selected the question types. The game itself rotated the questions randomly. When the learner answered a question correctly the game would give them feedback on the correct answer and give the player a point. However, if the answer was incorrect, the game would show them the correct answer and present them with another try after a few questions. We also altered the question types for the second treatment. Thus, we regulated the level of challenge in the game by choosing the vocabulary items and how they were presented in the game and what was required from the learner to receive a point.

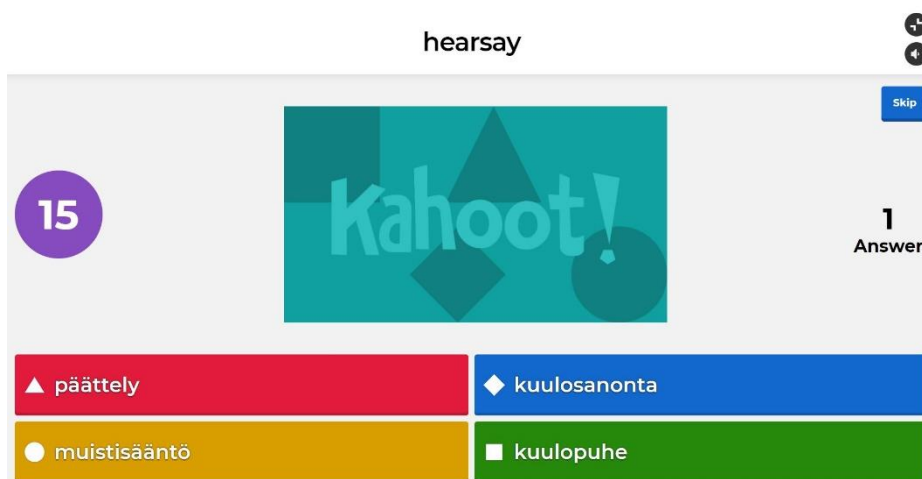
Players receive feedback through interaction with their crewmates and after completing the tasks. The players play with each other and are likely to receive constant feedback from their teammates of their behaviour. Feedback is also closely related to assessment, which then shows when answering the questions and proceeding in the game. As said, the game rotates the inserted questions and creates multiple opportunities for learning the target vocabulary and to modify their behaviour accordingly. The players receive immediate response whether their answer was correct or incorrect.



### 5.2.3.2 Kahoot!

Similarly to *Gimkit!*, *Kahoot!* is also an online game-based learning platform and widely used in all school subjects. As well as *Gimkit!*, *Kahoot!* is suited for players of all ages and competence levels since the contents of the game can be edited and modified by the teacher. The game mode used in both of our treatment sessions was 1v1, thus the participants played against their classmates. The goal is to answer the multiple-choice and true or false questions correctly and faster than any other classmate. This also works as the main challenge of the game. The learners are given a short amount of time to read the question from the shared screen and when the time is up the answering options are revealed on the learner's own digital devices. An example of the question type is presented below in Figure 4. After each question, the score board, which has information of which players are in the lead and who has a strike in correct answers, is shown on the screen. In the learner's own devices, they can see their own placement in comparison to their classmates.

**Figure 4** View of the task type in *Kahoot!*



In comparison to *Gimkit!*, *Kahoot!* is more clearly designed for educational purposes. It does not have a narrative element, nor does it require or encourage interaction between players. The main purpose is to answer the questions correctly and as fast as you can to outperform the other players. Even though, it is clear for both groups that the games are played for educational purposes, *Kahoot!* is not as game-like as *Gimkit!* is. However, feedback-wise *Kahoot!* provides feedback of the choices the learners make. The correct answers are presented once each player has answered the question or once the time is up. The learner sees whether their answer was correct on their own device and the question specific division of answers per choices is shown on the screen for everyone to see.

Lastly, the role of competition differs between the games. In *Kahoot!* the motivational

aspect is mostly based on competition, showing the scoreboard and the speed in the game. Hakulinen, Auvinen and Korhonen's (2013) study found increased competition in gamification to have a negative outcome on learning. In their study, speed became the main target rather than being correct. In *Kahoot!* the situation can be very similar. When the question is shown on the screen, the learner might already make a decision to aim for speed because they are not confident in that they know the correct answer.

### **5.3 Analysis of the vocabulary tests**

Our data consisted of the measures of the effect of digital game-based tasks on vocabulary acquisition. The data was analysed quantitatively by using computer program IBM SPSS version 25. In order to choose the appropriate statistical test between parametric and non-parametric tests, we needed to discover whether our data was normally distributed or not. As Larson-Hall (2010, 62) points out, parametric tests hold the assumption that the sampled data is normally distributed. If the data is not normally distributed, non-parametric statistics are used instead because they do not require the data to be normally distributed (Larson-Hall 2010, 373). To test the possible normal distribution, we opted for Shapiro-Wilk test because it is the most effective test for small sample sizes (under 50) (Larson-Hall 2010, 84).

Our vocabulary test had a longitudinal design: pre-test, post-test, and delayed post-test. Larson-Hall (2010, 323) also points out that research designs, which utilise repeated measures, are beneficial in the field of SLA, where sample sizes are generally small since they enhance the statistical power of a test. This is especially desirable for our study since our sample size was under 50. However, according to the above-mentioned Shapiro-Wilk test, our data was not clearly normally distributed (see Table 4 in section 6.2). This is why we opted for the non-parametric version of repeated-measures ANOVA test, which is the Friedman test.

To discover where the difference lay, we also used the Wilcoxon Signed-Rank test. This choice is supported by Larson-Hall (2010, 384), who states that if a statistical difference has been found with Friedman test the exact place of difference is still uncertain. For this reason, it was necessary to analyse only two levels at a time with the Wilcoxon Signed-Rank test (*ibid.*). In our study this means that we analysed the sampled data in pairs: pair 1: pre-test and post-test, pair 2: pre-test and delayed-post-test.

### **5.4 Analysis of motivation questionnaires**

The data of our motivational self-system questionnaires was also analysed quantitatively utilising the same version of SPSS as in the analysis of our vocabulary tests. In order to have the answers in a suitable form for SPSS, we gave the answer options corresponding values.

Since our questionnaire contained both positive negative statements, they needed to be coded differently. The positive statements were coded as in the questionnaire, on a scale of 1 to 4: value 1 corresponding to “strongly disagree”, 2 “disagree”, 3 “agree”, 4 “strongly agree”. However, the coding in the negative statements needed to be reversed. In other words, 1 was coded as 4, and 2 coded as 3, 3 was coded 2 and 4 was coded as 1. In the pre-treatment questionnaire, there were in total 3 negative statements; 6, 8, 10. The post-treatment test also contained 3 negative statements; 7, 9 and 15. (See Appendix 3).

To get an overview of the collected data, we looked at the descriptive statistics in SPSS. Since the motivation questionnaires were divided into three different sections, ideal L2 self, ought-to L2 self and the L2 learning experience, we calculated the mean values of each section in order to analyse the data efficiently. We calculated the mean value of each participant’s score and also, the mean values of each section. This way we were able to scrutinize the effect of the games on the students’ learning experience and whether the game qualities had enhanced their learning motivation.

After this we examined the participants L2 learning experience after the treatments. We run a Shapiro-Wilk test of normality to be able to choose the right t-test. Since the data followed normal distribution, we opted for independent samples t-test because we wanted to see and compare the mean score of two experimental groups (Larson-Hall 2016, 242). We also did a Pearson’s correlation test on the L learning experience statements to inspect, which statement correlated with each other.

### **5.5 Correlation analysis of the vocabulary acquisition and second language motivational self-system**

To see whether there was a correlation between student’s vocabulary acquisition and motivation, we run a correlation test on SPSS. In order to choose the right correlation test, we needed to find out whether the data was normally distributed or not. Since our sample size was small, we chose the Shapiro-Wilk test of normality for both vocabulary tests and post-treatment motivation questionnaire data. According to Larson-Hall (2016, 208) a non-parametric correlation test is either Spearman’s correlation test or Kendall's Tau-b correlation test. The decision between these two tests is done by evaluating the monotonicity of the data (ibid.). Spearman’s correlation analysis assumes that the variables have a monotonic relationship and the Kendall's Tau-b has more lenience towards the monotonicity (ibid.). The monotonic relationship was calculated by looking at the following variables: post-treatment motivation mean values and the post-test results, and post-treatment motivation mean values and the delayed-post-test results. The monotonic relationship was small, and therefore we opted for the

Kendall's Tau-b correlation test.

For the Kendall's tau-b correlation analysis we combined the data from our pre-, post- and delayed post-test and the data from our pre-treatments and post-treatment questionnaires. After the selection, SPSS generated a single table showing the correlation according to Kendall's tau-b procedure. We received a correlation matrix that showed detailed information about the correlation between our 10 variables. Kendall's tau-b correlation calculates the significance value ( $\tau_b$ ) of each variable. (Laerd Statistics n.d.a).

## 6 Results

In this chapter, we analyse the data through our three research questions. We start with research question 1, after which we move on to questions 2 and 3. Tables are presented to visualize our study results.

### 6.1 Educational games and vocabulary acquisition

To answer our first research question “How do educational games *Kahoot!* and *Gimkit!* differ in promoting upper secondary school students’ vocabulary acquisition?”, we needed to analyse the results of the vocabulary tests. First, we take a look at the data as a whole, after which we analyse the groups separately and compare the values of the vocabulary tests.

We used SPSS descriptive statistics to get an overview of the data of each three test. We were especially interested in the mean values of the tests to see whether the vocabulary acquisition had improved after the treatments. The mean value of the pre-test was 19.8 out of 31. In the post-test, the mean was 26.9 and in the delayed post-test it was slightly higher: 27.3. This descriptive statistic indicates that the participants’ knowledge of the target vocabulary had increased after the treatments. We present more detailed results of the increase in vocabulary knowledge later in this section but, at this point, it can already be noted that there is an increase in the participant’s target vocabulary knowledge.

We were also interested in the dispersion of the data and, thus we explored the standard deviation of the tests. Standard deviation (SD) tells the amount of how much each observation varies from the mean score (Larsson-Hall 2010, 66). The highest standard deviation was found in the pre-test, which then indicates that, in the pre-test, the results were more widely dispersed from the mean. The post-test and the delayed post-test had lower standard deviations and, hence, in those tests, the results were more tightly clustered around the mean.

As for the differences between the two groups, Table 3 presents the descriptive statistics of the groups’ performance in the vocabulary tests. The table includes the means and standard deviations, which show how the groups differed in their vocabulary acquisition. It also shows the minimum and maximum scores and the dispersion of the data.

**Table 3** Descriptive statistics of the pre-, post-, and delayed post-test

Group		N	Minimum	Maximum	Mean	Std. Deviation
Experimental group 1	Pre_test	23	5	31	20,1	7,2
	Post_test	23	6	35	26,4	7,4

	Delayed_Post_Test	19	13	33	27,3	6,3
	Valid N (listwise)	19				
Experimental group 2	Pre_test	26	6	30	19,5	5,9
	Post_test	26	18	33	27,4	4,5
	Delayed_Post_Test	19	15	33	27,4	4,5
	Valid N (listwise)	19				

As Table 3 presents, the experimental group 1's performance in the pre-test was slightly better (mean = 20,1) than experimental group 2's (mean = 19.5). Because the difference between the mean values in the pre-test was so low, it can be stated that the groups' initial knowledge of the TL vocabulary items was at the same level. However, the SD in the pre-test is higher (SD = 7.2) in the experimental group 1 when compared to the experimental group 2 (SD = 5.9). This shows that there is more dispersion in the vocabulary knowledge in the experimental group 1.

After the treatments, the vocabulary acquisition in both of the groups had enhanced almost equally. The mean in the experimental group 1 was 26.4 and in the experimental group 2 it was 27.4. It can be noticed that even though the experimental group 2 had slightly lower score in the pre-test, it outperformed the experimental group 1 in the post-test. However, there was no significant difference between the groups. As for the delayed post-test, the means were almost the same.

Even though this descriptive statistics tells that there is a clear improvement in the vocabulary acquisition after the treatments, it does not provide us answers on exactly how the digital games, *Gimkit!* and *Kahoot!*, differ in promoting the vocabulary acquisition. Therefore, we need to analyse the data in more detail with SPSS.

## 6.2 Educational games promoting vocabulary acquisition

After discovering that both of the groups' performance had improved after the treatments, we wanted to find out if *Gimkit!* and *Kahoot!* differed in promoting vocabulary acquisition. To do this, we analysed the data in SPSS. In this section, we present the results of our analysis and discuss the effects of the two digital games.

In order to choose the accurate statistical analysis method and see the differences between the games, we needed to know if our data was normally distributed. To do this we ran a test for normality in SPSS. The Table 4 shows the results of the Shapiro-Wilk normality test.

**Table 4** The results of the Shapiro-Wilk normality test

	Group	Shapiro-Wilk		
		Statistic	df	Sig.
Pre_test	Experimental group 1	,946	19	,342
	Experimental group 2	,964	19	,655
Post_test	Experimental group 1	,901	19	,050
	Experimental group 2	,917	19	,100
Delayed_Post_Test	Experimental group 1	,820	19	,002
	Experimental group 2	,902	19	,054

The results of the Shapiro- Wilk test, presented in the Table 4, indicate whether the data was normally distributed or not. If the  $p$ -value is less than .05 the data is not normally distributed (Larson-Hall 2010, 84). If, on the other hand, the  $p$ -value is greater than .05, the data follows a normal distribution (ibid). As can be seen from the Table 4, the pre-test clearly followed normal distribution since the  $p$ -values in both groups were clearly greater than .05 (experimental group 1  $p = .342$ , experimental group 2  $p = .655$ ). However, the post-test was not as clear as the pre-test. The  $p$ -value was greater than .05 in the experimental group 2 ( $p = .100$ ) but when it comes to the experimental group 1, the  $p$ -value was exactly .05. This did not exclude the possibility of the data to be normally distributed, but it did not make it clearly normally distributed either. Hence, in the case of the pre-test and the post-test, we decided that we opt for non-parametric test to get more reliable results.

Since the  $p$ -values in each three tests were not all clearly greater than .05 it can be stated that the sampled data was not normally distributed. Because the data did not follow normal distribution the appropriate statistical test for testing the participants' vocabulary acquisition was the non-parametric Friedman test. Next, we discuss the results of the Friedman test.

**Table 5** Results from the Friedman test

Experimental group 1	N	19
	Chi-Square	30,658
	df	2
	Asymp. Sig.	,000
Experimental group 2	N	19
	Chi-Square	22,750
	df	2
	Asymp. Sig.	,000

#### a. Friedman Test

The Friedman test was applied to discover differences between the two experimental groups. Table 5 shows the results of the non-parametric Friedman test of differences among repeated measures. The chi-square value ( $\chi^2(2)$ ), presented in the table above, shows whether a statistically significant difference can be found. By looking at the values, it can be said that there is a significant difference to be found in both groups' performance. The Chi-square value for experimental group 1 is  $\chi^2(2) = 30.658, p = 0.000$ . As for the experimental group 2, the values are as follows:  $\chi^2(2) = 22.750, p = .000$ . These findings support the findings of the studies by Behbahani and Shahbazi (2020), Chen and Hsu (2020), and Sartini (2020) who discovered that the vocabulary acquisition of their participants had improved after playing digital games as a part of formal language learning. It can be inferred that the digital games used in our study have had an influence on the experimental groups' performance. However, based on these results the causality and the relationship between the variables cannot be confirmed. In order to indicate where the differences lie between these groups, we run a post hoc test: Wilcoxon signed-rank test. The results of the post hoc test are presented next.

#### 6.2.1 Differences in students' performance before and after playing the digital games

Table 6 illustrates the ranks table of the Wilcoxon signed-rank test. To see whether there was a statistical difference in the groups, we ran a separate Wilcoxon signed-rank test by using different combinations of the groups, pre-test to post-test, pre-test to delayed post-test, and post-test to delayed post-test. Since we are making more than one comparison, we needed to use a Bonferroni adjustment (Laerd Statistics n.d.b.). The Bonferroni adjustment is calculated by taking our initial significance level ( $p \leq 0.05$ ) and dividing it by the number of tests. Thus, our new  $p$  value is  $0.05/3 \leq 0.017$ . By looking at the results of Wilcoxon signed-rank test, we noticed that there was a significant difference between pre-test and post-test (experimental group 1  $Z = -3.733, p = .000$ , experimental group 2  $Z = -4.110, p = .000$ ), as well as between pre-test and delayed post-test (experimental group 1  $Z = -3.828, p = 0.000$ , experimental group 2  $Z = -3.428, p = .001$ ). There were no significant differences between post-test and delayed post-test because  $p$  value was greater than .017. This indicated that the participants were able to maintain the achieved level of the target vocabulary knowledge. Thus, it can be concluded that vocabulary acquisition was indeed enhanced by playing *Gimkit!* and *Kahoot!* and playing these games had long-term effects on vocabulary knowledge. Therefore, it can be stated that both games promoted vocabulary acquisition among upper secondary school students. When looking at the differences in the pre-test and post-test, the results for experimental group 2's scores were



higher (24) than experimental group 1's (21), but the significant values remained the same ( $p = 0.000$ ) for both groups.

**Table 6** Results of the Wilcoxon signed-rank test

Group		Post_test - Pre test	Delayed_Post _Test - Pre test	Delayed_Post _Test - Post test
Experimental group 1	Z	-3,733 <sup>b</sup>	-3,828 <sup>b</sup>	-1,231 <sup>c</sup>
	Asymp. Sig. (2-tailed)	,000	,000	,218
Experimental group 2	Z	-4,110 <sup>b</sup>	-3,428 <sup>b</sup>	-,858 <sup>c</sup>
	Asymp. Sig. (2-tailed)	,000	,001	,391

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

c. Based on positive ranks.

To see how the groups differ, we need to take a look at the ranks table of the Wilcoxon signed-ranks test. The data shows the comparison between the two experimental groups' before and after scores. When looking at the ranks in the pre- and post-test in both groups, in total 45 participants out of 49 had a higher score after the two treatment sessions. In other words, most participants in our study benefitted from playing the two digital games and expanded their vocabulary knowledge. The vocabulary knowledge of only three participants was not improved by playing the digital games. There was one participant's whose scores remained the same after the treatments. Table 7 presents the comparison between the tests.

**Table 7** The ranks that show comparisons of pre-tests, post-tests and delayed post-tests scores

Group		N	Mean Rank	Sum of Ranks	
Experimental group 1	Post_test - Pre_test	Negative Ranks	2 <sup>a</sup>	7,8	15,5
		Positive Ranks	21 <sup>b</sup>	12,4	260,5
		Ties	0 <sup>c</sup>		
		Total	23		
	Delayed_Post_Test - Pre_test	Negative Ranks	0 <sup>d</sup>	,0	,0
		Positive Ranks	19 <sup>e</sup>	10,0	190,0
		Ties	0 <sup>f</sup>		
		Total	19		
	Delayed_Post_Test - Post_test	Negative Ranks	11 <sup>g</sup>	8,3	91,5
		Positive Ranks	5 <sup>h</sup>	8,9	44,5
		Ties	3 <sup>i</sup>		
		Total	19		

Experimental group 2	Post_test - Pre_test	Negative Ranks	1 <sup>a</sup>	10,0	10,0
		Positive Ranks	24 <sup>b</sup>	13,1	315,0
		Ties	1 <sup>c</sup>		
		Total	26		
	Delayed_Post_Test - Pre_test	Negative Ranks	1 <sup>d</sup>	10,0	10,0
		Positive Ranks	18 <sup>e</sup>	10,0	180,0
		Ties	0 <sup>f</sup>		
		Total	19		
	Delayed_Post_Test - Post_test	Negative Ranks	9 <sup>g</sup>	9,4	84,5
		Positive Ranks	7 <sup>h</sup>	7,4	51,5
		Ties	3 <sup>i</sup>		
		Total	19		

- a. Post\_test < Pre\_test
- b. Post\_test > Pre\_test
- c. Post\_test = Pre\_test
- d. Delayed\_Post\_Test < Pre\_test
- e. Delayed\_Post\_Test > Pre\_test
- f. Delayed\_Post\_Test = Pre\_test
- g. Delayed\_Post\_Test < Post\_test
- h. Delayed\_Post\_Test > Post\_test
- i. Delayed\_Post\_Test = Post\_test

When it comes to the test statistics between the pre-test and delayed post-test, it can be stated that there is a statistical difference in the tests (experimental group 1  $p = .000$ , experimental group 2  $p = .001$ ). As can be seen from the ranks in Table 7, in the experimental group 1 every participant received higher score in the delayed post-test than in the pre-test. In experimental group 2, only one participant scored lower in the delayed post-test than in the pre-test. These results indicate that both digital games have positive long-term effects on vocabulary acquisition. The participants were able to maintain the vocabulary knowledge they had acquired after the treatments. This result supports the use of digital games in L2 learning. However, it should be borne in mind that this study did not include a control group. Hence, these results do not indicate whether non-gamified teaching methods would result in even higher performance. We discuss this later in this paper. The ranks between post-test and delayed post-test are not examined because, as already mentioned, the results are not statistically significant (experimental group 1  $p = .218$ , experimental group 2  $p = .391$ ).

To answer our first research question, how do the digital games differ in promoting vocabulary acquisition, it can be stated that both of the games had a positive impact on the

participant’s vocabulary knowledge. The vocabulary knowledge in both groups had increased significantly after playing the digital games. However, the games did not differ significantly in promoting the TL vocabulary acquisition.

### 6.3 How educational games *Kahoot!* and *Gimkit!* differed in promoting upper secondary school student’s motivation

Our second research question was “How do the students perceive the use of digital games as an L2 learning experience?”. Before conducting the study, we hypothesised that *Gimkit!* would have a more profound effect on motivation than *Kahoot!*. In the following sections, we examine the participants’ L2MSS with the results of the two motivation questionnaires. We start by presenting the descriptive statistics of the motivation questionnaires and later, we scrutinise the third dimension of the L2MSS: the L2 learning experience.

#### 6.3.1 The results of the motivation questionnaires

To get an overview of the results of the two motivation questionnaires, the descriptive statistics are inspected. The descriptive statistics in Table 8 presents the mean values of the two tests. It can be seen from the results that the motivation level was already high in both of the groups before playing the games and there is no significant rise in the values after the treatments. Experimental group 1’s mean value was 3 before and after the treatments. As for the experimental group 2, the mean value before the treatments was 3 and there was a minor fall to 2.9. However, this change is not statistically significant and, hence it does not give information on the effect of playing *Kahoot!* on motivation. At this point, we can only state that all the participants were in general motivated to learn English before and after the treatments. These results are not aligned with our hypothesis that *Gimkit!* would have a more profound effect on motivation than *Kahoot!*. We analyse the effects of the game qualities on participants motivation in more detail later in this section.

**Table 8** Descriptive statistics of the motivation questionnaires

Group		Motivation_P re_mean	Motivation_P ost_Mean
Experimental group 1	N	Valid	23
		Missing	0
		Mean	2,9
		Median	2,9
		Std. Deviation	,3
		Minimum	2,3
		Maximum	3,6

Experimental group 2	N	Valid	26	26
		Missing	0	0
	Mean		3,0	2,9
	Median		3,1	2,9
	Std. Deviation		,3	,3
	Minimum		2,3	1,7
	Maximum		3,5	3,3

We were also interested to analyse the dispersion of our data and to do this we needed to compare the standard deviations in both groups. As can be seen from the Table 8, there are no significant differences in the standard deviation values. In order words, both experimental groups were quite unanimous.

The minimum and maximum values in both groups show a possible difference in the dispersion of the data. The values were pretty much the same before the treatments but after the treatments they was a minor difference. The experimental group 1 had after the treatments minimum value 2.5 while the other group had 1.7. As for the post-treatments' maximum values, the experimental group 1 had 3.8 and the other group had 3.3. However, the difference is not statistically significant and, hence it does not provide us any information on how the games differ in promoting motivation. Next, we focus on the L2 learning experience and the participants' perceptions on the use of digital games in L2 classroom.

### 6.3.2 Inspection of the L2 learning experience among the students

As to answer our second research question “how do the students perceive the use of digital games as an L2 learning experience”, we examined the L2 learning experience section of our motivation data collected via post-treatment questionnaire. In order to properly analyse the data, we tested the internal consistency of the scale by using Cronbach's  $\alpha$  (Laerd Statistics n.d.c). The results of the test show a high level of internal consistency (0.809, with the reliability coefficient of 0.7 or above). This means that our data is reliable.

Before selecting a statistical method, the normal distribution of the data needed to be analysed. The data in the motivation questionnaire's L2 learning experience section followed a normal distribution,  $p$ -value in each question was .000. Therefore, according to Larson-Hall (2016, 242), the optimal statistical method was independent samples t-test due to the fact that we were looking at the mean scores from our two experimental groups and we were interested in the score division between the groups. Also, in order to use a t-test, the sample needed to follow a normal distribution ( $p < 0.05$ ), which was true for our sample. To better examine the

effect of the game qualities on motivation, we did a correlation matrix on SPSS with the post-treatment questionnaire's L2 learning experience statements (Appendix 4). Since the data followed a normal distribution, we chose the Pearson correlation test to see if the statements in L2 learning experience section correlated with each other. Before comparing the data between the two experimental groups, the whole data was inspected with descriptive statistics. The most insightful results of the descriptive statistics are discussed next.

To describe the variability, the mean and standard deviation are scrutinized. The L2 learning experience, thus playing the two different digital games in the L2 classroom, was considered positive by the two experimental groups (mean = 3.0). Least variation in the answers can be found when looking at how willingly the students took part in playing digital games (mean = 3.6, SD = 0.6) and if they enjoyed playing digital games in classroom (M = 3.3, SD = 0.7). Also, when looking at storyline, a game quality item, the variance within the groups was very low (mean = 3.1, SD = 0.6) even though the experimental group 1's digital game contained a storyline and the experimental group 2's did not. At this point, it can be stated that playing digital games in formal education was considered a pleasant language learning activity and that the enjoyment of playing the digital game was not dependent on the game itself. This infers that both *Kahoot!* and *Gimkit!* were considered a pleasant and stimulating learning activity. These results are aligned with Castillo-Cuesta's (2020), Mohd, Elmagzoub Eltahir et al. (2021) and Kotob and Ibrahim (2019) who all studied the use of digital games in language learning and discovered positive effects on the participant's engagement and motivation.

The highest level of variance was found in the game mode (solo or teamplay) and visible on-screen progress. When asking about the game mode, the mean was 2.7 and standard deviation was 1.0, and as for the on-screen progress the mean was 2.6 and standard deviation 1.0. Because the games differ in game mode and also, in how the progress is shown on the screen, no conclusions can be drawn from the variance differences. That is why these results need to be looked at on a group-level.

Table 9 is based on the results of the independent samples t-test of the post-treatment L2 learning experience section. This table contains information on the mean, SD, and significance value of each question. Mean value is looked at because it gives an overview of the scores, SD contains information on how much there is variation in the responses from the mean, and significance value informs about the significance of the results (Larson-Hall 2016, 255). Sig. (2-tailed) column represents the t-value in Table 9. Each question represents either motivation towards gamification in general or motivation affected by a specific game quality. The below table (Table 9) shows the statements in the post-treatment questionnaire. "G:" refers to the

statements shown for the experimental group 1 and “K” signals the statements shown for experimental group 2. These are shown separately since there is variation in the statements to see how the different game qualities affect participant’s motivation and perception of the digital games.

**Table 9** Participant’s perceptions on the use of digital games in classroom and the game qualities

N	Statements	Mean	Std. Deviation	Sig. (2-tailed)
1	G: I’m happy to participate in playing <i>Gimkit!</i>	3.7	0.6	.280
	K: I’m happy to participate in playing <i>Kahoot!</i>	3.5	0.7	
2	G: I consider myself weaker than my classmates in <i>Gimkit!</i> <sup>1</sup>	3.3	0.7	.189
	K: I consider myself weaker than my classmates in <i>Kahoot!</i> <sup>2</sup>	3.0	0.9	
3	G: I consider the in-game situation to be motivating in <i>Gimkit!</i>	3.0	0.6	.249
	K: I consider the in-game situation to be motivating in <i>Kahoot!</i>	2.8	0.8	
4	G: I enjoy playing <i>Gimkit!</i>	3.3	0.6	.429
	K: I enjoy playing <i>Kahoot!</i>	3.4	0.7	
5	G: I like competing as a team with my classmates in <i>Gimkit!</i>	3.2	0.6	.320
	K: I like competing against my classmates in <i>Kahoot!</i>	2.9	1.0	
6	G: I am spurred on by seeing our class’s progress on screen while playing <i>Gimkit!</i>	2.7	0.8	.601
	K: I am spurred on by seeing my ranking on screen while playing <i>Kahoot!</i>	2.8	1.0	
7	G: I am spurred on by seeing my classmates’ progress while playing <i>Gimkit!</i> (Investigations on screen)	2.7	0.8	.478

<sup>1</sup> Sentence is reverted.

<sup>2</sup> Sentence is reverted.

	K: I am spurred on by seeing my classmates' ranking on screen while playing <i>Kahoot!</i>	2.5	1.0	
8	G: I consider it to be more motivating to play as an individual than as a team <sup>3</sup>  K: I consider it to be more motivating to play as an individual than as a team	2.4  3.0	1.0  .9	.027
9	G: I like that <i>Gimkit!</i> has a storyline  K: I like that <i>Kahoot!</i> does not have a storyline	3.1  3.1	0.7  0.5	.804
10	G: I consider it to be motivating that I can progress in <i>Gimkit!</i> at my own pace  K: I consider it to be motivating that there is a time limit in <i>Kahoot!</i>	3.4  2.8	0.6  0.8	.004

Before analysing the results of the t-test, an overall view of the participants perception of playing the two digital games is discussed. As already mentioned, both groups enjoyed playing the digital games and considered it to be a pleasant learning activity. This can be seen from the mean values in statements regarding the willingness to participate (statement 1) and the actual enjoyment of playing the games (statement 4). These results are in line with studies conducted by Müller et al. (2018), Tan et al. (2019), and Sartini's (2020) who discovered playing digital games in formal learning environments to induced positive feelings towards learning. In both statements, the mean values were above 3. For the purpose of this study, it is beneficial that both of the groups enjoyed the treatment. This infers that the groups are similar enough to study the differences in the games and how they have affected motivation, and through that, vocabulary learning.

As can be seen from Table 9, there was a significant difference found in only two statements. These were statements 8 and 10, which focused on the game mode and the players

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<sup>3</sup> Sentence is reverted.

progress pace in the game. Next, we focus on these two questions because their results were statistically significant.

Statement 8 discusses the participant's perceptions of the game mode and whether they found it motivating. The participants who played *Gimkit!* did not find the team play mode highly motivating (mean = 2.4, SD = 1.0). It can be noted that there was some dispersion among the answers suggesting that some participants would have liked to play as an individual while others benefitted from the teamplay mode. As for the experimental group 2, solo play mode was generally considered motivating (mean = 3.0). As in the experimental group 1, variance in the answers can be found in this group (SD = 0.9). By looking at the standard deviations, it can be stated that the game mode divided opinions among the participants. Since the  $p$  value in statement 8 was significant ( $t(47) = -2.3; p = 0.027$ ), we can state that there is a statistical difference between the groups. The solo game mode was clearly more motivating than the team mode. This is an important contribution to the field because it shows that the game mode has a significant effect on L2 learning experience and, thus motivation. However, this contradicts with our hypothesis that *Gimkit!* would have been more motivating than *Kahoot!* due to its game mode.

The statement 10 discusses the pace or the time limit of the games. By looking at the mean value, the experimental group 1 perceived the possibility to progress at their own pace motivating (mean = 3.4, SD = 0.6). However, in the experimental group 2, the time limit feature was not considered highly motivating (mean = 2.8, SD = 0.8). As can be seen from the  $p$ -value in statement 10, there is a statistically significant difference between the experimental groups ( $t(40) = 3.0; p = .004$ ). Thus, it can be stated that solving the in-game tasks at the participant's own pace was considered more motivating than answering the in-game questions with a time limit. Unlike in statement 8, these results are in line with our hypothesis that *Gimkit!* would be considered more motivating because in *Gimkit!* the players are not restricted by time. Hadijah, Pratolo and Rondiyah (2020) and Müller et al. (2018) discovered the same negative effect of time limitation on the learner's vocabulary learning. According to Hadijah, Pratolo and Rondiyah's (2020) study results, the participants explained their failure or low scores in the game with the restricted answering time.

At this point, it can be stated that these two in-game features, game mode and time limit, affect the learners' L2 learning experience. By looking at the results of this study, it can be stated that when electing the most suitable game to use in L2 classroom, it is beneficial to use a digital game that allows the players to play as individuals without time limit. Since there was no statistically significant difference found in the other statements, we now examine the



possible correlations between the L2 learning experience statements. We focus on the statement 8 and 10, since in these statements there was a significant difference to be found.

According to the correlation matrix (Appendix 4), the solo game mode in *Kahoot!* (statement 8) correlates significantly with statements 2, 5, 6 and 9. In other words, this means that the participants who preferred the solo game mode also considered themselves better when compared to their classmates ( $r = 0.6, p = .003$ ) and liked to compete against their classmates ( $r = 0.5, p = .022$ ). These participants also benefited from seeing their ranking on the screen when playing *Kahoot!* ( $r = 0.4, p = 0.04$ ) and liked the fact that the game did not have a storyline ( $r = 0.5, p = 0.16$ ). These correlations suggest that those participants who enjoyed the solo game mode in *Kahoot!* also benefited from these specific in-game features and, in addition, they perceived themselves more competent than their classmates. The realization of competition and seeing one's progress on screen support the integral role of solo game mode and, thus benefit most those players who enjoy playing as an individual. In contrast to *Gimkit!*, there are no correlations to be found between the game mode and other statements in the L2 learning experience. Therefore, it can be stated that the team play mode in *Gimkit!* did not correlate significantly with other in-game features.

It is also meaningful to look at the correlation concerning the statement 10. In the experimental group 1, the possibility to progress in the game at the player's own pace (statement 10) correlates significantly with statements 1, 3, 4, 5, 7 and 9. These results show that participants who preferred playing as a team were also eager to take part in the game ( $r = 0.5, p = .011$ ), and considered the in-game situation motivating ( $r = 0.5, p = .011$ ) as well as enjoyable ( $r = 0.8, p = .000$ ). These participants also enjoyed competing as team ( $r = 0.5, p = .024$ ) and seeing their classmates' success in game ( $r = 0.5, p = .024$ ). In addition, positive feelings towards the progress style correlated with the in-game storyline feature ( $r = 0.5, p = .017$ ). These results indicate that those players who liked to progress at their own pace enjoyed playing *Gimkit!* and benefitted from the game mode, seeing the investigations on screen, and the storyline feature in *Gimkit!*. The possibility to progress at the player's own pace affected positively on the group's overall perception of playing the game. Thus, playing *Gimkit!* was considered enjoyable and motivating.

In the experimental group 2 the time limit feature in *Kahoot!* (statement 10) correlated significantly with statements 3, 4, 6, and 7. Those participants who found the time limit to be positive considered the in-game situation to be motivating ( $r = 0.5, p = 0.005$ ) and enjoyed playing *Kahoot!* ( $r = 0.4, p = 0.034$ ). They were also motivated to see their own ( $r = 0.5, p = .007$ ) and other's ( $r = 0.5, p = .014$ ) progress on the leader board. The time limit feature in

*Kahoot!* enhanced the players motivation and the importance of the leader board shown on screen. If the time restriction was considered positive, also the actual in-game situation was considered pleasant. In *Kahoot!*, players are able to gain points in two ways: by answering the questions correctly and by giving the correct answer as fast as possible. Moreover, it can be assumed that since the time limit and the answering speed are in central role, the leader board is an important feature and has an important function in the game. It could be suggested that because *Kahoot!* is a solo player game, the participants are constantly aware of their ranking and therefore, the leader board feature can be motivational to score even higher.

#### **6.4 The correlation between the students' vocabulary test scores and motivation**

To answer our final research "How do the students' vocabulary knowledge correlate with motivation?", we did a correlation test between the results of the vocabulary test and the motivation questionnaire. Before gathering the data, we made a hypothesis that there would be positive correlation between these the results of the vocabulary tests and the motivation questionnaire scores implicating that the more motivated the students were the better they acquired the target vocabulary items. Next, we discuss the findings of the correlation test.

To be able to see whether there is a correlation between motivation and vocabulary acquisition and to choose the right correlation test, we needed to know if the sampled data followed normal distribution. As with the vocabulary tests, we run a Shapiro-Wilk test of normality to see if the data was normally distributed or not. The results of the Shapiro-Wilk test showed that the sampled data did not follow normal distribution. As already mentioned in section 6.2.1., the vocabulary tests were not normally distributed either.

To answer a question whether there is correlation between the participants' vocabulary acquisition and motivation, we needed to check the possible correlation with SPSS. As the Shapiro-Wilk test showed, our data was not normally distributed ( $p > 0.05$ ), and therefore we needed to choose between the two non-parametric versions of the correlation tests. Since the monotonicity of the data is one of the criteria when electing the correct non-parametric correlation test, we calculated the monotonicity. The calculations of the monotonic relationship resulted in  $R^2 = 0.026 - 0.027$ . If the  $R^2$  value is closer to 1 it means that there is a perfect fit and if the value is closer to 0, there is a poor fit (Larson-Hall 2016, 209). In our case, the  $R^2$  value is very close to 0, and the points are widely scattered away from the regression line. With the given information it can be said that the correlation coefficient for  $r$  is small.

Since the monotonic relationship of the data is poor, we needed to opt for Kendall's tau-b correlation analysis because our data fulfils the criteria. Based on the correlation matrix (see Appendix 5), it can be stated that there is no significant correlation to be found between the

participant's vocabulary knowledge and motivation. These results are not aligned with our hypothesis nor with other studies conducted on topic, see for example Wong (2020), Takahashi (2020) and Lamb (2012). However, our discoveries are partly in line with Li and Zhang (2021) who also found the L2 learning experience to be a negative predictor on L2 achievement. These results are further discussed in the following section.

## 7 Discussion

In this section, we discuss the main objectives of our study. We explain and interpret our key results. In addition, we discuss the possible reasons behind our results and connect them into earlier studies discussed in the theory section. We highlight the significance of our results and mention possible topics for later research. We start with the results concerning our research question 1 and then we move on to our research questions 2 and 3. In other words, we first discuss the results concerning digital games and vocabulary acquisition, after which we examine how the games affected the participants' motivation, and the connection between vocabulary acquisition and motivation.

### 7.1 The effects of *Gimkit!* and *Kahoot!* on students' vocabulary acquisition

According to the results of this study, both games, *Gimkit!* and *Kahoot!* were beneficial to participants' vocabulary acquisition. The target vocabulary knowledge had increased significantly after the treatments in both experimental groups. These results support other studies in this field, which also found the use of digital games in L2 learning to be beneficial for vocabulary acquisition. Rasti Behbahani and Shahbazi (2020) found digital games in language learning to improve students' productive-recognition of form-meaning. Chen and Hsu (2020) found digital games beneficial in both receptive and productive learning of vocabulary. In addition, Sartini (2020) indicated digital games in language learning to have a positive impact on vocabulary mastery and even gains in terminology. Thus, our findings that digital games as a part of L2 learning are beneficial for receptive and productive vocabulary knowledge support previous research in the field. They support the view that digital games are a useful tool for language learners to gain vocabulary knowledge and, therefore the use of digital games in formal education can support the learning process.

In addition, the results of the delayed post-test indicated that not only did the digital games enhance the students' knowledge of the target vocabulary, but they also had a positive long-term effect. There was no significant difference between the post-test and the delayed post-test. This means that both groups were able to maintain the achieved knowledge of the TL vocabulary, which they had acquired during the time of the treatments. However, the low number of participants taking part in the delayed post-test can affect these results. To get a better understanding of the possible long-term effects, further research needs to be conducted. Azzouz Boudadi and Gutiérrez-Colón (2020, 66) also point out the need for more studies concerning gamification and learning outcomes.

Since the focus in this study was to see the differences between the games, our study did

not include a control group. In this case, the control group would have been a group in which the target vocabulary would have been taught with more traditional methods, without digital games. This would have allowed us to examine whether non-gamified teaching methods had outperformed the use of *Gimkit!* and *Kahoot!* in promoting students' vocabulary acquisition and motivation. It would have been interesting to study the possible differences between the use of *Gimkit!* and *Kahoot!* and non-gamified teaching, and it is something to study in the future in a possible follow-up study.

Playing the digital games had a positive effect on vocabulary acquisition. As for our hypothesis that *Gimkit!* would be more beneficial in terms of vocabulary learning, we can state that both games, *Gimkit!* and *Kahoot!*, significantly increased the participants knowledge of the target vocabulary and there was no statistical difference between the games.

### **7.2 The effects of *Gimkit!* and *Kahoot!* on the students' motivation**

We were also interested to find out how the games affect students' L2 learning motivation. To do this, we studied the scores of both motivation questionnaires: the pre-treatment questionnaire and the post-treatment questionnaire. We hypothesised that students would find *Gimkit!* more motivating than *Kahoot!*. The results of our study indicated that our hypothesis was incorrect. According to the pre-treatment questionnaire, the participants' motivation was high already before the treatments and, hence playing *Gimkit!* or *Kahoot!* did not have an impact on their motivation. According to our results, there was no statistically significant difference between these groups. However, both groups enjoyed playing the games and found both *Gimkit!* and *Kahoot!* a pleasant learning activity. These results reinforce the previous findings that digital games are perceived as an enjoyable learning task in L2 classrooms. For instance, Sahrir and Alias (2011), Mohd, Elmagzoub Eltahir et al. (2021), Sartini (2020), and Kotob and Ibrahim (2019) all found gamification to have a positive impact on language learning.

### **7.3 The effects of *Kahoot!* and *Gimkit!* on students' L2 learning experience**

After examining the results of the two motivational questionnaires, we studied the post-treatment questionnaires focusing on the L2 learning experience section. This was done because we wanted to see how the game qualities affected the student's perceptions on the use of digital games as an L2 learning experience and motivation. This comparison of the games was based on the fact that, even though *Gimkit!* and *Kahoot!* are both played online with learner's digital devices, there are differences between the games. This study focused especially on the internal game elements such as interaction, game mode, narrative elements, feedback, and the game mechanics and how they affected students' motivation.

Our study shows, that *Gimkit!* and *Kahoot!* affected differently on students' perceptions of the L2 learning experience. We found significant results when examining the game mode and the in-game progress pace. The participants who played *Gimkit!* did not consider the team play mode to be highly motivating. However, there was a lot of dispersion in the answers indicating that there were some participants who found it motivating to play as a team. Possible reason behind this might be the group dynamic, which can make the team play mode less enjoyable for some players depending on how they perceive themselves as a member of the class. Another affecting factor could be individual differences. These concern the individual preferences to participate in activities as a group or as an individual.

The game mode in *Kahoot!* turned out to be more motivating than in *Gimkit!*. According to the results, the participants felt the solo play mode to be more motivating than the team play mode. These results then support the use of *Kahoot!* in L2 learning to boost learners' motivation. The results of the positive impact of *Kahoot!* are aligned with studies conducted by Hadijah, Pratolo and Rondiyah (2020), Tan et al. (2019), and Wichadee and Pattanapichet (2018) who all found *Kahoot!* to have a positive impact on language learning. Thus, according to these results, solo game mode is more affective in promoting L2 learning motivation than team play mode.

Another significant result was found in the progress pace. At this time, the results supported the in-game feature in *Gimkit!* where the players were able to progress at their own pace. The results indicate that for higher levels of motivation there should not be a time limit. The restricted answer time in *Kahoot!* was perceived to be less motivating than the possibility to progress at own pace. Similarly, in Hadijah, Pratolo and Rondiyah's (2020) study, the results showed that the participants considered the time limitation when answering the questions to be problematic and even affecting their performance negatively. These results offer insightful knowledge of the in-game features and especially the progress pace in digital games. Our results suggest that the most motivating digital game in L2 learning would be a solo game, in which the players can solve tasks at their own pace.

We also found significant correlations between the L2 learning experience statements. According to our study, players who enjoyed the solo game mode in *Kahoot!* felt more competent in comparison to their classmates. They also benefitted from seeing their ranking on screen. It should be noted that there was some dispersion in the answers. It is meaningful to discuss the correlation between the solo game mode, self-esteem, and ranking. A possible reason for these correlations could be that because *Kahoot!* is a solo player game, it causes the students to be more aware of their ranking in the class. This would then indicate that *Kahoot!*

can reinforce students' self-esteem if they are constantly among the top players. On the contrast, students can consider themselves as weak language learners if they do not excel in the game. The leader board system in *Kahoot!* only shows five top players, which highlights the purpose of the game solo player mode and the importance of one's performance and, thus it can boost motivation to excel in the tasks. *Gimkit!* turned out to be more neutral in this case because students play it as a team, which erases the aspect of comparison.

The enjoyment of the solo game mode in *Kahoot!* was also connected to the competition aspect. Those participants who preferred the solo game mode were motivated to compete against their classmates. It could be stated that since competition feature is central in *Kahoot!* students who are competitive gained motivation and felt encouraged because, due to the game mode, the players themselves were in charge of their success and placement in the leader board. On the other hand, if a student did not like competition and, possibly, was not among the top players, the game mode was not as motivating. This was indicated by the dispersion of the answers.

Another significant correlation was found when studying students' perceptions towards the time limit and how it affected motivation. Students who played *Gimkit!* found it motivating to progress at their own pace. On contrast, students who played *Kahoot!* did not find the time limit to be motivating. The difference between the groups was statistically significant. The lack of time limit in *Gimkit!* also affected the participants' overall perceptions towards playing the game. This can be seen in the positive correlations between the possibility to progress at own pace and willingness to participate, motivation, and enjoyment. These results indicate that time limit is a feature, which needs to be taken into consideration when choosing the best alternative for the digital game played in the class. It is meaningful to provide language learners activities, which are considered pleasant and entertaining. This enables an encouraging learning environment where the learning of new vocabulary is not seen as the main purpose of the task but rather a by-product of stimulating learning activities.

Progressing at players' own pace was also connected to competition and the possibility to see the class's success on the leader board. Also, the storyline feature correlated positively with the progress pace. The results suggest that when the participants solved the tasks and did not feel pressured by the time limit, they enjoyed competing as a team and benefitted from seeing their classmates' success on the leader board. The team's success was not dependent on individual's speed in solving the tasks. On the contrary, the players were able to test their current vocabulary knowledge and learn new items without the time pressure. This enables participants at different competence levels to benefit from the game.

On the other hand, the time limit in *Kahoot!* also correlated positively with enjoyment, motivation, and the leader board feature. It could be stated that participants who liked the time limit feature considered *Kahoot!* to be motivating and an enjoyable learning activity. They benefitted from seeing their own and their classmates' success on the leader board. A possible explanation for this could be that the speed of the game keeps up the interest in playing *Kahoot!*. The possibility to compare one's knowledge to others' success also boosted motivation.

In conclusion, according to our study, the effect of digital games as language learning activities in L2 learning experience depends on two factors: the learner's preference to play as an individual or as a team as well as his/her perception towards the possible time limit. The results indicate that students would benefit the most from a game that is a solo player game in which the players can progress at their own pace. Thus, we cannot state for one, *Kahoot!* or *Gimkit!*, to be better than the other. Digital game-based tasks should not be used in language learning without first evaluating their actual benefits for facilitating the learning process and motivation.

#### **7.4 The correlation between vocabulary acquisition and motivation**

Our third, and final, research question was to find out if there is a correlation between students' vocabulary knowledge and motivation. Based on previous research conducted by Wong (2020), Takahashi (2020) and Lamb (2012), we hypothesised that there would be a positive correlation between student's vocabulary knowledge and high levels of motivation. However, according to the results of our study, there was no positive correlation to be found between the participants' vocabulary knowledge and motivation. These results can partly be explained by the fact that the participants felt already motivated to learn English before the treatments. The mean in the pre-treatment motivation questionnaire was already high in both groups and there was no significance variance between the participants. In other words, all the participants felt motivated towards learning English already before playing the digital games. This might explain the fact that we did not find correlation between vocabulary knowledge and motivation. Our results are partly in line with Moskovsky et al.'s (2016) and Li and Zhang's (2021) study. Moskovsky et al.'s (2016, 650) studied the connection between Saudi EFL learner's L2MSS and L2 achievement and found out that there was only a weak connection between the intended learning behaviour and the actual language proficiency, and the stronger the students rated their ideal self the lower was their proficiency level. To support the weak connection of L2MSS and language proficiency, Li and Zhang's (2021, 7) indicated that ought-to L2 self and positive learning experience were negative predictors on L2 achievement among Tibetan Chinese language learners. Our study indicated similar results of the relationship of L2MSS and



language proficiency, especially the role of positive learning experience.

The participants in Wong's (2020), Takahashi's (2020) and Lamb's (2012) studies came from various backgrounds and, hence their initial motivation to learn a foreign language possibly varied more than in our study. Wong (2020, 1) studied 121 Chinese language learners, Takahashi (2020, 679) studied 545 Japanese university students, and Lamb (2012, 997) studied 527 Indonesian junior high school language learners. Takashaki (2020, 679) mentions that the participants in his study lived in a small city and did not have opportunities to communicate in English very day. The participants in Lamb's study came from three different contexts: a provincial town, a rural district, and a metropolitan city (Lamb 2012, 997). The Chinese language learners in Wong's study were grade-six ethnic minority students who lived in Hong Kong (Wong 2020, 1). Compared to our study, the participants in these studies were more heterogeneous in terms of motivation. This might have been the reason why Wong (2020), Takahashi (2020) and Lamb (2012) all found the L2MSS to promote language learning. We might have found different results regarding the correlation between motivation and vocabulary acquisition if the participants had not been Finnish upper secondary school English learners. For instance, the effect of motivation in vocabulary knowledge could have been more visible if we would have studied Finnish learners of German. Also, if we compare the number of participants in our study, 49, to the other studies we notice that it is significantly smaller. The small number of participants might also explain why there was no correlation to be found.

## 8 Conclusion

The purpose of this study was to find out the effect of digital games in SL acquisition. We wanted to discover how the digital games *Gimkit!* and *Kahoot!* affect upper secondary school student's L2 vocabulary acquisition and motivation. What made our study relevant in this field was the comparison between two digital games. Even though digital games and L2 learning is a widely studied field, the aspect of comparing the effect of two different games is more uncommon. Our study offers an insight into how the games affect language learner's vocabulary acquisition and, which game qualities promote motivation. This study can help language teachers to choose the right digital game for their purpose and it sheds a light on the game qualities to see the exact features that are beneficial in enhancing learning motivation. In the beginning of this paper, we addressed three research questions concerning the use of digital games in an L2 classroom. At first, we were interested to find out how educational games *Gimkit!* and *Kahoot!* differ in promoting upper secondary school student's vocabulary acquisition. According to our results, both games were beneficial for vocabulary acquisition. The target vocabulary knowledge had increased significantly in both experimental groups after playing the digital games. There was no significant difference found between the games. These results support the view that digital games are a useful tool for language learners to gain vocabulary knowledge. The results are in line with previous research supporting the use of digital games in language teaching.

In addition, we examined how the students perceive the use of digital games as an L2 learning experience. The results indicate that the use of digital games in formal education was perceived enjoyable. As for the in-game features, the meaningfulness of the game is dependent on the game mode and the progress pace in the game. According to our results, these are the features that should be taken into account when deciding, which digital game to use. Based on these findings, learners would benefit the most from a solo player game, in which the players can progress at their own pace.

Lastly, this study also examined if there is a correlation between the students' vocabulary knowledge and motivation. According to our results, there was no correlation between high levels of motivation and vocabulary knowledge. These results can partly be explained by the small number of participants and the fact that their motivation to learn English was already high before playing the digital games.

In conclusion, this study confirms that digital game-based tasks are beneficial in language learning in terms of promoting the learners' vocabulary acquisition. The meaningful features,

which support motivation, are the game mode and whether there is a time restriction in the game or not. Based on this study, digital games are fruitful language learning tools in formal education. In the future, further research is needed to get even better understanding on which game elements facilitate vocabulary acquisition. There is also a need for qualitative analysis of the game features' effect in motivation. Future research could focus on studying Finnish learners of other languages than English. In addition to target language change, future studies should contain a control group. This enables researchers to scrutinize the effect of playing educational games on motivation and vocabulary acquisition.

## References

- Alderson, J. Charles. 2005. *Diagnosing Foreign Language Proficiency: The Interface between Learning and Assessment*. London: Continuum.
- Alexiou, Andreas and Michaéla C. Schippers. 2018. "Digital game elements, user experience and learning: A conceptual framework." *Education and Information Technologies* 23, no. 6: 2545-2567.
- Ali Mohsen, Mohammed. 2016. "The use of computer-based simulation to aid comprehension and incidental vocabulary learning." *Journal of Educational Computing Research* 54, no. 6: 863–884.
- Azzouz Boudadi, Nadia, and Mar Gutiérrez-Colón. 2020. "Effect of Gamification on Students' Motivation and Learning Achievement in Second Language Acquisition Within Higher Education: a Literature Review 2011-2019." *The EuroCALL Review* 28, no. 1: 40–69.
- Becker, Katrin. 2008. "Video Game Pedagogy: Good Games = Good Pedagogy." In *Games: Purpose and Potential in Education*, edited by Christopher Thomas Miller, 73–125. New York: Springer Science+Business.
- Carter, Ronald. 2012. *Vocabulary: Applied Linguistic Perspectives*. London: Taylor & Francis Group.
- Castillo-Cuesta, Luz. 2020. "Using Digital Games for Enhancing EFL Grammar and Vocabulary in Higher Education." *International Journal of Emerging Technologies in Learning* 15, no. 20: 116–129.
- Chen, Hao-Jan Howard, and Hsiao-Ling Hsu. 2020. "The Impact of a Serious Game on Vocabulary and Content Learning." *Computer Assisted Language Learning* 33, no. 7: 811–832.
- Chen, Meng-Hua, Wen-Ta Tseng, and Tsung-Yuan Hsiao. 2018. "The Effectiveness of Digital Game-based Vocabulary Learning: A Framework-based View of Meta-analysis." *British Journal of Educational Technology* 49, no.1: 69–77.
- Cornillie, Frederik, Geraldine Clarebout, and Piet Desmet. 2012. "Between Learning and Playing? Exploring Learners' Perceptions of Corrective Feedback in an Immersive Game for English Pragmatics." *ReCALL* 24, no. 3: 257–278.
- David, Singleton. 1999. *Exploring the Second Language Mental Lexicon*. Cambridge: Cambridge University Press.
- Dörnyei, Zoltán. 2005. *The Psychology of the Language Learner Individual Differences in Second Language Acquisition*. Mahwah, N.J: L. Erlbaum.
- Dörnyei, Zoltán, Alastair Henry, and Peter D. MacIntyre. 2014. *Motivational Dynamics in Language Learning Blue Ridge Summit*. PA: Multilingual Matters.
- Ellis, Rod. 2009. "Implicit and Explicit Learning, Knowledge and Instruction" In *Implicit and Explicit Knowledge in Second Language Learning, Testing and Teaching*, edited by Rod Ellis, Shawn Loewen, Catherine Elder, Hayo Reinders, Rosemary Erlam and Jenefer Philip, 3–26. Blue Ridge Summit: Multilingual Matters.

- Eltahir, Mohd. Elmagzoub, Najeh Rajeh Alsalhi, Sami Al-Qatawneh, Hatem Ahmad AlQudah, and Mazan Jaradat. 2021. "The Impact of Game-Based Learning (GBL) on Students' Motivation, Engagement and Academic Performance on an Arabic Language Grammar Course in Higher Education." *Education and Information Technologies* 26, no. 3: 3251–3278.
- Ermi, Laura, Satu Heliö, and Frans Mäyrä. 2004. *Pelien voima ja pelaamisen hallinta: lapset ja nuoret pelikulttuurien toimijoina*. Tampere: Tampere University Press.
- Feng, Teng. 2015. "The Effectiveness of Extensive Reading on EFL Learners' Vocabulary Learning: Incidental Versus Intentional Learning." *BELT - Brazilian English Language Teaching Journal* 6, no. 1: 66–80.
- Gardner, Robert. 1985. *Social Psychology and Second Language Learning: The Role of Attitudes and Motivation*. London: Arnold.
- Hadijah, Hadijah, Bambang Widi Pratolo, and Rondiyah Rondiyah. 2020. "Interactive Game 'Kahoot!' as the Media of Students' Vocabulary Assessment." *JEFL (Journal on English as a Foreign Language)* 10, no. 1: 87–105.
- Hakulinen, Lasse, Tapio Auvinen, and Ari Korhonen. 2013. "Empirical Study on the Effect of Achievement Badges in TRAKLA2 Online Learning Environment." *Learning and Teaching in Computing and Engineering*, 47–54.
- Hamari, Juho, Jonna Koivisto, and Harri Sarsa. 2014. "Does Gamification Work? -- A Literature Review of Empirical Studies on Gamification." *47th Hawaii International Conference on System Sciences*, 3025–3034.
- Hamari, Juho, David J. Shernoff, Elizabeth Rowe, Brianno Coller, Jodi Asbell-Clarke, and Teon Edwards. 2016. "Challenging Games Help Students Learn: An Empirical Study on Engagement, Flow and Immersion in Game-Based Learning." *Computers in Human Behavior* 54, 170–179.
- Hanus, Michael D., and Jesse Fox. 2015. "Assessing the Effects of Gamification in the Classroom: A Longitudinal Study on Intrinsic Motivation, Social Comparison, Satisfaction, Effort, and Academic Performance". *Computers and Education* 80, 152–161.
- Hulstijn, Jan, and P. Robinson. 2001. "Intentional and Incidental Second-Language Vocabulary Learning: A Reappraisal of Elaboration, Rehearsal and Automaticity." In *Cognition and Second Language Instruction*, edited by Peter Robinson, 258–286. Cambridge: Cambridge University Press.
- Hung, Hsiu-Ting, Jie Chi Yang, Gwo-Jen Hwang, Hui-Chun Chu, and Chun-Chieh Wang. 2018. "A scoping review of research on digital game-based language learning." *Computers & Education* 126, 89–104.
- Hwang, Wu-Yuin, Timothy Shih, Zhao-Heng Ma, Rustam Shadiev, and Shu-Yu Chen. 2016. "Evaluating Listening and Speaking Skills in a Mobile Game-Based Learning Environment with Situational Contexts." *Computer Assisted Language Learning* 29, no. 4: 639–57.
- Joe, Angela. 1998. "What Effects Do Text-Based Tasks Promoting Generation Have on Incidental Vocabulary Acquisition?" *Applied linguistics* 19, no. 3: 357–377.

- Juul, Jesper. 2005. *Half-real: Video Games Between Real Rules and Fictional Worlds*. Cambridge, Mass: MIT Press.
- Järvinen, Heini-Marja. 2014. "Kielen opettamisen menetelmiä." In *Kuinka kieltä opitaan*, edited by Päivi Pietilä and Pekka Lintunen, 89–113. Helsinki: Gaudeamus.
- Kamil, Michael L., and Elfrieda H. Hiebert. 2005. "Teaching and Learning Vocabulary: Perspectives and Persistent Issues." In *Teaching and Learning Vocabulary: Bringing Research to Practice*, edited by Elfrieda H. Hiebert and Michael L. Kamil, 1–23. Mahwah, N.J: L. Erlbaum Associates.
- Karami, Amirreza, and Freddie A. Bowles. 2019. "Which Strategy Promotes Retention?: Intentional Vocabulary Learning, Incidental Vocabulary Learning, or a Mixture of Both?" *The Australian Journal of Teacher Education* 44, no. 9: 25–43.
- Keengwe, Jared, Grace Onchwari, and Joachim Agamba. 2014. "Promoting Effective e-Learning Practices through the Constructivist Pedagogy." *Education and Information Technologies* 19, no. 4: 887–898.
- Kotob, Mazen Muhieddine, and Abbass Ibrahim. 2019. "Gamification: The Effect on Students' Motivation and Achievement in Language Learning." *Journal of Applied Linguistics and Language Research* 6, no. 11: 177–198.
- Laerd Statistics. n.d.a. Kendall's Tau-b using SPSS Statistics. *Laerd Statistics*. Accessed 21 August 2020. <https://statistics.laerd.com/spss-tutorials/kendalls-tau-b-using-spss-statistics.php>.
- Laerd Statistics. n.d.b. Friedman Test in SPSS Statistics. *Laerd Statistics*. Accessed 21 August 2020. <https://statistics.laerd.com/spss-tutorials/friedman-test-using-spss-statistics.php>.
- Laerd Statistics. n.d.c. What does cronbach's alpha mean?. *Laerd Statistics*. Accessed 21 August 2020. <https://stats.idre.ucla.edu/spss/faq/what-does-cronbachs-alpha-mean/>.
- Lamb, Martin. 2012. "A Self System Perspective on Young Adolescents' Motivation to Learn English in Urban and Rural Settings." *Language Learning* 62, no. 4: 997–1023.
- Larson-Hall, Jennifer. 2010. *A Guide to Doing Statistics in Second Language Research Using SPSS and R*. London: Routledge.
- . 2016. *A Guide to Doing Statistics in Second Language Research Using SPSS and R*. London: Routledge.
- Laufer, Batia, and Zahava Goldstein. 2004. "Testing Vocabulary Knowledge: Size, Strength and Computer Adaptiveness." *Language Learning* 54, no. 3: 399–436.
- Lee, Sangmin-Michelle. 2019. "Her Story or Their Own Stories? Digital Game-Based Learning, Student Creativity, and Creative Writing." *ReCALL* 31, no. 3: 238–254.
- Lin, Chi-Jen, Gwo-Jen Hwang, Qing-Ke Fu, and Jing-Fang Chen. 2018. "A Flipped Contextual Game-Based Learning Approach to Enhancing EFL Students' English Business Writing Performance and Reflective Behaviors." *Educational Technology & Society* 21, no. 3, 117–131.
- Li, Ming, and Lubei Zhang. 2021. "Tibetan CSL Learners' L2 Motivational Self System and L2 Achievement." *System (Linköping)* 97, 102436–102452.

- Meganathan, Pavani, Ngee Thai Yap, Shamala Paramasivam, and Ilyana Jalaluddin. 2019. "Incidental and Intentional Learning of Vocabulary Among Young ESL Learners." *3L, Language, Linguistics, Literature* 25, no. 4: 51–67.
- Merriam-Webster. n.d. "Cognate | definition of cognate." Merriam-Webster dictionary. Accessed 6 November 2021. <https://www.merriam-webster.com/dictionary/cognate>.
- Mondria, Jan-Arjen, and Boukje Wiersma. 2004. "Receptive, productive, and receptive + productive L2 vocabulary learning: what difference does it make?" In *Vocabulary in a Second Language: Selection, Acquisition, and Testing*, edited by Paul Bogaards and Batia Laufer, 79–100. Amsterdam: John Benjamin's Publishing company.
- Moskovsky, Christo, Silvia Racheva, Turki Assulaimani, and Jean Harkins. 2016. "The L2 Motivational Self System and L2 Achievement: A Study of Saudi EFL Learners." *The Modern Language Journal* 100, no. 3: 641–654.
- Mousavi, Seyyed Nasser, Nasser Ghafoori, and Mahnaz Saeidi. 2021 "Noticing, retrieving, and generation: an Investigation into Vocabulary learning and Retention." *Práxis Educacional* 17, no. 44: 1–32.
- Müller, Amanda, Jeong-Bae Son, Kazunori Nozawa, and Reza Dashtestani. 2018. "Learning English Idioms with a Web-Based Educational Game." *Journal of Educational Computing Research* 56, no. 6: 848–865.
- Nation, I.S.P. 2001. *Learning Vocabulary in Another Language*. Cambridge: Cambridge University Press.
- Nation, I.S.P. 1990. *Teaching and Learning Vocabulary*. Boston: Heinle & Heinle publishers.
- Nielsen. 2021. "The Future of Video Gaming is Bright – Even as Real Experiences Return." *Nielsen*. Accessed 8 August 2021. <https://www.nielsen.com/us/en/insights/article/2021/the-future-of-video-gaming-is-bright-even-as-real-experiences-return/>.
- Niitemaa, Marja-Leena. 2014. "Kuinka vieraan kielen sanoja opitaan ja opetetaan." In *Kuinka kieltä opitaan*, edited by Päivi Pietilä and Pekka Lintunen, 138–164. Helsinki: Gaudeamus.
- Ortega, Lourdes. 2009. *Understanding Second Language Acquisition*. New York: Routledge.
- Pietilä, Päivi. 2014. "Yksilölliset erot kielenoppimisessa." In *Kuinka kieltä opitaan*, edited by Päivi Pietilä and Pekka Lintunen, 45–67. Helsinki: Gaudeamus.
- Prensky, Marc. 2007. *Digital Game-Based Learning*. Minnesota: Paragon House.
- Rama, Paul S., Rebecca W. Black, Elizabeth van Es, and Mark Warschauer. 2012. "Affordances for Second Language Learning in World of Warcraft." *ReCALL* 24, no. 3: 322–338.
- Rasti Behbahani, Amin. 2020. "Investigating the effect of digital game tasks, inducing different levels of involvement load, on the acquisition of vocabulary items." Doctoral Thesis, University of Jyväskylä. Accessed 10 April 2021. <http://urn.fi/URN:ISBN:978-951-39-8130-3>.
- . 2021. "Why Digital Games Can Be Advantageous in Vocabulary Learning." *Theory and Practice in Language Studies* 11, no. 2: 111–118.

- Rasti Behbahani, Amin, and Maryam Shahbazi. 2020. "Investigating the effectiveness of a digital gamebased task on the acquisition of word knowledge." *Computer Assisted Language Learning* 1–25.
- Reinders, Hayo. 2012. *Digital Games in Language Learning and Teaching*. London: Palgrave Macmillan.
- Reinhardt, Jonathon. 2019. *Gameful Second and Foreign Language Teaching and Learning: Theory, Research, and Practice*. Cham: Palgrave Macmillan.
- Reinhardt, Jonathon, and Julie M. Sykes. 2012. "Conceptualizing Digital Game-Mediated L2 Learning and Pedagogy: Game-Enhanced and Game-Based Research and Practice." In *Digital Games in Language Learning and Teaching*, edited by Hayo Reinders, 32–49. London: Palgrave Macmillan.
- Richards, J.C. 1976. "The Role of Vocabulary Teaching." *TESOL Quarterly* 10, no. 1: 77–89.
- Roshandel, Javad, Behzad Ghonsooly, and Afsaneh Ghanizadeh. 2018. "L2 Motivational Self-System and Self-Efficacy: A Quantitative Survey-Based Study." *International Journal of Instruction* 11, no. 1: 329–344.
- Sahrir, Muhammad Sabri, and Nor Aziah Alias. 2011. "A Study on Malaysian Language Learners' Perception Towards Learning Arabic Via Online Games." *GEMA Online™ Journal of Language Studies* 11, no. 3: 129–145.
- Sandler, Randall. 2012. *Virtual Worlds for Language Learning: From Theory to Practice*. Vol 2. Bern: Lang.
- Sartini, Sri. 2020. "Kahoot in Maritime English Teaching: Its Impact on Nautical Science Cadet's Oral Reproduction and Vocabulary." *English Language Teaching Educational Journal* 3, no. 1: 41–51.
- Schmitt, Nobert. 2007. "Current Perspectives on Vocabulary Teaching and Learning" In *International Handbook of English Language Teaching*, edited by Jim Cummins and Chris Davison, 827–843. New York: Springer.
- . 2010. *Researching Vocabulary: A Vocabulary Research Manual*. Eastbourne: Palgrave Macmillan.
- Silvennoinen, Inka, and Mikko Meriläinen. 2016. "Nuoret pelissä - Tietoa kasvattajille nuorten digitaalisesta pelaamisesta ja rahapelaamisesta." In *Julkari*, edited by Terveyden ja Hyvinvoinnin laitos, 4–72. Helsinki: Grano.
- Singleton, David. 2014. "How Do Attitude and Motivation Help in Learning a Second Language?" In *Key Topics of Second Language Acquisition*, edited by Vivian Cook and David Singleton, 90–102. Bristol: Multilingual Matters.
- Sok, Sarah, and ZhaoHong Han. 2020. "A Study of L2 Vocabulary Acquisition Under Incidental and Intentional Conditions." *Vigo International Journal of Applied Linguistics* 17, no. 17:113–140.
- Sylvén, Liss Kerstin, and Pia Sundqvist. 2012. "Gaming as extramural English L2 Learning and L2 proficiency among young learners." *ReCALL* 24, no 3: 302–321.
- Taguchi, Tatsuya, Michael Magid, and Mostafa Papi. 2018 "The L2 Motivational Self System Among Japanese, Chinese and Iranian Learners of English: A Comparative Study." *Motivation, Language Identity and the L2 Self, Multilingual Matters*, 66–97.



- Takahashi, Chika, and Seongah Im. 2020. "Comparing Self-Determination Theory and the L2 Motivational Self System and Their Relationships to L2 Proficiency." *Studies in Second Language Learning and Teaching* 10, no. 4: 673–696.
- Tan, Debbita Ai Lin, Bee Choo Lee, Malini Ganapathy, and Shaidatul Akma Adi Kasuma. 2019. "Language Learning in the 21st Century: Malaysian ESL Students' Perceptions of Kahoot." *International Journal of Virtual and Personal Learning Environments* 9, no. 2: 55–71.
- Thorne, Steven L., Rebecca W. Black, and Julie M. Sykes. 2009. "Second Language Use, Socialization, and Learning in Internet Interest Communities and Online Gaming." *The Modern Language Journal (Boulder, Colo.)* 93, no. 1: 802–821.
- Ushioda, Ema. 2014. "Context and Complex Dynamic Systems Theory." *Motivational Dynamics in Language Learning*, 47–54.
- Vazirabad, Aylar Fallah, and Farahman Farrokhi. 2020. "Investigating Digital Apps: Gaming Elements and Learning Context." *International Journal of Applied Linguistics & English Literature* 9, no. 3: 25–36.
- Vygotskiĭ, Lev Semenovich, and Michael Cole. 1978. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press.
- Webb, Stuart. 2007. "The Effects of Repetition on Vocabulary Knowledge." *Applied Linguistics* 28, no.1: 46–65.
- . 2008. "Receptive and Productive Vocabulary sizes of L2 Learners." *Studies in Second Language Acquisition* 30 no. 1: 79–95.
- Whitton, Nicola. 2010. *Learning with Digital Games: A Practical Guide to Engaging Students in Higher Education*. New York: Routledge.
- Wichadee, Saovapa, and Fasawang Pattanapichet. 2018. "Enhancement of Performance and Motivation Through Application of Digital Games in an English language Class." *Teaching English with Technology* 18, no. 1: 77–92.
- Wong, Yu Ka. 2020. "Effects of Language Proficiency on L2 Motivational Selves: A Study of Young Chinese Language Learners." *System (Linköping)* 88: 1–13.
- Wu, Shaoqun, Margaret Franken, and Ian H. Witten. 2012. "Collocation Games from a Language Corpus." In *Digital Games in Language Learning and Teaching*, edited by Hayo Reinders, 209–229. London: Palgrave Macmillan UK.
- Zou, Di, Yan Huang, and Haoran Xie. 2019. "Digital game-based vocabulary learning: where are we and where are we going?" *Computer Assisted Language Learning* 34, no.6 :

# Appendices

## Appendix 1 Vocabulary tests

### 1. Käännä alleviivatut sanat suomeksi.

- A) Can book me a slot at the Edinburgh Festival Fringe?
- B) We must appoint a new teacher soon.
- C) You must be fluent in many languages.
- D) The Swiss speak several languages, which they learn at school.
- E) It is illegal to drive under the influence.
- F) Have you ever considered a career as a shrink?
- G) You can't judge them solely on the basis of hearsay.
- H) South African Broadcasting Cooperation desperately looks for talented African presenters.
- I) Jokes aside, it has been a tough life.
- J) Anxiety makes it much harder for a person to articulate their thoughts.

### 2. Merkitse onko väittämä totta T (True) vai tarua F (False). Merkitse lauseen perään kirjain X, jos et ymmärtänyt lausetta.

- A) If a person comes to terms with a matter, he/she accepts it.
- B) If two or more people want to split up, it means that they want to live together.
- C) Politically incorrect means using appropriate language in different contexts.
- D) If someone is on their guard, they are taking it easy.
- E) When you break into the stand-up circuit, you are an outsider.

### 3. Valitse selityksiin sopiva sana. Merkitse sanan numero selityksen kohdalle.

- A) Anecdote out of the ordinary
- B) Audience a piece of humorous writing
- C) Appoint a prank or a trick
- D) Host to buy in advance
- E) Unconventional a short amusing story
- F) Skit a collection of people watching something
- G) Book a person who receives other people as guests
- H) Spotlight a job that lasts a certain period
- I) Gig a light directed to a small area
- J) Gag to assign a job or a role

## Appendix 2 Pre-treatment motivation questionnaire

4. Kirjoita lauseen perään numero, joka kuvastaa eniten omaa tuntemustasi. (1. = täysin eri mieltä 2. = eri mieltä 3. = samaa mieltä 4. = täysin samaa mieltä)

### Tulevaisuudessa...

- Pystyn kuvittelemaan itseni asumaan ulkomailla ja käyväni keskustelua englanniksi
- Pystyn kuvittelemaan tilanteen, jossa puhun englantia ulkomaalaisten kanssa
- Tarvitsen englantia voidakseni tehdä tulevaisuudessa haluamiani asioita.

### Tällä hetkellä...

- Opiskelen englantia koska läheiset ystäväni ajattelevat sen olevan tärkeää
- Englannin opiskelu on tarpeellista, koska ihmiset ympärilläni odottavat sitä minulta.
- Englannin opiskelu on tarpeellista, koska sen avulla saan hyväksyntää luokkatovereiltani ja opettajaltani.
- Jos epäonnistun englannin oppimisessa, tuotan pettymyksen luokkatovereilleni ja opettajalleni.

### Englannin kielen tunneilla...

- Osallistun englannin tunneilla ryhmäkeskusteluihin englanniksi
- En uskalla vastata opettajan kysymykseen englanniksi, vaikka tietäisin vastauksen
- Olen itsevarma käyttäessäni englantia muiden luokkatovereideni kuullen
- Koen englanninkielentaitoni oleva heikompi muihin luokkatovereihin verrattuna
- Uskon englanninkielitaitoni olevan tarpeeksi hyvä vastatessani opettajan esittämiin kysymyksiin
- Osallistun englannin tunneilla parikeskusteluihin englanniksi

## Appendix 3 Post-treatment motivation questionnaire

**Kirjoita lauseen perään numero, joka kuvastaa eniten omaa tuntemustasi. (1. = täysin eri mieltä 2. = eri mieltä 3. = samaa mieltä 4. = täysin samaa mieltä)**

### **Tulevaisuudessa...**

- Pystyn kuvittelemaan itseni asumaan ulkomailla ja käyväni keskustelua englanniksi
- Pystyn kuvittelemaan tilanteen, jossa puhun englantia ulkomaalaisten kanssa
- Tarvitsen englantia voidakseni tehdä tulevaisuudessa haluamiani asioita.

### **Tällä hetkellä...**

- Opiskelen englantia koska läheiset ystäväni ajattelevat sen olevan tärkeää
- Englannin opiskelu on tarpeellista, koska ihmiset ympärilläni odottavat sitä minulta.
- Englannin opiskelu on tarpeellista, koska sen avulla saan hyväksyntää luokkatovereiltani ja opettajaltani.
- Jos epäonnistun englannin oppimisessa, tuotan pettymyksen luokkatovereilleni ja opettajalleni.

### **Englannin kielen tunneilla... (*Gimkit!*)**

- Osallistun mielelläni Gimkitin pelaamiseen
- Koen olevani Gimkitissä heikompi kuin muut luokkatoverini
- Koen pelitilanteen Gimkitissä motivoivaksi
- Minusta on mukavaa pelata Gimkitiä
- Minusta on mukava kilpailla joukkueena luokkatovereideni kanssa Gimkitissä
- Minua kannustaa nähdä luokkamme edistyminen Gimkitissä
- Minua kannustaa nähdä muiden edistyminen Gimkitissä (investigationit taululla)
- Minusta on motivoivampaa pelata yksilönä kuin joukkueena
- Pidän siitä, että Gimkitissä on tarina.
- Minua motivoi, että Gimkitissä saa edetä omaan tahtiin

### **Englannin kielen tunneilla... (*Kahoot!*)**

- Osallistun mielelläni Kahootin pelaamiseen
- Koen olevani Kahootissa heikompi kuin muut luokkatoverini
- Koen pelitilanteen Kahootissa motivoivaksi
- Minusta on mukavaa pelata Kahootia
- Minusta on mukava kilpailla luokkatovereitani vastaan Kahootissa
- Minua kannustaa nähdä oma sijoitukseni Kahootissa
- Minua kannustaa nähdä muiden sijoitukset Kahootissa
- Minusta on motivoivampaa pelata yksilönä kuin joukkueena
- Pidän siitä, että Gimkitissä ei ole tarina.
- Minua motivoi, että Kahootissa on aikaraja





L2learning_e	Pearson	,256	-,143	,577**	,409*	,336	,471*	,473*	-,101	,052	1
xperience_pr	Correlation										
ogress_pace	Sig. (2-tailed)	,218	,497	,003	,043	,100	,018	,017	,632	,805	
	N	25	25	25	25	25	25	25	25	25	25

\*. Correlation is significant at the 0.05 level (2-tailed).

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

## Appendix 5 Correlation matrix of the vocabulary tests scores and the motivation

Group			Pre test	Post test	Delayed_Po st_Test	Motivation_ Pre mean	Motivation_ Post Mean	
Experimental group 1	Pre_test	Correlation Coefficient	1,000	,653**	,669**	,469**	-,121	
		Sig. (2-tailed)	.	,000	,000	,003	,449	
		N	23	23	19	23	23	
	Post_test	Correlation Coefficient	,653**	1,000	,837**	,291	-,022	
		Sig. (2-tailed)	,000	.	,000	,067	,892	
		N	23	23	19	23	23	
	Delayed_Post_Test	Correlation Coefficient	,669**	,837**	1,000	,462**	-,006	
		Sig. (2-tailed)	,000	,000	.	,009	,971	
		N	19	19	19	19	19	
	Motivation_Pre_mean	Correlation Coefficient	,469**	,291	,462**	1,000	-,004	
		Sig. (2-tailed)	,003	,067	,009	.	,978	
		N	23	23	19	23	23	
	Motivation_Post_Mea n	Correlation Coefficient	-,121	-,022	-,006	-,004	1,000	
		Sig. (2-tailed)	,449	,892	,971	,978	.	
		N	23	23	19	23	23	
	Experimental group 2	Pre_test	Correlation Coefficient	1,000	,304*	,168	,147	-,066
			Sig. (2-tailed)	.	,036	,338	,322	,654
			N	26	26	19	26	26
Post_test		Correlation Coefficient	,304*	1,000	,522**	,135	,254	
		Sig. (2-tailed)	,036	.	,003	,367	,088	
		N	26	26	19	26	26	
Delayed_Post_Test		Correlation Coefficient	,168	,522**	1,000	,232	,247	
		Sig. (2-tailed)	,338	,003	.	,195	,164	
		N	19	19	19	19	19	
Motivation_Pre_mean		Correlation Coefficient	,147	,135	,232	1,000	,327*	
		Sig. (2-tailed)	,322	,367	,195	.	,031	
		N	26	26	19	26	26	
Motivation_Post_Mea n		Correlation Coefficient	-,066	,254	,247	,327*	1,000	
		Sig. (2-tailed)	,654	,088	,164	,031	.	



N	26	26	19	26	26
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\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

## Appendix 6: Finnish Summary

Tämän pro gradu -tutkielman aiheena on digitaalisten pelien käyttö toisen kielen opetuksessa. Tutkielman tarkoitus on selvittää, miten digitaaliset opetuspelit *Gimkit!* ja *Kahoot!* vaikuttavat lukioikäisten opiskelijoiden englanninkielisen sanaston oppimiseen ja opiskelumotivaatioon. Pro-gradu tehtiin parityönä kahden englannin kielen opiskelijan kesken. Digitaalisten opetuspelien käyttö kielenopetuksessa on nykypäivänä yleistynyt teknologian nopean kehityksen ja helpon saatavuuden ansiosta. Digitaalisten opetuspelien vaikutus kielenopiskeluun ja motivaatioon on aikaisempien tutkimusten perusteella positiivinen (Hung ym. 2018, Zou, Huang ja Xie 2019, Lee 2019). Koska pelien hyödyllisyys on esimerkiksi yllä mainittujen tutkimusten kautta todettu positiiviseksi, muodostuikin nykypäivänä tärkeäksi taidoksi kyky valita opetustavoitteen kannalta paras mahdollinen peli opetustilanteeseen.

Tämä pro-gradu tutkielma keskittyy vertailemaan kahden eri digitaalisen pelin vaikutusta sanastonoppimiseen ja motivaatioon. Vertailuasetelman ansiosta tutkimus pyrkii kartoittamaan, vaikuttavatko pelit eri tavalla opiskelijoiden sanaston oppimiseen. Tämän lisäksi tutkielma tarkastelee pelien sisäisiä ominaisuuksia ja pyrkii siten selvittämään, mitkä pelin ominaisuudet hyödyttäisivät kielenopiskelijoita eniten motivaation kannalta. Näin tutkielma pyrkii tuomaan uutta tietoa toisen kielen opetuksen kentälle, sekä auttamaan kielenopettajia oikeinlaisen opetuspelin valinnassa.

Tutkielmassa vertailtavat pelit ovat *Kahoot!* ja *Gimkit!*. Pelit valittiin tutkielmaan niiden erovaisuuksien vuoksi. *Kahoot!* on yksin pelattava sanastopeli, jossa nopeus palkitaan ja yksilön oma sijoitus on keskeisessä asemassa. *Gimkit!* puolestaan on joukkuepeli, jossa joukkueella on yhteinen tavoite, johon päästään ratkomalla tehtäviä ilman aikarajoitusta. Toisin kuin *Kahoot!* -pelissä, tässä pelissä ei ole vain yhtä voittajaa, vaan joukkueen on tarkoitus selvitä pelistä yhdessä. Näiden kahden digitaalisen opetuspelin vaikutusta sanaston oppimiseen ja motivaatioon tutkitaan kolmen eri tutkimuskysymyksen avulla. Tutkielmassa esitetyt tutkimuskysymykset ovat:

1. Miten digitaaliset opetuspelit *Kahoot!* ja *Gimkit!* eroavat lukioikäisten opiskelijoiden sanaston oppimisen edistämässä?
2. Miten oppilaat kokevat digitaalisten opetuspelien käytön opetuksessa?
3. Miten opiskelijoiden sanastonhallinta korreloi motivaation kanssa?

Tutkielman alussa esitellään myös kaksi hypoteesia tutkimuskysymyksiin liittyen. Hypoteesit perustuvat tutkielman kirjoittajien omakohtaiseen kokemukseen kielenopettamisen kentällä sekä aikaisempiin tutkimuksiin aiheesta. Tutkielmassa esitellyt hypoteesit ovat:

1. *Gimkit!* on opiskelijoiden mukaan motivoivampi peli kielenopetuksessa ja se edistää opiskelijoiden sanastonoppimista paremmin kuin *Kahoot!*
2. Opiskelijoiden sanaston osaaminen korreloi positiivisesti motivaation kanssa.

Tutkielman ensimmäisessä teoriaosassa käsitellään sanastoa ja siihen liittyvää teoriaa. Käsiteltävät aiheet ovat sanaston tärkeys osana kielenoppimista, erilaisia tapoja määrittää sana sekä erilaiset tavat oppia vieraskielistä sanastoa. Teoriaosa esittelee ja vertailee kriittisesti yleisimpiä näkemyksiä sanan eri määritelmistä ja oppimistavoista. Teorian pohjalta voidaan todeta, että sanan määrittämiseen ei ole olemassa yhtä oikeaa vastausta. Määrittelemiseen vaikuttaa paljon esimerkiksi sanojen laskutapa, eli se lasketaanko sanat juoksevina sanoina tai sanatyyppeinä vai perustuuko lasku sisältösanoihin ja kielioppisanoihin (Singleton 1991, 10). Yleisesti ottaen sanasto voidaan kuitenkin käsittää systeemiksi osaksi kielen osajärjestelmää (Niitemaa 2014, 139).

Sanojen osaaminen ei myöskään ole yksinkertainen prosessi. Tutkielma kartoittaa mm. Nationin (1990) näkemystä sanojen osaamisesta. Nation (1990, 31–32) näkee sanojen koostuvan kolmesta ulottuvuudesta, jotka ovat sanan muoto, merkitys ja käyttö. Näitä ulottuvuuksia voidaan tarkastella sekä reseptiivisen että produktiivisen osaamisen kautta sekä suullisen ja kirjallisen osaamisen näkökulmasta (Nation 1990, 31–32). Aikaisempien tutkimusten perusteella reseptiivisen sanavaraston on todettu olevan produktiivista suurempi (Niitemaa 2014, Webb 2008, Kamil and Hiebert 2005). Teoriaosa tuo myös ilmi näkökannan, jonka mukaan sanastonhallinnassa ja opetuksessa tulisi tiedostaa erilaiset tavat oppia sanastoa. Vieraskielisen sanaston opetuksessa olisi hyvä ottaa huomioon implisiittinen ja eksplisiittinen tapa oppia sanoja (Ellis 2009, 3). Eri oppistapojen lisäksi myös toistolla, sanan huomioimisella ja hakemisella on suuri vaikutus sanojen opettamisessa (Nation 2001, 103). Ensimmäisen teoriaosan pohjalta nousee esille sanojen monimuotoisuus ja erilaiset lähestymistavat vieraskielisen sanaston opetukseen. Tämän lisäksi ensimmäisessä teoriaosassa esitellään tässä tutkielmassa käytetyt määritelmät sanan määrittämiseksi.

Tutkielman toinen osa käsittelee digitaalisten oppimispelien hyödyntämistä kielenopetuksessa ja etenkin sanaston oppimisessa. Digitaalisten pelien käyttö opetuksessa on yleistynyt Suomessa, ja käsite digitaalisiin peleihin perustuva oppiminen (*digital game-based learning*) viittaakin oppimiseen, joka tapahtuu digitaalisia pelejä hyödyntämällä. Opetuksessa käytetään oppimisvälineenä pelejä, joiden tarkoituksena on luoda turvallinen, koukuttava ja motivoiva

oppimisympäristö (Reinhardt 2019, 194–195). Teoriaosassa määritellään digitaalinen peli sekä kartoitetaan digitaalisten pelien sisäisiä ominaisuuksia, jotka ovat merkittävässä asemassa, jotta pelaaminen koetaan mielekkääksi sekä koukuttavaksi toiminnaksi. Keskustelemme myös digitaalisten pelien sisäisten ominaisuuksien hyödyistä tunnettujen oppimisteorioiden näkökulmasta, kuten lähikehityksen vyöhykkeen (*Zone of Proximal Development*) toteutumisesta pelimaailmassa. Vygotskiin teoria lähikehityksen vyöhykkeestä kuvaa optimaalisen oppimisen tasoa tai aluetta (Vygotski and Cole 1978, 86). Oppija voi saavuttaa tämän tason, kun hän toimii yhteistyössä häntä kyvykkäämpien aikuisten tai ikätovereiden kanssa tai saa apua heiltä. Esimerkkinä pelistä, jossa lähikehityksen vyöhyke voi toteutua, mainitaan virtuaaliset maailmat. Tämä pelityyppi tarjoaa usein pelaajille hyvin oppimisrikkaan ympäristön, jossa pelaajat oppivat vuorovaikutuksen kautta (Halmari ym. 2016, 170, Sandler 2012, 24). Virtuaalisissa maailmoissa pelaajat ovat vuorovaikutuksessa ympäristön sekä muiden pelaajien kanssa. Kielenoppimisen näkökulmasta tämä on hyvin hedelmällinen oppimisympäristö, sillä oppijat oppivat tekemällä, kokeilemalla sekä muokkaamalla ympäristöään. Tätä prosessia tukee muut pelaajat, joiden kanssa pelaaja voi kommunikoida, sekä itse peliympäristö, joka mukautuu pelaajan tekemien päätösten mukaan.

Aiempien tutkimusten perusteella voi todeta, että digitaaliset pelit voivat myös tukea ja tehostaa vieraan kielen sanaston oppimista (esim. Rasti Behbahani 2020). Teoriaosuudessa keskustellaan aiemmista tutkimuksista, jotka keskittyvät digitaalisten pelien hyötyihin kielten oppimisessa sekä erityisesti sanaston oppimisessa. Sanaston oppimisella on keskeinen merkitys kielenoppimisessa, jolloin onkin luonnollista, että sen pelillistäminen on yleistä. Aiemmat tutkimukset näyttävät, että digitaaliset peleihin perustuvat tehtävät (digital game-based tasks) ovat edistäneet oppilaiden reseptiivistä sekä produktiivista sanastoa (esim. Rasti Behbahani ja Shahbazi 2020, Chen ja Hsu 2020). Voidaan todeta, että digitaalisten pelien käyttö opetuksessa voi edistää ja tukea kokonaisvaltaista sanastonoppimista. Vaikka digitaalisten pelien hyödyt ovat tutkittuja, niiden käytöstä on ilmennyt myös negatiivisia vaikutuksia. Hadijah, Pratolo ja Rondiyah (2020) ja Müller ym. (2018) huomasivat, että tietyt peliominaisuudet, kuten aikarajoitus ja etenemistahti, voivat heikentää oppimistuloksia. Näiden yllä mainittujen tulosten johdosta on merkityksellistä tutkia oppimislejää yksityiskohtaisemmin, jotta olisi mahdollista hyödyntää niitä entistä enemmän oppimisen tukena.

Kolmas ja viimeinen teoriaosa tutkielmassa käsittelee kieltenoppimista ja motivaatiota. Motivaatio on laajasti tutkittu aihe, johon on aikojen saatossa syntynyt monta erilaista näkökulmaa ja teoriaa. Tutkielman kannalta motivaatiota päätettiin tutkia vain yhden

motivaatioteorian pohjalta. Tutkielmassa käytetty motivaatioteoria on Dörnyein (2005) esittelemä teoria kielenoppimisesta. Dörnyei (2005) jakaa kielenoppimismotivaation kolmeen eri osa-alueeseen: ideaali L2-minä, vaadittu L2-minä ja L2 oppimiskokemus. Tutkielma kartoitti oppilaiden kokemuksia kaikista kolmesta osa-alueesta, mutta keskittyi eniten L2 oppimiskokemukseen, sillä tutkielman tarkoitus on tutkia digitaalisten opetuspelien käyttöä osana L2 opetustilannetta. Aikaisempien tutkimusten pohjalta (Takahashi and Im 2020, Lamb 2012) voidaan todeta L2 oppimiskokemuksella olevan vaikutusta vieraankielenopiskelijoiden kielitaitoon.

Tutkielman aineisto kerättiin keväällä 2021. Tutkimukseen osallistui erään eteläsuomalaisen lukion kaksi rinnakkaisluokkaa. Molemmat luokat suorittivat tutkimushetkellä samaa englannin kielen kurssia. Yhteensä tutkimukseen osallistui 49 lukiolaista, jotka olivat iältään 15–16-vuotiaita. Ryhmät olivat heterogeenisiä, ja osallistujien taitotaso englannin kielessä vaihteli. Tutkimus koostui kolmesta kyselylomakkeesta ja kahdesta pelikerrasta. Tutkimukseen osallistuvista luokista toinen ryhmä pelasi *Gimkit!* -peliä, ja vastaavasti toinen ryhmää pelasi *Kahoot!* -peliä.

Tutkimukseen osallistuttiin anonyymisti, ja osallistujille tehtiin selväksi, että tutkimuksen kyselylomakkeiden tulokset eivät vaikuta heidän kurssiarvosanaansa. Ensimmäisen kyselylomakkeen tarkoitus oli lähtötason kartoittaminen. Lähtötason selvittämiseksi osallistujat tekivät sanastotestin ennen ensimmäistä pelikertaa. Sanastotestin lisäksi ensimmäinen kyselylomake sisälsi kysymyksiä motivaatiosta. Ensimmäisen kyselylomakkeen jälkeen osallistujat pelasivat opetuspelejä kahdella peräkkäisellä englannin kielen tunnilla 15 minuutin ajan. Toisen pelikerran jälkeen osallistujat vastasivat toiseen kyselylomakkeeseen, joka koostui samasta sanastotestistä kuin ensimmäisellä kerralla sekä uudesta motivaatiokyselystä. Motivaatiokysely sisälsi tarkentavia kysymyksiä pelien ominaisuuksien vaikutuksesta L2 oppimiskokemukseen. Myöhemmin osallistujat vastasivat vielä kolmanteen kyselylomakkeeseen, joka koostui sanastotestistä. Tämän kolmannen ja viimeisen sanastotestin tarkoitus oli kartoittaa opetuspelien mahdollisia pitkäaikaisia vaikutuksia osallistujien sanaston osaamiseen. Kerätty data analysoitiin kvantitatiivisesti SPSS-ohjelmaa hyödyntäen.

Tutkimuksen tulosten mukaan molemmat digitaaliset opetuspelit, *Gimkit!* ja *Kahoot!*, edistivät osallistujien sanaston oppimista merkittävästi. Molemmat ryhmät paransivat merkittävästi tuloksiaan sanastotesteissä pelikertojen jälkeen. Näin ollen kumpikaan peli ei osoittautunut toista paremmaksi, vaan sanaston oppimisen kannalta molemmat pelit olivat yhtä hyödyllisiä.

Tulokset opetuspelien hyödyllisyydestä ovat linjassa aikaisempien tutkimusten kanssa. Viimeisen sanastotestin tulosten perusteella peleillä oli myös pitkäaikaisia positiivisia vaikutuksia sanaston oppimiseen. Pelien välillä ei ollut tulosten perusteella merkittävää eroa sanaston pitkäaikaisen osaamisen kannalta. Tutkielman tulokset tukevat digitaalisten opetuspelien hyödyllisyyttä kieltenopetuksessa ja etenkin sanaston oppimisessa. Ensimmäinen tutkimuksessa esitetty hypoteesi osoittautui kuitenkin virheelliseksi, sillä pelien välillä ei ollut eroja sanaston edistämässä.

Motivaatiota tarkasteltaessa pelit eivät olleet merkittävässä asemassa. Osallistujien motivaatio ei muuttunut pelikertojen jälkeen merkittävästi. Osasyynä tähän tulokseen voidaan pitää osallistujien korkeaa motivaatiota jo ennen pelien pelaamista. Koska ensimmäisen kyselylomakkeen mukaan osallistujien lähtötasomotivaatio oli korkea, ei pelien vaikutus motivaation edistämiseen ole yhtä selkeä verrattuna tilanteeseen, jossa lähtötasossa koettu motivaatio olisi ollut alhaisempi. Pelien vaikutusta motivaatioon voitaisiin tutkia tarkemmin, jos opiskeltava kieli olisi ollut jokin toinen, kuten esimerkiksi saksan kieli. Kohdekielen vaihtaminen olisikin mielenkiintoista esimerkiksi jatkotutkimuksien kannalta. Tutkimuksen tulosten perusteella voidaan kuitenkin todeta molempien ryhmien pitäneen digitaalisten opetuspelien pelaamisesta osana kieltenopetusta, sillä pelit pitivät yllä osallistujien korkeaa motivaatiota.

Koska tutkielman yhtenä tarkoituksena on verrata pelien sisäisiä ominaisuuksia ja niiden vaikutusta motivaatioon, keskityttiin tulosten analyysissä myös oppilaiden kokemuksiin pelien sisäisistä ominaisuuksista osana L2 oppimiskokemusta. Tulosten perusteella voidaan todeta, että pelien sisäisistä ominaisuuksista pelimuoto ja edistymistähti vaikuttivat eniten L2 oppimistilanteessa koettuun motivaatioon. Tutkimuksen tulosten perusteella motivoivin pelimuoto on yksinpeli, jossa pelaaja saa edetä omassa tahdissa ilman aikarajaa. Näin ollen kumpikaan peleistä, *Kahoot!* tai *Gimkit!*, ei ollut selkeästi toista motivoivampi. Tämä tulos on ristiriidassa tutkielmassa esitellyn hypoteesin kanssa, jonka mukaan *Gimkit!* olisi motivoivampi kuin *Kahoot!* Tutkielman tulos auttaa kuitenkin kieltenopettajia valitsemaan opetustilanteeseen parhaiten sopivan pelin, kun tarkoituksena on nostattaa oppilaiden kokemaa opiskelumotivaatiota.

Lopuksi tutkielmassa pyrittiin myös selvittämään mahdollista korrelaatiota motivaation ja sanastohallinnan välillä. Hypoteesina oli, että korkea motivaatio näkyy hyvässä sanaston osaamisessa. Tulosten mukaan motivaation ja sanastohallinnan välillä ei kuitenkaan ilmennyt

korrelaatiota, eli hypoteesi osoittautui vääräksi. Myös tätä tulosta voidaan selittää korkealla motivaatiolla jo ennen pelien pelaamista sekä pienellä otoskoolla. Jatkotutkimuksissa tulisi siis kohdekielen vaihtamisen lisäksi myös kartoittaa isompi joukko vastaajia.

Tutkielman tulosten perusteella voidaan tiivistetysti todeta digitaalisten opetuspelien käytön kielenopetuksessa olevan tehokasta sanastonoppimisen edistämässä. Tutkielmassa tukiut pelit, *Gimkit!* ja *Kahoot!*, vaikuttivat molemmat positiivisesti sanastonoppimiseen. Osallistujat myös kokivat pelit mielekkääksi osaksi L2 oppimistilannetta, ja molemmat pelit ylläpitivät osallistujien korkeaa opiskelumotivaatiota. Pelien välillä ei kuitenkaan havaittu suuria eroavaisuuksia. Kielenopetuksen kannalta motivoivin peli on tutkimuksen tulosten perusteella yksin pelattava peli, jossa ei ole aikarajoitusta. Tutkielman tulokset pelien ominaisuuksista tuovat uutta tietoa kielenopetuksen kentälle ja auttavat kielenopettajia valitsemaan opetustarkoitukseen sopivan pelin.

Tutkielman pohjalta heräsi myös tarve jatkotutkimuksille. Tulevaisuudessa digitaalisten opetuspelien hyödyllisyyttä kielenopetuksessa voitaisiin tutkia tarkastelemalla yksityiskohtaisemmin pelien ominaisuuksien vaikutuksia motivaatioon. Aihetta tulisi tutkia vaihtamalla kohdekieli englannista suomalaisessa kontekstissa harvinaisempaan kieleen, sillä motivaatio opiskella englantia on suomenkielisissä kouluissa yleensä jo valmiiksi korkea. Myös kontrolliryhmän lisääminen tutkimusasetelmaan tarjoaisi tarkempaa tietoa digitaalisten pelien vaikutuksesta sanaston oppimiseen ja motivaatioon, sillä sen avulla voitaisiin verrata digitaalisia opetuspelejä hyödyntävää opetusta perinteisempään opetukseen. Tutkielman otoskoko oli myös verrattain pieni, joten otoskoon kasvattaminen jatkotutkimuksissa olisi hyödyllistä, jotta pelien vaikutus oppimiseen ja motivaatioon tulisi selkeämmin esille.