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Using Digital Game-Based Language Learning for Developing English Language Skills

A Mini Scoping Review

Master's thesis in Primary and Secondary Teacher Education for Years 1-7

Supervisor: Fredrik Mørk Røkenes

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NTNU

Kunnskap for en bedre verden

Abstract

The use of digital games in educational contexts has become a worldwide pedagogical approach. Digital games can make learning more fun and engaging, but they can also take away some of the seriousness and stress some pupils may associate with more traditional classroom instruction. Over the last few decades, digital game-based learning has become more popular, also in the English as a foreign language classroom. As a result, the field of research on the topic have expanded and become more extensive. This study is a mini scoping review, and it aims to provide an overview of available literature discussing the topic of digital game-based language learning. More specifically, it provides an overview of studies that examine how digital games can facilitate the development of English language skills in the EFL classroom. A total of 20 studies have been reviewed, and results indicate that: 1) most digital game-based language learning studies were conducted in 2020 and 2021, 2) the majority of studies were conducted in Asia, more specifically in Taiwan, 3) most participants were aged between 5 and 13 years, 4) most studies adopted a quantitative methodology (experimental design), and tests were the most frequent data collection approach, 5) most studies had a small sample size, 6) vocabulary was the English language skill most frequently focused upon, 7) mostly serious games were identified, 8) in the analyzed studies, no connections could be identified between game genres and the development of English language skills, 9) but rather a connection between game elements and the development of English language skills.

Keywords: Digital games, digital game-based learning, English language skills, English as a foreign language, digital game-based language learning

Sammendrag

Bruken av digitale spill i undervisningssammenheng har blitt en verdensomspennende pedagogisk tilnærming. Digitale spill kan gjøre læring morsommere og mer engasjerende, men det kan også ta bort noe av alvoret og stresset enkelte elever kan forbinde med mer tradisjonell klasseromsundervisning. I løpet av de siste tiårene har digital spill-basert læring blitt mer populært, også i klasserom hvor engelsk undervises som et fremmedspråk. Som et resultat har forskningsfeltet på dette temaet blitt utvidet og mer omfattende. Denne studien er en mini scoping review, og den har som mål å gi en oversikt over tilgjengelig litteratur som diskuterer digital spill-basert læring som tema. Mer spesifikt gir den en oversikt over studier som undersøker hvordan digitale spill kan tilrettelegge for utviklingen av engelske språkferdigheter i engelskklasserommet. Totalt 20 studier er gjennomgått, og resultatene indikerer at: 1) de fleste studiene om digital spill-basert læring ble utført i 2020 og 2021, 2) flertallet av studiene ble utført i Asia, nærmere bestemt i Taiwan, 3) de fleste deltakerne var mellom 5 og 13 år, 4) de fleste studiene tok i bruk en kvantitativ metodikk (eksperimentell design), der bruk av tester var den hyppigste datainnsamlingstilnærmingen, 5) de fleste studiene hadde en liten utvalgsstørrelse, 6) ordforråd var den engelske språkferdigheten som hyppigst ble fokusert på, 7) flest seriøse spill ble identifisert, 8) i de analyserte studiene kunne det ikke påvises noen sammenheng mellom spill-sjanger og utvikling av engelske språkferdigheter, 9) men heller en sammenheng mellom spill-elementer og utvikling av engelske språkferdigheter.

Nøkkelord: Digitale spill, digital spill-basert læring, engelsk som fremmedspråk, digital spill-basert språklæring

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List of Abbreviations

CALL	Computer assisted language learning
CEFR	Common European framework of reference for languages
CG	Control group
DCG	Digital commercial games
DGBLL	Digital game-based language learning
EFL	English as a foreign language
EG	Experimental group
ESL	English as a second language
GBL	Game-based learning
GBLL	Game-based language learning
L2	Second language
MMORPG	Massive multi-player online role-play game
S1-S20	Study 1 – Study 20

1. Introduction

Using digital games for education has been identified as one of the global pedagogical approaches required for 21st century learners. The intention is to make education more interactive and interesting and to enhance understanding (Ishak et al., 2020, p. 1). This expanded use of learning games in educational contexts has led to an emergence of game-based learning (GBL) as a recognized field of study (Hung et al., 2018, p. 2). GBL creates variation in the teaching and can have positive effects on pupils' commitment and motivation in learning (Eltahir et al., 2021). It has also been claimed that using digital games in kindergarten to grade 12 is more practical in order to increase pupils' levels of interest. Interactive games use advanced graphics and programming tools, and game designers and developers often collaborate with educators to construct good instructional games for learning (Ishak et al., 2020, p. 1). Today, millions of people play digital games in a growing variety of genres and titles in numerous languages (Reinhardt, 2017, p. 202).

According to Meyer, the use of games in language learning contexts also have a long history (Meyer, 2013, p. 40). Games are often used in early language learning and are central to communicative approaches to language learning. Games can provide contextualized input, and the use of role play, challenge, and competition will engage learners. Further, games are often used to support the learning of language skills through repetition and drills, for instance for basic vocabulary training (Meyer, 2012, p. 333). Interacting with, through and about digital games has become an everyday, language-mediating activity, and for many players around the world, it has become a means to learn languages informally. While educational systems in several Western countries are perceived as creative and forward-looking, some educational systems (e.g., in some Asian countries) can still be perceived as somewhat conservative and reserved (Frami, n.d.). Nevertheless, game-based language learning has become a phenomenon, even in these countries. It is therefore no surprise that several researchers have, in recent years, begun to examine games as potential second or foreign language resources (Reinhardt, 2017, p. 202).

This mini scoping review examines the field of research of the development of certain English language skills and how the use of digital game-based language learning (DGBLL) in the English as a foreign language (EFL)¹ classroom can contribute to the development of such skills. The review maps available literature on the topic and provide an overview based on two research questions. The research questions explored in this review are:

1. What is the current state of knowledge regarding the development of English language skills by using DGBLL in the EFL classroom?
2. In what ways do the digital games in the included studies support the development of English language skills in the EFL classroom, specifically with regard to digital game function types, game genres and game elements?

This topic piqued my interest as it is innovative and forward-looking. In addition, my interest in the topic grew further after the outbreak of the covid-19 pandemic. School systems all over the world faced challenges that now made completely new demands on

¹ Throughout this review, English as a foreign language will be referred to as English as a foreign language (EFL), English as a second language (ESL), or second language (L2).

digital teaching, in which digital game-based learning could potentially become a new and central form of learning.

Initially, I will define DGBLL and related terms, and I will discuss theoretical perspectives on learning in relation to this. Further, I will describe the methodology of this mini scoping review, and how the literature search was refined. Finally, the material will be analyzed, and I will discuss the findings. All will be summarized in a conclusion and suggestions for future research.

2. Theoretical framework and definitions

This chapter consists of the theoretical framework for this mini scoping review. Here, relevant aspects of learning English as a foreign language will briefly be described. Furthermore, I will explore digital game-based learning and digital game-based language learning as well as look into certain categories of this.

2.1. Learning English as a foreign language

A global language like English is often heard in daily use all over the world. It has become a part of the daily lives of people from diverse linguistic and cultural backgrounds. This also applies in countries where English is not a primary language but a second language or where it has a supranational function (e.g., in countries where English is not an official language, but where shop fronts use English signs) (Galloway & Rose, 2015, p. 11). Many European countries are at the top of the English proficiency index as of 2016, which is not surprising given historical trade connection with the United Kingdom and due to the fact that English is one of the three “working languages” of the European Commission. While European countries appear at the top of the index, Asian countries, have a higher overall average proficiency (Breene, 2019). In Asia, a high English proficiency is linked to social development and innovation, and it often leads to higher average income, a better quality of life and greater investment in research and development. Therefore, many Asian countries invest heavily on English education and training, and the desire to learn English is tremendous (Muslimin, 2017).

Many benefits are claimed for starting language learning at an early age. Child second language acquisition refers to acquisition by someone young enough to be within the *Critical Period*, yet with an already acquired first language (Gass et al., 2020, p. 111). The Critical Period Hypothesis is the name given to the idea that young children can learn a foreign or second language particularly effectively before puberty because they, up until then, have access to the same language specialized faculty involved in first language acquisition; after that, they need to rely on general cognitive ability (Ellis & Shintani, 2014, p. 297). Some researchers, however, argue that there is no such cut-off point for language learning. Where the goal is native-like proficiency in a second language, it can be beneficial to start early. Nevertheless, if the goal is communicative ability in a foreign language, the benefits of an early start are much less clear (Cameron, 2018, p. 14).

Children are exposed to English language from an early age in videos, TV, on computers, and in film. Still, it is not certain that they encounter a lot of “everyday” English language. Therefore, there is a great responsibility placed on the teacher to provide an adequate exposure to the language and to provide opportunities for language learning in the EFL classroom (Cameron, 2018, pp. 11-12).

According to Gass et al. (2020), a good way to test knowledge is by using that knowledge in some productive manner as opposed to using language only for comprehension (p. 407). For instance, due to a lack of opportunities to use English language for genuine communication among Taiwanese EFL learners, they are, in general, known to have a low-level communication ability (Wu et al., 2014, p. 1). Still, Taiwanese government wishes to recognize English as a quasi-official language of Taiwan within the next few years (Tseng, 2008, p. 84) (see discussion in Chapter 5.1.2).

In contrast, children in Norway are exposed to much more English in everyday life as TV-shows, movies, etc. are usually broadcast in the original language, with subtitles. In Norwegian schools, it has also become a requirement that pupils are given

opportunities to experience, use and explore the English language from the outset. English teaching should also facilitate for pupils to unfold and interact in authentic and practical situations (Norwegian Directorate of Education and Training, 2020).

2.1.1. Developing English language skills

English has emerged as one of the dominant languages of choice in internal communication (Galloway & Rose, 2015, p. 127). Therefore, basic skills in English have nearly become a necessity in people's everyday life. Basic English skills have many components. In this mini scoping review, however, the focus will be on how DGBLL can be used to develop the following English language skills:

- English speaking skills
- English listening skills
- English reading skills
- English communicative skills
- English vocabulary skills
- English grammar skills
- English phrasal verb skills

English language speaking and listening are core elements of interaction (Hwang et al., 2015, p. 1). A development of speaking and listening skills are important in order to communicate effectively. Speaking skills give us the ability to convey information verbally in a way that listeners can understand. Speaking is an interactive process where information is shared and, when necessary, acted upon by the listener. Four elements of speaking are vocabulary, grammar, fluency, and pronunciation (Twinkl, n.d.²). Listening skills enables people to accurately receive and interpret messages in a communication process. Without the ability to listen effectively, messages can easily be misunderstood (Skillyouneed, n.d.).

Reading can be considered both a skill and a cultural competence. Through reading, children get to take part in the textual culture, but they also develop the ability to interpret and understand different texts. This in turn provides an opportunity for new learning, of understanding oneself and society (Folkehelseinstituttet, 2015).

Communicative skills are the ability to convey information from one person to another effectively and efficiently. Such skills are best developed when attention is paid to language flow and not just accuracy, to authentic language use and contexts and last, but not least, to the need to apply language learned in the classroom to real-life, authentic contexts (Wu et al., 2014, p. 216).

Vocabulary is related to the words of a language. Recent studies on vocabulary draw on the understanding of lexis, which is Greek for "word", referring to all the words in a language (Lessard-Clouston, 2014, p. 1). Thus, one can say that lexis, or vocabulary, is the core of language. Vocabulary plays a fundamental part in, for instance, reading processes and is crucial to reading comprehension. Children need a rich vocabulary that grows through language and literacy experiences in order to be able to comprehend and construct increasingly complex texts, and to engage in oral language (Victoria State Government, 2021). Vocabulary is also necessary in order to understand others and to be able to express thoughts and ideas (Lessard-Clouston, 2014, p. 2). It is argued that a person needs to know a range of 3000-9000 words to have a proficient

² A British online educational publishing house, producing teaching and educational resources.

language (Gass et al., 2020, p. 232). There are three types of English vocabulary: 1) high-frequency, 2) mid-frequency and 3) low-frequency (Masrai, 2019, p. 3). High-frequency vocabulary include the most frequent 3000-word families. Mid-frequency vocabulary includes words between 3000 and 9000-word frequency level. Finally, low frequency vocabulary includes the words beyond 9000-word families. At this level of word frequency, vocabulary becomes infrequent and thus has limited use (Masrai, 2019, pp. 3-4). Examples of high-frequency vocabulary are *the*, *history* and *prefer*. Mid-frequency vocabulary are *academic*, *default* and *authentic*. Low-frequency vocabulary can be *remorse*, *resonate* and *outdo* (Schmitt & Schmitt, 2012, p. 488, 495).

Grammar should have a central place in children's foreign language learning. The grammar term has been used to refer to an aspect of how a language is conventionally used, for instance to the structure or system of a particular language (Cameron, 2018, pp. 97-98). Many people speak their own language without having studied the grammar in advance and children do start speaking before knowing the meaning of grammar. Nevertheless, adequate grammar skills can help learn a new language more quickly and efficiently (English club, n.d.).

A *phrasal verb* is a phrase that is made up of a verb (an action word, e.g., *hearing*) and another word or two, usually a preposition (a word describing the relationship between two words, e.g., "the book is *under* the sofa"), but sometimes an adverb (a word describing a verb, e.g., "we left too *early*"). A phrasal verb work by changing the verb's meaning based on the preposition that follows them. For instance, the word *come* by itself means to move towards something. However, when placed together with the preposition *on*, it changes meaning and becomes a phrase of encouragement (Geikhman, n.d.). It is of importance to learn phrasal verbs because they are very common in informal English, and it will be difficult to understand informal English language unless you are familiar with phrasal verbs and their meanings. Additionally, learning how to use phrasal verbs will help language learners to sound more natural in everyday conversations ("Phrasal verbs", n.d.)

2.2. Digital game-based learning

In this chapter, I will briefly describe what a game is, and what a digital game is. Further, I will explain the digital game function types, the digital game genres and the digital game elements which are explored in this study. I will also introduce four learning perspectives, to which I will associate the game elements in the final discussion. Finally, I will add some possible limitations of digital game-based learning and some remarks concerning the emergence of digital game-based language learning.

2.2.1. What is a game?

There are several definitions to what a game is. Some denominators are that games are activities engaged in for diversion or amusement, that they consist of procedures or strategies for gaining an end, and, finally, that they contain competition which is conducted according to rules. A game is, in other words, considered playful and engaging, goal-oriented, and rule-governed (Reinhardt, 2019, p. 78). Although the terms *game* and *play* are often used interchangeably, play differs from games in that play, to a greater extent, is associated with an exploratory and improvisational form of activity that usually is voluntary and deals with imaginary settings often perceived as exciting (Jørgensen & Mortensen, 2013; Eik et al., 2011, p. 11). It is also important to differentiate between GBL and gamification. While GBL consist of learning contexts where game elements are used to teach specific skills or achieve specific learning

outcomes, gamification is the application of game elements and principles in a non-game context to engage users in a task or activity (Findlay, 2016; Tahir, 2021, p. 19). Examples of gamification can be receiving points, earning diplomas/badges, leveling up, etc. Gamification will, however, not be part of this review as the term implies a much wider and looser concept, that in turn includes much more than the GBL term. It includes game features, but without directly being GBL. This also became clear when the search string for this mini scoping review was prepared. By including the Gamification term in the search string (see Figure 1), the number of search results increased considerably, and a detailed treatment of this number by far exceeds the framework for this study.

2.2.2. What is a digital game?

Games can be either analog or digital. Analog games are non-electronic games played by people face-to-face. Digital games, on the other hand, are interactive video games available to players on electronic devices and platforms, such as computers, arcade consoles, video consoles connected to home television sets, handheld game machines, mobile devices, etc. (Project Nayuki, 2020; Lowood, n.d.).

In the following paragraphs, descriptions of digital game function types, digital game genres and digital game elements will be presented.

2.2.2.1 Digital game function types

In categorizing digital games, it can be useful to consider their primary function: is the digital game initially developed for entertainment, or for learning? Digital commercial games (e.g., Mario Kart) are mainly developed for fun, recreation, and entertainment, even though they can have some educational value (Connolly et al., 2012, p. 662; R uth & Kaspar, 2021).

Digital serious games on the other hand, are designed with the purpose of education (Becker, 2016, p. 43, 44). The main aim for serious games is learning and behavioral change. Serious games were developed for broad purposes of training and behavioral change in business, industry, marketing, healthcare, and government NGOs (non-governmental organization) as well as in education (Connolly et al., 2012, p. 662).

2.2.2.2 Digital game genres

Digital game genres can be defined as a category for games that have similar mechanics, player behavior, and themes (Reinhardt, 2019, p. 90).

Action games often involve movement, physical coordination, and time pressure. Subgenres include fighting, platform, shooter, and survival. Sports videos can sometimes be considered a subgenre of action. Themes in this genre tend to go towards sports, military, and combat, and dynamics that facilitate language use and learning include comprehending rules, listening for cues, and reacting, coordinating actions with other players, and managing time pressure (Reinhardt, 2019, pp. 91-92). One example of an action game is *Assassins Creed*.

Puzzle games are a genre that emphasize puzzle solving. Puzzles may test several problem-solving skills, such as logic, strategy, pattern recognition, sequence solving and word completion. The genre is broad, but they tend to focus on logical and conceptual challenges. These games often add time-pressure ("Puzzle video game facts Kids", 2021). *Hurdle* is one example of a puzzle game.

Adventure games involve exploration, following stories and developing characters, in addition to solving puzzles. Themes tend towards science-fiction, fantasy,

and mystery, and potential for language use and learning lies in the following of the stories, making decisions, choosing options, matching objects, solving puzzles, and interacting with other players (Reinhardt, 2019, p. 92). It takes two is an adventure game.

In *Social deduction* games, there are usually two teams with contrary goals. One of these teams tend to be smaller, villainous, and hidden within the larger group. Working together, these villainous players try to sabotage or kill other players. The other players then must work on finding out who the traitor is (TvTropes, n.d.). Among Us is a social deduction game.

MMORPGs (massively multi-player online role-playing games) often have a fantasy-based theme and may involve extensive character building. Dynamics that facilitate language use and learning are, among other things, the developing of characters and identity play, comprehending rules, following stories, choosing quests, and interacting with other players. One MMORPG is World of Warcraft (Reinhardt, 2019, p. 93).

Board games are usually games in which pieces are moved in particular ways on a board marked with a pattern (Board Game, n.d.). Monopoly is one example of a board game.

Simulation games often involve building or managing a representation of a system, like a city, a theme park, a life, or a society. Themes tend to include any sort of organization or entity that can be managed as a system, from restaurants to prisons. Dynamics that support language use and learning include comprehending rules, planning, organizing, weighing outcomes, and strategizing (Reinhardt, 2019, p. 93). The Sims is a simulation game.

Strategy games mainly focus on planning and strategizing the victory against an opponent and may also involve battles and fighting in real time. Themes are often based on history or war, and games with this genre may facilitate for language learning by including comprehending rules, long-term planning, and tactics, coordinating with other players, and measuring risk-taking. Age of empires is a strategy game.

Quiz games are contest games where participants test what they know by answering questions on varying topics (Raikar, n.d.). Kahoot is a quiz game.

Science fiction games takes the player away from reality and to the great beyond, sometime even to alternative timelines, where players get to explore ends of human endeavour (Lobley, 2021). BioShock is a science fiction game.

2.2.2.3 Digital game elements

Digital game elements are the components or the characteristics that make up a game (Igi Global (n.d.)).

The digital game elements of this mini scoping review are based on findings made in the 20 included studies. The researchers of these studies may not have mentioned these elements themselves, but by reading the studies, I identified and interpreted them as language-promoting digital game elements. Definitions of the identified digital game elements are given in Table 5.

2.2.3 The potential of digital game-based learning

According to Shute and Ke (2012), a good game can act as a transformative digital learning tool to support deep and meaningful learning. Learning is at its best when it is active, goal-oriented, contextualized, and interesting (Shute & Ke, 2012, p. 47).

When digital games first appeared in the 1970's, educators quickly realized their potential as learning tools, and the connection between learning and games became a center of attention among instructional technologists and educational theorists. Second and foreign language educators also noticed the potential of games for second and foreign language learning (Reinhardt, 2019, pp. 5-6). Digital learning games have become a much-applied tool inside and outside of schools due to the increased availability of computer and multimedia technologies at schools (Tisza et al., 2021). According to James Paul Gee (2005), good game designers are practical theoreticians of learning, since what makes a game deep is that players get to exercise their learning muscles, often without knowing it and without having to pay attention to the matter (Gee, 2005, p. 5).

Due to the covid-19 outbreak at the end of 2019, teachers had to come up with new and creative ways to teach online as social distancing was mandatory. Online platforms were used by many countries. Online learning tools ranged from educational content which pupils could explore on their own and formalized learning programs that they could work on at their own pace, to real-time online lessons led by teachers using virtual meeting platforms (Schleicher, 2020, p. 15). A potential alternative to such remote teaching could be digital game-based learning (DGBL) as it is considered a motivating and fun form of learning, which can, in turn, improve student learning outcomes and creativity (Wati & Yuniawatika, 2020).

2.2.4 Four perspectives on digital game-based learning

Plass et al. (2015) mention four specific game-based learning perspectives: *cognitive processing, motivation, affect* and *sociocultural interaction*. According to Plass et al. (2015), "the integrated viewpoints of cognitive, motivational, affective, and sociocultural perspectives are necessary for both game design and game research in order to fully capture what games have to offer for learning" (Plass et al., 2015, p. 278).

These four perspectives will be discussed closer in the upcoming paragraphs in order to shed light on the main research question of this review, namely how digital game-based language learning can facilitate the development of English language skills. The four perspectives will also be the basis for my final analysis and discussion.

2.2.4.1 Cognitive processing

The cognitive perspective investigates what happens "inside" the head of the learner. Cognitive theorists believe that humans do not react automatically to outer stimuli; humans are active beings who interpret and evaluates outer stimuli on an independent foundation before acting. Cognitivists place more emphasis on exploring the human inner world, on finding out how it organizes stimuli and how knowledge is organized (Imsen, 2012, p. 35). In other words, in a cognitive perspective on game-based learning, the goal of the game is to construct mental models for learners (Plass et al., 2015, p. 265). EFL teachers have considered DGBLL to help long-term memory and provide practical experience (Taufik et al., 2019, p. 278). Information presented in a game, is organized as visual and verbal representations in working memory, and further, integrated with one another and with prior knowledge (Plass et al., 2015, p. 265). Digital games can facilitate cognitive processing in several ways.

In cognitive theory, the topic of adaptivity have been raised, especially since technology-based scaffolding have become more prevalent. One major debate has been around the concept of true scaffolding, where an adaptation of scaffolding happens during a learning process (Zydney, 2012, p. 2914). During true scaffolding, an ongoing

evaluation of the learner takes place, and the scaffolding fades as the learner acquire skills and knowledge. When it comes to true scaffolding in game-based learning, it is, for instance, common for the support to gradually be removed as the player advance in the game (Plass et al., 2015, p. 266). Appropriate ongoing feedback can also serve as a scaffold, especially when players face challenges in the game (Plass et al., 2015, p. 266).

By presenting information or tasks closely related to the context of learning or to real life, the game facilitates transfer of learning (Plass et al., 2015, p. 265). Transfer of learning can be defined as how a learner can apply already acquired knowledge, skills, and practices across time and contexts (IGI Global, n.d.). In other words, it is our use of past learning when learning something new, and the application of that learning to both similar and new situations (Haskell, 2000, p. XIII). Games can facilitate transfer in two ways (Plass et al., 2015, p. 266).

- 1) By providing repeated opportunity to practice skills and apply knowledge which, in turn, may lead to automaticity. In second language production, the formulation of messages does not happen automatically and requires attentional control. Here, learners must encode their message with the correct language and forms as they self-monitor their utterances. The degree of automatic is related to the level of the learner in terms of proficiency (Gass et al., 2020, p. 274). The most central way for automaticity to take place is through fast, unconscious, and effortless processing. After a consistent and regular association between a certain input and output patterns have been made, automatization may happen (Gass et al., 2020, p. 302).
- 2) By providing different, but related experiences that facilitate the abstractions needed for knowledge to be generalized to new situations (Plass et al., 2015, p. 266).

Representation of information may also be considered a strength of games in connection with cognitive processing (Plass et al., 2015, p. 265). Most games represent key information in visual form, which can, for instance, be based on principles of cognitive load theory. Studies have shown that iconic representations (e.g., burners that represent heat) are particularly helpful to learners with low prior knowledge and for learners at younger developmental stages. This can be due to the fact that information is available in several formats (Plass et al., 2015, pp. 265-267).

2.2.4.2 Motivation

Motivation is about how emotions, thoughts and reasoning go together and gives color and glow to our actions. It can be defined as what causes activity in an individual, what keeps the activity going, and what gives the activity an aim and a meaning (Imsen, 2012, p. 375). People may experience either intrinsic or extrinsic motivation. Intrinsic motivation is when an activity is done because of its inherent satisfaction, rather than for some separable consequence (Ryan & Deci, 2000, p. 56). In other words, the activity is considered genuinely interesting. The joy and satisfaction lie in the activity rather than externally added praise or other rewards following the activity (Skaalvik & Skaalvik, 2015, p. 66). Extrinsic motivation contrasts with intrinsic motivation in that it has instrumental value (Ryan & Deci, 2000, p. 60). Such motivation is often understood as an activity performed in order to achieve a reward (Skaalvik & Skaalvk, 2015, p. 67).

According to Plass et al. (2015), several core elements of game design are thought to be intrinsically motivating to players (p. 269). Autonomy, for instance, constitutes a core part of the intrinsic motivation of playing games (Deterding, 2016, p. 3931). Autonomy can be defined as “behaving with a sense of volition, willingness, and congruence; it means to fully endorse and concur with the behavior one is engaged in” (Deterding, 2016, p. 3932). Digital games allow learners to become more self-directed because digital play environments engage learners to a greater extent and possess features that contribute to independent learning, such as safe spaces and authentic learning environments (Toh & Kirschner, 2020). It is claimed that the experience of autonomy is associated with game enjoyment and motivation to play the game (Tam, 2020).

A motivational approach to games and learning emphasize that games can engage and motivate players by providing enjoyable experiences they wish to continue doing (Plass et al., 2015, p. 270). Sensory stimuli can, for instance, provide such experiences. For a limited time, digital games can take a player into another reality. Stepping into an imaginary world disrupts the stability of normal sensations and perceptions and allows the player to experience a distortion of perception that is not experienced in the real world (Garris et al., 2002, p. 449). A game with an interesting storyline can have the same effect. A good story activates the imagination of the audience by eliciting the creative part of the brain and by having them imagine being a part of the setting and experiencing what a relatable character is going through (Curtis, 2019). It has also been argued that learners are more likely to engage in activities that they find personally interesting, relevant, and authentic (Plass et al., 2015, p. 269; Banegas et al., 2019).

Mastery expectations are crucial for how pupils perceive demanding tasks (or games); as challenges, as obstacles or as threatening settings. Thereby, mastery expectations also become crucial for pupils’ effort and perseverance. Learners who believe they will master a challenge, have a greater desire to do the task. However, to gain experience in mastering new tasks, pupils must be exposed to adaptive challenges which they have prerequisites to master. In other words, the difficulty of the challenge must match their level of competence and ability (Skaalvik & Skaalvik, 2017, p. 22).

Finally, many digital games show how clear goals can lead to better performance and skill development. First and foremost, clear digital game goals are specific, so the player, in advance of starting the game, can understand what they need to achieve in order to master the game (Freyman, 2020).

2.2.4.3 Affect

Affect refers to the feelings or emotions of individuals. In relation to language learning, it can refer to feelings or emotional reactions about the language, the people who speak that language, about the experience of learning or being taught a language. One unique form of affect in language learning is anxiety (Gass et al., 2020, pp. 530-531). Language anxiety is a type of situation-specific anxiety. It may be facilitating (i.e., have a positive effect on second language learning), however, it is mostly considered debilitating (Ellis & Shintani, 2014, p. 286).

According to Plass et al. (2015), one way to include affect in games is by taking advantage of the ability of specific game elements, such as aesthetic design, game mechanics, narrative, etc., to induce emotions in players. Here, the game is designed to impact learners’ experience of emotions, such as anxiety, etc. (Plass et al., 2015, p. 271). Using games in learning contexts, can be particularly beneficial in settings where

pupils at first, feel nervous. Playing games may help these pupils relax and then ease into subject matter (Barack, 2019). Nevertheless, although games can lead to reduced anxiety among players, they can, potentially, also lead to higher anxiety. This can happen if, for instance, the difficulty of the task is above their level of skill (Scasserra, 2008, pp. 9-10).

When taking an affective perspective on game-based learning, one must consider the emotional aspects of play and their impact on learner engagement - whether they facilitate or hinder learning. A playful learning environment usually aim to optimize engagement of the game, often at the expense of cognitive load induced by the game. Thus, it has been argued that affect can reengage learners who have disengaged from learning altogether, and who cannot be engaged with other methods (Plass et al., 2015, p. 271).

Based on this description, it could be argued that the affect perspective presented by Plass et al. (2015) could be incorporated as part of the motivational perspective. Still, in this context, I will retain affect as an independent perspective. In data collection and analysis, the concept of affect has been limited to apply to situation-specific anxiety.

2.2.4.4 Sociocultural interaction

With the 21st century came a social turn where sociocultural theoretical influences became more apparent in language instruction (Otto, 2017, p. 19). According to sociocultural theory, learning happens through the influence of people, through external stimulation, when people experiment, etc. In other words, learning happens through interaction between the individual and the external world (Imsen, 2012, pp. 171-172). Games often provide opportunities for social engagement by including contexts where peers and social interactions occur to enhance learning (Plass et al., 2015, p. 272).

Krashen's *Input Hypothesis* (1985) states that acquisition takes place when learners are exposed to comprehensible input that is one step beyond their present stage of linguistic competence (Krashen, 1985). According to the Input Hypothesis, second language learning is driven by input, and all that is needed for second language acquisition to take place is comprehensible input and a low affective filter (i.e., learners want to attend to the input and are not prevented from doing so by anxiety) (Ellis & Shintani, 2014, p. 9).

To understand Krashen's Input Hypothesis, it is important to use interaction elements that support a sociocultural perspective. However, the theory must also be understood as a cognitive process, considering how to build and include new knowledge (see Chapter 2.2.4.1). Moreover, the theory can be understood in light of an affective perspective through emphasis on creating an open learning environment without stressful and anxious elements (see Chapter 2.2.4.3).

The *Interaction Hypothesis* also emphasized the importance of comprehensible input but maintained that second language acquisition is best achieved through interaction (Ellis & Shintani, 2014, p. 9). The Interaction hypothesis accounts for learning through input (exposure to language), output (production of language), and feedback that comes as a result of interaction. This approach believes that language learning is stimulated by communicative pressure, and it examines the relationship between communication and acquisition and the mechanisms (e.g., noticing, attention) that mediate between them (Gass et al., 2020, p. 400).

Language input is considered the single most important concept of second language learning as learning can only take place when learners are exposed to input

(Ellis & Shintani, 2014, p. 7, 173). It refers to the exposure learners have to authentic language in use. This can be from different sources, such as the teacher, other pupils, or the environment around language learners. Such input can be compared to intake, which refers to input that is "taken in" and internalized by the learner so it can be applied (British Council, n.d.). In the context of this study, it is important to emphasize that games can be a source of input in line with direct human contact.

Comprehensible output facilitates language learning by raising learners' awareness of gaps in their linguistic knowledge of the target language, through noticing. That is, producing language helps learners to notice their problems, which further enables these learners to modify their output (Ellis & Shintani, 2014, p. 207).

Feedback provides information to language learners about their utterances, in addition to opportunities to focus on production or comprehension. When providing language learners with feedback, it is important that the feedback is appropriate for the individual learner as such feedback can cause the learner to perform better in the game (Gass et al., 2020, pp. 335-336; Burgos, et al., n.d., p. 1).

In game-based learning, observational learning is common practice. Observers can offer advice, support and encouragement and may thus be considered a part of the game's social context (Plass et al., 2015, p. 275). For a player who is in the Zone of Proximal Development (ZPD), an observer can, potentially, act as the support the player needs until he/she is able to manage on his/her own in the game. ZPD refers to "the difference between what a learner can do without help and what a learner can achieve with guidance and encouragement from a skilled partner" (McLeod, 2019). In other words, ZPD refers to the process where learning moves from a social process to a cognitive process. A process that might need assistance at first can, over time, shift to a process where this assistance is no longer needed, and where the learning has been internalized (Gass et al., 2020, p. 335). Such collaborative contexts can also contribute to creating a non-threatening learning environment in which learners may feel safe to express their thoughts and points of view (Rad, 2021, p. 554).

Games can consist of several forms of interaction. Interaction may take place between players or between the player and the game (Manninen, 2003). Therefore, because social and cultural interactions are based around interactions with objects, game-designers must also consider how objects within the game can facilitate interaction (Plass et al., 2015, p. 273).

2.2.5 Limitations of digital game-based learning

So far, several views on how DGBLL can lead to English language learning, have been listed. However, it is important not to forget, nor ignore, the limitations of DGBLL. Some instructors may want to distance themselves from using DGBLL as they assume that pupils have enough screen time as it is, or because it requires a technology learning curve (which there may not be enough time for). Some are skeptical to whether the use of games can replace traditional learning strategies (Nisbet, 2021).

According to Aune (2019), there are concerns to whether games are too much of a distraction for pupils rather than a positive addition to the classroom (p. 21). Digital games also tend to affect the brain in the same way as addictive drugs do; triggering the release of dopamine, a chemical which reinforces behavior. Thus, digital games do have the potential to become an addictive stimulus (Bezruczyk, 2021). And last, but not least, long exposure to violent games has been found to be positively related to adolescent aggression (Shao & Wang, 2019).

2.3 Digital game-based language learning

Digital game-based language learning (DGBLL) is the design and use of digital games to learn or teach a second or foreign language (Osman & Rabu, 2020, p. 56). Computer assisted language learning (CALL) researchers and second language instructors have recently begun examining games as potential second or foreign language teaching and learning resources (Reinhardt, 2017, p. 202). Earlier, games were considered impractical because they were implementable only in computer labs. But today, the Internet, networks, and mobile-based technologies have increasingly provided access, portability, and configurability (Reinhardt, 2017, p. 202). Game developers and educators observed that games motivated players to learn often highly complex rules and detailed narratives with seemingly little effort and high levels of engagement. Also, game-based approaches can make the attainment of educational objectives and learning processes easier, more student-centered, more fun, and more effective than traditional classroom teaching (Pesare et al., 2016, p. 3). It has been noted that digital games build intrinsic motivation by promoting curiosity, evoking fantasy, and offering challenges with clear goals and constant feedback. Games can also support communication based on text, image, and sound. In addition, a game may provide tools for interaction between two people, as well as enable communication between whole groups and communities (University of Jyvaeskylae, 2007). As a result, sources show that there was a significant increase in investments of educational technology in 2018 and onwards, especially in Asian countries (Holon IQ, 2021).

Young people today, having been raised playing digital games, may be attuned to the experiential, discovery-based pedagogy that are designed into games. This is often contrasted to the top-down, teacher-led instruction found in traditional pedagogy, and it is argued that schools will fail unless the differences are rectified (Reinhardt, 2017, p. 203). Gee (2005) claims that well-designed games incorporate learning principles that make them effective learning spaces, and he maintain that games are designed as situated learning spaces, where players learn through embodied, simulated experiences that scaffold opportunities for practice and mastery (Reinhardt, 2017, p. 203).

3. Review of previous literature

Through performing various database searches in NTNU Oria and Google scholar for the sake of finding and identifying relevant literature reviews, I discovered that DGBLL is a relevant phenomenon today, and that the topic has been extensively researched and written about. Several literature reviews investigate the connection between games and learning, and the use of games in educational contexts. Still, I was not able to identify too many reviews with the exact same focus points as this mini scoping review, especially within the age groups and the choice of target language (see Table 2).

A meta-analysis prepared by Chiu et al. (2012) discussed the effectiveness of digital game-based learning types in EFL settings. Included were 14 studies published between 2005 and 2010. The participants were students, however, there was no disclosure regarding their ages. A conclusion was that meaningful and engaging games provide a large effect size as opposed to drill and practice games that provide a small effect size. It further found that there were greater opportunities for learning using meaningful and engaging games as they provide more room for interacting and for negotiating meaning for learners. Still, the analysis discovered that there are more drill and practice games used for language learning than meaningful and engaging ones (Chiu

et al., 2012). Nonetheless, this study can, as of today, be considered relatively old as development within technology in today's world often happens overnight.

Another meta-analysis was conducted by Dixon et al. (2022), exploring 26 studies available at the time of data collection which was January 2020. The analysis did not mention the age of the participants. Its target is to investigate the effect of digital games on second language development overall and across some variables, such as 1) game developers' intended purpose of the game, 2) outcome measures, and 3) several game designs features such as the type of player interaction, etc. The results of the analysis suggest that DGBLL has had a small to medium positive effect (based on the same data on effect size as Chiu et al., 2012) for between-group designs and a medium effect for within-group designs. Ultimately, games designed for entertainment were found to be more effective than those designed for second language learning (Dixon et al., 2022).

An analysis by Mark Peterson (2016) investigated 10 studies focusing on the use of target language (TL) in MMORPGs where players interact in real-time within a theme-based simulated virtual world. Such games facilitate and encourage group gameplay where collaboration and social interaction is necessary which further encourages players to communicate by using the TL and it allows experimentation and exploration associated with second language (L2) learning. The study found that players are exposed to TL both in written and oral communication, allowing them to notice gaps in their TL knowledge. The game also facilitates peer-based learning which integrates zones of proximal development where learners get to develop proficiency in their second language. Peterson also mention how this type of game facilitates for both in-game and out-of-game communities, offering players membership of TL-based communities of practice. The analysis concluded that participants increased their TL output remarkably over time. Even though the analysis did not specifically mention what TL this type of game facilitates the most, it did express that it mainly encouraged English as a TL. The ages of the participants were not mentioned, nor the specific time-period for when the included studies had been published. It did however say that they had been conducted over the last ten years (Peterson, 2016).

By reviewing 19 studies, Osman and Rabu (2020) did their own literature review on the effect of digital game-based language learning for second language acquisition. It does not consider a specific second language as the target language. The time span from which the included studies were from, was 2008-2018, and participants were of all ages. Studies included in the review investigated both commercial games and educational games. The review considered two target outcomes: 1) language literacy skills (listening, reading, speaking, writing, language retention, and vocabulary, and 2) learning attitudes (achievement, engagement, enjoyment, motivation, perception, and confidence). Conclusions were that research mostly focus on and discuss how games affect learning attitudes, followed by studies that cover both outcomes, while only a few studies investigated the use of games on language literacy (Osman & Rabu, 2020).

Four scoping reviews were identified investigating digital game-based language learning and second language acquisition. Hung et al. (2016) published a scoping review exploring trends in digital game-based language learning research within 23 relevant studies produced between 2010-2014. First, the review discovered that only 4% of the articles in the four journals used to select their 23 DGBLL studies were identified as related to DGBLL. Most included studies used a mixed methodology. Further it found that most researchers conduct short-term studies rather than longitudinal ones. The TL included in the study was not limited to English, even though results showed that English was the most frequent TL. Participants in the studies varied from higher education

(65%), elementary education (9%) and secondary education (4%), while some did not specify the educational levels of their participants (22%). The study discovered that most DGBLL researchers prefer the use of off-the-shelf-digital games (79%) over self-developed ones (17%), further suggesting that this may be because off-the-shelf-games are easier as they are cheaper to produce and require less effort to come up with. Most researchers chose MMORPG games in their studies, such as World of Warcraft (Hung et al., 2016).

Hung et al. (2018) conducted a scoping review where 50 studies were investigated ranging within the timespan of 2007-2016. It did not specify the age of the participants. Nevertheless, it became clear that the participants were of all ages as it was clear that the study considered participants who were in primary school and in higher education. The review aims to give an overview of evidence on the use and impacts of digital games in language education. It found that games such as MMORPGs were most common in DGBLL literature. It found that most DGBLL studies used games to facilitate English as a second language (ESL) learning. Finally, the review revealed that most of the DGBLL studies featured positive outcomes regarding student learning, with the most frequently reported ones being related to affective or psychological states, closely followed by language acquisition (Hung et al., 2018).

Xu et al. (2019), produced a scoping review looking at current practices of digital game-based language learning to support English language learning. The review included 59 studies published conducted between 2000 and 2018 and found that most of them used a quantitative method (57,63%), while mixed method (37,29%) and qualitative method (5,08%) were used to a lesser extent. Studies included students of all ages and proficiency levels. The review found that the most frequently investigated area in DGBLL with English language learners is vocabulary (47.46%), followed by overall English language proficiency (15.25%), pragmatics (8.47%), grammar (5.08%), writing (3.39%) and speaking (1.69%). From the 59 studies, nearly 80% reported a positive impact of DGBLL on learner's English language acquisition, while one study found it to have a negative impact. About 8% found that DGBLL did not have a significant effect on language learning (Xu et al., 2019).

Finally, Jabbari and Eslami (2018) conducted a scoping review focusing on massively multiplayer online games (MMOGs) in second language learning, but specifically in EFL and ESL contexts. The review explored 30 studies published after year 2000 but did not specify a finish date/year for the publication of these selected studies. Also, the participants were of different ages (10-37 years). Of the 30 studies included, 19 used qualitative methodology, 8 used mixed methodology, and 4 used quantitative methodology. The studies mainly focused on L2 learning related to motivational and affective factors, but also on L2 vocabulary and learners' communicative competence. The review did not include studies that exclusively dealt with EFL or ESL. It concluded that most studies saw the development of L2 related to motivational and affective outcomes, but also L2 skills such as (mainly) vocabulary acquisition, communicative competence, and L2 production. However, it also included topics such as L2 literacy practices, skilled linguistic action and values realizing, practicing autonomy, L2 learning strategies, opportunities for negotiation of meaning, and the linguistic complexity of game-presented texts and game-external websites were dealt with by one or two studies (Jabbari & Eslami, 2018).

To summarize the findings of the eight previous literature reviews mentioned, it was found that all of them, essentially, experienced overall positive effects on the use of DGBLL in developing English language skills. Several of the reviews, especially the four scoping reviews, provided overviews that illustrate a clear picture of the field of DGBLL in

connection with foreign language learning. Nevertheless, only Hung et al. (2018) and Jabbari and Eslami (2018) dealt with English as a TL, L2, or EFL in their reviews, while the others did not mention any language. None of the mentioned studies or reviews specifically investigated participants in primary and secondary school. Even though a few of the studies had these levels of education included, they would also include participants from pre-school or higher education – and adult education. Some of the previous literature reviews seemingly focus on the different characteristics of the digital games, such as: 1) game function type, 2) game genre or, 3) game elements. However, none of them considers all three characteristics in relation to each other. The current mini scoping review have therefore synthesized information about all three characteristics and will investigate how games in the studies can contribute to developing certain English language skills among the participants. This review has also addressed studies that include participants in primary and secondary school who have English as their L2, TL, or ESL.

4. Methodology

As there is an extensive amount of literature available on the development of English language skills by using DGBLL, it seems appropriate to conduct a literature review, more specifically a scoping review, that aims to provide an overview of available literature addressing the topic and identifying potential gaps of knowledge. As opposed to a full scoping review, the current study has been defined a “mini scoping review” as the review explores a limited number of studies, is within the scope of a master’s thesis and has been written within a fairly limited time period. This mini scoping review will from now on be exclusively referred to as a study or review.

4.1 Literature review

A literature review is an academic text that provides an appropriate summary of previous work, objectives and purposes clear to the reader. Additionally, it must have an extra dimension, namely the interpretation of the author. Thus, literature reviews can also be considered as “research on research” (Krumsvik & Røkenes, 2019, p. 96). Often, a topic is studied because there is supposedly little research available in the particular research area. However, it is important that claims like this can be justified and supported. Thus, the researcher must conduct a literature review, in order to get an overview, to identify knowledge gaps and to position the review towards precisely the knowledge that is lacking in the field of research (Krumsvik & Røkenes, 2019, p. 97). Literature reviews can also have other purposes. They can share results of other closely related studies to the one being undertaken. They can also relate a study to the larger, ongoing dialogue in the literature. Finally, they can provide a framework for establishing the importance of the study as well as a benchmark for comparing the results with other findings (Creswell & Creswell, 2018, pp. 25-26).

4.2 Scoping review

There are various types of literature reviews, of which scoping reviews is one of them. Even though scoping reviews have been around since the 2000’s, they are still considered relatively new approaches for synthesizing research evidence (Arksey & O’Malley, 2005; Munn et al., 2018, p. 6; Levac et al., 2010). The approach aims to map existing literature within specific fields and topics of research (Dille & Røkenes, 2021, p. 2). It also aims to give an indication of the amount of literature and studies covering the

field or topic as well as an overview (Munn et. al., 2018, p. 2). In contrast to the more well-established approach of systematic reviews, where researchers focus on well-defined questions where appropriate and specific study designs are identified, a scoping review addresses a wider topic or field where several different study designs can be used. Systematic reviews try to answer questions from a narrow range of quality assessed studies (Arksey & O'Malley, 2005, p. 20; Gough et al., 2017). Scoping reviews, on the other hand, do not assess the quality of included studies, meaning that all studies meeting the eligibility criteria are included, regardless of their quality (Xu et al., 2019, p. 882). Since scoping reviews do not assess quality of evidence, they cannot determine whether studies provide sturdy or generalizable findings (Arksey & O'Malley, 2005, p. 27).

Four common causes are known for undertaking a scoping review (Arksey & O'Malley, 2005):

1. Examining the extent, range, and nature of research activity. Scoping reviews may not provide detailed descriptions of research findings, but can, in a decent way, map research fields where it is demanding to visualize the range of literature available
2. Determining whether it is necessary to conduct a full systematic review
3. Summarizing and disseminate research findings. Such a review may give more detailed descriptions of both the range of research in a particular area of study, and of the findings.
4. Identifying research gaps in the existing literature (p. 21).

The first two causes suggest that scoping reviews are one part of an ongoing process of reviewing, where the goal is to produce a full systematic review. The final two reasons suggest that scoping reviews can serve as a method on their own (Arksey & O'Malley, 2005, p. 22). Based on the two research questions in this review, the first and third causes appear to be particularly relevant. Additionally, in my discussion, I point out some knowledge gaps in available literature discussing the use of DGBLL in the EFL classroom; and in this context, cause four also apply here.

4.3 Progression in the review

Six stages are identified in scoping reviews (Arksey and O'Malley, 2005, p. 22):

1. The researcher identifies the research question(s). What exactly will be investigated?
2. Relevant studies are identified. What studies can help answer the research question(s)?
3. Relevant studies are selected. Here, the researcher decides what studies will be included in the review.
4. Selected studies are charted based on their content.
5. Results are collated, summarized, and reported.
6. Optional stage encourages for a consolation exercise. This stage, however, will not be part of this review.

In addition, as a preparation for the identification of relevant studies, a pre-examination stage was carried out to identify relevant key words, terms, and core

concepts. This pre-stage acted as a form of “pre-literature review” that provided an overview of current definitions and concepts that could support the collection of search results relevant to this study.

4.3.1 Identifying the research questions

My review aims to answer the following two research questions:

1. What is the current state of knowledge regarding the development of English language skills by using DGBLL in the EFL classroom?
2. In what ways do the digital games in the included studies support the development of English language skills in the EFL classroom, specifically with regard to digital game function types, game genres and game elements?

The first research question sheds light on the current state of knowledge in literature regarding the development of English language skills using DGBLL in the EFL classroom. The focus is on variables such as year of publication, countries in which the studies were conducted, age of the participants, methodological procedures of included studies (including methodologies, data collection approaches and sample size), English language skills focused upon (i.e., vocabulary, grammar, communicative skills, speaking skills, listening skills, reading skills, and phrasal verb knowledge).

The second research question aims to show in what ways the digital games in the included studies can facilitate the development of the English language skills. This will be investigated based on the digital games’ function types, genres, and elements. Finally, the review will, based on the outcomes reported in the included studies, examine whether the use of DGBLL in the EFL classroom proves to be beneficial, for example in comparison with traditional classroom teaching. However, it is especially the significance of various game elements that will be central to my discussion.

4.3.2 Identifying relevant studies

In the pre-examination stage of identifying relevant studies, I began searching for and discovering key words, terms, and core concepts that were appropriate for the topic and research questions. For this, I used Google, NTNU Oria and YouTube. These platforms provided useful definitions in general, but they also led me to descriptions of scoping reviews as a study design. During the pre-stage, I came across so-called *grey literature*³. Due to a lack of quality assurance, not all grey literature can be considered reliable. Still, grey literature can be useful in providing data not found in commercially published literature (Paez, 2017). Even though grey literature will not be part of the actual review, it served as a support in my search for key words, terms, and core concepts.

Once central key words, terms, and core concepts were established, the search for relevant literature began. Both NTNU’s academic library and reference lists of previous lecture presentations provide a broad literary pool of relevant studies for the review. Two electronic databases, Web of Science and ERIC, were also used to find available literature. These databases provide easy access to thousands of journals, conference papers, and materials on different topics (Creswell & Creswell, 2018, p. 30).

³ Grey literature refers to literature typically produced on all levels of government, academics, business, and industry in electronic and print, not controlled by commercial publishers. Some examples can be newsletters, reports, working papers, theses, government documents, conference proceedings, and other publications distributed free, available by subscription or sale (Rothstein & Hopewell, 2009, pp. 103-105).

Both databases were used with the same search strings. Although the search string was identical in the two databases, ERIC led to a significantly larger search result than Web of Science.

To access as comprehensible coverage of relevant literature as possible, one should use open and broad search terms (Li et al., 2021, p. 6). Based on the research questions, I explored search terms, such as *game-based learning*, *game-based language learning*, *gamification*, *early language learning*, *language learning skills*, *vocabulary*, *vocabulary skills*, etc. These Search terms were further be combined into search strings, using "AND" to connect the terms. These combinations led me to a final search string, which eventually led me to the specific studies that were included in this scoping review. The final search string is illustrated in Table 1.

Search Terms
"game-based language learning"
AND
"language learning skills"
AND
«Elementary school»
AND
«EFL»
AND
«PEER(yes)»

Table 1: Final search string

In Table 1, the Boolean operator AND is used. In order for a study to satisfy the set inclusion criteria, it must also satisfy alle the lines separated by AND.

I began by including the two most central concepts in my study: 1) "digital game-based language learning" AND 2) "English language learning skills. However, since I got too few search results, I broadened these terms by changing them to "game-based language learning" and "language learning skills". Literature that uses the broader terms may also be of relevance for the mini scoping review. It seemed more suitable to sort out studies that dealt with digital games through the process described in Figure 1, rather than using the term «digital» directly in the search string.

The term "elementary school" was used as I initially only wanted to include studies examining this level of education. It turned out, however, that the literature that emerged also included levels of education beyond this level. In addition, there were only a limited number of studies in this search result that exclusively examined primary school as a level of education. Thus, I expanded the review to include both primary – and secondary school in data collection procedure. The abbreviation EFL was included to emphasize that I wanted to investigate studies dealing with English as a foreign language. Finally, the term "PEER" was included to secure a certain level of quality of the studies that appeared in the search.

4.3.3 Study selection

Due to time restrictions, it was necessary to narrow the search and the focus of the review. Without such a narrowing, it is easy to come across an insurmountable number of search results, where one is left with unmanageable amounts of data (Krumsvik & Røkenes, 2019, p. 112). In order to avoid this, some inclusion and exclusion criteria for the selection of relevant studies were selected. These criteria are illustrated in Table 2.

Criterion	Included	Excluded
Databases	Eric and Web of Science	Other databases
Relevance	Articles relevant in answering the research questions	Articles not relevant in answering the research questions
Time frame	January 1, 2010 – April 20, 2022	Literature published before January 1, 2010
Publication languages	English and/or Norwegian	Other languages
Publication type	Peer-reviewed articles	Grey literature, book and book chapters, documents, conference proceedings
Participants	Articles focusing on participants in primary and secondary school, ages 5-19 years. Articles including so-called mixed populations will also be considered if the content is relevant for this scoping review	Articles focusing on participants outside of primary and secondary school, or outside the ages 5 to 19 years. Also, articles including a mixed population which are less relevant for the topic of this scoping review
Games	Articles focusing on digital games	Articles focusing on other types of games (e.g., analog games)

Table 2: Inclusion and exclusion criteria (inspired by Krumsvik & Røkenes, 2019, p. 112)

The time frame in which the studies have been conducted, was limited to 01.01.2010- 20.04.2022. This is because previous searches have shown that the largest number of studies addressing the current topic have been published between 2010 and the present. Publication languages are limited to Norwegian and/or English as there is enough available literature written in these languages to cover the literary need of this review. Additionally, these are the languages in which I have proficiency. Included studies should be peer reviewed to ensure a certain level of academic quality. The age of the participants in the included studies should span from the ages of 5 to 19, as this covers the age range in Norwegian elementary and secondary schools (years 1-13). So-called “mixed populations” were, however, also included. This refers to studies where participants’ ages varies across the different ages within primary and secondary school, but also to studies incorporating participants of varied ages, some of whom may be aged beyond the age groups found in primary and secondary school. The prerequisite for these studies, however, is that the average age of the participants is still within the age range that applies to primary and secondary school (in Norwegian schools). Finally, studies included should focus on digital games. There are neither restrictions regarding

the countries in which the included studies were conducted, nor the study designs of included material.

Figure 1 illustrates a flowchart diagram presenting the steps of collecting the study selection for this review. Searches were conducted between December 2021 and April 2022, and the final search string was identified on April 20, 2022. The search was conducted in two databases: ERIC and Web of Science. The final search string resulted in a total of 231 search results distributed on the two databases, a number that was reduced by each step in the flowchart.

‘Search’ presents the first step, where the number of relevant studies identified in the final search string were, based on the inclusion and exclusion criteria, collected, and returned to the review. In addition to search results in the two databases, 10 studies were added manually. These studies were found on different platforms and databases such as Google Scholar, and NTNU Orii, or they were referred to by other scoping reviews or reviews. They were added due to their relevance regarding the topic and research questions of the current review. Unlike the studies included from ERIC or Web of Science, which went through all the steps of the flowchart systematically, the studies resulting from the manual searches were directly added to the batch of final studies included because they had either been read in advance or because they had been read in their entirety immediately after they were discovered. In the ‘identification’ step, the studies returned from both databases were added. During ‘screening’, the titles, authors, publication dates, etc. were scrutinized within studies found, and duplicates were removed. In the ‘eligibility’ step, titles and abstracts were skimmed, and studies that did not meet the inclusion criteria were removed. The final step, ‘included’, represent the final studies included to the review after a screening based on their full content, in addition to the studies identified during the execution of the manual searches.

After completing the screening and selection process for this review, I was left with 20 studies.

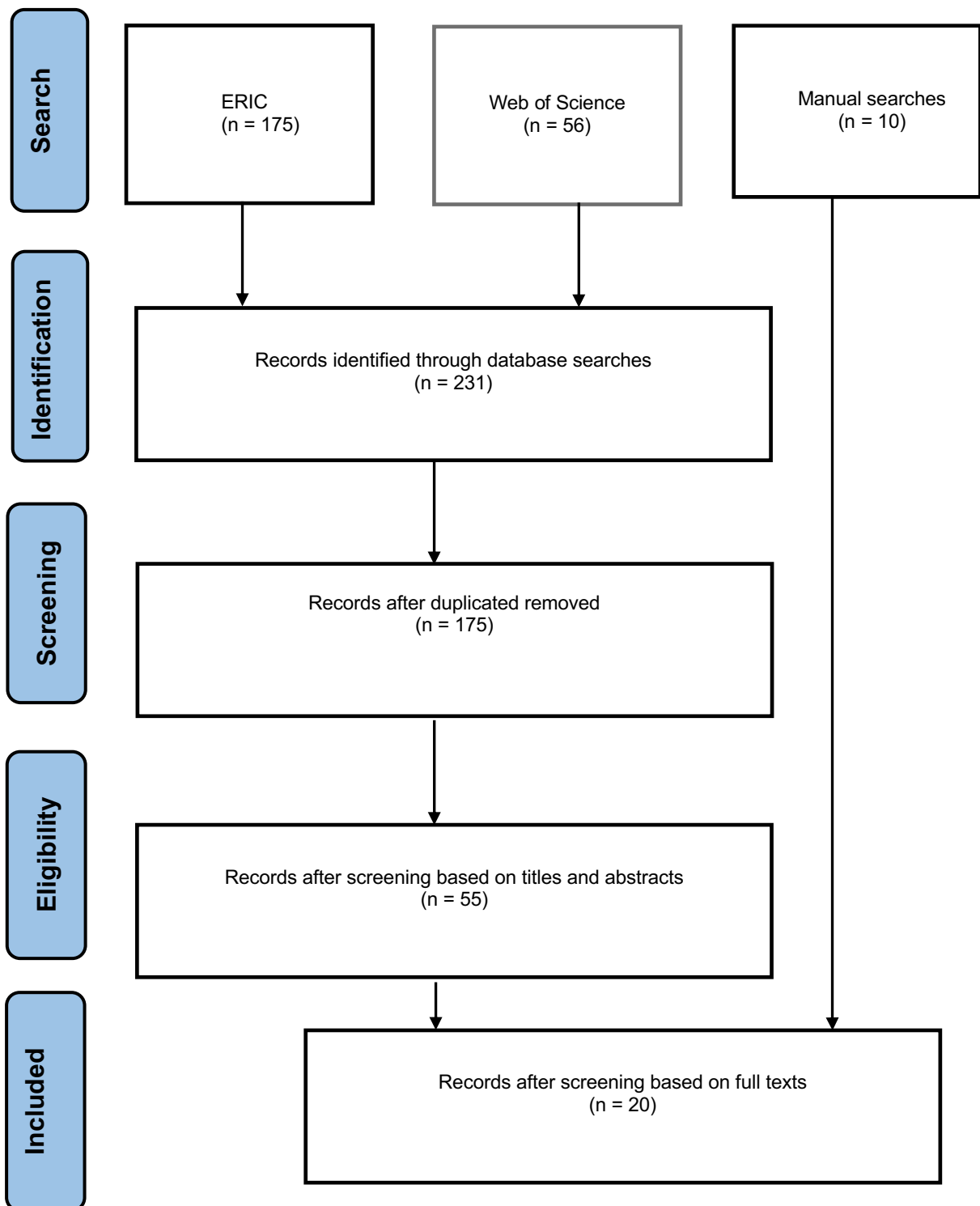


Figure 1: Flowchart diagram of the screening and selection process (inspired by Moher et al., 2009)

4.3.4 Charting the data

Once again, the selected studies were carefully reviewed. The content of the studies that were relevant for this review was then, as recommended by Creswell & Creswell (2018, p. 30), collected, coded, and categorized. The data material extracted from the studies was placed in an overview table (see Table 3). Here, basic numerical data of the extent, nature and distribution of the included studies was provided (Arksey & O'Malley, 2005, p 27). The table presents various aspects of the included studies, such as: author, year of publication, country location, characteristics of participants, methodological procedures, game function types, game genres, game elements, and outcomes.

The coding scheme corresponds with the research questions of this review and consist of three main categories: 1) general features, 2) the digital games in the included studies, and 3) outcomes. In addition to coding these three categories, each study has been given an abbreviation, S1-S20, which refers to the identified studies (see Table 3).

4.3.4.1 Categorization of general features

Firstly, the general features of the included studies are described. Information about the author is provided. The distribution of included studies based on year and country of publication has also been included. The ages of participants were also noted as this aspect is one of the elements making this review somewhat "unique" compared to previous literature (see Chapter 3).

The methodological procedures of included studies is also discussed. Nevertheless, not all research designs within these methods are described. The descriptions below are only intended for illustrating the research designs that emerge in the studies included in this review. The three methodological procedures used in the included studies of this review are as follows:

- 1) Quantitative methodology: which consists of survey and experimental designs. A survey design provides a quantitative description of trends, attitudes, and opinions of a population, or tests for associations among variables of a population. It includes studies using questionnaires or structured interviews for data collection with the intent of generalizing from a sample to a population (Creswell & Creswell, 2018, p. 12, 147). An experimental design seeks to determine if a specific treatment influences an outcome. This can be assessed by providing a specific treatment to one group and withholding it from another and then determining how the groups scored on an outcome. Experiments include true experiments, with the random assignment of subjects to treatment conditions, and quasi-experiments that use nonrandomized assignments (Creswell & Creswell, 2018, p. 12). The experiments can also include pretests and posttests in order to carry out measurements of effects and outcomes both before and after a treatment (Glen, n.d).
- 2) Qualitative methodology: Qualitative design relies on text and image data, and have unique steps in data analysis, and draw on diverse designs. The method section for qualitative research partly requires educating readers as to the intent of qualitative research, i.e., mentioning designs, reflecting on the role the researcher plays in the study, using specific protocols for recording data, analyzing the information through multiple steps of analysis, and mentioning approaches for documenting the methodological integrity or accuracy – or validity – of collected data (Creswell & Creswell, 2018, p. 179). In narrative research the researcher

studies the lives of individuals and asks one or more people to provide stories about their lives. In phenomenological research, the researcher describes the lived experiences of individuals about a phenomenon as it is described by participants. In grounded theory, the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants. Finally, in ethnography, the researcher, over time, studies shared patterns of behaviors, language, and actions of an intact cultural group in a natural setting (Creswell & Creswell, 2018, p. 13).

- 3) Mixed methodology: combines or integrates both qualitative and quantitative research and data in a study. In convergent mixed methods the researcher converges or merges quantitative and qualitative data, at roughly the same time. Explanatory sequential mixed methods, is when the researcher first conducts quantitative research, analyzes the results, and then builds on the results to explain them in more depth with qualitative research. Exploratory sequential mixed methods are where the researcher begins with a qualitative research stage, and explores the views of participants, where data is analyzed and the information is used to build into a second, quantitative phase (Creswell & Creswell, 2018, p. 15).

4.3.4.2 Categorization of digital games in the included studies

The second category describes certain characteristics of the games included in the 20 studies, such as digital game function types, digital game genres, and digital game elements. These three categories aim to explain how digital games' function types, genres and elements can contribute to the development of English language skills.

4.3.4.3 Categorization of outcomes

The final categorization reports outcomes of included studies. In addition to a textual description of some main findings in the last column of Table 3, outcomes are primarily represented through findings of game elements and their significance for the four learning perspectives.

4.3.5 Collating, summarizing, and reporting the results

In this final stage, I gave an account of the findings based on the extracted data material from stage 4. I summarized the extent, nature, and geographical distribution of the studies. Further, I analyzed and discussed in what ways the digital games in the included studies could support the development of English language skills in the EFL classroom, especially with respect to digital game function types, game genres and game elements. In the discussion of findings, I was able to identify both confirmative and contradictory evidence in relation to available literature as well as previous research. Finally, I was able to show the main areas of interest, and potential gaps in available literature.

4.4 Ethical and methodological considerations

4.4.1 Positionality and reflexivity

Personal stance refers to a person's positioning towards an issue based upon their beliefs and views of the world (Savin-Baden & Major, 2013, p. 68). Positionality emerges from personal stance; however, it is more narrowly defined as it reflects the position of the researcher in the given research study (Savin-Baden & Major, 2013, p. 71). Positioning theory is based on social constructionism and assumes that human

behavior is goal-directed and constrained by group norms, and that human subjectivity is a result of the history of each individual's interactions with other people. The positions are fluid and can vary from one moment to the next (Barnes, 2004, p. 1). A researcher's positionality can affect their views about research context and participants. This is connected to bias. Bias is a preconception of something, which means that a researcher holds a preferential perspective at the expense of other, perhaps equally valid, alternatives (Savin-Baden & Major, 2013, p. 70). This can affect the validity and reliability of the study.

Reflexivity helps researchers consider their own position and influence during the study, and it helps them know how they have constructed and even imposed meaning on the research process (Alvesson & Skoldberg, 2009). Reflexivity is the self-conscious analytical scrutiny of the self as researcher, which further induces self-discovery. It helps researchers realize the fact that it is not possible to remain outside the topic or process of the research and look in. The researcher is both integral and integrated in the research (Savin-Baden & Major, 2013, p. 76).

In connection with this review, it is worth mentioning that I have, throughout my time in primary and secondary school, as a student, and later as a pre-service teacher, only had positive experiences with digital game-based learning. Hence, I may have been colored by these positive experiences when I collected my data material. That is, I may have been influenced by this by, for instance, subconsciously being more concerned with including the positive aspects of DGBLL than the potentially negative aspects of it. In addition, my personal stance may, potentially, have influenced the way I interpreted my data and how I prepared my discussion.

4.5. Methodological limitations of scoping reviews

Even though scoping reviews have great potential in their ability to create an overview of available literature on specific themes and issues, there are some limitations and challenges connected to the research design. The scoping review is often referred to as the rapid and simple version of the systematic review. This is not necessarily correct in practice. Usually, scoping reviews are conducted within a limited timeframe. Nevertheless, they are a major undertaking. Therefore, this research design is not recommended for researchers working within very limited timeframes (Hanneke et al., 2016, p. 6). In the current review, I have completed a form of scoping review. Yet, I have had to impose certain restrictions.

As mentioned in Chapter 4, the current study was, originally, called a scoping review. However, due to a limited time to complete the study, and limited amount of manpower, etc., the study was renamed to a mini scoping review, with the intention of reducing certain expectations usually accompanying the "classical" scoping review.

Also, the broad nature of the research questions in scoping reviews may lead to findings similarly broad, requiring additional steps on the part of the author to synthesize and draw useful conclusions from them (Hanneke et al., 2016, p. 6).

Finally, scoping reviews do not typically involve a risk of bias assessment. Critical appraisal of the risk of bias in a scoping review is not required or mandatory. However, even if bias is not formally assessed, it may still exist (Sucharew & Macaluso, 2019). Factors such as sample size, may affect bias in reviews. A study with low statistical power (that is, a low sample size), has a reduced chance of detecting a true effect (Button et al., 2013). In other words, studies with a small sample size tends to have larger effect size than those with large samples. Thus, bias is often more serious in small sample research than it is in large sample studies (Slavin & Smith, 2009, p. 500, 501). I

have made an overall assessment of statistical bias as a result of sample sizes in chapter 5.1.4.3.

I have based my assessments on Slavin and Smith's (2009) suggestion to sample sizes. Slavin and Smith have presented a suggestion to sample sizes, where any sample size lower than 100 is considered a small sample size, anything between 100 and 250 is a medium sample size, while samples larger than 250 are identified as large (Slavin & Smith, 2009, p. 503). These are the units that will serve as a benchmark for sample sizes within the studies included in this review.

In the current review, there are two dimensions of sample size: 1) the sample size of this review, that is the number of studies included (20 studies), and 2) the number of participants in the included studies (see discussion in Chapter 5.1.4.3). The first dimension is most relevant in connection with the limitations for this particular review. Compared to the reviews mentioned in Chapter 3, this review has a slightly below average number of studies included. The average number of selected studies was 28,8. A possible reason why the sample size in this review is slightly below average may be that I did not include literature other than peer-reviewed articles. Another possible reason is the search string itself. Had I chosen a search string that was broader or used my final search string in more than two databases, my search would most likely have resulted in a broader search result.

Nevertheless, the sample size of this study does not differ much from previous literature discussing DGBLL. Thus, there is reason to believe that a relatively small sample size is common in this type of studies. The sample size retrieved from the 20 studies, can thus be assumed to be representative for this type of studies.

One final limitation of this study is the number of studies I was left with from the two databases after all the inclusion criteria were met. Of the 20 included studies, ten of them (50%) came from the two databases. The remainder of the studies were identified through manual searches, where the studies were found outside of the two databases. To begin with, I was left with a broad search result. Nevertheless, when the studies in the search result were evaluated closer based on inclusion criteria, many of them were removed. The main reason for this was that otherwise relevant studies had participants with an age that went beyond what was set as the age limits set in the inclusion criteria.

I could have extended the inclusion criteria set for the age limit of participants in my review. However, I will be working with pupils in elementary and secondary school, and therefore, the set age group is most relevant to me.

5. Results and discussion

This section will present the results and findings of this scoping review. The findings are presented within relevant headings that are also appropriate for answering the two research questions. Table 3 provides an overview of overall information withdrawn from the 20 included studies that can help answer the two research questions.

Study/Author/ Year	Country	Age of participants	Methodology/Data collection/ Sample size	Game function type	Game genre	Game elements	English language skill	Outcome
S1/ Ebrahimzadeh, M., Alavi, S. / 2017	Iran	12-18 years	Quantitative / experimental design + posttest and posttest / 241 participants Three groups included: 1) Players, 2) Watchers, and 3) Readers	Commercial game	Strategy	- Interaction - Autonomy - Clear goals - Repetition - Ongoing feedback	Vocabulary	Players and watchers outperformed readers in terms of short- and long-term vocabulary retention.
S2/ Vazirabad, A. F., Farrokhi, F. / 2020	Iran	An average age of 21 years (University and pre- university level students)	Mixed method / quasi- experimental design + pretest and posttest + diaries and + semi- structured interviews / 174 participants Four groups included: 1) blended learning, 2) apps acted as main tutor, 3) autonomous play outside of class, 4) gamified and non-digital	Serious game	Quiz games	- Interaction - Ongoing feedback - Interesting storyline - Repetition	Phrasal verb knowledge	Pupils in all four groups improved their phrasal verb knowledge. Participants in blended learning in both digital games outperformed other groups. Pupils in phrasal nerds group outperformed pupils in Kahoot.
S3/ Ebrahimzadeh, M, Alavi, S. / 2016	Iran	12-18 years	Quantitative/ experimental design + pretest and delayed posttest + field notes / 136 participants	Commercial game	Strategy	- Interaction - Autonomy - Clear goals - Adaptive challenges	Vocabulary	Two groups are included: players and watchers. Was a significant difference between players and watchers regarding vocabulary learning. Enjoyment can motivate students to keep up through sustained, long-term process of language learning.
S4/ Chen, Z.-H., Lee, S.-Y. / 2018	Taiwan	10 years old	Quantitative/ quasi- experimental design +	Serious game	Simulation game	- Interaction - Clear goals - Repetition	Vocabulary	The my-pet-shop system contributed to enhanced flow experience and better learning self-

			pretest and posttest / 30 participants			- Visual support - Ongoing feedback		regulation when compared to using a the my-pet-rush quiz game system. Also, behavior analysis revealed that the component of learning regulation played a critical role.
			Two groups included: 1) Experimental group playing My-pet-shop and 2) control group playing My-pet-rush quiz game					
S5/ Calvo-Ferrer, J. R. & Belda-Medina, J. / 2021	Spain	16-18 years old	Quantitative/ Empirical study/ experimental design + pretest and posttest / 54 participants	Commercial game	Social deduction game	- Repetition - Interaction - Clear goals	Vocabulary	The pre- and post-tests suggest that players who use new second language words in the game would remember more vocabulary than those who only encountering them. It also found that vocabulary intentionally input helped other users trigger incidental vocabulary learning, and that repetition had a positive effect on L2 vocabulary learning
			Included two groups: 1) incidental condition group and 2) intentional condition group					
S6/ Hazar, E. / 2020	Turkey	8-9 years old	Quantitative/ experimental design + pretest and posttest / 37 participants	Serious game	Puzzle game	- Visual or textual support - Repetition - Rich language input	Vocabulary	The use of digital games in teaching vocabulary is effective for the improvement of learners' vocabulary knowledge in comparison to settings where pupils learn vocabulary without games on EBA (educational informatics network).
			Included two groups: 1) experimental groups including activities with digital games on EBA and 2) control group taking regular classes					
S7/ Rad, H. S. / 2021	Iran	15-23 years old, an average of 18 years	Quantitative/ quasi-experimental design + pretest and posttest / 66 participants	Serious game	Quiz game	- Ongoing feedback - Non-threatening - Interaction	Grammar	Findings indicate that PCARD (Play Curricular Activity Reflection Discussion) DGB flipped learning improved EFL learners' grammar skills more than standard flipped learning group.
			Included two groups: 1) experimental group and 2) control group					

S8/ Young, S. S.-C., Wang, Y.-H. / 2014	Taiwan	7-9 years old	Mixed method/ experimental design + pretest, posttest, and delayed test + questionnaire + semi-structured interviews / 52 participants Included two groups: 1) experimental group with game-based learning and 2) control group with drill practice	N/A	Puzzle game	<ul style="list-style-type: none"> - Repetition - Visual support - Ongoing feedback - Adaptive challenge - Non-threatening atmosphere - Interaction 	Vocabulary	Those who learned with both drill and game-based practice outperformed those who only participated in drill practice in terms of English pronunciation. Still, learners in the control group did, perform better in the delayed vocabulary retention test. Thus, the adoption of traditional teaching/drill-based practice may facilitate learner's vocabulary retention more than that of the game-based activity because it focuses more on memorizing than game-based group.
S9/ Wu, C.-J., Chen, G.D., Huang, C.-W. / 2014	Taiwan	16-18 years old	Quantitative/ experimental design + pretest and posttest + survey / 96 participants Included three groups: 1) DLP (Digital learning playground) group, 2) board game group, and 3) ordinary teaching group	Serious game	Board game	<ul style="list-style-type: none"> - Authentic - Non-threatening atmosphere - Sensory stimuli 	Communicative' skills	Participants in the digital board game-based language learning group (DLP group) achieved significantly better communication ability compared to those in an ordinary, non-digital, board game adaptive language teaching group. DLP helped encourage learners to speak by playing and learning with context-relevant immersions and efficient game instruction management.
S10/ Chu, H.-C., Wang, C.-C., Wang, L. / 2019	Taiwan	11,5 years old	Quantitative/ quasi-experimental design + pretest and posttest + questionnaire / 130 participants Include two groups: 1) experimental group using the grammar concept mapping-based	Serious game	Adventure game	<ul style="list-style-type: none"> - Adaptive challenges - Non-threatening - Interaction - Interesting storyline - Repetition 	Grammar skills	Participants using the proposed approach revealed significantly better English grammar achievements than those who learned with the collaborative English gaming approach.

			collaborative English gaming approach and 2) control group using the collaborative English gaming approach						
S11/ Sylvén, L. K., Sundqvist, P. / 2012	Sweden	11-12 years old	Quantitative/ * three proficiency tests + questionnaires + diary / 86 participants	Commercial game	Simulation games MMORPG	- Interaction - Rich target language input - Authentic	Reading, listening, and vocabulary	Frequent gamers outperformed moderate gamers who, in turn, outperformed non-gamers. Even though the study does not provide direct evidence, findings indicate that the collaborative interaction that takes place between gamers in MMORPGs may facilitate L2 acquisition.	
S12/ Lai, K.-W. K., Chen, H.-J.H. / 2021	China	17-18 years old	Quantitative/ experimental design + pretest and posttest / 30 participants Include two groups: 1) VR group using a Sci-Fi VR visual novel game and 2) using the same game, only the PC version	Commercial game	Sci-fi (VR visual novel) game	- Visual support - Repetition - Interesting storyline - Interaction - Authenticity	Vocabulary	Both game play groups enhanced vocabulary knowledge in both tests. However, the VR group demonstrated a significantly higher mean score than the PC group in the vocabulary translation delayed posttest. Learners in both groups enjoyed playing the visual novel game and were willing to adopt it as a tool for learning vocabulary.	
S13/ Yang, Q.-F., Chang, S.-C., Hwang, G.-J., Zou, D. / 2020	Taiwan	17 years on average	Quantitative/ quasi-experimental design + pretest and posttest / 51 participants Include two groups: 1) cognitive complexity level-based gaming group and 2) conventional group	Serious game	Strategy game	- Threatening atmosphere - Adaptive challenges	Vocabulary	Compared to the conventional situational gaming approach, the situational game with the cognitive complexity-based competition strategy significantly improved participants' learning performance. In the conventional group, some participants experienced higher anxiety because of the difficulty level set by the game mechanism. Here, all students followed the same procedure of learning, some of whom may have been stuck at	

									learning levels with inappropriate cognitive complexity for a long time.
S14/ Hong, Z.-W., Shem, W.-W., Chin, K.-Y., Chen, I.-L. & Chen, Y.-L. / 2022	Taiwan	12 years	Quantitative / quasi-experimental design + pretest and posttest / 57 participants Include two groups: 1) experimental group and 2) control group	Serious game	Adventure game	- Visual or textual support - Adaptive challenges	Vocabulary	Compared with control group, the students in the hidden object game group significantly outperformed regarding vocabulary recognition. However, even though the experimental group also showed relatively higher learning motivation, there was no significant difference between two modes.	
S15/ Sundqvist, P. / 2019	Sweden	15-16 years old	Mixed (quantitative-dominant) / experimental design + vocabulary tests + semi-structured interviews + surveys + essays / 1069 participants Includes two groups: 1) sample A group and 2) sample B group	Commercial games	Several game genres	- Interaction - Interaction	Vocabulary	Playing commercial games in the wild is clearly related to second language English vocabulary proficiency. There was also a significantly positive correlation between time played and test scores.	
S16/ Hwang, W.-Y., Shih, T.K., Ma, Z.-H., Shadiev, R., Chen, S. Y. / 2015	Taiwan	16-18 years old	Quantitative/ experimental design + pretest and posttest / 40 participants	Serious game	Puzzle game	- Visual and textual support - Repetition - Interaction	Listening and speaking skills	Game-based learning activities can significantly improve students' speaking skills if driven by a mobile system. There was, however, no significant difference between the experimental and control groups in the listening posttest.	
S17/ Ashraf, H., Motlagh, F. G., Salami, M. /2014	Iran	16-22 years old	Quantitative/ experimental design + pretest and posttest / 24 participants	Commercial games	Board game Action game	- Interaction - Non-threatening environment	Vocabulary	Findings show that the experimental group outperformed the control group statistically significant in the posttest. Therefore, the study claims that	

			Include two groups: 1) experimental group and 2) control group		Simulation game				online games prove to be more effective in learning English vocabulary for these students.
S18/ Yang, F.-C. O., Wu, W.-C. V. & Wu, Y.-J. A. / 2020	Taiwan	17-18 years old	Mixed/ pretest and posttest + Semi-structured interviews + diaries / 134 participants	Serious game	Adventure game	<ul style="list-style-type: none"> - Adaptive challenges - Interesting storyline - Repetition - Ongoing feedback - Authentic 	Vocabulary	Both quantitative and qualitative findings show that Saving Alice significantly enhance student learning outcomes, and that frequency of using game-based mobile apps correlate with learning outcomes.	
S19/ Jensen, S. H. / 2017	Denmark	8 and 10 years old	Quantitative/ *pretest and posttest + diaries / 107 participants	N/A	N/A	<ul style="list-style-type: none"> - Rich language input - Visual support 	Vocabulary	The study confirms that English language games may play an important role in language learning. The results showed that gaming with both spoken and written English was significantly related to vocabulary scores.	
S20/ Chandra, C. K. / 2021	Indonesia	8 and 9 years old	Quantitative/ * pretest and posttest + surveys / 5 participants	Serious game	Adventure game	<ul style="list-style-type: none"> - Rich language input 	Vocabulary	One finding is that digital game-based language learning is a useful tool to improve the subjects' English vocabulary.	

Table 3: Overview of information withdrawn from the included studies

* Refers to cases where the research design was not clarified in the study.

5.1. General features

This section presents and discusses findings regarding general features of the included studies.

5.1.1. Distribution by publication year

As illustrated in Figure 2, the first study meeting the inclusion criteria of this review was published in 2012.

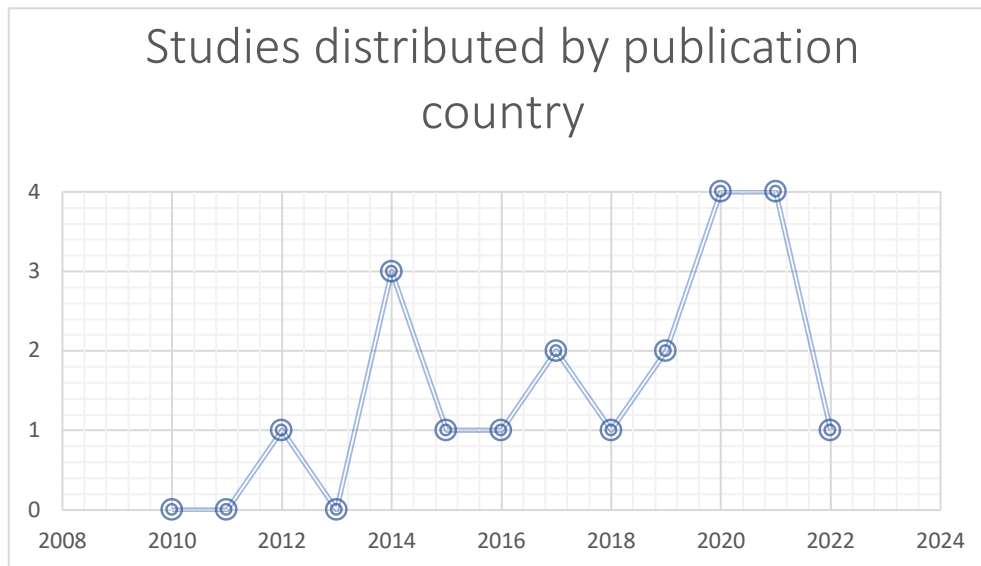


Figure 2: Clustered column illustrating distribution of studies by publication year

There is apparently a gradually increasing trend in the amount of research on DGBLL in the period 2010-2022, especially from 2019. This finding corresponds with Chapter 2.3, which refers to an increase in investments of educational technology in 2018 and onwards, especially in Asia (i.e., China and India). There may be a connection between this and the fact that the conduction of DGBLL studies increased around the same time as investments in educational technology may have created a greater interest and a greater focus on technology, and thus also on digital platforms for learning.

Another possible reason for the increase of studies investigating the use of DGBLL from 2019, may be the outbreak of the global covid-19 pandemic at the end of 2019 (see Chapter 2.2.3). Schools were closed and pupils had to participate digitally from home. For several teachers, remote teaching and emergency remote teaching was something new, which provided a reason for teachers and educators to take the time to experiment with digital technologies such as digital games. As this new "normal" required remote teaching, it may have aroused researchers' curiosity to investigate the potential of digital game-based learning and how it can be applied in the classroom to facilitate and develop learning. As stated by Wati and Yuniawatika (2020), digital game-based learning is considered fun and motivating (see Chapter 2.2.3). Therefore, researchers may have been interested in exploring what learning outcomes may result from this teaching method.

5.1.2. Distribution by publication countries

Of the 20 studies included in the current study, 16 were produced in Asian countries (80 %). Eight of these studies came from Taiwan, which accounted for nearly

half of the total number of studies included in this review (40 %). Five studies came from Iran (25 %), one study came from Turkey (5 %), one came from China (5%), and one from Indonesia (5%). The remaining four studies originated in Europe (20 %), among which two studies were produced in Sweden (10%), one in Spain (5 %) and one in Denmark (5 %).

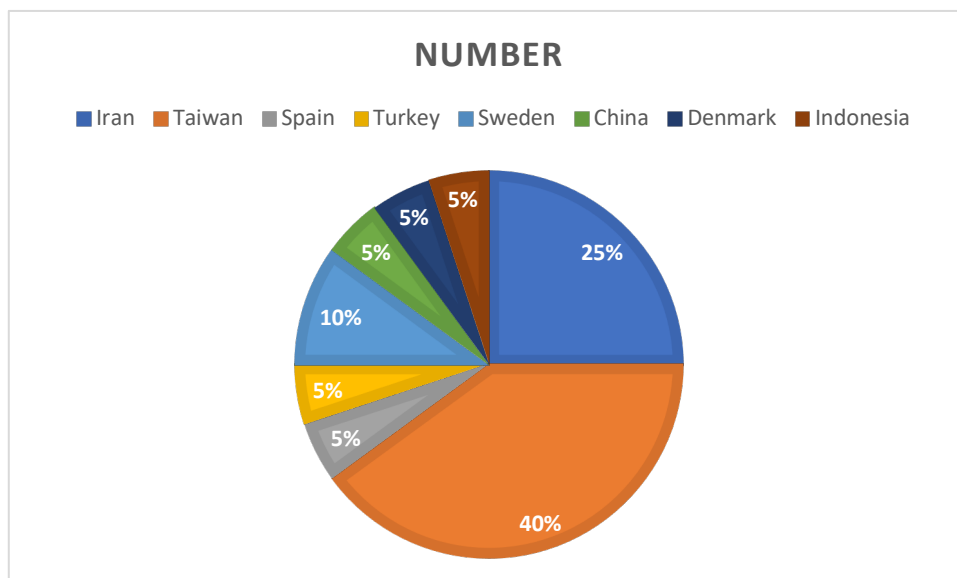


Figure 3: Pie chart showing distribution of studies by publication country

These numbers indicate that there is a large interest for DGBLL in Asian countries, especially in Taiwan. This is consistent with reviews produced by Chiu et al. (2012) and Osman and Rabu (2020), who found that most of their studies also had their origin in Taiwan (see Chapter 3). According to Wu et al. (2014), Taiwanese EFL learners, in general, have a low-level communication ability due to a lack of opportunities to use language for genuine communication in classrooms (see Chapter 2.1). Hence, the high percentage of studies investigating DGBLL in EFL classrooms may originate in Taiwan precisely because researchers are curious to whether digital game-based language learning may improve Taiwanese language learners' proficiency by providing them with relevant and authentic contexts which enables them to practice.

It is also known that Taiwanese government wishes to recognize English as a quasi-official language in Taiwan within a few years (see Chapter 2.1). This is probably motivated by Taiwan's conflict and disagreement regarding Taiwanese independency from China, in which they are heavily dependent on their ties and support received from the West and the US in particular (Maizland, 2021). The establishment of English as a quasi-official language can be a tool for strengthening these ties.

As for the fact that 80% of the studies were conducted in Asian countries, this can be related to the importance of the English language in Asian countries in general. In Chapter 2.1, it is stated that Asian countries link high English proficiency to social development and innovation. Thus, it can be argued that Asian countries focus on the development of English language skills in their populations in order to arrange better future prospects and ultimately also a higher quality of life.

In contrast to the large number of studies conducted in Asia, only four of the studies came from Europe. According to Breene (2019), Europeans are at the top of the English proficiency index. However, Asian countries have a more even English proficiency

across their populations and borders (see Chapter 2.1). Thus, there is no obvious reason why European countries should not include digital game-based language learning as a resource in the EFL classroom. As English proficiency in European countries is more uneven than in Asian countries, the implementation of digital game-based language learning could potentially help to even out some of these differences.

5.1.3. Age of participants

Several previous literature studies within the field of DGBLL in the EFL classroom focus on a wide age range among their participants. Osman and Rabu (2020) and Xu et al. (2019), for instance, include participants of all ages. Hung et al. (2016) focused on studies including participants from primary and secondary school, but also beyond this level of education, such as participants from higher education. Thus, the current study chose to focus on a narrower age range – the younger participants, who are still in primary and secondary school (5-19 years) (see Table 4). Some of the included studies does, however, have a mixed population. As mentioned in chapter 4.3.3, a mixed population, according to this review, refers to studies where the age of the participants can vary from 5 to 19 years. The other form of mixed population refers to studies where the age of the participants can be beyond 5 and 19 years.

Ages	5 – 13 years	13 – 16 years	16 – 19 years	Mixed population, only including ages within the age range of 5-19 years	Mixed population, also including ages beyond the age range of 5-19 years
Number of studies	8	1	6	2	3

Table 4: Age of participants

According to findings, the largest distribution of studies was those with participants aged 5 to 13 years (40 %). The second largest group was the group including participants aged 16 to 19 years (25%). Three studies (15 %) included a mixed population in the sense that participants’ ages went across several age groups, yet within the age range of 5-19 years. Another three studies (15 %) included a mixed population where participants’ ages also went beyond the age range of primary and secondary school age. Only one study included participants exclusively within the age range of 13 to 16 years (5 %).

These numbers can be seen in connection with Chapter 2.1. Here, several advantages to early language learning are claimed. As the largest proportion of studies in this review include the “youngest” group of participants, it may seem as though the researchers of these studies may have had a desire to investigate these claims. Also, as stated in Chapter 2.1, the youngest participants tend to be more enthusiastic learners than older participants, and it is therefore conceivable that this also applies to digital game-based learning. Nevertheless, none of the previous literature studies mentioned in Chapter 3 looked exclusively into the youngest participants. Osman and Rabu (2020), Hung et al. (2016) and Xu et al. (2019) all explored participants of all ages. This may be because the researchers wished to include all English language learners, regardless of their ages. However, it may also be of practical reasons. For instance, it can often be more convenient to include older participants as they tend to be more reflected and

expressive about their opinions and thoughts. It may also be easier for the researcher to relate to them and convey information to them. Several digital games have a higher age limit, and it can thus be more practical to include older participants in order to avoid having to deal with this as a potential problem. Finally, there are age limits for including people as participants in research studies. Since, in several countries, one must be of legal age to participate in a study without the consent of a parents or a guardian, it may be more practical to include participants who can give their consent to participate and decide for themselves whether they wish to provide personal data where and when needed.

5.1.4. Methodological procedures

In the upcoming three paragraphs, aspects of the methodological procedures of the included studies will be discussed. One of these aspects is methodologies employed, that is what research method the studies have applied. Another aspect is applied data collection approaches, i.e., the research design of studies. Finally, the sample size of the studies, and whether these can lead to statistical bias, is discussed.

5.1.4.1. Methodologies employed

Regarding the methodological approaches of the various studies, it became clear that there was a predominance of quantitative methodology used in included studies (see Figure 4). Of the 20 studies, 16 used a quantitative methodology (80 %), while the remaining four studies used a mixed methodology (20 %). This means that none of the included studies used a qualitative methodology.

As the included studies examined the use of DGBLL as a learning practice in the EFL classroom, it can be advantageous to do this through a methodology that facilitates data collection through experimental design where one can compare the practice to other teaching practices. Such experimental designs falls under quantitative methodology (see Chapter 4.3.6.1).

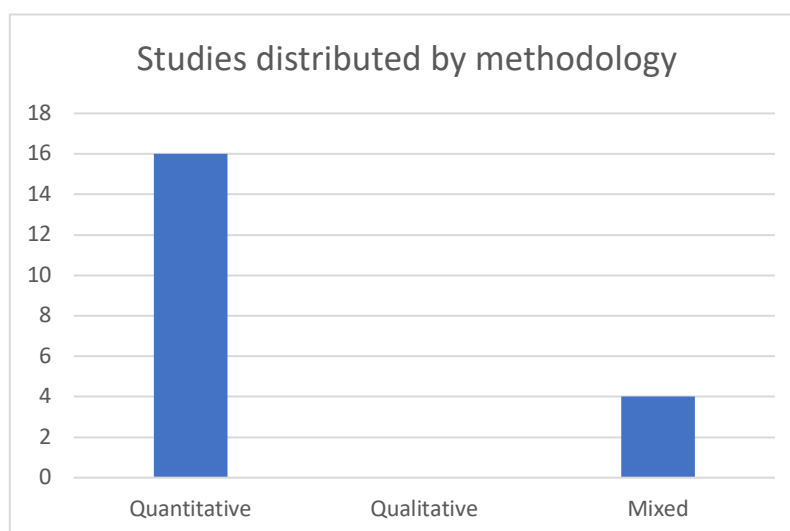


Figure 4: Clustered column showing studies distributed by methodology

These findings coincide with some previous literature reviews, such as Xu et al. (2019), who also found that the majority of studies included used quantitative methodology.

Nevertheless, the findings contradict the review conducted by Jabbari and Eslami (2018), Hung et al. (2016) and Hung et al. (2018), whose reviews presented most studies using either mixed or qualitative methodology.

This review could not identify any obvious reasons for these contradictory findings. However, it is an observation that these contradictory reviews, all of which are a few years old, examined studies that mainly had their year of publication before the included studies in this review. Jabbari and Eslami (2018) included studies published after 2000 (however without emphasizing an end date). Hung et al. (2016) included studies from 2010-2014. Hung et al. (2018) included studies from 2007-2016. Although some of the studies included in the current review were also conducted within these years, most of them were published after 2014, with a significant proportion of studies from 2020 and 2021. There is therefore reason to question whether there may have been a shift in the choice of methodology in recent years. This question may be relevant for future research.

5.1.4.2. *Data collection approaches*

Experimental and quasi-experimental design was most frequently used within the studies (16 out of 20) (80 %). Further, all 20 studies included tests (i.e., pretests, posttests, delayed posttests), followed by surveys and diaries, both of which were used equally many times (11,1%) (see Table 3). Six of the studies also included surveys and/or questionnaires (30 %). Six studies included semi-structured interviews (30 %), and four studies included diaries (20 %). Only one study included field notes as a data collection approach (5 %). Ten studies used more than one data collection approach (50 %). These studies may have done so in order to get more in-depth details in their findings.

The use of tests and surveys can be useful for seeing language learning development or to get superficial information or feedback from participants. Still, in cases where only tests and surveys are used, there are nuances and information that are not available. Nevertheless, the majority of the included studies have chosen this data collection approach.

5.1.4.3. *Sample size*

Sample sizes are of importance as they express something about the reliability and validity of a particular study. As mentioned in Chapter 4.5, a small sample size tends to have a larger effect size than large samples and can potentially provide statistical bias. The implementation of the classification of size units presented by Slavin and Smith (2009) (see Chapter 4.5) made it evident that 13 of the included studies (65 %) have a relatively small participant sample. Six studies (30 %) are classified as having a medium sample size, while only one study (5 %) have a large sample size (see Figure 5).

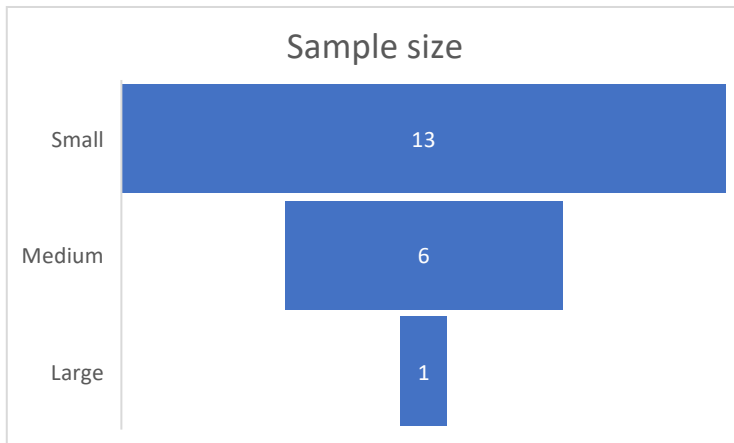


Figure 5: Funnel bar illustrating the sample size of included studies

Qualitative studies are not necessarily in need of large sample sizes as their data collection procedures usually provide them with in-depth information. The current review includes mixed-method studies, where there are elements of qualitative methodology. However, the preponderance of included studies implement a quantitative methodology with the intention of generalizing data from a sample to a population (see Chapter 4.3.6.1). Hence, there is a potential for bias in this scoping review and it may have been appropriate to use larger sample sizes. Bias in this case refers to statistical bias, which in this case further implies that if the sample size is not large enough, the results may not be representative.

5.1.5. English language skills focused upon

The included studies analyze the development of several English language skills. As can be seen in Figure 6, the specific English language skills focused upon were: *Vocabulary, phrasal verb knowledge, grammar, communicative skills (i.e., reading, listening, and speaking), and other communicative skills*. Some of the studies investigate several of these English language skills.

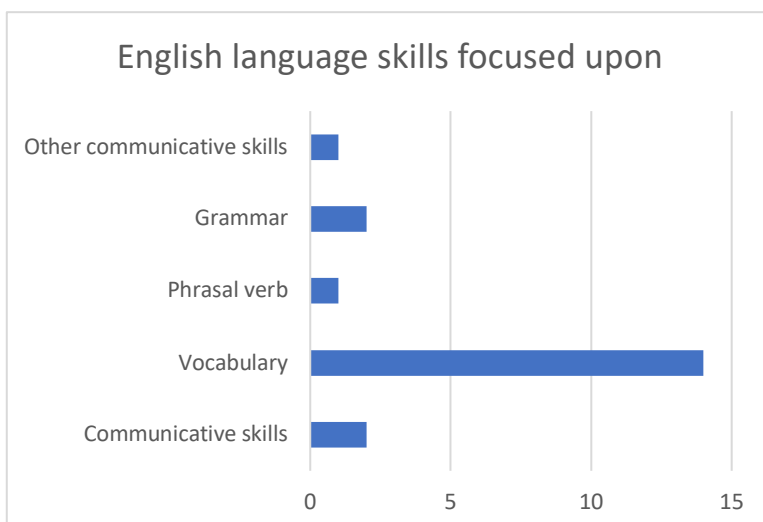


Figure 6: Clustered bar illustrating the number of studies focusing on different English language skills

It was evident that vocabulary is the language skill most frequently investigated among the studies (70 %). According to Chapter 2.1.1, vocabulary is crucial in reading processes and in comprehension. Also, in order to comprehend and construct complex

texts and engage in oral language, children need to have a rich and growing vocabulary. Several of the games implemented in the included studies request players to look for or use single words to solve a task. For instance, in S16, self-designed cards were put together by players to form proper sentences. This requires for the player to have a basic vocabulary understanding.

5.2 Digital games in the included studies

In this section, I will investigate the games used in the 20 studies. This review investigates the game function types. Further, it discusses game genres and whether the development of English language skills can be dependent upon this aspect. At last, the review discussed findings of identified digital game elements and how they can facilitate the development of English language skills with respect to four learning perspectives. It was challenging to identify and classify the game genres and game elements in some studies as these aspects were not explicitly specified. Nevertheless, I placed all studies within categories based on available information about the games provided by the studies. In cases where game information in included studies was limited, I made my own subjective interpretation, which may be up for discussion. Some studies operated with several games. For that reason, several game genres may have been identified for these studies.

Based on the 20 included studies, I was able to identify two digital game function types, 10 digital game genres, and 12 digital game elements.

5.2.1 Digital game function types

The classification of game function types identified in this scoping review were based on whether they were serious games or commercial games; that is, whether they were initially produced for use in educational contexts or for use in past-time and/or entertainment contexts (see Chapter 2.2.2.1). After reviewing the games used in the various studies, it turned out that 11 studies (55 %) operated with serious games, while only seven (35 %) of the studies implemented commercial games. Two studies did not provide any information about the digital games implemented.

An observation was that most studies conducted in Asian countries used serious games, while the four European countries either used commercial games or did not specify the game function type (see Table 3). As mentioned in Chapter 1, Asian educational systems tend to still be somewhat conservative and reserved in relation to some of the West's more creative and forward-looking educational systems. Thus, there may not be as much room for games primarily created for entertainment in Asia. Western countries, on the other hand, such as Denmark and Sweden, seems to be more open to this.

Dixon et al. (2022) found that games designed for entertainment were, apparently, more effective than games designed for second language education in regard to positive learning outcomes (see Chapter 3). However, the studies in this review were not directly concerned with which of these two game function types best facilitate the development of English language skills. This indicates that the absence of commercial games does not necessarily mean that they are not relevant to language learning, but rather that there is not enough available data in the included studies to conclude whether one game function type is more suitable for developing English language skills than another.

5.2.2 Digital game genres

As stated in Chapter 2.2.2.2, digital game genres refer to categorizations of games with similar mechanics, player behaviors and themes. Altogether, 10 game genres were identified (see Table 3). Excluding the group where no genre was specified, the most frequent game genre in the included studies was adventure games (20 %), closely followed by strategy games (15%), simulation games (15%) and puzzle games (15 %). Quiz games and board games each covered 10 % of the total amount of digital game genres, while MMORPG 's, social deduction games, science fiction games, and action games covered 5% each. In one study, it was not possible to identify a game genre simply because the study did not contain any information about a possible genre.

According to these findings, none of the game genres stand out remarkably as particularly valuable for the development of English language skills. This may indicate that learning outcomes are independent of game genre. On the other hand, it may also indicate that there is too little data material in this review to document whether some game genres are more valuable than others in relation to the use of DGBLL in the EFL classroom. What the data material of this review have been able to document, however, is that many game genres have the potential to facilitate the development of English language skills.

5.2.3 Digital game elements identified as facilitators of English language skills

Several digital game elements were identified based on their visibility throughout the studies implemented in this scoping review (see Table 5). A total of 69 instances of digital game elements were found in the digital games implemented in included studies. These elements fell into 12 categories. These 12 categories were connection to the four perspectives presented by Plass et al. (2015) based on how these elements can facilitate the development of English language skills among language learners (see Chapter 2.2.4). The four perspectives are 1) *cognitive processing*, 2) *motivation*, 3) *affect*, and 4) *sociocultural interaction*. The identified digital game elements relate to the four learning perspectives in different ways, and across each other. This will be discussed in more detail in the upcoming chapters⁴.

Table 5 provides an overview of the 12 identified digital game elements with definitions to each of them, in relation to how the game elements have been used in this review.

⁴ In addition to Table 5, incidents are summarized in Table 6 to Table 9. In these four tables, some of the identified game elements are referred to more than once: this is given by the "many to many" relationship between the game elements and the learning perspectives illustrated in Figure 7. The consequence of this is that if you add up the total number of observations of game elements for Table 6 to Table 9, you will get a significantly higher number than 69. In the same way, if you add up the percentages, you get more than 100%.

Digital game element	Digital game elements defined	Frequency
Adaptive challenges	Dynamic challenges adjusted to the individual's skill level	6
Clear goals	Clearly defined goals	4
Autonomy	Self-determination over different directions and development in the game	2
Interesting storyline	A storyline that, through its story/narrative, captures the player's attention	4
Authenticity	The game being closely related to relevant and real-life contexts	4
Sensory stimuli	A game taking players into another reality, allowing them to experience a distortion of perception in a way that cannot be experienced in real life (i.e., sound effects, graphics)	2
Relaxed atmosphere or threatening atmosphere	<u>Relaxed atmosphere</u> : An atmosphere where players feel comfortable and safe, and where they feel as though they are having fun rather than learning subjects <u>Threatening atmosphere</u> : an atmosphere that creates anxiety and thus prevents learning from happening	5 + 2
Interaction	I.e., discussions, conversations, collaboration, communication, or feedback between people. Interaction in this context also applies to interaction between players and the game.	13
Ongoing feedback	Ongoing response to players about their performance	6
Repetition	Games where players are given the opportunity to practice and repeat parts of the game that can further lead to memorization and (thus) English language learning	10
Visual or textual support	Either images or texts that help players gain a deeper understanding of the game to advance in it	7
Rich language input	Exposure to authentic language in use.	4
Overall digital game elements		69

Table 5: Overview of game elements identified and instances of game elements

In line with the definitions of the 12 digital game elements, several examples have been identified within the 20 studies. In the following sections, one example per game element will be presented.

S13 refers to the digital game element of *adaptive challenges*. Players in the study cannot progress in the game before the time is right and before the player is ready for it. In order to progress in the game, players must achieve a score that is above a set goal. If the player manages to do so, he/she will get the opportunity to upgrade to the next level. Otherwise, the player must remain on the same level until the score which the digital game demands before advancing in the game is achieved (Q.-F. Yang et al., 2020, p. 5).

S4 operated with a game which offered pupils two levels of goals: immediate and long-term goals. The study went on to suggest that the two levels of goal might make pupils perceive a greater intensity of *goal clarity*, which can, in turn, contribute to enhancing level of immersion (Chen & Lee, 2018, p. 77).

Autonomy was identified in S3, as pupils could reconceptualize skills they learned in class into other digital video games in order to guess the meaning of unknown vocabulary. In other words, they were able to take charge of their own learning (Ebrahimzadeh & Alavi, 2016, p. 8). The same game element was portrayed in S12 where the included VR game, "Angels and Demigods", allowed players to "interact with the in-game characters by selecting dialogue choices which alter the paths of the game's storyline" (Lai & Chen, 2021, p. 11).

S12 includes the game element of *interesting storyline*, as the game plot revolves around a world in a distant future where humanity has fallen into a great civil war, which further induced humanity to create genetically modified soldiers as weapons to fight each other. Participants in this study claimed that they learned new English vocabulary due to the fact that the game had a particularly interesting storyline (Lai & Chen, 2021, p. 20).

According to S12, the included VR game can create a life-like interaction which facilitate authentic engagement. Here, players can experience a realistic and *authentic* environment while being detached from the real world (Lai & Chen, 2021, p. 7). The study believed that the participants' improved performance could be due to the fact that the game had an immersive presence and provided opportunities for embodied interaction (Lai & Chen, 2021, p. 22).

The game in S12 facilitates the development of English language skills by providing opportunities for players to refer to the animation and spoken dialogue in the game in order to acquire the meaning of certain words. These cues work as *visual and textual support* that can help players associate words with the sounds and images to strengthen their recall (Lai & Chen, 2021, pp. 10-11).

Participants in S9 were engaged in learning by numerous sound effects and interactive visual effects, that is *sensory stimuli* (Wu et al., 2014, p. 223). Players in S12, using the VR game, also seemed appreciative of this game element as they expressed their delight in the virtual features of the game, which in turn led to higher engagement and interaction with the game (Lai & Chen, 2021, p. 22).

S9 claims that digital learning playgrounds' face-to-face game surrounding setting can bring the effect that each player can witness and absorb the language being used constantly, which results in *repetition* of thriving language input for EFL learners (Wu et al., 2014, p. 224).

S4 used a game where participants were provided with *ongoing feedback*, which the study believed was a key element that could be helpful in facilitating the flow and immersive experience and which, ultimately, could enhance students' engagement

(Chen & Lee, 2018, p. 78). Ongoing feedback was also an element identified in S3. Nevertheless, participants did not pay much attention to feedback here. Reasons for this was that 1) some of the feedback was irrelevant regarding the vocabulary items, 2) the relevant feedback was not always displayed on the screen, and also that 3) the participants were in the heat of the battle and did not have time to pay attention (Ebrahimzadeh & Alavi, 2016, p. 9).

As mentioned by Manninen (2003) in Chapter 2.2.3.6, *interaction* can be interpreted from two different points of view, namely interaction between the player and the game, and interaction between the player and other people. Interaction was a key game element in several of the studies included in this review. S11, for instance, implemented MMORPGs which, in turn, was considered highly beneficial for second language learning as it provides opportunities for players to interact with co-players (Sylvén & Sundqvist, 2012, p. 306). In S13, on the other hand, it became clear that players had to interact with non-player characters (NPCs) in the game (Yang et al., 2020, p. 6).

S8 stated that participants of the study were at different achievement levels, but that there was still a friendly interaction between the pupils while practicing speaking with the GeCALL system. Since the pupils experienced a positive and friendly atmosphere, the students were willing to try (and possibly fail) in the EFL classroom. In this *relaxed atmosphere* the pupils were stimulated to actively practice their oral speaking (Young and Wang, 2014, p. 249). S13, on the other hand, stated how games can have the potential of creating a threatening atmosphere. This is possible if, for instance, game challenges are too demanding. This can create emotions of affect, such as anxiety. Here, it became clear that participants experienced higher levels of anxiety as there was a lack of balance between the game challenge and the skill level of the participants (Q.-F. Yang et al., 2020, p. 17.)

According to S19, results show that oral and written English input, that is, *rich language input*, and gaming is significantly related to vocabulary scores (Jensen, 2017, p. 1).

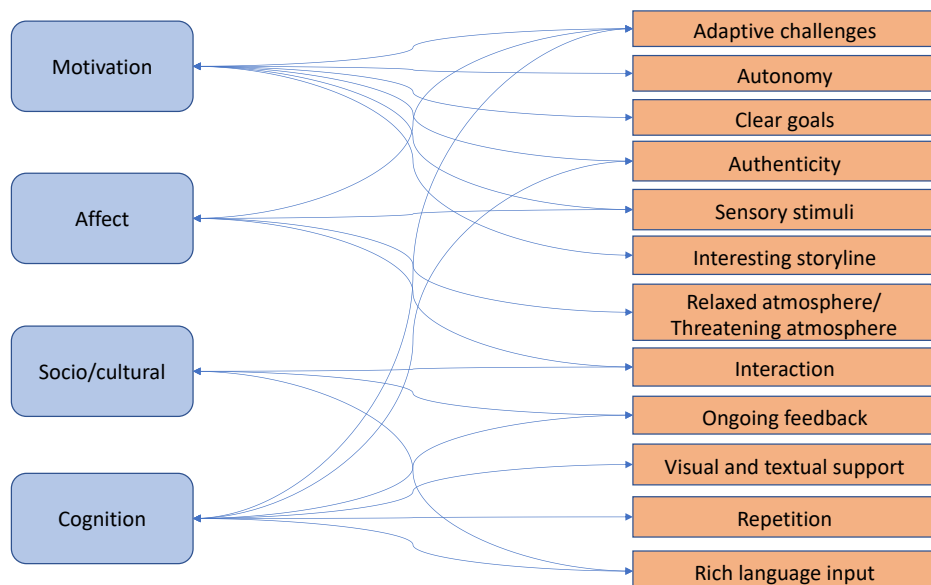


Figure 7 Network diagram showing how digital game elements support four learning perspectives (according to Plass et al., 2015)

Figure 7 provides a comprehensive overview of the available connections between the four learning perspectives according to Plass et al. (2015) and the 12 identified game elements. The four perspectives are found on the left-hand side, while the game elements are on the right-hand side. This figure illustrates that there is a “many to many” relationship between the 12 learning elements and the four learning perspectives, i.e., each learning perspective is supported by several learning elements, and many learning elements are important for several of the learning perspectives. This can further also support an understanding that there is a connection between the different learning perspectives; for instance, that motivation and sociocultural interaction can be connected to the same underlying learning elements and driving forces – and the same applies to, for instance, motivation and cognitive processing.

Overall, these findings support the main conclusion of Plass et al. (2015) about a “holistic learning perspective” (see Chapter 2.2.4).

The following chapters will provide a more detailed overview of which digital game elements fit together with which of the four learning perspectives, and how they facilitate for the development of English language skills. None of the included studies directly discuss the relationship between the learning elements and the four learning perspectives used in this review. Despite this, I will, in the following discussions, highlight some examples from the studies that support my claims about these connections.

5.2.3.1 Digital game elements used to support cognitive processing for developing English language skills

As illustrated in Table 6, six game elements have been connected to the cognitive perspective. These elements can help create mental models that further facilitate English language learning by organizing information in working memory, with one another and with prior knowledge (see Chapter 2.2.4.1).

Digital game element	Instances	Percentage of total element instances
Repetition	5	7,5 %
Ongoing feedback	7	10,5 %
Visual or textual support	7	10,5 %
Authenticity	2	3 %
Adaptive challenges	6	9 %
Rich language input	4	6 %

Table 6: Incidents of game elements related to cognitive processing

According to S13, pupils should experience learning and engagement zones where they are faced with tasks of high challenge, but at the same time also with a lot of support – also called scaffolding (Q.-F. Yang et al, 2020, p. 2). What the study does not mention is that this scaffold should fade as the learner acquires skills and knowledge. In other words, the support can be removed as the player advance in the game (see Chapter 2.2.4.1). In games, appropriate ongoing feedback can work as a scaffold in cognitive processes when, for instance, players face challenges (see Chapter 2.2.4.1). S11 confirms this by stating that ongoing feedback, among other things, is pivotal for L2 development (Sylvén & Sundqvist, 2012, p. 305).

In S19, the game provided players with input relevant to their need. This input was then repeated several times, which led to English language learning among the pupils (Jensen, 2017, pp. 13-14). By providing language learners with opportunities to practice skills and apply knowledge, new information becomes automatized. In other words, automatization happens after a consistent and regular association between a certain form of input and output pattern have been made (through repetition) (see Chapter 2.2.3.1).

S19 also expressed that gaming may play a role in vocabulary learning as players wish to understand the input of the game (Jensen, 2017, pp. 13-14). In order for language learning to take place, language input should, according to the Input Hypothesis consist of comprehensible language that is slightly beyond the pupils' current stage of linguistic competence (see Chapter 2.2.4.1). This rich language input is presented to the learners, the learners organize this information as visual and verbal representations in working memory, and then integrate these representations with one another and with prior knowledge, in short; cognitive processing (see Chapter 2.2.4.1).

S14 depicts how participants in the study was able to learn new vocabulary with the help of corresponding pictures. According to this study, such corresponding pictures help learners to recognize and maintain vocabulary more easily (Hong et al., 2022, p. 74, 77). Similarly, language learners in S12 were provided with audio-visual cues that helped them associate words with sounds and images in the game. For instance, the word metamorphosis was displayed when the characters in the game were "morphing" into an angel. This would, ultimately, strengthen their recall (Lai & Chen, 2021, pp. 10-11). According to Plass et al. (2015), representations like these can be considered a strength of games as they can support learner at younger developmental stages or learners who have low prior knowledge (see Chapter 2.2.4.1).

S9 suggests that board games are optimal teaching supplements for language learning because they provide learners with authentic experiences (Wu et al., 2014, p. 215). By presenting learners to different, yet related experiences, the game facilitates transfer of learning, that is, games facilitate opportunities for players to use generalized knowledge to new situations. In other words, the game provides opportunities for players to use information familiar to them in order to learn new information (see

Chapter 2.2.4.1). One of the objectives of S9 was in fact to assess pupils' ability to transfer their learning into potential real-life contexts (Wu et al., 2014, p. 220).

Plass et al. (2015) also emphasizes the following two game elements: 1) learning mechanics and 2) gestures and movement. These game elements, however, have not been identified in the games implemented in included studies. On the other hand, this review has identified rich language input as a game element, while this was not mentioned by Plass et al. (2015).

5.2.3.2 Digital game elements used as motivational tools for developing English language skills

In this review, six of the identified game elements were linked to the motivational perspective (see Table 7). From this perspective, these games elements can contribute to English language learning simply because they are motivating to learners, i.e., they evoke emotions, thoughts and reasoning that give color and glow to our actions (see Chapter 2.2.4.2). Among the game elements placed within this perspective, most of them lead to intrinsic motivation, which according to Ryan and Deci (2000), means that an activity is done because of its inherent satisfaction and not because of a separable consequence (see Chapter 2.2.4.2). In other words, the reason why these six game elements can lead to intrinsic motivation is because of the properties of each game element. If used properly, the properties of these game elements can evoke a genuine interest, joy, and satisfaction in the players, which leads to the players sincerely wanting to play, advance, and complete the game. This can ultimately, according to Chapter 2.2.4.2, lead to greater language learning outcome.

Digital game elements	Instances	Percentage of total element instances
Adaptive challenges	5	7 %
Clear goals	3	4,5 %
Autonomy	3	4,5 %
Interesting storyline	5	7 %
Sensory stimuli	1	1,5 %
Authenticity	3	4,5 %

Table 7: Incidents of game elements related to motivation

S14 suggests that using games in class can arouse and sustain learners' intrinsic motivation due to, for instance self-efficacy (Hong et al., 2022, p. 77). A person that is self-efficient can also be considered autonomous which refers to a person who fully endorse and concur with the behavior they are engaged in. Further, it is believed that autonomy constitutes a core part of the intrinsic motivation of playing games as players are provided with an engaging environment that possess features which contribute to independent learning (see Chapter 2.2.4.2).

According to Skaalvik and Skaalvik (2017), language learners have expectations of mastery when facing new situations, and a learner who believes they will master the challenge, will be more motivated to do the task. Thus, they need to receive challenges that are adapted to their level of competence and ability (see Chapter 2.2.4.2). This was confirmed by S13, that states that when there is a balance with the challenge and the skill in a game, there is an increasing possibility of entering a flow-state, which will

further encourage (and hence motivate) students to participate in more complicated activities to pursue greater learning interest (Q.-F. Yang et al., 2020, p. 17).

It is more likely that learners will engage in a game if it appears relevant and authentic to the player (see Chapter 2.2.4.2). This claim is in accordance with S12 and S11. The game used in S12 created life-like interactions that facilitated authentic engagement (and hence motivation). It also created a greater sense of presence which in turn motivated and caused learners to cognitively process information (Lai & Chen, 2021, p. 7). S11 makes a brief but accurate statement, saying that digital games are, to a large extent, authentic and that players seem highly motivated to play them (Sylvén & Sundqvist, 2012, p. 308).

The story in the game of S12 was set in a distant future where humanity had created genetically modified soldiers called "angels" as weapons to fight each other (Lai & Chen, 2021, p. 8). Garris et al. (2002) believes that games can motivate players through sensory stimuli by bringing them into a world that disrupts the stability of normal sensations and perceptions by allowing players to experience a distortion of the perception of reality (see Chapter 2.2.4.2).

Participants in S12 uttered that the particularly interesting storyline of the game had motivated them to learn English (Lai & Chen, 2021, p. 20). According to Curtis (2019), games that consist of an interesting storyline is more likely to motivate pupils because the story activates the imagination of players by awakening their creativity and allowing them to feel as they are a part of the narrative (see Chapter 2.2.4.2).

Finally, participants in S4 could perceive clear goals, which enhanced their engagement experience, and thus also their motivation (Chen & Lee, 2018, p. 78). Freyman (2020) states that digital game goals should be specific, so players, in advance of starting the game, understand what they need to do to master the game. Such clarity in goals can lead to better performance and skill development as they are motivating to players (see Chapter 2.2.4.2).

5.2.3.3 Digital game elements used as affective tools for developing English language skills

Four game elements can be related to the affective perspective when it comes to developing English language skills (see Table 8). These game elements have the potential to evoke certain feelings or emotional reactions in language learning contexts which can either lead to learning or hinder learning. According to Gass et al. (2020), anxiety is a unique form of affect in language learning contexts. Thus, the affect term in this review have been limited to exclusively apply to "situation-specific anxiety" in data collection and processing (see Chapter 2.2.4.3).

The game element of relaxed atmosphere/threatening atmosphere could be considered to not be a separate game element, but rather a consequence of, for instance, adaptive challenges and/or interaction. It is nevertheless documented (see S9, p. 222) that game-based learning by itself can function as a relaxed atmosphere for learning, and thus also that it can function as a general phenomenon independent of other game elements. Therefore, I have chosen to keep relaxed atmosphere/threatening atmosphere as a separate game element, even though it may also be strongly associated with other game elements.

Digital game element	Instances	Percentage of total element instances
Relaxed atmosphere/ threatening atmosphere	4 / 2	6 % / 3%
Adaptive challenges	5	7 %
Interaction	13	19 %

Table 8: Incidents of game elements related to affect

Barack (2019) states that games can be particularly beneficial in learning contexts as nervous pupils tend to find gameplay in such contexts to be relaxing and helpful in easing into subject matter (see Chapter 2.2.4.3). S9 supported this by expressing how the use of a digital learning playground led to participants experiencing less stressed language learning (Wu et al., 2014, p. 222). By making use of such playful learning environments, engagement of the game can be optimized, often at the expense of cognitive load. Thus, even learners who have initially opted out of various teaching contexts, can become reengaged (see Chapter 2.2.4.3).

Nevertheless, if gaming conditions are inappropriate (for instance due to non-adapted challenges), digital games can, as stated by Scasserra (2008), also lead to increased anxiety among players (see Chapter 2.2.4.3). This was the case in the control group of S13. While participants in the experimental group (i.e., the cognitive complexity-based gaming approach group) received tasks adjusted to their own cognitive level, players in the control group, all had to follow the same procedure of learning. This caused some of the participants to feel that they were at an inappropriate cognitive complexity level for a long time. Thus, some of these participants experienced a state of high anxiety and low learning effectiveness (Q.-F. Yang et al. 2020, p. 16).

Players in S12 felt comfortable and did not mind making mistakes when interacting with peers. This further led to less anxiety among the pupils and thus to better learning (Vazaribad & Farrokhi, 2020, p. 33). If done right, such collaborative contexts have the potential to create non-threatening learning environments for players, where peers can help each other and where it is safe for individuals to express their thoughts and points of view (see Chapter 2.2.4.4).

5.2.3.4 Digital game elements used to support sociocultural interaction for developing English language skills

Three digital game elements were associated to the sociocultural perspective in connection with the development of English language skills. In this perspective, learning happens through external stimulation such as interaction between people or, based on this study, between people and the game (see Chapter 2.2.4.4). These three game elements cover around 35 % of the total percentage of game element instances (see Table 9). This indicates that the three game elements may be quite significant in digital games used in educational contexts where the focus is developing English language skills.

Digital game element	Instances	Percentage of total element instances
Interaction	13	19 %
Ongoing feedback	7	10 %
Rich language input	4	6 %

Table 9: Incidents of game elements related to sociocultural interaction

Plass et al. (2015) believe that games provide opportunities for social engagement by including contexts where peers and social interactions occur to enhance learning (see Chapter 2.2.4.4). S11 confirms this by illustrating how such collaborative interaction can facilitate second language learning (Sylvén & Sundqvist, 2012, p. 316).

S11 also supports the importance of rich language input. According to this study, digital games that facilitate interaction (e.g., MMORPGs) are highly beneficial for second language learning as players get to engage in, among other things, rich target language input (Sylvén & Sundqvist, 2012, p. 315). Interaction consists of input, output, and feedback. However, it is claimed that language input is considered the most important concept of second language learning as learning cannot take place without learners being exposed to input. By exposing language learners to comprehensible language that is slightly beyond their current interlanguage and level of grammatical understanding, language is developed (see Chapter 2.2.4.4).

A common practice in digital game-based language learning contexts, is observational learning. Here, observers tend to be just as eager and engaged as the players themselves and they can also learn a lot by following the game from the sideline (see Chapter 2.2.4.4). In S3, two groups were included: the Players and the Watchers. While Players played the game, Watchers observed, and it turned out that participants in both groups seemed to be equally engaged and that there was no significant difference in learning outcomes between the two groups. Such contexts allow for learners to lean on each other and give each other advice, support, and encouragement, for instance if a player is in the Zone of Proximal Development and need assistance from a peer (see Chapter 2.2.4.4). This was also highlighted in the study conducted by Mark Peterson (2016), who claimed that games can facilitate peer-based learning which integrates zones of proximal development where learners can develop their second language proficiency (see Chapter 3).

As mentioned, feedback also has a central role in interaction as it provides learners with information about their utterances. The participants in S7 confirmed the importance of feedback by stating that they believed that it was the feedback they received from their peers or their teacher that helped them solve their problems and learn better (Rad, 2021, p. 553).

5.2.4 Negative effects of DGBLL?

As mentioned in Chapter 2.3, young people today, may be attuned to the experiential discovery-based pedagogy that are designed into games. Additionally, game-based approaches are known to make the attainment of learning processes, among other things, more fun, more student-centered, and more effective than traditional classroom teaching (Reinhardt, 2017, p. 203; Pesare et al., 2016, p. 3). Among the 20 studies, none of the conclusions directly stated that the use of DGBLL in developing English language skills led to negative learning outcomes. Nevertheless, S8 stated that of the two groups included, the group that had instruction in the form of

drilling did better on the delayed retention test than the group that had instruction in the form of DGBLL. The reason was claimed to be the fact that participants in the game-based group focused more on using the words in the game, rather than repeating and memorizing them long term (Young & Wang, 2014, p. 248). In Chapter 2.2.5, Nisbet (2021) mentioned how some teachers are skeptical to whether DGBLL can be considered an appropriate alternative to traditional classroom teaching. One of the reasons may be precisely what is described in the example mentioned.

Admittedly, a possible cause of the absence of negative effects of DGBLL may be that the research questions of the 20 included studies were not concerned with identifying such effects. The absence of observations of negative effects therefore does not necessarily have strong concluding power.

6 Conclusion and future research

Although DGBLL is still considered to be quite innovative and new in pedagogical practice, it has recently received a lot of attention among DGBLL researchers, which has resulted in several research studies on the topic over the last decade.

This mini scoping review provide an overview of available research literature addressing how DGBLL can facilitate the development of certain English language skills. For this review, two research questions were answered by following the five stages of scoping reviews. The two research questions were:

1. What is the current state of knowledge regarding the development of English language skills by using DGBLL in the EFL classroom?
2. In what ways do the digital games in the included studies support the development of English language skills in the EFL classroom, specifically with regard to digital game function types, game genres and game elements?

As a consequence of the set inclusion criteria, it was possible to identify and include 20 studies in the current mini scoping review. Findings indicate that most studies were conducted in recent years. The increase of studies is possibly due to an increased interest and investment around digital learning forms. This trend may have been boosted by the outbreak of the covid-19 pandemic at the end of 2019 and the change of teaching methods related to that. Further, it became evident that many studies originate from Asian countries, more specifically Taiwan. Taiwanese government wishes to implement English as a national language within the next few years, and the motivation for using DGBLL in the EFL classroom may be connected to this vision for the future. The most frequent participant age, as a result of inclusion criteria, were between 5 and 13 years. Most of the studies adopted a quantitative methodology (experimental design), and tests were the most frequent data collection approach used. The tests were efficient in measuring the potential development in English language skills among the participants. Most studies had a small sample size, indicating a risk of statistical bias. It also became clear that vocabulary was the English language skill most frequently focused upon.

It became evident that mostly serious games (unlike commercial games) had been implemented in the included studies. The included studies treat several digital game genres and game elements. The development of English language skills was associated with digital games of several different game genres, and learning outcomes seems to be rather independent of game genre. 12 digital game elements were

identified, and these could be connected to the four applied learning perspectives in a “many to many” relationship.

My main conclusion is that the digital game elements and learning perspectives are linked together in a complex “many to many” relationship, which means that a versatile selection of digital game elements must all be in place for English language skills to be developed. This will lead to an overall recommendation to simultaneously use a broad set of tools and methods in the EFL classroom.

Based on my findings, I would like to recommend some topics for future research.

During the preparation for this review, it became clear that there are not many studies exploring the use of analog game-based language learning. In Chapter 2.2.5, some limitations of digital game-based language learning were mentioned. Some of those limitations were, for instance, that pupils already have enough screen time, or that digital games involve a steep technology learning curve, which there is rarely time for. Thus, despite the innovative technology development of today, it could be interesting to see more studies focusing on the implementation of analog game-based language learning.

Additionally, as mentioned in Chapter 2.2.3, the covid-19 pandemic may have been a possible reason why the number of studies dealing with DGBLL increased between 2020 and 2021. Nevertheless, in regard to the pandemic, it is too early to say whether this will have an impact on the interest in DGBLL in future educational contexts. Therefore, one question for future research is: If the use of DGBLL was strengthened because of the covid-19 pandemic, has it come to stay, or will the use of DGBLL decrease as the pandemic situation normalizes?

As discussed in Chapter 5.1.4.1, I have observed an apparent change in research methods over the years. It is a question, possible for further research, if this is a coincidence or a systematic trend.

Finally, as mentioned in the chapter discussion methodological limitations of scoping reviews, I would have liked to conduct a study that went even deeper into the investigation of possible connections between digital game elements and learning perspectives.

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