Introduction

Given the recent emphasis on active and autonomous learning as well as situated learning in education, digital games (games played through any digital device, including computers, videos, tablets and mobile phones) have gained growing attention as a learning tool among educators. Games contain features that are central to learning, such as setting clear goals, providing visible outcomes and instant feedback, having challenging tasks and fostering collaboration and interaction (e.g., Garris et al. 2002; Gee 2007; Prensky 2001). Because an increasing number of young learners are familiar with technology from an early age in their lives, digital games can place this new generation of learners ‘at the heart of the learning and teaching processes’ (Reinders 2012, p. 2). Although research on digital games has until relatively recently largely concentrated on science, engineering and math, second and foreign language (L2 and FL) educators have shown growing interest in digital games for their potential to provide students with authentic learning tasks and opportunities to use language for communication (García-Carbonell et al. 2001). The use of digital games for L2/FL education is sometimes referred to as digital game-based language learning (Cornillie et al. 2012).

The aim of this chapter is to provide L2/FL educators and researchers with an overview of how digital games can be and have been used as educational tools by examining major studies conducted in L2/FL learning as well as other educational settings. As I discuss below, major issues examined in general educational research are largely relevant to L2/FL learning, while there are L2/FL domain-specific issues as well. Studies also suggest that digital games may not always be effective for learning and motivation. Therefore, this chapter aims to identify conditions under which digital games can be effectively used for educational purposes. It also addresses potential challenges, especially when digital games are used with young language learners.

In this chapter, I define young language learners as children ages 5–15 who are learning an L2 or FL. The limited number of digital game-based studies in L2/FL research have mostly targeted learners in their early teens and older, although some studies report
participants’ grade level(s) but not their ages. In the following sections, I indicate participants’ ages only when the authors reported them explicitly.

**Historical perspectives**

The use of digital games for L2/FL learning and instruction is relatively new, with origins in early computer-assisted language learning (CALL) during the 1980s (Cornillie et al. 2012). Although digital games are a relatively recent phenomenon, *games* themselves have been part of every culture as an important human activity since ancient times. In this section, I first define *games*. I then discuss how games, including digital games, have come to be used for educational purposes. I conclude this section with a description of the major learning theories underlying gaming.

**Definitions of games**

Games can be considered a type of play with goals and rules. Games have been used by people in all cultures to acquire various knowledge and skills (cognitive, social, emotional and physical skills) as well as to have fun. Despite the ubiquity of games, however, researchers have reached little consensus on a precise definition of them. One may recall the famous argument made by philosopher Ludwig Wittgenstein (1953) that there is no essential feature that characterises all games; instead, he argued, we can only see some complicated, overarching network of similarities across games. Other researchers have tried to identify essential features of games. Garris et al. (2002) reviewed game features that have been proposed in past research. They found that while there has been little consensus on the precise features, those features can be categorised into six dimensions: fantasy, rules/goals, sensory stimuli, challenge, mystery and control.

Engineers first developed basic digital games in late 1950s and early 1960s, but digital games did not reach wider audiences until the 1970s. With the development of home computing environments, home consoles and PC games drastically expanded the reach of digital games in 1980s and 1990s. Since the 2000s, gaming on smartphones, tablets and other mobile devices has been the fastest growing segment in the digital game industry (Williams 2017).

Digital games have been characterised in a number of different ways. For example, they have been classified by genre (e.g., action games, adventure games, role-playing games), player configuration (e.g., single-player game, multiplayer games, massively multiplayer games), type (e.g., casual game, social network games) and so forth (Sykes and Reinhardt 2013). Researchers have also categorised digital games according to their purposes. From an instructional point of view, games have been classified into *serious games* and *commercial games*. Serious games (also referred to as *instructional games*) are specifically designed for educational purposes and are often distinguished from commercial games designed primarily for entertainment purposes (also referred to as *entertainment games*, *commercial off-the-shelf games*, or *vernacular games*). As I discuss below, however, reflecting a paradigmatic shift in learning theories towards more focus on playing and active engagement in learning processes, some researchers (e.g., Thomas 2012) came to question the dichotomy between serious learning and entertainment. Indeed, in recent years, a growing number of researchers have examined not only serious games but also commercial games to see if they have an effect on students’ learning and motivation.

Focusing on digital games in L2 education, Reinhardt and Skyes (2012) characterised L2 learning and pedagogical environments as *game-enhanced* and *game-based* environments.
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**Game-enhanced environment** refers to general game-playing contexts (i.e., commercial games, including massively multiplayer online games and social network games), whereas **game-based environment** refers to cases in which learners work with serious games or in synthetic game-immersive environments specifically designed for L2 development and pedagogy. Research on game-enhanced environments concerns the general potential of digital games as learning and pedagogical tools, either as part of formal L2 curriculum or not. Research on game-based environments primarily examines the specific design of serious games for L2 learning and their effect on outcomes (learning, motivation, etc.).

**The role of games in learning**

Modern learning theories as well as major L2 learning and pedagogical approaches have supported the potential of digital games as a significant educational tool. As mentioned above, games are a form of play with goals and rules, and psychologists have long paid close attention to the role of play in children’s social/emotional, cognitive and language development. Through play, children develop their sense of self (Mead 1934) and facilitate communication and metacommunication abilities (Bateson 1972). Piaget (1962) focused on the role of play in children’s development of mental representation and abstract thinking. Most notably, Vygotsky (1978, p. 101) viewed children’s play as ‘a leading factor in development’. For Vygotsky, cognitive development is realised by transforming information from the external world and internalising it primarily through language. When children are at play, they make sense of the external world by engaging in dialogue with themselves or with others. They imagine and perform different roles and experience different language uses. Through play, children engage in social interaction. They observe others, imitate them and receive feedback. Vygotsky argued that since children at play always go beyond their everyday activities, play creates a *zone of proximal development* (ZPD): a distance between a child’s actual developmental level and the potentially achievable level with the help of capable others. Social interaction that happens within a child’s ZPD is considered to be a basis for his or her learning. This concept of learning as being essentially a type of social interaction – as opposed to a mental change residing in individuals – is one of the strongest theoretical supports for using games, a form of play, for learning.

Games are also ‘structured on the very notion of player-driven choice’ (Sykes and Reinhardt 2013, p. 17). Games rest on a player’s agency and active engagement in game tasks. Bruner’s sociocognitive theory (1966) highlighted the importance of active observations and hands-on activities in learning for both children and adults. Children start encoding information through hands-on activities (enactive learning), and store such active-based information first iconically (e.g., visual images) and then symbolically (e.g., language). Bruner believed that humans are active problem solvers from birth and that learning can take place at any age as long as the instruction is organised in such a way that concepts are introduced with graduated levels of difficulty and in a spiral fashion through observing and engaging in problem-solving activities. Learners’ self-directed engagement is critical in this pedagogical approach. Games in computer formats can be well suited to providing learners with opportunities to perform various activities organised around problems of concern to them. They can offer increasing levels of difficulty in rich, multimodal contexts that allow learners to interact with others.

Moreover, the goal-oriented and player-driven features of games align well with the notion of task-based language teaching (TBTLT), a well-recognised approach to L2 learning and pedagogy. TBLT primarily focuses on meaning in communicative language use through performing tasks. A task is not a random activity but ‘results in language use where learners..."
treat the language as a “tool” for achieving a communicative outcome rather than as an “object” to be studied, analyzed and displayed’ (Ellis and Shintani 2014, p. 136). According to Sykes and Reinhardt (2013), TBLT was developed with the intention of making language education more learner-centred. In practice, however, teachers usually pre-identify goals and design tasks for their students’ learning; L2 learners have little agency in setting their own goals and selecting tasks for their learning. In this respect, tasks in classrooms have been largely implemented in a ‘learning driven, rather than learner driven’ (18) fashion. Sykes and Reinhardt suggested that the goal-oriented and player-driven features of digital games (i.e., players have to know the goal of the game and choose to engage in the game) can potentially provide learners and educators with opportunities for finding an optimal balance between learning-driven and learner-driven use of tasks in L2 learning. Moreover, new technology can give learners greater exposure to authentic uses of the target language and opportunities to negotiate meaning (Peterson 2010). Technology also makes it possible to develop more complicated and integrative tasks that better fit learners’ needs (Thomas 2012).

In addition to the potential benefits of digital games for learning, it has been argued that certain characteristics of digital games create intrinsically motivating instructional environments. Malone (1981), for example, proposed three such characteristics: challenge, fantasy and curiosity. A challenging environment is realised by having personally meaningful and achievable goals with optimal difficulty levels. Mental images created by fantasy environments are perceived to be fun and interesting. Curiosity brings ‘surprisingness with respect to the knowledge and expectation a learner has’ (Malone 1981, pp. 337–338). According to self-determination theory, one’s intrinsically motivated behaviours rest on satisfying one’s own ‘innate psychological needs’: namely, feeling of competence (self-efficacy), a sense of autonomy and a sense of relatedness (a sense of belonging or connectedness to other people, group, community and culture) (Ryan and Deci 2000, p. 57). Social contexts that support such innate psychological needs allow a learner to be intrinsically motivated and to make extrinsically motivated behaviours more self-determined. Digital games can provide learners with such social contexts.

Critical issues and topics

As discussed in the previous section, theoretically speaking, digital games should be effective both in terms of learning and motivation. However, there is some skepticism among the general public when it comes to the actual use of digital games for educational purposes (Gee 2007). Thus, researchers have primarily focused on two topics. First, they are concerned with whether or not digital games are indeed effective in enhancing students’ learning and motivation and, if so, under what conditions. Second, although somewhat less explored, researchers have been interested in understanding elements in digital games that would promote students’ learning and motivation (issues related to game designs) as well as understanding how best to implement digital games in instruction (issues related to game implementation). For L2/FL researchers, especially those who are interested in young L2/FL learners, concerns include domain-specific effectiveness (i.e., effectiveness on language learning) as well as age-related effectiveness (i.e., effectiveness among young learners) of digital games.

Current contributions and research

In this section, I offer an overview of major findings concerning the two topics identified above. Research on digital games has been conducted largely in the fields of science,
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Although studies on L2/FL learning are slowly on the rise, I offer reviews of the current research, first in general educational contexts, followed by specific issues addressed in research in L2/FL learning contexts. Finally, while the number of studies on digital games among young L2/FL learners remains very limited, I examine these studies closely.

**Digital games for learning and pedagogy – general educational contexts**

A recent meta-analysis reveals the state of understanding concerning the effectiveness of digital games in education. Wouters et al. (2013) focused on serious games and examined their effectiveness in relation to nongame-based conventional instructional methods such as lectures, practices/drills, and reading. They found that serious games were more effective than the conventional methods not only in learning (i.e., gaining knowledge and skills) but also in the retention of learning (the effect lasts longer); however, no such benefit was found for motivation. Moreover, while serious games improved learning for children and young adults, the benefits did not extend to adult learners. The study further indicated that serious games worked better (a) when they were supplemented with other instruction such as explicit practice and follow-up discussions, (b) when multiple training sessions were offered, and (c) when learners played games in groups. A higher degree of realistic visualization and the inclusion of narratives did not necessarily result in more effective learning, suggesting that serious game designers should pay attention to learning content rather than visual realism, and that they should avoid heavy cognitive processing of narrative information. In a finding that is especially relevant to this chapter, the effect size on learning was particularly large in language acquisition compared with other educational domains.

A more recent meta-analysis by Clark et al. (2016) and a literature review by Boyle et al. (2016) included entertainment games as well as serious games. Consistent with Wouters et al. (2013) on serious games discussed above, these studies also found advantages for digital games in learning (not only in the acquisition of knowledge and skills but also in interpersonal learning outcomes such as intellectual openness and conscientiousness) over nongaming conditions. No significant relation was found between the amount of time spent on game playing and the learning outcome (Clark et al. 2016).

Researchers have also attempted to identify game features that promote learning. According to Clark et al. (2016), simple games, as opposed to more sophisticated games, can have an effect on improving certain types of learning, such as lower order thinking skills. Competition did not necessarily contribute to learning (Boyle et al. 2016). However, the inclusion of uncertainty elements in games enhanced learners’ motivation as well as their learning (Howard-Jones and Demetriou 2009; Ozcelik et al. 2013). While such information can be useful from an instructional design point of view, caution is necessary in order to avoid ‘an overly positivistic view of discrete game elements and a corresponding lack of attention to the broader ecology and “alchemy” of professional game design and player experiences’ (Cornillie et al. 2012, p. 249).

The motivational effects of digital games – and the consequences of those effects on learning – are not yet very clear. For example, Iten and Petko (2016) examined the relationship between enjoyment and learning among 74 primary school children (ages 10–13) in Switzerland. The researchers found that enjoying or having fun with games was not the primary reason the children used serious games; instead, the games’ anticipated usefulness or simplicity motivated the children to use them. Greater enjoyment in playing games...
increased their interest in the subject matter but did not lead to greater learning (measured by self-reported cognitive gains). Iten and Petko suggested that there are ‘complex interrelations’ between game enjoyment and learning (161). The lack of a clear understanding of the association between digital games and motivation and its relation to learning appears to be, in part, due to conceptual and methodological shortcomings. Key concepts such as enjoyment, fun, and engagement are inconsistently or unclearly conceptualised. Player enjoyment is often viewed as equivalent to the notion of flow, a mental state in which a player is involved in a task with complete concentration and engagement (Csikszentmihalyi 1991) and ‘a key aspect of motivating game play experiences’ (Sykes and Reinhardt 2013, p. 97). Based on this assumption, various measurements have been developed independently among researchers to capture game enjoyment and engagement. Such measurements include questionnaires, interviews, observations and other behavioural measurements (e.g., attention to time and the number of intermissions during games in Sharek and Wiebe 2014; time to complete tasks and eye movement in Jennett et al. 2008). However, the validity of such measures is often unknown.

**Digital games for learning and pedagogy – L2/FL learning contexts**

The major issues in general educational research on digital games discussed above largely apply to L2/FL learning contexts as well. However, L2/FL researchers also recognise that the multimodal interactions that occur within digital gaming spaces provide learners with rich target language resources and opportunities for language learning.

One of the fruitful areas of research on digital games in L2/FL learning is the examination of how language learning takes place when L2/FL learners engage in digital games and interact with other players. A number of studies have been conducted on commercial/entertainment game environments, often by employing discourse analyses, observations and interviews. Such studies (e.g., Coleman 2002; Peterson 2012; Reinders and Wattana 2012; Thorne 2008), mostly conducted among college students, generally found that L2/FL learners have extensive exposure to authentic use of the target language and intensive language practice with other players in natural and often playful ways. The goal-oriented nature of games pushes learners to produce the target language, and users have plentiful opportunities to negotiate meaning and to employ a variety of pragmatic strategies (e.g., clarification requests) during the interactions. Frequent self- and other-corrections and repairs are observed. L2-speaking players also tend to actively interact with other players and exhibit positive perceptions of the interaction in L2/FL during game playing. In addition, game-enhanced environments can support learners’ language socialisation by providing them with expert guidance on immersing themselves into the target culture and communities of practice. Some researchers, such as Thorne et al. (2009), consider digital space as a ground for learners to experiment with and form identities. For example, by using avatars during gameplay or having multilingual and hybrid uses of language in interaction, learners experiment with new identities, which can help reduce anxieties or develop sociocultural competencies related to language.

Caution is necessary when generalising from these findings. Many of the studies that examined players’ interactions tended to have a small number of participants, and it is likely that players’ interactions vary substantially depending on the nature of the digital games, the characteristics of players (e.g., age, gender, language proficiency and game-playing proficiency) and their motivation and reasons for playing games. Some games contain more narrative or verbal components than others. In Reinders and Wattana (2012),
although their Thai college students showed higher degrees of willingness to communicate in English in digital game playing (a massive multiplayer online role-playing game, MMORPG) over time, no improvement in accuracy and complexity in their English language use was observed, leading the researchers to speculate that the participants were not able to pay attention to forms and meaning simultaneously during the gameplay. A similar point was made by deHaan, Reed, and Kuwada (2010), who did not see any advantage among players of FL music video games compared with game watchers (the students who were asked to watch the game on different monitors); the game players performed poorly in their incidental vocabulary learning (measured by both immediate recall and delayed recall of vocabulary). deHaan et al. ascribed the result to the excessive cognitive demands required for gameplay. It is important to remember that players of commercial/entertainment games usually focus on completing game tasks or missions rather than learning a language (or any other content knowledge and skills). In Reinders and Wattana (2012), participants expressed positive attitudes about their communication experience during gameplay, but when they were specifically asked about English learning, they expressed concerns about ‘the use of abbreviations, emoticons, smileys, simple words and ungrammatical sentences to communicate, because they felt that over-use of these would not contribute to their accuracy and complexity in language production’ (181). Therefore, if commercial/entertainment games are to be used for L2/FL learning/teaching purposes, we need to better understand how to maximise the games’ potential benefits for learning and pedagogy in relation to learners’ and educators’ needs and goals.

Research on serious games/instructional game designs also concerns how best to make use of digital games as learning/pedagogical tools. According to Kao’s (2014) small-scale meta-analysis on the effectiveness of serious games in Asia (based on 25 studies), serious games were more effective in English learning in general than traditional instruction that did not involve gaming (e.g., grammar-translation methods), and the effects were greater if (a) the games required meaningful engagement (as opposed to drill-based games), (b) learners were involved in a long-term gameplay engagement (defined as engagement that lasted more than a month), and (c) the target of language learning was procedural knowledge (as opposed to declarative knowledge). Whether or not the games were networked (connected to the Internet) did not matter. Although feedback was not included in Kao’s moderator analysis, the existence of precise feedback functions seems to play a critical role in game-based language learning (Jackson et al. 2012).

Stakeholders’ attitudes and behaviours towards digital games vary as well. Learners’ varying attitudes and behaviours appeared to influence their learning outcomes. For example, Sykes (2010) observed her Spanish-learning students for 120 hours when they played Croquetlandia (a synthetic immersive environment specifically designed for pragmatic learning) as part of their regular class activities. She identified four types of gameplay behaviours (which she named explorer, student, presenter and non-player) depending on the learners’ approaches to the game (the extent to which the learners explore the game space beyond the course requirements), frequencies of entering the game and time spent playing. This study highlights the importance of paying attention to individual differences in players’ behaviours during the gameplay when examining game effectiveness. Finally, teachers’ computer literacy or virtual world literacy skills were closely related to their attitudes towards game-based learning, and their attitudes in turn are considered potentially influential over students’ learning outcomes (e.g., Chik 2012; Franciosi 2015; Proctor and Marks 2013). The precise interrelations between teachers’ attitudes and students’ L2/FL learning outcomes, however, are not well understood.
Digital games for learning and pedagogy – Young learners’ L2/FL learning

Although empirical research on digital games among young L2/FL learners is in its infancy, in the following sections I address our current understanding with respect to (a) the effectiveness of digital games in L2/FL learning; (b) how to design effective digital games; and (c) how to implement digital games in instruction.

Effectiveness among young L2/FL learners

Serious games appear to be effective among young L2/FL learners for vocabulary learning (e.g., Aghlara and Tamjid 2011), grammar learning (e.g., Sadeghi and Dousti 2013) and content subject learning in Content and Language Integrated Learning (CLIL) contexts (e.g., Dourda et al. 2014). Positive effects were reported even among children as young as kindergarteners, as in Segers and Verhoeven’s (2002, 2003) research on L2-vocabulary learning among immigrant kindergarten children in the Netherlands. Longer duration of gameplay tends to bring better results. Segers and Verhoeven’s data (2002) suggest that kindergarteners may need to have a certain minimum number of encounters during the game in order to learn a new word, perhaps due to their less-developed memory and information-processing capacities.

Positive results also have been reported for game-enhanced environments. For example, in Suh, Kim, and Kim (2010), South Korean fifth- and sixth-grade students who received English instruction through MMORPG (40 minutes of instruction twice a week for two months) performed better in listening, reading and writing (but, curiously, not in speaking) compared with students who received regular instruction. Similarly, Sylvén and Sundqvist (2012) showed a positive relationship between young Swedish students’ (ages 11–12) engagement of a MMORPG during extramural activities and their L2-English proficiency (measured by tests in vocabulary, listening and reading comprehension). Boys benefitted more in vocabulary learning than girls, perhaps because they spent more time playing the digital game. According to Zheng et al. (2009), however, Chinese seventh-grade students who engaged in a game-like 3-D virtual world with native-English speaking players (60 minutes per week for 25 weeks) exhibited higher self-efficacy in their use of English than the students in the control group, but they did not have better English performance (measured by an achievement test).

Due to the limited number of studies, it is premature to conclude anything definitive. While published studies generally found positive effects of digital games, they vary in the learning and affective domains examined (e.g., vocabulary, reading, etc.), types of games implemented, the way that digital games were implemented, duration of the students’ gameplay, measures used, ages of participants and social-educational contexts of implementation. Any of these factors can potentially influence outcomes.

Most critically, there is little information on how age-related factors uniquely interact with L2/FL learning through digital games. The benefits (or challenges) of using digital games in L2/FL learning among young learners remain largely unknown, especially in relation to age-related cognitive, social, affective and L1 language factors. Based on observations of Turkish children (ages 10–14) playing digital games in English at Internet Cafés, Turgut and Irgin (2009) identified some of the unique behaviours and attitudes among young learners who grew up with technology. Such characteristics included quickly adapting to new computer applications and functions, figuring out the meaning of unknown words by...
asking peers, having a strong desire to understand and participate in dialogues with other players and being aware of both pros and cons of game playing. Piirainen-Marsh and Tainio (2009) focused on lexical and prosodic repetition in interactions during videogame playing in English among Finnish boys (ages 10–14). It is thought that repetition plays a significant role in children’s language acquisition (e.g., Cook 2000). Using Conversational Analysis, Piirainen-Marsh and Tainio showed how repetition can be a resource for ‘engaging with the second language, analyzing it, and putting it to use in ways that enable players to display and develop their linguistic and interactional competence’ (153). We need more studies such as those by Turgut and Irgin (2009) and Piirainen-Marsh and Tainio (2009), which shed light on young learners’ specific characteristics in understanding their digital game language learning.

**Game task designs for young L2/FL learners**

There is very little research on digital game-task designs specifically targeting young L2/FL learners. Examining Japanese children’s (ages 4–12) behaviours towards serious games that were part of an online learning kit for a standardised English proficiency test, Butler, Someya, and Fukuhara (2014) found that attractive games (measured by frequencies of game-playing) shared certain elements. These elements included (a) having optimal cognitive challenge; (b) evoking children’s curiosity; (c) allowing players great control over the gameplay; and (d) having multiple players. Importantly, however, the attractive games did not necessarily contribute to the children’s English learning, as measured by standardised test scores. Butler (2015, 2017) further explored this topic by asking Japanese sixth graders (ages 11–12) to work in groups to design English digital games for vocabulary learning. Treating children as experts in the new digital learning paradigm, Butler first asked them to examine some existing serious English games and to identify a series of motivational elements (elements that make the game attractive) and learning elements (elements that promote learning). The children then designed games based on their self-identified motivational and learning elements and conducted peer- and self-evaluations of their designs. Learning elements that the children highly valued included (a) having repetition/reviewing; (b) utilising multiple modalities; and (c) allowing autonomy over learning. Motivational elements valued highly included (a) challenging; (b) fantasies/stories; (c) granting a great deal of control; and (d) instant feedback. Importantly, the challenging elements were almost always combined with learner-controlled functions in their game designs, suggesting that children prefer to choose what to learn and the level of challenge. The children were also aware that unexpected elements that disrupt linear relationships between the result of learning and the game scores can be a great source of motivation, including for children with lower proficiency (i.e., giving them a chance to win). Finally, the children acknowledged that creating and maintaining an attractive avatar was a great motivational source for them. In a study conducted among college students, Yee and Bailenson (2007) found that players’ interactive behaviours changed according to the attractiveness of their own avatars. We can thus expect that this phenomenon, what Yee and Bailenson called ‘the Proteus Effect’, can have significant implications for designing digital games for young learners as well.

**Digital game implementation for young L2/FL learners**

As noted above, research suggests that digital games are more effective for learning in general if they are combined with regular instruction. Although our understanding of how best
to implement digital games for L2/FL instruction for young learners is far from sufficient, some studies provide insights. In Sandberg, Maris and de Geus (2011), a game-based mobile application was introduced to Dutch fifth-grade students. The participants were divided into three conditions: (a) a group that received regular English lessons only; (b) a group that used the mobile application as part of the formal instruction in addition to the regular lessons; and (c) another group that was allowed to access to the mobile application at home as well as in class. The third group learned the target vocabulary better than the other two groups. The researchers argued that for effective implementation of the mobile application, it was important to secure autonomous learning spaces for children in and outside of school and to have parents and teachers provide support for the children’s game-based learning.

Teachers play a critical role in implementing game-based instruction in formal classrooms. Meyer (2009) reported interesting cases of two teachers from Danish primary schools in which serious games were implemented. In one fifth-grade class, the teacher allowed children to choose digital activities from the game platform. The children tended to choose play- or game-like activities that resembled the web-based games that they were accustomed to playing in their spare time rather than typical school-like activities. As a result, the teacher’s role as ‘a mediator between game activities and learning activities’ (p. 717) became important. Despite the fact that the children were instructed that they would be learning English, they kept ‘out of school identities as players and gamers’ and brought ‘unsolicited and unwanted entertainment into the classroom’ (717). Under such a context, the teacher was required to reconceptualise the role of gaming in learning. In a fourth-grade classroom, the activities were more structured, pre-selected, and supervised by the teacher, and the children showed more concentration. The children were allowed to work on more playful tasks only as a reward after they finished their learning-focused tasks. These two cases highlight the critical role that teachers play in implementing digital games. The cases also illustrate challenges that teachers face in promoting autonomous and situated learning while dealing with changing expectations of teachers’ and students’ roles in the new paradigm of teaching and learning.

**Recommendations for practice**

Based on the preceding discussions, it is apparent that digital games have potential for young learners’ L2/FL learning and motivation, but that to maximise their effectiveness certain considerations must be made. In this section, I discuss practical issues related to game design and implementation.

**Game designing: making the best use of games’ potential while meeting young learners’ needs**

In designing or choosing digital games for young L2/FL learners, it is important to make best use of a game’s potential while paying close attention to learners’ characteristics and needs. We can draw on research findings to help ensure that digital games provide learners with maximum opportunities for authentic communication. Instead of drill-based games, we should design games that require meaningful engagement and highlight the development of procedural knowledge. At the same time, we need to remember that young learners are in the midst of cognitive, linguistic and social-affective development. If nonlinguistic cognitive and interaction demands are too high to complete the game tasks, learners may not be able to invest sufficient mental resources in L2/FL language. Being too immersed in
gaming or having excessive emotional engagement may hinder their learning (Butler et al. 2014; Meyer 2009). Young learners who grow up with technology may possess unique characteristics that differ from older generations. Prensky (2001) listed a number of changes of cognitive style that he observed among the generation growing up with computer games. Major characteristics included (a) processing information at a very high speed; (b) being good at parallel processing; (c) accessing graphics before texts; (d) showing preference for active learning over passive learning; and (g) considering play as work (52). While we need more empirical evidence to confirm Prensky’s observation, we can expect that game designs that correspond well with young learners’ preferred cognitive styles would be more likely to motivate them and facilitate their learning. Caution is necessary, however, not to overgeneralise these characteristics. More effort is necessary to observe children’s behaviours during gameplay and to find out their own perspectives in order to better understand their needs and individual differences and incorporate such information into game designs.

**Game implementation: teachers’ deeper understanding of their changing roles is necessary**

Game-enhanced and game-based instruction should not replace existing classroom instruction. Digital games appear to be most effective if they are used to supplement existing instruction, and, as Reinhardt and Skyes (2012) stated, ‘even with the most comprehensive all-encompassing game-mediated L2 learning environment, a human instructor should play a key role’ (pp. 34–35). Because learning in game-enhanced or game-based environment entails autonomous, situated and collaborative learning, teachers are asked to play different roles in these new learning spaces – whether they are in and outside of the classroom. While playing games, children may exhibit undesirable behaviours in light of the specific cultural and educational tradition of teaching. Meyer (2009) reported that even in Denmark, which has a long history of communicative language teaching and has been open to playful and innovative approaches to language learning/teaching in general, primary school teachers are somewhat skeptical about the use of digital games in instruction. Teachers seem to need assistance in developing (a) a deeper understanding of both the possibilities and limitations of digital games for young learners, (b) digital literacy skills, and (c) different and/or flexible conceptualisations of their role in instruction.

**Future directions**

Research on digital games for young L2/FL learners is largely unexplored, and there is no question that we need more empirical studies. In this section, I focus on the following three areas of research that are in particular need of investigation: (a) research on effectiveness in learning and motivation; (b) research on game task design and implementation; and (3) game-based assessment.

**Research on effectiveness: unpacking the effective elements**

Studies on the effectiveness of digital games have mostly examined a specific digital game implemented in a specific way in a specific context, often using holistic measurements. Such studies have relatively limited application beyond the particular case examined. It would be more informative if we could unpack the elements (e.g., cognitive and interactive demands, game procedures, learner characteristics, conditions for implementation,
etc.) that contribute to specific language-learning outcomes. We also need to better understand the process of learning through digital games – for example, log functions can be used efficiently to capture the process of learning over time. Not only short-term effects but longer-term effects need to be investigated. We also need to better understand how learning through digital games is taking place outside of formal classroom L2/FL instruction and how such autonomous learning may influence learning in the classroom. Moreover, it is important to know how learning observed in a game-enhanced or game-based environment can be applied in wider contexts, going beyond the specific game context. As mentioned already, attention should be paid to the interaction between age-related factors and young learners’ L2/FL learning. Individual differences in learners’ learning styles and in their learning through digital games should be investigated as well, instead of simply assuming that young learners are all well-equipped to benefit from digital learning. Finally, the relationship between game engagement and learning should be better understood. As I have discussed, game engagement does not necessarily guarantee learning.

Research on game task design and implementation

Although it has been suggested that digital games should supplement existing language teaching, we’re still in the early stages of this research. It would be useful to have more case studies that describe the detailed process of game implementation and the challenges that teachers and students face during the process. Such information would have substantial implications for curriculum designers and teachers. In addition, we do not know enough about teachers’ attitudes and behaviours towards digital games, their digital literacy and game-playing experiences and how such factors may influence their implementation of digital games. Action research by teachers with different attitudes and knowledge about digital games would be very informative.

Game-based assessment

Assessment and instruction are tightly connected. Although hardly any research has been conducted on the use of digital games for assessment, this is a promising possibility. There are a number of potential merits of using digital games for young learners’ L2/FL assessment – not just in an assessment of learning (a traditional measurement-oriented approach to assessment primarily aiming at capturing one’s ability) capacity but also in an assessment for learning (a learning-oriented assessment approach primarily focusing on assisting learning) capacity (Butler 2016). First, typical characteristics of digital games, such as instant feedback and autonomy, can help learners to see their performance and progress, and assist them in setting a next step/goal for their own learning. Second, as mentioned already, log records, chats and other interactional and performance-related records can allow teachers and learners to access the process of learning during a single gameplay as well as during a series of gameplays over time. This could be a positive means of obtaining authentic assessment information without making learners feel self-conscious about being assessed. Third, digital games, as with other digital devices, are better equipped for use with individualised assessments. Finally, digital games, especially in a game-enhanced environment, can be used for capturing implicit learning because learners may not pay attention to the target language use. Considering these potential merits, it is a fruitful new area for future inquiry.

In conclusion, digital games have great potential for enhancing young learners’ L2/FL learning and motivation. However, we need to better understand how best to design and
implement digital games in and outside of classroom instruction in order to maximise their effects. We also need to be aware of potential limitations and challenges of using digital games for educational purposes. Teachers play a crucial role in the process of identifying the best practices when using digital games.

Further reading


This is one of the first collections of papers focusing on the use of digital games in L2/FL learning and pedagogy. It includes papers concerning theoretical foundations for digital computer learning as well as a series of empirical studies. While most of the papers deal with older learners, the issues discussed in this volume are largely relevant to L2/FL learning and pedagogy for young learners as well.


This book provides a comprehensive overview of the research on digital games in L2/FL education. Discussion is organised around five major concepts in second language acquisition research: goal, interaction, feedback, context and motivation. The book is written in a very accessible manner and is a good introduction to the topic.

Related topics

Motivation, language outside the classroom

References


Gaming and young learners


