A-Systematic-Review-of-Video-Games-for-Second-Language-Acquisition

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Clemson University
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Chapter 21
A Systematic Review of Video Games for Second Language Acquisition

Juan Li
Clemson University, USA

ABSTRACT

This study overviews contemporary studies on the use of video games for second language acquisition within the past ten years spanning the development of computer-assisted language learning (CALL) and its connections to SLA, definitions of video games, empirical studies on the facilitative roles played by video games for second language (L2) learning and utilizing massively multiplayer online role-playing games (MMORPGs) for language learning. The purpose of this chapter is to help the readers obtain a systematic understanding of the development and application of video games in second language education. Findings of this study suggests that players are able to acquire L2 knowledge while playing video games. It also suggests that future research should focus more on the actual integration of video games into language instruction.

INTRODUCTION

Second Language Acquisition (SLA) scholars Leaver and Willis (2004) proposed three basic premises for acquiring a second language effectively: language learning is a complex non-linear process; language is best learned through a variety of comprehensible input and exposure to the target language; learners need to use the language through interaction. Similarly, Zhao and Lai (2009) identified four key factors for effective second language acquisition, including rich input, adequate use of the target language in an authentic environment for real purpose, quality negative feedback and individualized instruction. In contrast to the ideal language learning environments, the paucity of adequate exposure to target language (TL) and lack of motivation to use the language in a real environment comprise considerable challenges for language learners (Zhao & Lai, 2009). Separation from the TL makes "repeating the contents of textbooks in isolated ways" (Suh, Kim and Kim, 2010, p. 371) a typical learning approach for students,

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especially for those who live in communities where the TL is not spoken. As a result of inadequate exposure to the target language in the culturally relevant context, the literacy performance gap between ELLs and native English speakers in the United States remains critical in the past decade (Wilde, 2010; Banerjee, Alsalman, & Alqafari, 2016).

With the development of technology, the integration of Computer-Assisted Language Learning (CALL) has become an integral part of SLA. Researchers (e.g. Chapelle, 2009; Payne & Whitney, 2002; Stockwell & Harrington, 2003; Thorne, 2008) integrated a variety of SLA theoretical approaches to inform the pedagogical implications of technology-oriented language education. Chapelle (2009) grouped 4 general theoretical perspectives of SLA—cognitive linguistic perspectives, psycholinguistic perspectives, the language in a social context, and human learning—to illuminate how SLA theories can be used to enhance CALL research and practices.

Empirical studies have been conducted to investigate whether and how modern technologies facilitate second language learning. A review study conducted by Zhao (2003) presented research on the effectiveness of technology use in second language instruction between 1997 and 2001. The large mean effect size of this meta-analysis indicated that applications of technology have a very positive impact on all aspects of language education. He concluded that modern technology can enhance the effectiveness of language education by eliciting more authentic communications, high-quality input, and useful feedback. Parmaxi and Zaphiris (2017) reviewed 41 published empirical studies from 2009 to 2013 on the use of Web 2.0 technologies in the field of Computer-Assisted Language Learning (CALL). These studies were selected from four top-ranked CALL journals (Smith & Lafford, 2009): *Language Learning and Technology*, *CALICO Journal*, *Computer Assisted Language Learning*, and *ReCALL*. They concluded that Web 2.0 technological tools effectively support several language skills, including writing, intercultural awareness, speaking, and autonomous learning. They also pointed out that social constructivism was the top SLA theory employed by researchers. This finding aligns with the evolution of second language learning theories from behaviorism and cognitivism to social constructivism (Kolb, 1984). That is to say, language learning methodologies have experienced a radical shift from a lecture-based form of knowledge transmission to more socially constructive and collaborative approaches, such as communicative language teaching and task-based language teaching (Ellis, 2003; Thomas, 2012).

At the early 21st century, the widespread popularity of video games has attracted educational researchers (e.g. Gee, 2003; Squire, 2009; Watson, 2007) across disciplines to seriously investigate the educational value of video games. Squire (2006) stated that "the study of games and learning is ready to come of age" (p. 167). In SLA, an increasing number of studies have been conducted to examine the benefits of video games for language learning from a both cognitive and constructive perspective. For example, researchers (Bytheway, 2015; Hussain et al., 2015; Ebrahimzadeh & Sepideh, 2017) found that commercial video games can increase students' language learning motivation and engagement. Peterson (2010) described video games, especially Massively Multiplayer Online Role Playing Games (MMORPGs), as arenas for second language learning tools.

BACKGROUND

The connection between rule-bound games and human learning has been identified in the early works of educational research. Piaget (1961) proposed that the socialization associated with rule-governed games promotes children's cognitive development. The video games industry began in the early 1960s

with the creation of *Spacewar!* by an MIT student named Steve Russell (Graetz, 1981). According to the Entertainment Software Association (ESA) (2015), there are 155 million Americans who play video games—42% of whom play video games at least 3 hours per week—and the average age of players is 35. The rapid development of the video game industry has increasingly drawn the attention of academics to the study of computer-based play environments (Egenfeldt-Nielsen, Smith, & Tosca, 2015). Meanwhile, a number of game and education related terms become popular with this trend. For example, Gamification, Serious Games, and Game-based Learning.

Gamification is defined as "the use of video game elements in non-gaming systems to improve user experience and user engagement (Deterding et al., 2011, p. 1). It has been used in a variety of contexts to motivate people. Most popular game elements used for applications include badges, points, leaderboards, and rewards (Lister, 2015; Flores, 2015). In education, the use of gamification technique is to incorporate game mechanics into the teaching and learning activities without actually playing video games. This idea was based on the current situation that the actual implementation of games in classrooms is difficult for most schools (Armier, Shepherd, & Skrabut, 2016; Todd, 2017).

Proponents (e.g. Gee, 2008; McGonigal, 2011; Urh et al., 2015; Buckley & Doyle, 2016) of gamification believe that this innovative and appealing technique can considerably increase people's motivation, engagement, and productivity. For example, game designer and digital technology advocator Jane McGonigal (2011) made a brave statement that the current problems and conflicts on our planet can be solved by games. From the perspective of positive psychology, she further explained that the positive emotions and social connectivity aroused by the essence of the play in games can help us achieve anything we want. However, some scholars speak strongly against the popularity of gamification. As one of the most radical opponents, Bogost (2015) wrote a very provocative article "*Why Gamification is Bullshit*" in response to McGonigal's statement, arguing that the idea of gamification is deception and exploit created by market consultants. Following this debate, Todd (2017) revisited Bogost's ideas in the educational context, pointing the deceitful use of gamification and subjective of its definition. Based on a review of literature, the author concluded that the current research on gamification is shallow because they are built on superficial tricks rather than solid learning theories. It is not hard to conclude that the applications and research of gamification are on much debate and requires further investigation.

One of the best examples of the wide prevalence of gamification is the tremendous development of serious games (De Freitas & Liarokapis, 2011). Serious games, also called "edutainment" games, are actual games that were designed to educate players rather than providing pure entertainment (Flores, 2015; Stege, Lankveld, & Spronck, 2011). Different from educational games that have explicit educational goals, serious games are designed to play like entertainment or commercial games with implicit learning contents (Stege, Lankveld, & Spronck, 2011; Winn, 2008). Thus, serious games are expected to be both entertaining and educational. Game-based learning refers to the use of games to enhance the learning experience (Isaacs, 2015). This research adopted Yudintseva's (2015) definition of that "video game is a goal-directed challenging interaction governed by a set of rules and feedback". This definition was chosen because it synthesized the fundamental features of video games proposed by leading scholars (Peterson, 2013; Malone, 1981; Prensky, 2001b; Gee, 2005) in the field of study. In the current study, "video game" is used as a generic term. It includes different types of games in a variety of platforms, such as game consoles, laptop, desktop, and handheld gaming devices.

THEORETICAL FOUNDATIONS

Evolving from Interactionist approaches that stress the importance of conversation and the Input Hypothesis, Long and supporters of the Interactionist Hypothesis (e.g. Gass, Mackey, & Pica, 1998) argue that interaction is the most important process for L2 learners to acquire language data. Ellis (1999) defined interaction as "interpersonal activity that arises during face-to-face communication" and "intrapersonal activity involved in mental processing" (p. 3). In CALL, the interaction between the learner and the computer/network also belongs to the category of interaction (Chapelle, 2005). Two types of interaction are identified from psycholinguistic interactionist literature (Peterson, 2010). The first type is the negotiation of meaning, which occurs to solve communication problems by using strategies such as clarification checks, confirmation checks, and comprehension checks. Learners negotiate meaning by noticing the modified input and producing modified output during the interaction when communication breakdowns take place (Swain, 1985). This conversational and linguistic exchange brings about the acquisition of the target language because learners are able to comprehend the input and transform this input into the intake through noticing (Schimidt, 1990, 1994, 1995). Researchers (Ellis & He, 1999; Ellis, Tanaka, & Yamazaki, 1994; De la Fuente, 2002) who specifically looked at the lexical aspects of SLA found that negotiation of meaning 12 is beneficial for vocabulary acquisition. The other type of interaction is corrective feedback, which exposes the learners to the linguistic problems they create. There are various types of corrective feedback, including explicit correction, recasting, clarification requests, metalinguistic clues, elicitation, and repetition. These two types of interaction have been researched by several SLA researchers (Chapelle, 2005; Gass, 2003; Long, 1996; Picca, 1994) as beneficial tools to enhance learners' cognitive reconstruction of the target language. Drawing on psycholinguistic perspectives and design features of MMORPGs, Peterson (2010) summarized the potential advantages of using MMORPGs to facilitate second language acquisition: adequate exposure to the target language and real-time feedback in an authentic environment through multiple communicative approaches provide opportunities for negotiation of meaning and corrective feedback; access to worldwide interlocutors enhance learners' communicative competences and social abilities, and learner-centered interaction enables more engagement.

Sociocultural theories informed by Vygotsky (1980) emphasize the social nature of learning. They have been utilized as theoretical rationales for second language acquisition in an extensive body of literature (Firth & Wagner, 2007; Lantolf & Appel, 1994; Lantolf & Thorne, 2006; Lee & Smagorinsky, 2000; Nassaji & Swain, 2000). Vygotsky (1978) claimed that any kind of cognitive development originates externally on an inter-psychological plane in the form of social interaction, which is then internalized on an intra-psychological plane as inner speech. The scaffolding involved in this social interaction gives rise to the operation of the Zone of Proximal Development (ZPD), in 13 which the most powerful learning happens (Thompson, 2013). ZPD refers to the difference between what a child can accomplish independently and what a child can accomplish under assistance (scaffolding) from a more capable person, and this assistance can be provided by adults as well as peers. Sociocultural theory advocates for integrating the traditionally dichotomized cognitive and social domains by proposing that human beings' mental processes and their social activities and artifacts are not only interrelated but also, to a large extent, determined by one another (Lantolf, 2000). Mediation, which is considered the central and most distinguishing concept of sociocultural theory (Lantolf, 2000), explains how individuals develop their higher mental activities through the consistent dialogues between their cognitive and social exercises. According to Vygotsky (1987), human beings employ tools and labor activity to regulate or mediate

their action on the world. Tools, as artifacts created by human culture and history, could be in any physical and symbolic forms, such as languages and signs. Drawing on this theoretical framework, recent neo-Vygotskian SLA researchers (e.g. Firth & Wagner, 1997; Lantolf, 2000; Lantolf & Appel, 1994) have criticized current practices in SLA that heavily underline the individual's cognition by profoundly disconnecting language from the social and contextual environment, even in studies that involve social discourse. Instead, these researchers claim that second language learning is a process of co-construction of meaning in the target language, which may occur through social interaction and operation of the ZPD (Lantolf & Thorne, 2006). Following Vygotsky, many researchers (e.g. Bruner, 1987; Cole & Wertch, 1996; Lave & Wenger, 14 1991; Wertsch, 1998) suggested that learning is a social discourse, in which social interaction is the key to co-constructing knowledge. However, Platt & Brooks (1994) argued that the so-called "acquisition rich environments" created by traditional classrooms may not generate the most effective second language acquisition, because the language activities adopted in the classrooms do not encourage regulatory and purposeful communications other than propositional information exchanges. Thorne (2008) proposed that interaction generated by online games may foster a really acquisition rich environment that creates a ZPD through intentional dialogues and co-construction of meaning in the target language. The Interactionist Hypothesis and sociocultural theories discussed above have served as the foundation for much of SLA research. However, over the past two decades, second language researchers have extended these theoretical frameworks, gradually turning away from focusing on the subconscious and cognitive process within the mind of individuals to the socially interactive process of language development. Both theoretical frameworks suggest that interactive activities promote language skills by focusing on different but complementary perspectives. While the Interactionist Hypothesis solely focuses on the negotiation of meaning, sociocultural theory investigates social interactions in general and stresses the co-construction of knowledge through language activities.

The revolutionary advancement of digital technology, accompanied by the emergence of new learning sciences, stretched the theoretical frameworks discussed above to Digital Game-Based Learning (DGBL). Leading DGBL scholars (e.g. Aldrich, 15 2004; Gee, 2003; Johnson, 2005; Prensky, 2006; Squire, 2011; Steinkuehler, 2005) produced a large body of literature demonstrating the cognitive benefits of playing digital games. For example, Gee (2013) proposed that the optimal learning of human beings happens through well-designed experiences in a social context, which can be provided by digital media in popular culture. As for language acquisition, he argued that the meaning of language is not some abstract propositional representation that resembles a verbal language. Rather, meaning in language is tied to people's experiences of situated action in the material and social world. Gee's theories have been applied extensively in current game-based SLA research with the purpose of investigating whether or how video games create an intriguing real-world environment to engage language learners to complete game tasks that require social interaction (Bryant, 2006).

METHOD

The current study aims to review the previous studies of the use of video games in second language learning. It starts from a review of studies on attitudes, with the purpose of examining perceptions of various groups of people towards using video games for acquiring language knowledge. It also examines the learning outcomes of using video games in second language education. Massively Multi-player Online Role-Play Games (MMORPGs), a special game genre that features social interactions, is discussed in

regard to social interactions. In exploring these topics of research, it addresses gaps in the literature and suggests directions for future research. The objective of this study is to provide insights into the current studies of video games and appropriately integrate video games into the language learning classroom.

In this study, "video games," "computer games," or "digital games," and "MMORPGs," were used independently and combined with each of the following: language learning, second language acquisition, English as a second language. Academic Search Complete, ERIC, Education Research Complete, Education Full Text (H.W. Wilson), Professional Development Collection, Teacher Reference Center and Google Scholar were used as the major databases to search for articles. After skimming the titles and abstracts, full versions of the potentially relevant articles were retrieved.

Papers selected for this review must (a) be manuscripts published in peer-reviewed journals and books; (b) included empirical studies using quantitative, qualitative, or mixed-methods approaches; (c) be published over the last decade (2009-2019); and (d) be published in English. In addition, Articles without full text available and nonacademic resources are excluded from this research.

Twenty-seven Articles that met inclusion criteria were coded. Based on their research Five research themes were identified: research on attitude (9), research on interaction (3), research on comparison with traditional instructions (9), research on learning strategies (3), and research on online gaming communities (3). An overview of the selected studies is provided in the Appendix.

RESEARCH ON ATTITUDE

Attitude, which is defined as the "learned predisposition to respond in a consistently favorable and unfavorable manner with respect to a given object" (Fishbein & Ajzen, 1975, p. 6), affects the implementation of an instructional strategy. A number of SLA studies have investigated the attitude or preference of various groups towards utilizing video games for language learning, with the purpose of effectively implementing game-based learning in classrooms (Mifsud, Vella, & Camilleri, 2013).

Based on the self-reports of 20 Taiwanese pre-service teachers after they played an adventure video game called *Back to The Future* (BTTF) one hour per week for 12 weeks, Chen, Chen, Chen, and Yang (2012) found that teachers believed that video games can foster second language acquisition, and they are especially useful for receptive skills, such as reading, listening, and vocabulary knowledge. In order to identify the discrepancies between teachers' and learners' attitude, Chen and Yang (2013) conducted another survey study on learners' (N = 35) attitude towards another adventure video game, *BONE*. They concluded that students held a similarly positive attitude towards video games in facilitating their English skills. However, both studies implied that the level of language difficulty in the game and game design are crucial factors affecting language learning results.

In order to include all "stakeholders'" attitude towards video games and learning, Mifsud, Vella, and Camilleri (2013) designed three questionnaires for students (n = 1163), teachers (n = 149), and parents (n = 783) in Malta on their opinions towards video games in education. The results showed that most students, teachers, and parents believed that video games are helpful for learning.

Given that qualitative data helps confirm or disconfirm the quantitative evidence, Wu, Richards, and Saw (2014) conducted a concurrent mixed-methods research to investigate the perceptions and motivations of casual gamers, or non-gamers (N = 19), after one hour's session of playing *EverQuest2* (*EQ2*) (Sony Online Entertainment, 2004). They found that most of the non-gamers showed a positive

attitude and learning expectations towards the game, although some participants complained about the inconveniences brought by the all-English interface and the unfamiliar game jargon.

The majority of the existing literature demonstrates that various groups of "stakeholders," including learners, educators, parents, gamers, and non-gamers, hold optimistic attitudes towards video games for language learning, although to different extents. For example, parents only believe that educational games have learning potential (Mifsud, Vella, & Camilleri, 2013), and male participants are more willing to utilize video games than female participants (Bolliger et al., 2015).

Given the positive perceptions of using video games for second language instruction, some researchers are interested in probing predictive factors contributing to students' preference for video games. For instance, Bourgonjon, Valcke, Soetaert, and Schellens (2010) proposed that that students' perspectives affect instructors' integration of instructional technology. Defining preference for video games as "positive feelings about games for learning and predicted choice for video games in the classroom" (p. 1147), Bourgonjon et al. proposed a path model on the basis of an extension and validation of the technology acceptance model (TAM) (Davis, Bagozzi, & Warshaw, 1989) to predict students' preference for video games. They then empirically tested 858 secondary school students. Their results showed that usefulness, ease of use, learning opportunities, and gaming experiences directly affect students' perceptions on utilizing video games in language classrooms. Bolliger, Mills, White, and Kohyama (2015) modified this questionnaire and conducted an extended study in a Japanese private university on students' ($N = 222$) perceptions. The researchers surprisingly found that even in a teacher-centered educational context in which teachers are highly respected as the only experts (Davis & Ikeno, 2011), students demonstrated great enthusiasm toward using video games in English language learning, which may "minimize the role of the teacher and place greater control of the learning processes in the hands of the students" (p. 394). They confirmed the findings by Bourgonjon et al. (2010) and added an academic major as another predictive factor. In addition, they noted that the students most frequently perceived enjoyment and motivation as advantages in gameplay. These studies are of significance in that they pointed out the heterogeneity of video game consumers, and developed the traditional TAM model. However, both studies regarded video games in general, without making a distinction between different types of video games. A recent study by Li (2019) adapted the Bourgonjon et al. (2010)'s instrument, focusing on a certain game genre MMORPGs and English vocabulary learning. Based on the data collected from 371 MMORPG players of 36 different first languages, the author created a path model investigating the factors that predict players' preference of using MMORPGs to acquire English vocabulary. The study concluded that learning opportunities provided by MMORPGs predict players' preference, meaning that the player would like to learn through playing games if they believe there are more learning opportunities than those in traditional classroom instructions. This study is important because it specified the participants, game type, and language skill.

Before the actual implementation of video games in classrooms, an examination of the willingness to communicate (WTC) is crucial for effective L2 education (MacIntyre, Dörnyei, Clément, & Noels, 1998). Research (Sparks & Ganschow, 2007) concluded that anxiety negatively influences language learners' motivation and result in low performance. To overcome anxiety and advance their language skills, language learners must be willing to use the target language (Horowitz, 2019). However, language education in the classroom may increase the anxiety level, so that some students are even prepared for anxiety before they enter the classroom (Horowitz, 2019), or shake or even freeze up in class (Liu & Huang, 2011). For example, in an interview study on five ESL college students in Thailand, Reinders, and Wattana (2015) demonstrated that digital games lowered students' anxiety about using the target language

and enhanced their WTC. A recent survey study (Horowitz, 2019) in Puerto Rico supported previous research that playing online multiplayer video games can lower the level of anxiety and increase WTC.

RESEARCH ON INTERACTIONS IN MMORPG

Most of the current empirical studies revealed positive results on the use of video games for second language learning (Kim, 2018). Among them, research on interactions has become the highlight of this area and are considered as a particularly important connection between games and SLA (Chotipaktanasook & Reinders, 2018). MMORPGs, which enable players from around the world to interact with one another, have obtained most of the attention on this topic.

MMORPGs experienced incredible popularity a decade ago. For example, *World of Warcraft* (*WoW*) has more than 12 million global subscribers (Bytheway, 2013). An MMORPGs survey indicated that 45% of MMORPGs players spend more than 20 hours per week on MMORPGs, and 80% of MMORPGs players reported that they have spent more than 8 hours continuously playing MMORPGs in one session (Ng & Wiemer-Hastings, 2005). Additionally, based on a three-year longitudinal study on the online survey data collected from 30,000 MMORPGs players, MMORPGs attract people from various age groups (11-68) with an average age of 26.57 (Yee, 2006). Although still profitable, the MMORPG genre has encountered a slow and steady decline since 2010. A large number of the hard-core players discarded MMORPGs and sought for the exciting appeals form other types of games or even Apps (Bartle, 2013). However, in the educational area, MMORPGs maintains its dominance than other game genres (Bawa, Watson, & Watson, 2018).

The term MMORPGs was coined in 1997 by Richard Garriott, an online game creator, and originated from text-based role-playing games called Multi-User Dungeons (MUD). Dickey (2007) defined MMORPG as "a persistent, networked, interactive, narrative environment in which players collaborate, strategize, plan, and interact with objects, resources, and other players within a multimodal environment" (p. 254). MMORPGs feature immersive 3-Dimensional graphics interfaces, diverse visual and audio channels for communication, social interactions, and customizable character avatars (Peterson, 2012a). They also require the players to frequently engage in collaboration, competition, and sociability to accomplish game-related tasks (Christou, Law, Zaphiris, & Ang, 2013). Due to these characteristics, the potentially significant educational implications associated with MMORPGs have been examined in a variety of contexts (Aldrich, 2009; Prensky, 2001b, 2006), including promoting critical thinking, problem-solving and leadership skills (Yee, 2006), supporting collaborative learning for online courses (Childress & Braswell, 2006), and fostering intrinsic motivation (Dickey, 2007).

These distinguishing characteristics make MMORPGs valuable resources for second language learners (Peterson, 2010a). The ubiquitous and constant conversations taking place through a variety of chat channels are normally text-based in a target language (Steinkuehler & Williams, 2006). The topics of the conversation are quite diverse, spanning from game strategies and game characters, adventures of players, to politics and culture (Steinkuehler & Williams, 2006). These conversations create abundant opportunities for language learners to use the target language in an authentic and immersive environment. SLA scholars Zhao and Lai (2009) asserted that the "legitimate use of human and technological expertise makes MMORPGs optimal language learning environments" due to the massive exposure and feedback, ample practice and testing of the acquired skills in a real setting (p. 408). In addition, distributed learning resources, intriguing collaborative activities, real-time chat, cultural exchanges,

democratic environments, and the high level of motivation promoted by MMORPGs all contribute to a less stressful and conducive learning environment (Peterson, 2016).

Peterson (2011, 2012a, 2012b) conducted several studies to examine a variety of social interactions of MMORPGs from sociocultural perspectives. By analyzing the recorded text chat interactions collected from seven Japanese college students playing *Allods Online*, Peterson (2011) found that students actively participated in the social interactions in the target language. Feedback from the participants reported enjoyment and exposure to new vocabulary. A later qualitative study (2012a) on six intermediate-level Japanese students concluded that participants perceived interactions in MMORPGs are engaging, motivating, and enjoyable. Another qualitative study (2012b) on four EFL learners' social interaction in playing *Wonderland* and their attitudes by analyzing their text chats and interview questions confirmed his previous findings that participants felt less anxious and more enjoyable, and peer scaffolding in games fosters a beneficial environment for the target language production. In addition to empirical studies, Peterson (2016) reviewed 10 studies from SLA cognitive and sociocultural perspectives. He concluded that interactions elicited by MMORPGs involve collaboration, peer scaffolding, co-construction of meaning, and output of the target language, indicating that MMORPGs create conducive language learning environment from both perspectives. Later studies (Azman & Dollsaid, 2018; Goh, 2016; Newgarden & Zheng, 2016; Suh, Kim, & Kim, 2010) supported that real-time conversations, dialogue with other players, particularly with native speakers, providing plenty of language learning opportunities. A recent study (Chotipaktanasook & Reinders, 2018) integrating MMORPG *Ragnarok Online* into a 15-week language course in Thailand. Based on the analysis of the thirty college students' text and voice chats records, they found that both the quantity and quality of the L2 interactions in participating in MMORPG are significantly better than in the classroom. This study is important because it was an actual implementation of MMORPG in language instruction which may offer evidence-based pedagogical implications of incorporating video games into the classroom.

VIDEO GAMES IN COMPARISON TO CLASSROOMS

Some scholars (e.g. Peterson 2010; Suh, Kim and Kim, 2010; Sundqvist & Wikström, 2015; Thorne, Fischer, & Lu, 2012) are interested in making comparisons between traditional classroom instruction and game-enhanced instruction for second language education.

A mixed-methods study (Neville, Shelton, & McInnis, 2009) on German vocabulary acquisition showed that learners who were exposed to the video game performed better in vocabulary retention and transfer than those who used print-based materials, despite the fact that students perceived the traditional materials satisfactory and more relevant for learning objectives. Another large-scale experimental design of the study (N = 302) undertaken by Korean researchers Suh, Kim, and Kim (2010) supported the previous results that students who participated in MMORPGs-based learning obtained higher scores in English listening, reading, and writing skills than those who received traditional face-to-face instruction.

Sundqvist and Wikström (2015) examined the relation between out-of-school video gameplay and L2 English measurements on Swedish ESL students (N = 80). Based on the data analysis of a questionnaire, students' written assignments, and English vocabulary test scores, they found that the group of frequent gamers—those who played games more than 5 hours per week—achieved higher grades in both essay writing and vocabulary tests than both groups of non-gamers and moderate gamers who played games less than 5 hours a week. A later mixed-methods study (Sundqvist, 2019) confirmed the positive relation

between playing time and L2 English vocabulary learning outcomes. A test on 45 words revealed that gamers achieved much higher scores than non-gamers at all vocabulary frequency levels, advanced words in particular. The qualitative stage of the study supported the quantitative result that playing commercial video games is beneficial for L2 vocabulary acquisition. An intervention study (Chotipaktanasook & Reinders, 2018) by incorporating MMORPG *Ragnarok Online* into a 15-week language course on 30 Thai students demonstrated similar results. The participants were asked to complete an MMORPG session after completing traditional classroom instruction of each unit. The results showed that the game not only encouraged students to produce significantly more L2 output but also evidenced more use of discourse functions than classroom activities.

Worth noting are a few research results that disagreed with the effectiveness of playing video games for L2 learning, compared with the traditional instruction. For example, Rankin et al. (2009) divided 18 ESL Chinese participants into three groups: one group of students attended three hours of classroom instruction, one group played *EQ2* alone for four hours, and the third group teamed with native English speakers and played *EQ2* for four hours. Both the vocabulary post-test scores in the game context and the subsequent content analysis confirmed their hypothesis that in-game social interactions between native and L2 learners accommodate L2 vocabulary acquisition. However, students who received traditional drill and rote practices achieved significantly higher post-test scores in *sentence usage* assessment than other groups. While acknowledging the facilitative role played by games, they revealed that traditional vocabulary instruction is at least more effective for certain learning objectives. Unfortunately, this study didn't articulate the traditional instructional strategies utilized for the control groups. Carlvo-Ferrer and Ramón (2015) conducted pre-, post-, and delayed tests to compare the effect on L2 vocabulary acquisition between educational gaming and non-gaming learning environments. In line with previous research, this study showed that students using video games showed greater enjoyment and performed significantly better than the control group in the short run. However, the tests showed no effect of enjoyment on learning progress. In contrast to results reported from some other research that the enjoyment of gameplay provides valuable intrinsic motivation and enforcement for a better learning outcome (Ritterfeld & Weber, 2006; Hsu, 2015; Hanus & Fox, 2015; Sundqvist, 2015), this study argued that the fun factors of video games only provide extrinsic motivation to play the game, which is not sufficient to produce a better learning outcome. Iten and Petko (2016) drew a similar conclusion from the statistical data collected from 74 students playing an educational game AWWWAR that fun does not predict successful learning. They suggested that the hypothesized positive correlation between the enjoyment of gameplay and learning outcomes should be discarded. It is interesting to note that one study conducted by Rankin et al. (2006) showed that intermediate-advanced level ESL students achieved a 40% increase in vocabulary gains after they interacted with non-player characters in *EQ2*. However, a follow-up study by Rankin et al. (2009) found that students who played *EQ2* alone performed similarly in the vocabulary posttest to the group that received traditional instructions, which was worse than students who were paired with native speakers. These studies suggested that although video games are a rich medium of linguistic information, the learning context and activities are probably more important than the game itself. Also, game genres may restrict the learning outcomes. For example, English is not as crucial for winning in music games as it is in MMORPGs. Additionally, very short play time may also contribute to poor vocabulary noticing and recall.

These studies call for attention on the overemphasis and assumptions on the fun elements of video games in education. More research is needed to explore predictive factors of playing games for learning outcomes.

RESEARCH ON LEARNING STRATEGIES

In the language acquisition domain, incidental vocabulary learning refers to acquiring vocabulary as a byproduct through listening, reading, or writing activities, which are not geared toward explicit lexical information; intentional vocabulary learning refers to the activity of explicit vocabulary introduction (Hulstijn, 2001). In gaming environments, vocabulary may be acquired as a byproduct of playing the game or communicating with others (Sundqvist, 2015). In spite of an abundant body of literature (Coady, 1997; Ellis, 1994; Hatch & Brown, 1995; Huckin & Coady, 1999; Nagy & Anderson, 1984; Nation, 1990; Schmidt, 1995; Shu, Anderson & Zhang, 1995) that stresses the effect of incidental vocabulary acquisition, some researchers (Hulstijn, 2001; Krashen, 1989; Singleton, 1999) take issue with advocating for incidental vocabulary learning at the expense of intentional vocabulary learning.

To compare the effect of these two vocabulary learning strategies in a gaming environment, Chen and Yang (2013) divided 22 Taiwanese intermediate-level EFL students into two groups and asked them to play an English adventure game, *BONE*, for about 1.5 hours. One group was suggested (but not required) to take notes, while the other group was not allowed to take notes. The post-test results showed that both groups achieved vocabulary enhancement, but that there was no significant difference between the two groups, indicating that an intentional note-taking strategy does not outperform incidental vocabulary learning. The researchers also noticed a sharp decrease in the number of notes throughout the game session, probably due to inconvenience and a lack of motivation. Their study suggested that adopting a note-taking strategy through playing adventure video games is not conducive for learning vocabulary. This study is significant in that it explored implementations of vocabulary learning strategies in a gaming context, which implied practical suggestions for teachers. However, a sheer quantitative comparison is not adequate enough to discourage the application of the note-taking strategy. To obtain a deeper insight into how students acquire vocabulary in an authentic and complex environment, descriptive qualitative research emphasizing participants' perspectives is necessary (Bytheway, 2015).

Bytheway (2015) identified a flexible combination of 15 vocabulary learning strategies used by the participants through playing *WOW*, including interacting with players, playing in English, reading in-game information, looking up words, noticing frequency/repetition of words, requesting/giving explanations, equating image/action to word, recognizing knowledge gap and selecting words for attention, giving/asking feedback, noticing in other contexts and adding to existing knowledge, guessing from context, using word to learn word use, and observing players. After comparing these strategies with those established by current SLA researchers (Gu, 2003; Schmidt, 1997) under formal learning contexts, the researcher found that formal learning strategies are less comprehensive than in the gaming environment. For example, strategies that enable players to play the dual roles of both teachers and learners by requesting/giving explanations and receiving/giving feedback are largely absent under formal educational settings. This study suggested valuable implications for future research on aspects of vocabulary learning strategies in MMORPG context, but because of the very small sample size (N = 6), the results cannot be generalized to a larger population.

The impact of learner interactivity with the multimedia—which serves as a type of metacognitive strategy (Yudintseva, 2015) on learning outcomes—was also found in the literature (DeHaan, Reed, & Kuwada, 2010; Rankin et al., 2009). DeHaan, Reed, and Kuwada (2010) examined the L2 vocabulary effect of video game interactivity on L2 vocabulary recall in a Japanese university. Eighty participants were divided into forty pairs. One subject of the pair was asked to play a music video game called *Parappa the Rapper 2* (NanaOn-Sha, 2002) for 20 minutes, and the paired subject was asked to watch the game

on another monitor. Paired-samples *t*-test statistics on the pre- and post-tests on vocabulary revealed that the players recalled significantly fewer vocabulary items than the watchers. However, a two-week delayed posttest on vocabulary recall indicated that the watchers decreased much more vocabulary than the players This study suggested that the physical interactivity with video games hinders learning due to the additional and unnecessary cognitive load, which confirmed their previous research (DeHaan, 2005) that the interactivity with L2 multimedia is not conducive for language acquisition.

RESEARCH ON BEYOND-GAME LEARNING

Besides in-game learning, some researchers (e.g. Chik, 2014; Ryu, 2011, 2013) are interested in investigating the learning potential that extends from video games. In order to improve their gaming skills, some players participate in activities in online communities after they finish playing, forming a "beyond-game" culture (Gee, 2008; Steinkuehler, 2006), and this kind of "beyond-game" interaction is more active and richer than "in-game" interaction (Ryu, 2013). For instance, Ryu (2011) spent 25 months observing and interviewing 20 non-English native speakers to study their multiliteracies learning through interactions with native or more capable peers of English at *Civfantatics.com* (CFC), one of the biggest online communities devoted to *Civilization* (Civ). The author identified traditional, multimodal, multilingual, and multicultural learning moments based on a discourse analysis of their participation in the online space. He argued that multiple literacy practices elicited by online communities are beneficial for both L2 literacy learning. To further investigate and compare the role of social interactions both in-game and beyond-game, Ryu (2013) conducted a multi-phase exploratory case study at *CFC* by applying Activity Theory (Engeström, 1987), which refers to a framework explaining how people carry out purposeful collective activities, with the assistance of sophisticated tools in the complex dynamic environments of modern organizations (Hasan, 1999; Waycott et al., 2005). After repeated reviews of the observation data and in-depth interviews, the author concluded that in-game and out-of-game learning environments are interrelated, and while gameplay interaction assists with the acquisition of English words and phrases in a situated context, interaction with more capable peers in beyond-game culture facilitates English discourse development. Another12-month exploratory multi-phase case study on 10 Chinese-speaking university students undertaken by Chik (2014) examined the autonomous learning practices of learning L2 within communities. One of her findings is that gamers scaffold each other by taking on instructional roles in the online discussion, such as providing tutorials and game strategies and translating in-game texts, which form the "funds of knowledge" for L2 gamers (Moll, Amanti, Neff, & Gonzales, 1992). "Funds of knowledge" refers to "the historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (Moll et al., p. 133). Chik concluded that the "affinity space" (Gee, 2003), in which people are drawn together by shared interests, elicits a rewarding environment for fostering autonomy in L2 learning.

These studies demonstrated that online activities related to video games provide valuable L2 learning opportunities. However, most studies on this topic are still at the early age of descriptions and observations. Intervention studies are needed to investigate the effect of online gaming communities on L2 gains in comparison to other approaches.

DISCUSSION

The purpose of this review is to describe the trends of studies on using video games to facilitate the second language in the recent ten years. Five research themes have been identified: attitude, interaction, comparison to traditional instruction, learning strategies, and online gaming communities. It is clear from the research reviewed that players can acquire L2 knowledge while playing video games. For example, the frequent repetition of vocabulary in video games creates a greater range of opportunities for language learners to employ various strategies, such as guessing from the context, using dictionaries, or asking for help, to comprehend the unknown information (Turgut & Irgin, 2009). Additionally, the contextualized language environment provided by video games not only allows learners to acquire language skills in an authentic setting, but it also provides them with multiple ways to apply these skills in order to complete game activities (Gass & Selinker, 2001), which has proven more effective than explicit teaching and drill-and-practice activities that lack attention to individual differences (Filsecker & Bündgens-Kosten, 2012). In the context of gaming, collaboration is integral for players to achieve their ultimate goals of developing their characters' skills, undertaking progressive challenges, and consistently upgrading their game levels; this can happen through in-game interactions or through social organizations beyond the game in which players are able to develop interpersonal relationships through building alliances or exchanging experiences (Peterson, 2012a). This rich communication may generate noticing, negotiation of meaning (Long, 1996; Schmidt, 2001), peer scaffolding (Thorne, 2008), enhanced comprehensible output (Rankin, Gold, & Gooch, 2006; Peterson, 2012a), transfer and adaptive discourse management (Peterson, 2012a), and enhanced understanding of vocabulary (Rankin et al., 2006; Rankin et al., 2009).

This finding was so innovative and appealing that researchers try to seek for solutions to address current challenges of language education from video games. The fanatic trend of gamification produced an increasing number of publications focusing on the benefits of video games on language learning outcomes. However, many earlier studies are lack of validation. For example, many studies are limited by their short game durations, very small sample sizes, or unjustified sampling procedures, making it hard to generalize their results to a larger population. A recent literature review (Jabbari & Eslami, 2019) revealed that most of the current research on MMORPGs are qualitative, among which more than half did not report verifications of the data. This reveals a need for more high-quality empirical studies that draw on various paradigms and associated methodologies. Researchers could conduct more studies using a mixed-methods research design because mixed-methods research offers a theoretically and methodologically powerful approach for replicating studies in language education (Riazi & Candlin, 2014). Given that research on using video games to facilitate L2 learning has only recently emerged, many studies on the same topics have produced different, even opposite results, making it hard for future researchers to build on their findings. Replication studies are very important to push the field forward by validating prior findings. Replications studies with changes of variables and populations can make the existing research results more accurate and broadly applicable.

In addition, this review of literature presents the progress of the current research topic. More in-depth research with specific learning aspects has been found in each category theme. For example, studies on attitude have moved from understanding people's attitude toward video games to investigate factors predicting language learners' preference. This progress is important because it provides implications for teachers who intend to introduce video games into the classroom. By knowing the predictive factors of students' preference, teachers can make better decisions choosing video games, and arousing students' interests to achieve successful learning. Second, the MMORPG genre dominates the language research

area, particularly on interactions, in spite that its overall popularity has declined. So many studies have repeatedly proved that the value of social interactions in MMORPGs for language learning from both cognitive and sociocultural perspectives that it has almost become a cliché in the current time.

So, it is very refreshing to see that some researchers (e.g. Chotipaktanasook & Reinders, 2018) stepped forward to the actual implementation of MMORPGs into a real language course and examine its long-term effect. This indicates a promising future for game-based learning, and more research on game and curriculum design targeting at L2 learning are in need of successful incorporation. Third, research on comparisons between traditional instruction and game-based learning proved a few advantages of games, but they also pointed out that traditional instruction is more effective to achieve certain learning objectives. A new trend is the discussion of the assumed link between enjoyment, motivation, and learning outcomes. Fun elements in games have been regarded as sources of motivation and effective learning. However, with the re-examination of relations between enjoyment and learning gains, there appeared criticism on the overstress of enjoyment in education. Serious research investigating how to switch students' interest from the game itself to game contents is important. On the other hand, game designers for the educational purpose should pay more attention to a smooth and successful knowledge transfer rather than sugarcoating the knowledge with fun factors. Fourth, studies on identifying or comparing learning strategies in games are focused on vocabulary acquisition from the perspective of incidental learning. Most research found a positive result in acquiring vocabulary unconsciously while gaming in the short run, but few studies examined vocabulary retention and usage. In addition, there is no research on how to harness incidental vocabulary learning in games. Similarly, research on learning language from online gaming communities is at an early age, with no research on how to take advantage of this valuable learning tool with appropriate guidance.

CONCLUSION

The current study provides a synthesis that overviews contemporary studies on the use of video games for second language acquisition within the past ten years. The purpose of this literature is to help the readers obtain a comprehensive understanding of the progress and trends of video games in second language education. We can see that research on game-based language learning has made considerable progress. Trials of an actual implementation of games in the language classroom have become the new trend. Although researchers unanimously agreed on the rich learning opportunities in games, whether students can make good use of these resources and lead to successful learning has become a new debate.

It is with no doubt that video games create a beneficial language learning environment. However, a good learning environment alone does not guarantee successful learning. More in-depth investigations are needed before we realize the smooth and successful incorporation of video games into second language education.

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KEY TERMS AND DEFINITIONS

Computer-Assisted Language Learning (CALL): The research of applications of the computer for language education.

English Language Learners (ELLs): Students who are non-native English speakers and have limited proficiency in English. These students typically require special or modified instructions for the coursework.

English as a Second Language (ESL) Students: Non-native English speakers who are learning English.

Game-based Learning (GBL): Also called Digital Game Based Learning (DGBL), refers to the use of video games to enhance learning experiences.

Gamification: The use of game elements in non-gaming environment to promote motivation and engagement.

Interaction Hypothesis (IH): A theory of second-language acquisition which states that the development of language proficiency is facilitated by conversations and dialogues.

Second Language Acquisition (SLA): Also called Second Language Learning, L2 acquisition or L2 learning, refers to the process by which people learn a second language once the first language is established.

Serious games: Video games that were designed to achieve certain learning results.

Video Games: Also called computer games or digital games, refers to a variety of interactive games played on different display platforms, for example gaming device, television, or mobile device.

APPENDIX

Table 1. Brief Overview of the 27 studies

No.	Author(s)/Year of Publication	Participants	Research Method	Game Name/Type	Category	Findings
1	Chen, Chen, Chen, & Yang (2012)	20 Taiwanese pre-service teachers	Qualitative	Back to the Future/ Adventure game	Attitude	Participants believed that video games can foster second language acquisition, particularly for receptive skills.
2	Chen & Yang (2013)	35 Taiwanese students	Quantitative	Bone/Adventure game	Attitude	Students held a positive attitude toward video games in facilitating their English skills.
3	Mifsud, Vella, & Camilleri (2013)	1163 students, 149 teachers, 783 parents	Quantitative	Video games in general	Attitude	Most students, teachers, and parents believed that video games are helpful for learning.
4	Wu, Richards, & Saw (2014)	19 non-gamers	Mixed methods	EverQuest 2/ Massively Multiplayer game	Attitude	Most of the non-gamers showed a positive attitude and learning expectations towards the game
5	Bourgonjon, Valcke, Soetaert, & Schellens (2010)	858 secondary students	Quantitative	Video games in general	Predictive factors for a positive attitude	Perceived usefulness, ease of use, learning opportunities, and gaming experiences affect students' perceptions of the use of video games.
6	Bolliger, Mills, White, & Kohyama (2015)	222 college students	Quantitative	Video games in general	Predictive factors for a positive attitude	Students demonstrated great enthusiasm toward using video games; They confirmed the findings by Bourgonjon et al. (2010) and added an academic major as another predictive factor.
7	Li (2019)	371 MMORPG players	Quantitative	MMORPGs	Predictive factors for a positive attitude	Perceived learning opportunities in MMORPGs predict players' preference
8	Reinders & Wattana (2015)	5 ESL Thai students	Qualitative	Video games in general	Attitude towards WTC	Video games lowered students' anxiety and enhanced their WTC.
9	Horowitz (2019)	76 college Spanish speaking ESL students in Puerto Rico	Quantitative	Online Multiplayer game in general	Attitude towards WTC	Playing online multiplayer video games can lower the level of anxiety and increase WTC.
10	Peterson (2011)	7 Japanese college students	Qualitative	*Allods Online*/MMORPG	Interaction	Students actively participated in social interactions in the target language. Feedback from the participants reported enjoyment and exposure to new vocabulary.
11	Peterson (2012a)	5 Japanese and 1 French college students	Qualitative	*Wonderland/MMORPG*	Interaction	Participants perceived interactions in MMORPGs are engaging, motivating, and enjoyable.
12	Peterson (2012b)	4 Japanese college students	Qualitative	*Wonderland/MMORPG*	Interaction	Participants felt less anxious and more enjoyable; peer scaffolding in games fosters a beneficial environment for the target language production.
13	Chotipaktanasook & Reinders (2018)	30 Thai college students	Mixed methods	*Ragnarok Online*	Interaction	Both the quantity and quality of the L2 interactions in participating in MMORPG are significantly better than in the classroom.
13	Neville, Shelton, & McInnis (2009)	8 college students	Mixed methods	Interactive fiction (IF) game	Comparison	Learners who were exposed to the video game performed better in vocabulary retention and transfer than those who used print-based materials,
14	Suh, Kim, and Kim (2010)	302 Korean students	Quantitative	*An English MMORPG*	Comparison	Students who participated in MMORPGs-based learning obtained higher scores in English listening, reading, and writing skills than those who received traditional face-to-face instruction.
15	Sundqvist & Wikström (2015)	80 Swedish ESL students	Quantitative	*Commercial On-the-Shelf Video game*	Comparison	Frequent gamers—those who played games more than 5 hours per week—achieved higher grades in both essay writing and vocabulary tests than both groups of non-gamers and moderate gamers who played games less than 5 hours a week.

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Table 1. Continued

No.	Author(s)/Year of Publication	Participants	Research Method	Game Name/Type	Category	Findings
16	Sundqvist (2019)	Sample A: 1,069 Swedish ESL students Sample B: 16 Swedish ESL students	Mixed methods	*Commercial On-the-Shelf Video game*	Comparison	Gamers achieved much higher scores than non-gamers at all vocabulary frequency levels.
17	Chotipaktanasook & Reinders (2018)	30 Thai students	Mixed methods	*Ragnarok Online*	Comparison	The game not only encouraged students to produce significantly more L2 output but also evidenced more use of discourse functions than classroom activities.
18	Rankin et al. (2009)	18 ESL Chinese students	Quantitative	*Ever Quest 2*	Comparison	Students who received traditional drill and rote practices achieved significantly higher post-test scores in sentence usage assessment than other groups.
19	Carlvo-Ferrer & Ramón (2015)	65 ESL students	Quantitative	*The Conference Interpreter* /Educational game	Comparison	Students using video games showed greater enjoyment and performed significantly better than the control group in the short run. However, the tests showed no effect of enjoyment on learning progress.
20	Iten & Petko (2016)	74 ESL students	Quantitative	AWWWAR/ educational game	Comparison	The hypothesized positive correlation between the enjoyment of gameplay and learning outcomes should be discarded
21	Rankin et al. (2009)	8 Native English speakers and 18 Chinese ESL students	Quantitative	Ever Quest 2/MMORPG	Comparison	Students who played EQ2 alone performed similarly in the vocabulary posttest to the group that received traditional instructions, which was worse than students who were paired with native speakers.
22	Chen & Yang (2013)	22 Taiwanese EFL students	Quantitative	BONE/Adventure games	Learning strategies	The post-test results showed that both groups of taking notes and not taking notes achieved vocabulary enhancement, but that there was no significant difference between the two groups, indicating that an intentional note-taking strategy does not outperform incidental vocabulary learning. The researchers also noticed a sharp decrease in the number of notes throughout the game session,
23	Bytheway (2015)	6 students	Qualitative	World of Warcraft/ MMORPG	Learning strategies	The study identified a flexible combination of 15 vocabulary learning strategies used by the participants through playing WOW,
24	DeHaan, Reed, & Kuwada (2010)	80 Japanese students	Quantitative	*Parappa the Rapper 2/ music game*	Learning strategies	Paired-samples t-test statistics on the pre- and post-tests on vocabulary revealed that the players recalled significantly fewer vocabulary items than the watchers. However, a two-week delayed posttest on vocabulary recall indicated that the watchers decreased much more vocabulary than the players. This study suggested that the physical interactivity with video games hinders learning due to the additional and unnecessary cognitive load,
25	Ryu (2011)	20 non-English native speakers	Qualitative	*Civilization* /MMORPG	Online gaming community	Multiple literacy practices elicited by online communities are beneficial for both L2 literacy learning
26	Ryu (2013)	6 male players	Qualitative	*Civilization* /MMORPG	Online gaming community	in-game and out-of-game learning environments are interrelated, and while gameplay interaction assists with the acquisition of English words and phrases in a situated context, interaction with more capable peers in beyond-game culture facilitates English discourse development.
27	Chik (2014	10 Chinese college students	Qualitative	*N/A*	Online gaming community	gamers scaffold each other by taking on instructional roles in the online discussion, such as providing tutorials and game strategies and translating in-game texts, which form the "funds of knowledge" for L2 gamers.