Applied Research on English Language

V. 12 N. 1 2023
pp: 73-94
http://jare.ui.ac.ir

DOI: 10.22108/ARE.2022.135344.2001
Document Type: Research Paper

Digital Gaming as a Panacea for Incidental L2 Acquisition in an EFL Context

Liqaa Habeb Al-Obaydi [1], Marcel Pikhart [2], Farzaneh Shakki [3*],

[1] Assistant Professor, Department of English, Faculty of Education for Human Sciences, University of Diyala, Iraq
[2] Assistant Professor, Department of Applied Linguistics, Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic
[3] Postdoctoral Researcher, Department of English Language and Literature, Faculty of Humanities and Social Sciences, Golestan University, Gorgan, Iran

Received: 2022/10/05 **Accepted: 2022/10/12**

Abstract: The use of digital games has increased dramatically in the last two decades due to the augmentation in the number of Personal Computers (PCs) and mobile devices worldwide. Not only can digital games be played for entertainment, but also, they may have both positive and negative effects on their players. Various effects of digital games on individuals' levels of attention span, concentration, and addiction have already been tested by numerous studies; however, their impact on incidental Second Language (L2) acquisition is still untouched by language researchers. To address this lacuna, this is a longitudinal observational study that lasted for three months to investigate the impact of digital games played by young learners for entertainment at home on their unintentional acquisition of English as an L2. The age of the participants ranged from 8 to 14 years old, and the experiment was conducted during the Covid-19 pandemic in 2021. Three main games were played by the sample; namely, Free Fire, Minecraft, and Among Us. The findings revealed that digital gaming significantly influenced the vocabulary development of the participants, and gaming was a clear asset for their L2 acquisition. It was also found that the players' level of vocabulary retention was high; however, two drawbacks were identified in this regard, namely, the prolonged screen time and vocabulary items specifically related to a given area of a particular game. Overall, this study can be an impetus for further research into evaluating the benefits or drawbacks of using digital games for specific aspects of L2 acquisition such as the development of cognitive abilities or enhanced understanding.

Keywords: Second Language (L2) Acquisition, Digital Gaming, Incidental Learning, Vocabulary Learning, Psycholinguistics.

[*] **Corresponding Author.**

Authors' Email Address:
[1] Liqaa Habeb Al-Obaydi (liqaa.en.hum@uodiyala.edu.iq), **[2] Marcel Pikhart** (marcel.pikhart@uhk.cz), **[3] Farzaneh Shakki** (f.shakki69@gmail.com)

Introduction

Gaming has seen an unprecedented rise in the previous decade as, basically, everyone has had access to a computer or a mobile device. Such devices have been used mainly for educational, entertainment-based, and communication-based purposes mostly by the younger generation (Li, Peterson, & Wang, 2022). The younger generation is generally more prone to gaming as they are still connected to their natural need to play, and at the same time (Khazaie & Derakhshan, 2021) they have easy access to digital devices. There have been several studies (e.g., Čábelková, Strielkowski, Rybakova, & Molchanova, 2020; Donati et al., 2021; Du, Grace, Jagannath, & Salen-Tekinbas, 2021; Leonhardt & Overå, 2021; Jang et al., 2021) which have very recently analyzed the impact of gaming on various aspects of the L2 acquisition such as cognitive abilities, psychological status, creativity, social participation, isolation, or communicative competence. The use of virtual reality for increasing L2 acquisition has been also proved sufficiently in previous research (Pinto et al., 2021).

Digital media and computer games present both a challenge and a threat to the humans' mental state and the development of social bonds, particularly among the younger generation, i.e., the children and high-school students (Cabeza-Ramírez, Muñoz-Fernández, & Santos-Roldán, 2021; Chamarro, Oberst, Cladellas, & Fuster, 2020; Chung et al., 2020; Lin et al., 2021; Richard, Marchica, Ivoska, & Derevensky, 2021). The negative aspects of digital media have been recently studied widely (Riley, Oster, Rahamathulla, & Lawn, 2021). However, there has not been a sufficient number of studies on the role of digital gaming in L2 acquisition to find the advantages and disadvantages. Therefore, the present study attempts to fill this gap by analyzing the degree to which digital gaming affects the process of incidental acquisition of English as an L2 in younger game players, particularly the users between 8 and 14 years old, who are typically the pupils of primary schools and keen on gaming. It should be clarified here that by incidental L2 acquisition, we mean the acquisition of an L2 without the primary aim of acquiring the language through the intentional educational process. Though the "trials of an actual implementation of digital games in the language classroom have become the new trend" (Li, 2019, p. 485), the researchers did not want the participants in the study to play a language game whose primary or secondary purpose is to improve language learning. Rather, the participants played a game merely for the sake of entertainment or pleasure. Meanwhile, the influences of digital gaming on incidental L2 acquisition of the participants were investigated

according to Gros's (2007) proposition in which analyzing the context of learning via digital games has four fundamental aspects: 1) the context of the study, 2) the kind of activities carried out, 3) the kind of communication taking place between participants and the role of the teacher (the observer), and 4) the qualities of the game itself, including its critical and reflective elements. All these aspects were dealt with in the present study, which consequently guided the analysis of the obtained data. More specifically, the researchers formulated the following five research questions:

1. Does the use of digital games for entertainment at home lead to incidental vocabulary acquisition in young learners?
2. Which aspect of the English language is acquired more during the use of digital games?
3. Do digital games enhance communicative language skills or only vocabulary acquisition?
4. Which game (from the three that were under investigation in this study) has more significant effects on learning English and to what extent?
5. Is the effect of incidental vocabulary acquisition based on digital games long-lasting?

Literature Review

Chronologically, the field of electronic gaming has mainly emerged since the early 1970s and developed through the 1980s specifically in the business domain. In the last decade, this field has grown drastically and has paid much attention to simulations and less concentration on games. The publication of a set of books such as *Mind at Play* by Loftus and Loftus (1983) and *Mind and Media* by Greenfield (1996) represents the scholars' initial academic efforts to talk about digital gaming. Then, the line of research on digital gaming slowly grew by referring to the resource sites like Ludology, Game-culture, Game-research, and Joystick. At that time, the book *Digital Game-Based Learning* by Prensky (2001) helped shed light on the issues of training and simulation in relation to digital gaming. The noticeable growth in the field of game-based learning research happened in 2002 when Woodrow Wilson sponsored the Serious Games initiative, and after that, in 2004, the Serious Games Summit. Subsequently, Egenfeldt-Nielsen (2005) described the intersection of different generations of games and different learning theories in the domain of education.

Within reviewing the literature on digital games, some aspects are important to be explained, first learning and teaching in general, and learning and teaching English in particular. In relation to general education, research studies have mainly focused on three

trends: 1) the sociological approach, which deals with describing the use of games in interpersonal relationships and social development, 2) digital literacy, and 3) game-based learning in schools. Moreover, learning English in a non-instructional situation, such as outside the teaching environment with the goal of learning the language, or without it, such as through digital games (Derakhshan & Shakki, 2019; Sundqvist, 2009), was found to have positive effects on the players' size of vocabulary knowledge and their English proficiency test scores (Sylvén & Sundqvist, 2012). This finding can be very important especially when it is understood that the language of all advances in technology has been English (Alzeebaree & Hasan, 2020), and thus, English is the leading vehicle of communication in media worldwide.

Furthermore, the prominence of English as a lingua franca for IT and business people also gives credence to the natural and unintentional acquisition of the language through permanent language immersion that happens through its prevalent use (Klimova & Pikhart, 2021; Ortiz-Marcos et al., 2020). This notion is supported by Sundqvist (2009, p. 24) who mentions that it is "English that learners come in contact with or are involved in outside the walls of the classroom". This omnipresence of English makes it easily accessible to basically every user of technology. De Wilde, Brysbaert, and Eyckmans (2020) found that a vast majority of children improved their language skills, but there were significant individual variances in this regard. Gaming, social media usage, and speaking were the most effective sources of input. These are in fact interactive, multimodal input kinds that require language production. It was also found that most language proficiency tests assess the same aspects.

Reviewing the empirical studies on the effect of gaming on vocabulary learning, Chen and Hsu (2020) used a serious game titled Slave Trade to check whether vocabulary and knowledge of history can be acquired at the same time. Sixty-six college EFL students participated in this study and it was found that gaming has statistically significant improvements in both vocabulary and history knowledge. In addition, the students reported that they had enjoyed a positive learning experience via the serious game. By the same token, investigating the effect of digital gaming on vocabulary learning, Tsai and Tsai (2018) conducted a meta-analysis in L2 contexts on 26 primary studies. They had four conditions based on Mayer's (2015) taxonomy of research designs on digital game-based learning. Their research provides strong support for the use of digital games in vocabulary learning by generating a medium to large effect size. Similarly, Chen, Tseng, and Hsiao's (2018) study on the effectiveness of digital gaming was carried out through Csikszentmihalyi's (1990) Flow Theory as the framework. They analyzed 10 studies in their meta-analysis. A large effect size

again was found which corroborates the significance of using digital gaming in vocabulary learning.

Considering the positive effects of gaming found in the previous studies, the implications of this research are vast as more and more young people spend a large proportion of their free time in front of the screen, and incidental vocabulary learning has not been scrutinized yet. Psychologists, educational specialists, and other professionals need to know to what extent the use of digital media is beneficial. They also need to reach research evidence regarding the positive and negative impacts of digital media on language acquisition because it is necessary to determine if the detrimental effects are not too large compared to the benefits of this use.

Based on what was mentioned, the current study attempted to add to the scope of digital gaming literature by investigating whether digital games can be used to help people learn an L2. Not many research studies have worked specifically on the role of digital games, which are not educational games and are played for entertainment, in language skills development as this topic is relatively new. Therefore, it needs further attention to be able to obtain systematic and reliable research results. Most of the research studies conducted recently have gained positive results about vocabulary retention, the ability of the learners to recall the new lexical items, the retention of target language vocabulary items, and unintentional quick acquisition (Franciosi, Yagi, Tomoshige, & Ye, 2016; Hitosugi, Schmidt, & Hayashi, 2014; Maior, 2016; Qasim, 2021). It was also found that the acquisition of new words was determined to be highly encouraged by the frequency exposure of the in-game abundance of words, the visual appearance of participants in the game, the monsters in the game, and different locations used (Maior, 2016). Thus, this study attempted to bridge the gap in the literature in relation to the role digital games played for entertainment in L2 learning.

Methodology

The study is qualitative in nature, as the collected data were analyzed qualitatively without using statistical procedures. The study was based on the direct observation (Odom & Ogawa, 1992) of the users of the games in their natural environments without letting them know that they were part of the study. The sample consisted of eight basic school children with ages between 8 and 14 years old. The observation took place in their natural environments, during the time of the COVID-19 pandemic in Iraq. This was the time when they were forced to stay home and not attend schools because of the pandemic. To collect all the information required, the researchers used a protocol that consisted of the following questions:

1. Aspects of the English language developed more by the participants (tick X):

grammar	vocabulary	communication	pronunciation

2. Specify the kind of development in the skill developed.
3. Which game has a significant impact on students' acquisition of language?
4. Does the use of digital games for entertainment at home lead to real learning of the English language?

Yes	Somehow	No

The observer spent three months following and watching the eight participants' digital gaming activity very closely on a daily basis, keeping an eye on each detail in relation to their learning English, and making written notes on every single aspect of their gaming experience connected to their L2 acquisition. The protocol was used by the observer once a day. The participants all played their games digitally using their iPads or smartphones. The choice of the games was related to the participants' preferences without any intrusion on the part of the researchers. The participants chose to play approximately the same games within varied periods of time.

The choice of the participants was determined according to their accessibility as the researchers needed to see them daily. Therefore, all of them were the researchers' family members (their own children, nephews, and neighbors). They either played games individually in their homes or in the home yards as they were all neighbors and relatives. The consent to participate in the study was taken orally from the participants' parents, and all the necessary ethical considerations were taken into account. The researchers could see and talk to all of them daily, and they could conduct this close-up observation. The demographic information of the participants is presented in Table 1 which shows their first names, grades, ages, the device used, and grades in English classes. Numbers were used instead of the participants' names to protect their identities.

The research was approved by the Ethics Committee of the University of Hradec Kralove (No. 2/2021). Moreover, the written consent of the parents of the children who took part in the experiment was obtained. All GDPR regulations regarding privacy and data collection were observed.

Table 1. *The Demographic Information of the Participants*

No	Name	School Grade	Age (in years)	Device	Grade in English out of 100
1	xxx	Second secondary	14	iPad	100/100
2	xxx	First secondary	13	iPad	97/100
3	xxx	Sixth primary	12	Mobile	88/100
4	xxx	Sixth primary	12	Mobile	100/100
5	xxx	Sixth primary	12	Mobile	98/100
6	xxx	Fifth primary	11	iPad	100/100
7	xxx	Third primary	8	Mobile	95/100
8	xxx	Second primary	8	iPad	100/100

The researchers were following the children daily; usually asking them questions in a friendly way, and sometimes playing with them in order to collect relevant data and understand how the things related to their language development evolved. The researchers focused only on the digital games that were the most popular and played by all of the participants. Table 2 shows the games played by the participants with the details about them.

Table 2. *The Main Digital Games Played by the Research Sample*

Game	Description
Free Fire	Garena Free Fire (also known as Free Fire Battlegrounds or simply Free Fire) is a third-person action-adventure battle royal game created by 111 Dots Studio and released by Garena for Android and iOS. It considers one of the most widely downloaded mobile games of 2019. As a result of its widespread popularity, Google Play Store named it the "Best Popular Vote Game" of 2019. Up to 50 players are frequently involved in the game. They have landed on an island via parachute and are looking for weapons and killing equipment in order to defeat the other players. The players select their starting position and then take the weapons and resources that they require to begin their battle life. It includes audio chat, as well as the ability for participants to write to one another before beginning the game.
Minecraft	Minecraft is a sandbox video game created by Mojang. Markus "Notch" Persson created the game in the Java programming language for the first time. After numerous early test versions, it was first launched as a paid public alpha for personal use by computers in 2009, with Jens Bergensten taking over the development in November 2011. Minecraft has 200 million copies sold and 126 million monthly active users as of 2020. Players in Minecraft explore a procedurally generated 3D world with unlimited topography, discovering and extracting craft equipment and things, raw materials, and building constructions or earthworks. Players can either combat computer-controlled "mobs" or cooperate or compete with other players in the same globe, depending on the game mode. There is a survival mode and a creative mode in the game. In the first phase, players must gather resources in order to construct the world and sustain their health. In the second phase, the creative mode, players have access to a vast array of resources. Modifying the game allows players to create new gameplay mechanisms, items, and assets. They can communicate with each other in writing.
Among Us	Among Us is a multiplayer social deduction game played online. Inner sloth, an American game studio, produced and released it. It was released in June 2018 for iOS and Android devices, and in November 2018, for Microsoft Windows. In December 2020, the game was also available on the Nintendo Switch. It is a four-player or more multiplayer game. The players are either Impostors or Crewmates. The game is situated in a space-themed environment that is based on a map. When the number of Impostors equals the number of Crewmates, or when the sabotage countdown reaches zero, the Impostors win. The Crewmates win if they complete all of the assignments or if they identify and eliminate all of the Impostors. If a player dies, he or she becomes a ghost. It is worth noting that the game has no audio to prevent hidden information from being revealed in a local context. It solely offers written chat.

The ranges of the time spent by the participants daily varied among the three games and the participants. The majority of the participants preferred playing Free Fire. Thus, they spent most of their time playing it. Fewer time periods were spent on the other two games as Table 3 shows. Screen time was a significant parameter as the increased screen time was generally considered to be a very negative aspect inevitably connected to any online activity.

Table 3. *The Time Spent by Each Participant Daily*

participants	Free Fire	Minecraft	Among Us
1	1 and a half hour	Half an hour	1 hour
2	1 hour	Half an hour	Half an hour
3	3 hours	2 hours	1 hour
4	3 hours	1 hour	Half an hour
5	2 hours	1 hour	1 hour
6	3 hours	1 hour	Half an hour
7	2 hours	Half an hour	Half an hour
8	2 hours	4 hours	Half an hour

Results

The results yielded by the research were dependent on the analysis of the data in the protocol used. The improvement was observed only in the section on vocabulary. In communication, there was only very little development observed, and no other development was observed in grammar or pronunciation, and the protocol was used for three months (90 days). Thus, the results are based on the analysis of the 90 protocols' results as can be seen in Table 4.

Table 4. *The Results of the Daily Observation by the Protocol*

Items	Results	Percent
1. Which aspect of the English language is developed more by the participants?	Grammar 0 times Vocabulary 90 times Communication 9 times Pronunciation 5 times	0% 100% 10% 5%
2. Specify the kind of development in the skill developed.	No development in grammar Acquisition of new words in the vocabulary Little communication was mentioned Very little development in pronunciation	0% 100 10% 5%
3. Which game has a bigger impact on students' acquisition of language?	Free Fire	100%
4. Does the use of digital games for entertainment at home lead to real learning of the English language?	54 times the result no 13 times the result somehow 23 times the result yes	60% no, 15% somehow, and 25% yes.

The specification of the results in the protocol showed the approximate number of words acquired by each participant in Free Fire as demonstrated in Table 4. As the largest proportion of time spent by participants was proved to be in Free Fire, as shown in Table 3, the analysis of words acquired begins here. The details of the acquisition of words and its gradual development are clarified in Table 5. The details showed that the process of learning the new words increased gradually in the first two weeks as the learners tried to understand each item in the game because it was new to them and created a stimulating environment.

In the first week, the learners began to learn the names and terms used in the game which were totally new to them such as *start*, *head shout*, *body shot*, *skin*, *due*, *squad*, *solo*, *one shot*, *profile*, and *spam*. In the second week, their enthusiasm increased; thus, they were eager to know anything which could accelerate the process of learning. Examples of the words learned in the second week were *booyah*, *fire pass*, *rank*, *classic*, *peak*, *diamond royal*, *weapon royal*, and *gold royal*. In addition, there were also many new names of places on the map and the many types of weapons that they acquired. In the second and third months of playing, the

approximate range was between 7 to 10 new words. In this respect, the learning was restricted to the words of new events, namely only those words appearing periodically in specific celebrations such as Valentine's Day, Eid Al-Fiter, Ramadan, and COVID-19.

Table 5. *The Approximate Number of Words Acquired by Each Participant in Free Fire*

Participant	In the first week	In the second week	In the second month	In the third month
1	20	22	10	10
2	10	10	7	8
3	13	15	9	8
4	15	17	9	8
5	9	15	8	7
6	10	12	9	9
7	10	15	7	7
8	8	12	8	8

As far as Minecraft is concerned, it seems that this game was the closest to the participants' life details. Thus, much of its vocabulary was known to them from their studies in schools. The approximate number of words that were acquired by the participants ranged from 20 to 27 totally new words. Examples of these words are *wood*, *crafting table*, *axe*, *stone*, *mob*, *lava*, *bow*, and *pickaxe*. In the second week, the learning of the new words moderately grew. This depended on the time spent by each participant and the passion for the game. Examples of the words learned are *torch*, *TNT*, *ender pearl*, *white bed*, and *elytra*. In the second and third months, the acquisition of the new words and terms was dependent on the periodical event that occurred in the game such as the *spider*, *CubCrat*, and *hive*. As it is obvious, the majority of the words are very specific and game-connected. However, some of them can also appear in everyday life scenarios.

Table 6. *The Approximate Number of Words Acquired by Each Participant from Minecraft*

Participant	In the first week	In the second week	In the second month	In the third month
1	20	15	15	10
2	8	6	10	5
3	12	10	24	10
4	10	13	20	11
5	8	8	10	8
6	7	8	12	7
7	8	10	14	8
8	10	12	15	8

In the Among Us digital game, the number of words acquired was much fewer than in the other two mentioned games. The reason may be related to the limited number of events and characters in the game. The number of words acquired during the time of the experiment ranged from two to 12 words. In the first week, the range was between 8 and 12 words. Examples are *enter name*, *enter code*, *find game*, *back*, *imposters*, *chat*, *ping*, and *use*. In the second week, the acquired number of words was much fewer in than the first week as the gamers knew most of the words in the game because, as mentioned previously, the range of words used in the game was rather limited. Examples of words in the second week are as follows: *leave game*, *skin*, *report*, *bet*, *colors*, and *skip*. In the second and third months, the new words were very few because no new events were found in this game; thus, the players acquired them all after just a very short period of time.

Table 7. *The Approximate Number of Words Acquired by Each Participant from Among Us*

Participant	In the first week	In the second week	In the second month	In the third month
1	11	5	4	2
2	12	7	5	3
3	10	6	4	3
4	10	10	5	5
5	11	9	3	5
6	9	10	3	2
7	8	8	3	2
8	8	6	4	2

The words acquired by the participants were of different types, and they could be divided into several categories. This classification of the words acquired can have importance in constructing an inclusive vision towards the kind of words acquired by the young players. There are different traditions concerning the classification of words where they can be defined either syntactically or semantically. Syntactically speaking, a word may be defined depending on its arrangement in a sentence. Semantically, two approaches are mentioned to determine the meaning; the referential approach and the functional approach, or what is referred to sometimes as the lexical meaning and grammatical meaning, respectively.

The first division used is the syntactic analysis where the words acquired are divided into verbs, nouns, adjectives, adverbs, and prepositions. Table 7 shows that the most words acquired were nouns and verbs. Very few adjectives were found without mentioning adverbs and prepositions.

Semantic division of the words acquired showed that most of the words that exist in the games were lexical (content), and very few are grammatical. On the other hand, words that resulted from the processes of word formation also existed mostly as compound words and also very few clipped, acronyms, or coined words. Examples of these words are *head shout, body shot, leave game, CubCrat, TNT, ender pearl, white bed, double kill, booyah, fire pass,* and so on.

In relation to the development of communication skills, it was noticed that most language used in the games was fragmentary with little impact on the connected speech. The sentences used were short; one or two words sentences mostly in Free Fire such as *follow me, sorry, be patient, help me, good job, go go go, I need guns, stay together, and enemy has been spotted*. The difference was in the mood of the game. In Free Fire, for example, the players could play

together using sound chatting, and there were voice instructions in the game. However, in the other two games, Minecraft and Among Us, the players could play together but sound chat was not available. The players could communicate only in the written format. Concerning the kind of meaning conveyed, most of the speech expressed motivational, entertaining, and informative meanings. As a result, no real communication occurred among the gamers, and if some happened, it was only short and could not be considered an instance of real communication.

The last question of the protocol showed that in most of the observations recorded, the results were 60% no, 15% somehow, and 25% yes as can be seen in Table 4. This means that no real acquisition of language occurred during these non-educational games except for learning some vocabulary items that were related to the context of the game most of the time.

Discussion

In relation to the data yielded, and with regard to the questions of the present study, it was evident that certain language acquisition happened in young learners. However, it should be verified to what extent their language developed and what the retention span of these newly acquired words was. The use of digital games for entertainment at home is evidently less to learning the English language in a restricted way among young learners (i.e. limited in the range of vocabulary), and this can provide an answer to the first question of the study. This result is very much in agreement with those of De Wilde et al. (2020). Naturally, it is very much connected to vocabulary acquisition related only to the topic of the game; however, the research participants acquired the new words easily and with understanding them, as they appeared in a context so that they knew what the meaning of them was from the context itself without the need to translate them. This is a natural process that is well described from an L1 acquisition perspective where individuals acquire the language without the need of translating or explaining explicitly the rules of the language (Elsabbagh et al., 2013). This acquisition of L2 by playing games is thus very natural as it is similar to L1 acquisition at a very young age (Legault et al., 2019). It would be beneficial to use this advantage and keep it in mind when developing various learning apps for L2 acquisition as well.

According to the second and third research questions of the present study, evidently, vocabulary was the most acquired aspect of language and by any kind of immersion, which gaming naturally is (Dewaele & Dewaele, 2020; Edmonds & Gudmestad, 2021). Though there is a certain space for communication among learners in some games, in Free Fire, for example, it does not lead to any real talk. This may be due to many reasons; the most important of which

is the code-switching between the participants' native and target language which relates to the alternating use of more than one language by the players. It is a case that usually occurs either in an L2 context or in bilingual education. The young learners switch to their native language after the beginning of the game. This case is frequently known among elementary levels and should be dealt with flexibly (Cambra, 1998). The other reason is the atmosphere of competition, challenge, and speed found in the game, leading to a focus on winning the game despite learning other things. Other reasons were related to the communication itself. Communication is an advanced skill. One needs to make a balance between communicative and linguistic competencies. Thus, it is difficult for young learners, whose communication skills are still under construction, to communicate only in English.

This result is in line with Sylvén and Sundqvist's findings (2012) who mentioned that the default language of communication in most digital games is English, which is difficult to use naturally for anyone whose first language is not English. Consequently, they construct a hypothesis that "those successful and frequent players of such games who do not have English as their mother tongue acquire some of their English L2 proficiency in the activity of gaming" (Sylvén & Sundqvist, 2012, p. 3) as similarly noted in the present research study. However, it is very complicated to evaluate what the level of this acquisition would be when we want to consider only the game influence regardless of all other forming elements in L2 acquisition. However, one can be somehow confident that the vocabulary items acquired in one's context are significant and, as already noted, are acquired in the L1 mode, i.e., without any guidance by a teacher, textbook, translation, or intentional explanation. This L1 mode is crucial as it leads to a better understanding, higher retention, and generally better linguistic background.

As far as testing the three aforementioned digital games was concerned, which is related to the fourth research question of the study, it is essential to say that these games were the choice of the learners themselves. The researchers did not interfere with the selection of the games as they wanted to concentrate on the unintentional mode of learning by playing games that did not focus on any particular language and its acquisition. Thus, the players played merely for their entertainment or pleasure. When the language acquired was analyzed by the researchers, it was found that Free Fire had more effect on the participants. The number and scope of the words acquired and the communication chat the game provided to players proved that it was much better than the other two games in the process of natural learning of the language It could be caused by the possibility of communicating online with the participants in the game, which created an environment of mutual support, and this social aspect of language

acquisition is very natural and demanded, i.e., language is only acquired in and by communication.

Concerning the continuity of the learning process, it seems that the kind of learning that digital games provided was limited to the time of playing. Though the players acquired and retained many new words, they did not show a real level of learning in English. It goes without saying that teachers, writers, and even parents should not consider any entertaining game as a source of learning an L2, but they may be considered supporters of the process of L2 learning. This may be due to the limited scope of the language acquired and the changeable mood of learning in young learners. They update their choices of games periodically; thus, it is difficult for them to stay with only one game for a long period of time, and this can be demonstrated by the answer to the last question of the current study.

One more issue that must be taken into account when evaluating digital games for L2 acquisition is the increased screen time. This is probably the major drawback that cannot be eliminated but must be considered very seriously. Prolonged screen time causing severe restrictions in communication as well as reduced physical activity and social contact have been recently studied and found to be extremely influencing the quality of life and having far-reaching health effects on players (Alqaoud et al., 2021; Breidokienė et al., 2021; Nathan et al., 2021; Sigmundová & Sigmund, 2021; Wunsch et al., 2021) in addition to their impact on humanistic learning elements in eLearning environment (Al-Obaydi, 2021). Therefore, despite the fact that playing games has a certain positive effect on incidental vocabulary acquisition, it must be noted that it also presents a serious threat to the long-term well-being of the participants of this activity.

Conclusions

This study attempted to fill the gap in the literature in relation to the analysis and evaluation of the outputs of the incidental learning of English as an L2 occurring as a result of using digital games for entertainment by young learners. The research conducted clearly showed the undisputed impact, both positive and negative, of digital gaming on L2 acquisition in younger learners who spent their free time gaming. Naturally, it cannot be concluded that gaming is the only possible way of acquiring new vocabulary items, but it presents an aspect of pleasure embodied in incidental L2 acquisition. Moreover, in its nature, incidental L2 acquisition is similar to L1 acquisition in many respects. Young learners, or children, will always prefer the

gaming elements among different instructional activities, and L2 teachers should bear this in mind.

Educators who are responsible for curricula development must be aware of the fact that the element of gaming is an important impetus that improves motivation and can bring about higher levels of satisfaction during the learning process for learners. The digital gaming industry also needs to shed light on the aspect of natural English language learning by exploiting the fact that the language of most technological advances is English and that the players will learn some words intentionally or incidentally during gaming activities.

Acknowledgments

This research was supported by the SPEV Project 2022 run at the Faculty of Informatics and Management of the University of Hradec Kralove, Czech Republic. The authors would like to thank Ales Berger for his help when preparing the manuscript.

References

Al-Obaydi, L. H. (2021). Humanistic learning elements in a blended learning environment: A study in an EFL teaching context. *Interactive Learning Environments*, 1-14. DOI: https://doi.org/10.1080/10494820.2021.1919717.

Alqaoud, N., Al-Jawaldeh, A., Al-Anazi, F., Subhakaran, M., & Doggui, R. (2021). Trend and causes of overweight and obesity among pre-school children in Kuwait. *Children*, *8*(6), 524. https://doi.org/10.3390/children8060524.

Alzeebaree, Y., & Hasan, I. A. (2020). What makes an effective EFL teacher: High school students' perceptions. *Asian ESP Journal*, *16*(2), 169-183.

Breidokienė, R., Jusienė, R., Urbonas, V., Praninskienė, R., & Girdzijauskienė, S. (2021). Sedentary behavior among 6–14-year-old children during the COVID-19 lockdown and its relation to physical and mental health. *Healthcare*, *9*(6), 756. https://doi.org/10.3390/healthcare9060756.

Čábelková, I., Strielkowski, W., Rybakova, A., & Molchanova, A. (2020). Does playing video games increase emotional creativity?. *International Journal of Environmental Research and Public Health*, *17*(7), 2177. https://doi.org/10.3390/ijerph17072177.

Cabeza-Ramírez, L. J., Muñoz-Fernández, G. A., & Santos-Roldán, L. (2021). Video game streaming in young people and teenagers: Uptake, user groups, dangers, and opportunities. *Healthcare*, *9*(2), 192. https://doi.org/10.3390/healthcare9020192.

Cambra, M. (1998) Solicitaciones des professor y reacciones de los apprenden Francé scomo lengua extranjera en la ensenaza Primaria. In M. Pujolet et al. (Eds.) *Adquisicion de Lenguas Extranjeras: Perspectivas Actuales en Europa Madrid*. Edelsa.

Chamarro, A., Oberst, U., Cladellas, R., & Fuster, H. (2020). Effect of the frustration of psychological needs on addictive behaviors in mobile videogamers- The mediating role of use expectancies and time spent gaming. *International Journal of Environmental Research and Public Health*, *17*(17), 6429. https://doi.org/10.3390/ijerph17176429.

Chen, H. J. H., & Hsu, H. L. (2020). The impact of a serious game on vocabulary and content learning. *Computer Assisted Language Learning*, *33*(7), 811-832.

Chen, M. H., Tseng, W. T., & Hsiao, T. Y. (2018). The effectiveness of digital game based vocabulary learning: A framework-based view of meta-analysis. *British Journal of Educational Technology*, *49*(1), 69–77. doi:10.1111/bjet.12526.

Chung, S. J., Jang, J. H., Lee, J. Y., Choi, A., Kim, B. M., Park, M. K., … & Choi, J. S. (2020). Self-efficacy and clinical characteristics in casual gamers compared to excessive gaming users and non-gamers in young adults. *Journal of Clinical Medicine*, *9*(9), 2720. https://doi.org/10.3390/jcm9092720.

Csikszentmihalyi, M. (1990). *Flow: the psychology of optimal experience*. New York: Harper and Row.

Derakhshan, A., & Shakki, F. (2019). The effect of incidental and intentional instruction of English collocations on Iranian advanced EFL learners. *Journal of Language Related Research*, *10*(2), 25-51.

Dewaele, L., & Dewaele, J. M. (2020). Actual and self-perceived linguistic proficiency gains in French during study abroad. *Languages*, *6*(1), 6. https://doi.org/10.3390/languages6010006.

De Wilde, V., Brysbaert, M., & Eyckmans, J. (2020). Learning English through out-of-school exposure. Which levels of language proficiency are attained and which types of input are important?. *Bilingualism: Language and Cognition*, *23*(1), 171-185.

Donati, M. A., Guido, C. A., De Meo, G., Spalice, A., Sanson, F., Beccari, C., & Primi, C. (2021). Gaming among children and adolescents during the COVID-19 Lockdown: The role of parents in time spent on video games and gaming disorder symptoms. *International Journal of Environmental Research and Public Health*, *18*(12), 6642. https://doi.org/10.3390/ijerph18126642.

Du, Y., Grace, T. D., Jagannath, K., & Salen-Tekinbas, K. (2021). Connected play in virtual worlds: Communication and control mechanisms in virtual worlds for children and adolescents. *Journal of Multimodal Technologies and Interaction*, *5*(5), 27. https://doi.org/10.3390/mti5050027.

Edmonds, A., & Gudmestad, A. (2021). Collocational development during a stay abroad. *Languages*, *6*(1), 12. https://doi.org/10.3390/languages6010012

Egenfeldt-Nielsen, S. (2005). *Beyond edutainment*. Unpublished PhD Thesis, University of Copenhagen. Copenhagen, Denmark.

Elsabbagh, M., Hohenberger, A., Campos, R., Van Herwegen, J., Serres, J., De Schonen, S., … & Karmiloff-Smith, A. (2013). Narrowing perceptual sensitivity to the native language in infancy: Exogenous influences on developmental timing. *Journal of Behavioral Sciences*, *3*(1), 120-132. https://doi.org/10.3390/bs3010120.

Franciosi, S. J., Yagi, J., Tomoshige, Y., & Ye, S. (2016). The effect of a simple simulation game on long-term vocabulary retention. *Calico Journal*, *33*(3), 355-379.

Greenfield, P. M. (1996). Video games as cultural artifacts. In P. M. Greenfield & R. R. Cocking (Eds), *Interacting with video* (pp. 35-46). Ablex Publishing.

Gros, B. (2007). Digital games in education: The design of games-based learning environments. *Journal of Research on Technology in Education*, *40*(1), 23-38.

Hitosugi, C. I., Schmidt, M., & Hayashi, K. (2014). Digital game-based learning (DGBL) in the L2 classroom: The impact of the UN's off-the-shelf videogame, food force, on learner affect and vocabulary retention. *Calico Journal*, *31*(1), 19-39.

Jang, J. H., Chung, S. J., Choi, A., Lee, J. Y., Kim, B., Park, M., … & Choi, J. S. (2021). Association of general cognitive functions with gaming use in young adults: A comparison among excessive gamers, regular gamers and non-gamers. *Journal of Clinical Medicine*, *10*(11), 2293. https://doi.org/10.3390/jcm10112293.

Khazaie, S., & Derakhshan, A. (2021). An integration of fanfiction into the clouds of social robots for language for medical purposes productive and receptive skills education. *Journal of Research in Teaching*, *9*(4), 30-58.

Klimova, B., & Pikhart, M. (2021). New advances in second language acquisition methodology in higher education. *Journal of Education Sciences*, *11*(3), 128. https://doi.org/10.3390/educsci11030128.

Legault, J., Zhao, J., Chi, Y. A., Chen, W., Klippel, A., & Li, P. (2019). Immersive virtual reality as an effective tool for second language vocabulary learning. *Languages*, *4*(1), 13. https://doi.org/10.3390/languages4010013.

Leonhardt, M., & Overå, S. (2021). Are there differences in video gaming and use of social media among boys and girls?—A mixed methods approach. *International Journal of Environmental Research and Public Health*, *18*(11), 6085. https://doi.org/10.3390/ijerph18116085.

Li, J. (2019). *A systematic review of video games for second language acquisition*. Clemson University, USA. https://doi.org/10.4018/978-1-7998-0246-4.ch021.

Li, K., Peterson, M., & Wang, Q. (2022). Out-of-school language learning through digital gaming: A case study from an activity theory perspective. *Computer Assisted Language Learning*, 1-29.

Lin, P. C., Yen, J. Y., Lin, H. C., Chou, W. P., Liu, T. L., & Ko, C. H. (2021). Coping, resilience, and perceived stress in individuals with internet gaming disorder in Taiwan. *International Journal of Environmental Research and Public Health*, *18*(4), 1771. https://doi.org/10.3390/ijerph18041771.

Loftus, G., & Loftus, E. (1983). *Mind at play: The psychology of video games*. Basic Books.

Maior, A. K. (2016). *An exploration of the massively multiplayer online role-playing game World of Warcraft as a tool for facilitating incidental vocabulary acquisition*. Unpublished Master's Thesis. University of Glasgow. Utrecht University, Netherlands.

Mayer, R. E. (2015). On the need for research evidence to guide the design of computer games for learning. *Educational Psychologist*, *50*(4), 349-353. Doi:10.1080/00461520.2015.1133307.

Nathan, A., George, P., Ng, M., Wenden, E., Bai, P., Phiri, Z., & Christian, H. (2021). Impact of COVID-19 restrictions on western Australian children's physical activity and screen time. *International Journal of Environmental Research and Public Health*, *18*(5), 2583. https://doi.org/10.3390/ijerph18052583.

Odom, S. L., & Ogawa, I. (1992). Direct observation of young children's social interaction with peers: A review of methodology. *Journal of Behavioral Assessment*, *14*(3-4), 407-441.

Ortiz-Marcos, I., Breuker, V., Rodríguez-Rivero, R., Kjellgren, B., Dorel, F., Toffolon, M., … & Eccli, V. (2020). A framework of global competence for engineers: The need for a sustainable world. *Sustainability*, *12*(22), 9568. https://doi.org/10.3390/su12229568.

Pinto, R. D., Peixoto, B., Melo, M., Cabral, L., & Bessa, M. (2021). Foreign language learning gamification using virtual reality- a systematic review of empirical research. *Education Sciences*, *11*(5), 222. https://doi.org/10.3390/educsci11050222.

Prensky, M. (2001). *Digital game based learning*. McGraw Hill Press.

Qasim, A. (2021). Impact of digital games on incidental vocabulary acquisition of Pakistani high school students. *Asian EFL Journal Research Articles*, *28*(1), 206-224.

Richard, J., Marchica, L., Ivoska, W., & Derevensky, J. (2021). Bullying victimization and problem video gaming: The mediating role of externalizing and internalizing problems. *International Journal of Environmental Research and Public Health*, *18*(4), 1930. https://doi.org/10.3390/ijerph18041930.

Riley, B. J., Oster, C., Rahamathulla, M., & Lawn, S. (2021). Attitudes, risk factors, and behaviours of gambling among adolescents and young people: A literature review and gap analysis. *International Journal of Environmental Research and Public Health*, *18*(3), 984. https://doi.org/10.3390/ijerph18030984.

Sigmundová, D., & Sigmund, E. (2021). Weekday-weekend sedentary behavior and recreational screen time patterns in families with preschoolers, schoolchildren, and adolescents: Cross-sectional three cohort study. *International Journal of Environmental Research and Public Health*, *18*(9), 4532. https://doi.org/10.3390/ijerph18094532.

Sundqvist, P. (2009). *Extramural English matters: Out-of-school English and its impact on Swedish ninth graders' oral proficiency and vocabulary*. PhD Thesis. Karlstad University, Karlstad. Retrieved from: http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-4880.

Sylvén, L. K., & Sundqvist, P. (2012). Gaming as extramural English L2 learning and L2 proficiency among young learners. *ReCALL*, *24*(3), 302-321. Retrieved from: https://doi.org/10.1017/S095834401200016X.

Tsai, Y. L., & Tsai, C. C. (2018). Digital game-based second-language vocabulary learning and conditions of research designs: A meta-analysis study. *Journal of Computers & Education*, *125*, 345-357. Doi: 10.1016/j.compedu.2018.06.020.

Wunsch, K., Nigg, C., Niessner, C., Schmidt, S. C., Oriwol, D., Hanssen-Doose, A., … & Woll, A. (2021). The impact of COVID-19 on the interrelation of physical activity, screen time and health-related quality of life in children and adolescents in Germany: Results of the Motorik-Modul study. *Children*, *8*(2), 98. https://doi.org/10.3390/children8020098.