The Impact of Video Games on the Vocabulary Size of EFL Learners in Morocco

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Abstract. In Morocco, research in the area of video games' effects on language learning and language acquisition remains relatively unexplored. This research aimed to explore whether gamers can acquire vocabulary through video games or not. To test that, an online vocabulary levels test was distributed to English-speaking students from different universities in Morocco, then scores were compared using SPSS 25. The difference between the scores of gamers and those of non-gamers was not significant. However, gamers who focused on the voice-acting and dialogues of video games performed much better than gamers who focused on other aspects, such as gameplay, and story. Overall, the results suggest that the effect video games may have on students who major in English Studies or majors that are taught in English are minimal. That is not to say that the effect is non-existent. Based on the implications of these results and while taking into account the infrastructure of Moroccan education, if video games are to be employed as educational tools in the classroom, we suggested visual novels, a video game genre that focuses on character interaction and dialogue.

Key words: *Video games, Vocabulary acquisition, Vocabulary size, Educational Technology, Morocco.*

1. Introduction

The video game industry started in 1972 with the creation of a famous tennis-like game, "Pong." Today, we are in the eighth generation of video game consoles, and video games are as realistic and as interactive as ever (BBC, 2020). Especially with the appearance of virtual reality (VR) and augmented reality (AR) technologies, the video game industry is heading in a completely new direction. Moreover, with the recent COVID-19 pandemic lockdowns forcing people to stay home, video games have never been more popular (Barr & Copeland-Stewart, 2021), but what does that mean for language teaching? Language teachers around the world are always looking for ways to expose their students to authentic input to improve their language skills, and video games are no exception. While there were many attempts at "gamifying" classroom activities and using serious games in Morocco (Lamrani & Abdelwahed, 2020; Mimouni & Tamer, 2020; Ouahbi et al., 2016), there were not as many attempts to incorporate commercial video games to the classroom. In addition to that, there is a possibility that the general public has a negative connotation towards video games, seeing them as means to waste time or exposure to drugs and violence (Gentile & Andersen, 2003). Thus, teachers may hesitate to employ them in the classroom.

The study is motivated by the dearth of research in the area of the effects of video games on language acquisition in the Moroccan context. There is a lot of talk about using physical and traditional games or video game mechanics in classroom activities, but not much about using video games in the classroom. We are also interested in the untapped potential of video games; they are multimodal and are very likely to motivate learners. Despite that, they are not used much in the classroom, perhaps due to curriculum constraints. Finally, the results of this research will enable us to gain valuable insights on the role of video games in vocabulary acquisition. To that end, we will seek to answer two research questions: 1) Do video games have an effect on the vocabulary acquisition of English as a foreign language (EFL), and 2) Do different types of games and different gaming habits affect the vocabulary size of gamers?

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Many teachers advocate the use of authentic materials in the EFL classroom (Kilickaya, 2004), arguing that they have a positive effect on learner motivation, provide authentic cultural information, provide exposure to real language, relate more closely to learners ' needs, and support a more creative approach to teaching. (Philips and Shettlesworth 1978; Clarke 1989; Peacock 1997, as cited in Richards, 2001). Video games also happen to fit the classification of authentic materials (Ebrahimzadeh & Alavi, 2017; Kirriemuir & Mcfarlane, 2004; Richards 2001). In Peacock (1997), he compared authentic and artificial materials with regards to the observed and self-reported motivation they each produced. The result showed that the use of authentic materials significantly increased individual and overall class motivation, thus, increasing the efficiency at which learners acquire language. After all, emotional factors of language learners (including motivation) profoundly influence the effect of their acquisition (Krashen, 1982), but how does that relate to video games?

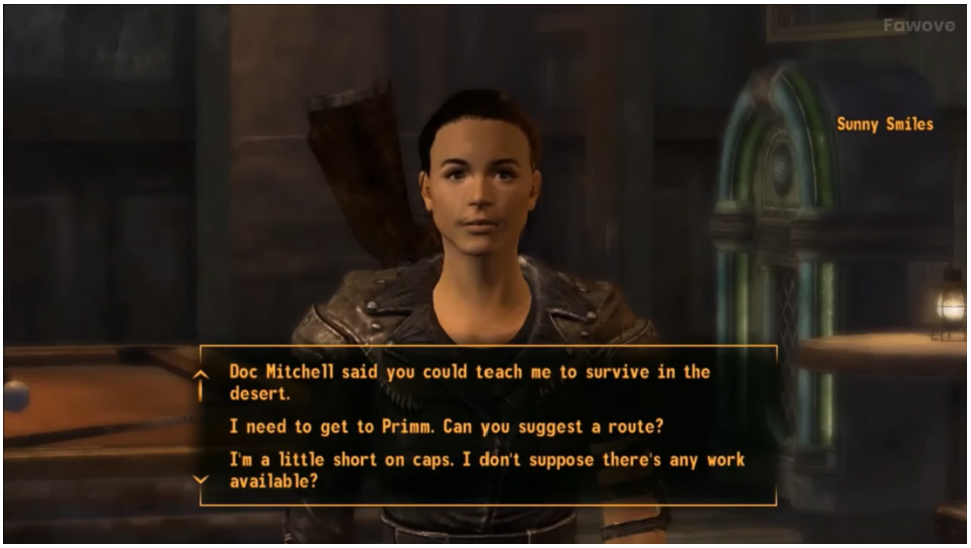
1.1 Video Game Benefits

The "lure" behind video games can be described as a combination of fantasy, challenge, curiosity, and a level of engagement described as 'flow' where players become oblivious to distractions (Kirriemuir & Mcfarlane, 2004). In addition, they are beneficial to second language (L2) learners because they can provide a strong and engaging narrative (context), purposeful interactions (authenticity), emotional engagement (motivation), freedom to fail (mistakes help you learn), and opportunities for independent decision making (learner autonomy).

To understand these aspects, we will use the example of the game Fallout: New Vegas (FNV) (2010), developed by Obsidian and published by Bethesda Softworks LLC. FNV is a post-apocalyptic game set decades after a nuclear war, in which you play as a courier with no clear background (Steimer, 2012). The courier's name, appearance, morality (good or evil), and skills are all decided and developed by the player. This game is best known for its immersive story and dialog. Carlzon (2017) best describes it as follows: "This game […] promotes pragmatic understanding by forcing the player to make active choices in order to move forward in the story and achieve the desired ending" (p. 6). In the case of FNV, this is best shown in its dialog system shown in Figures 1.1. and 1.2. These figures display what a typical dialog looks like in FNV. Figure 1.1. shows the possible dialog options the player can choose from, and Figure 1.2 shows how the character answers when the player chooses the first option. Granted, not all games incorporate this mechanic. In fact, we would argue that most games have a linear storyline. However, this does not diminish their authenticity.

Figure 1.1. Fallout: New Vegas's Dialogue System: Player Choices

Figure 1.2. Fallout: New Vegas's Dialogue System: Sunny Smiles's Response to the First Option



Carlzon (2017) also explained how FNV can enhance reading comprehension. Additionally, although video games, in general, are an excellent medium for many types of storytelling, their interactivity makes them far different from more traditional media such as books or films. Interactive stories themselves have many unique and challenging issues that are not encountered when writing a more traditionally structured tale (Lebowitz & Klug, 2011). This already checks the boxes of context and authenticity.

In the case of motivation and autonomy, many studies, such as Black (2008) and Ito et al. (2010) (as cited in Reinders 2012), show that teenagers can manipulate online interest-driven activities to practice foreign languages autonomously through activities they are passionate about; this does not exclude video games. Benson (2011) also argues that authentic materials, such as video games in our case, encourage learner autonomy. For motivation specifically, most video games involve a reward system based on goal-reward. This is usually done to extend the game's longevity, to encourage the players to use a feature, to motivate them to learn a new mechanic, and so on (Brown, 2020). Game developers must strike a good balance between the difficulty of reaching a goal, and the value of its reward. If this balance is broken, it can potentially cause an overjustification effect; the players' motivation becomes extrinsic as they start playing the game only for the rewards, and if the rewards end, the player loses interest (Day, 2017). The overjustification effect is further explained in an experiment done by Lepper, Greene, and Nisbett (1973). The point is that careful adjustments must be made to the reward system to keep the players motivated, hence, keeping them interested in the game and autonomously playing it.

Lastly, the freedom to fail aspect of video games exists in their technical part. Some games, such as Half-Life and Fallout: New Vegas, allow the player to save their progress and load it whenever they want. Others, such as Borderlands and the Batman Arkham series, use a checkpoint system in which the game decides when to save when the player reaches a certain point. There are, of course, less forgiving games, such as Enter the Gungeon and Dead Cells, which include what is called permadeath; if the player dies once, they lose most, if not all, of their progress, and they have to start again from zero. These types of games are designed with high replayability in mind. In any case, video games, allow the player to fail and learn from their mistakes, making them less frustrating to engage in than learning in a classroom, for example.

1.2 Challenges Facing Games as Learning Tools

While using video games to learn languages can be beneficial it still has to overcome a few obstacles for it to be used in the classroom. One of the biggest obstacles is the attitudes of teachers, policy makers, and stakeholders in general towards video games. In Morocco, the older generations tend to view video games as an activity that is exclusive to children and that is a waste of time (Hatim, 2019). Therefore, convincing the higher-ups to include or allow the use of video games in the syllabus might prove quite difficult. Another major problem we

would have to tackle is media literacy and proper infrastructure. It is no secret that incorporating new technologies into the classroom is met with inadequate school support, weak professional development, and obsolete classroom practices (Ait Hattani, 2019). That includes, but is not limited to, teachers not knowing how to use new technologies or how to implement them and institutions being unable to provide said technologies. For that reason, picking the right game for the classroom can be a tedious process and, sometimes, more trouble than it is worth. Therefore, the ability to judge the practicality of implementing a new technology and the risks associated with is extremely important.

1.3 Theoretical Framework

With all that said, learning vocabulary can be considered vital to mastering a second language (Schmitt, 2010). This is especially apparent in the high correlations that exist between vocabulary and various measures of language proficiency (Schmitt, 2010). Similarly, fluent readers have very fast and automatic vocabulary recognition, implying that vocabulary knowledge is also highly correlated with reading ability (Grabe, 2009). Second language writing is no exception. Learners need to have an appropriate level of control over vocabulary and the rhetorical structures of the language to be proficient in writing. Therefore, limited knowledge of vocabulary, language structure, and content constrains L2 writing performance (Grabe & Kaplan, 1996). Furthermore, as Wilkins (1972) said, without grammar, very little can be conveyed, and without vocabulary, nothing can be conveyed. Hence, it is no exaggeration to say that vocabulary is the start of every language acquisition.

1.3.1 Vocabulary Knowledge

Vocabulary or word knowledge can be divided into two types: vocabulary breadth, and vocabulary depth (Anderson and Freebody, 1981). Breadth (or size) refers to the number of words a person knows, and depth refers to what a person knows about said words. The latter can be measured in terms of how well the learner knows collocations, word derivations, etc. (Schmitt, 2010). For this particular research, we are interested in vocabulary breadth, so we will not delve much into vocabulary depth because it is extremely rich, and complex (Schmitt, 2010). It taps into many different aspects of words, such as knowledge of word associates, collocation, colligation, or word function (Milton, 2009).

With that in mind, knowing that vocabulary breadth is the number of words a person knows, it is necessary to define what exactly we mean by word. According to Milton (2009) and Schmitt (2010), a word can be defined in many ways; it can be a token, a type, a lemma, a word family, or a hapax legomenon (words that appear only once in the corpus (Kornai, 2007)). The first two terms, token and type, are particularly useful in corpus research (Schmitt, 2010). Tokens are the number of running words in a text, while types are the number of different words. For example, in the sentence "Fat cats eat fat rats," there are five tokens: fat, cats, eat, fat, and rats. However, there are four types: fat, cats, eat, and rats. Only the first occurrence of a word counts as a type.

Lemmas and word families are a slightly different matter. A lemma includes a "head" word and its most frequent inflections, so govern, governs, governed, and governing are all part of the same lemma. A word family includes a word as well as its inflections and derivations, so break (verb), breaker (noun), and breakable (adjective) are in the same word family (Milton, 2009). For the sake of this research, a word is defined as a lemma, so a clarification of the most frequent inflections is in order. To that end, Bauer and Nation (1993) divide word family affixations into seven levels, and they appropriate a frequency band for each level using data supplied in Kucera (1982) (as cited in Bauer and Nation, 1993) reporting on the lemmatization of the Brown Corpus. What we are concerned with is the second level, which includes lemmas. The inflectional affixes used in this level are the plural, the third person singular present tense, the past tense, the past participle, -ing, the comparative, the superlative, and the possessive. Therefore, although drive (n) and driver are both nouns, they cannot be considered part of the same lemma because driver does not fulfill any of the above criteria.

1.3.2 Vocabulary Acquisition

Taking that into account, the next step is to discuss what we mean by acquisition, in general, and vocabulary acquisition, in particular. For that reason, we are using the Usage-Based (UB) Grammar. UB Grammar approaches usually go hand in hand with the principles and findings of cognitive linguistics (Robinson & Ellis, 2008). There are two main principles in cognitive linguistics: the cognitive commitment and the generalization commitment. The cognitive commitment specifies that the findings of cognitive linguistics should not contradict what is known about human cognition from other disciplines, especially, from cognitive sciences (Evans, 2006). The generalization commitment, on the other hand, states that language "components", like all other cognitive processes, all function under the same rules; therefore, to separate language into syntax, phonology, and morphology, etc. would infringe upon this commitment (Evans, 2006). cognitive linguistics also bases its research on UB Grammar, and the symbolic thesis, which claims that the language system consists of symbolic assemblies, or conventional pairings, of form and meaning (Evans, 2006).

The interaction between UB Grammar, the symbolic thesis, and cognitive linguistics exists in the generalization commitment. It is the fact that there is no distinction between words, morphemes, word classes, etc. The basic units of language representation are what we call constructions. They are pairings of form and meaning or function similar to symbolic assemblies (Robinson & Ellis, 2008). This means that constructions include, but are not limited to, simple lexical words (e.g. table, decide, pretty), grammatical morphemes and the items they appear with (e.g. VERB + Past Tense; the + NOUN), idioms with fixed lexical content (e.g. go great guns), idioms that are partially filled (e.g. jog <someone's> memory), constructions with some fixed material (e.g. he made his way through the crowd), and fully abstract constructions (e.g. they gave him an award) (Goldberg, 2003). In addition to that, UB Grammar assumes that learners see language systems as patterns known as schemas and store them as such; they do not learn "rules," but they extract them from the input (Evans, 2006). Keep in mind that classification of vocabulary used in this research is purely for practical purposes, and that the findings of this research can, potentially, be generalized to all constructions, not just lemmas.

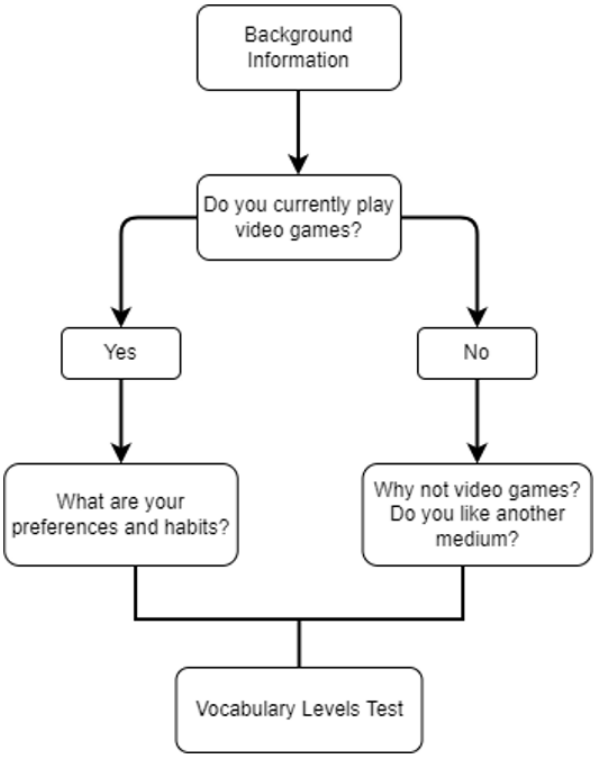
2. Materials and Methods

2.1 The Instrument

To answer the first research question, which is "Do video games have an effect on the vocabulary acquisition of EFL?" we have devised an online form in which a vocabulary levels test (VLT) is embedded using Google Forms (see Appendix). The questionnaire itself contains three main sections: general background information, gaming background (which has two versions), and the VLT. The general background section inquires about the age and educational level of the participants, as well as whether the participant is currently a gamer. How the participant answers the last question of section 1 determines what version of section 2 they will have to do. If they respond that they play video games, they are directed to the version of the second section that discusses their preferences (e.g. favorite genre) and their gaming habits. If they do the opposite, they are directed to the version of the second section that discusses their other interests. Figure 2 illustrates this aspect of the questionnaire. The third section is dedicated to the VLT, which measures vocabulary breadth (i.e. vocabulary size, not depth, as discussed in the literature review) (Schmitt et al., 2001). The VLT specifically used is a slightly modified instance of the version made by Norbert Schmitt (2000) (Version 1, to be precise) as well as Diane Schmitt, and Caroline Clapham. It is available on Schmitt's (n.d.) website.

In the second section, those who answered that they are gamers, were given questions to gauge their preferences and habits. For the preferences, they were asked two questions: "What genre do you like the most in video games?" and "What do you look for the most in a video game?" In the former, they can select one of the following ten options: Action, Adventure, Casual, Indie, Massively multiplayer (MMO), Racing, Role-playing Games, Simulation, Sports, and Strategy. In the latter, they had to choose one of the following six options: Story, Dialogue and voice-acting, Gameplay, Design, Graphics, and Nothing in particular. For their habits, they were asked how often they played games a week and for how long they play video games per session.

Figure 2. The questionnaire process



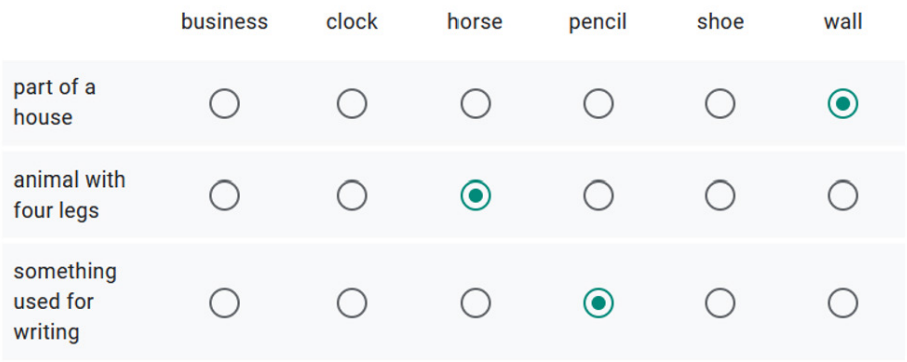
In the third section, the VLT (originally designed by Nation (1990)), as the name suggests, entails multiple levels. The levels addressed are the 2000, 3000, 5000, and 10,000 vocabulary levels as well as the academic vocabulary level (Schmitt et al., 2001). To clarify, each level deals with a certain type of vocabulary in a way that allows for the difficulty to scale up with each level, not to be confused with frequency levels. The 2000 level includes vocabulary of simplified reading books as well as vocabulary from the 1000 and 2000 sections of the General Service List (GSL) (West, 1953). The 3000 level entails a basis for beginning to read unsimplified texts. The academic level samples words from the university word list (UWL) (Xue & Nation, 1984) to include specialized vocabulary of university texts. The 5000 level is on the boundary between high-frequency words and low-frequency words. Finally, the 10,000 level encompasses low-frequency words, making it the most difficult level (Nation, 1990 and Schmitt et al., 2001).

For the presentation of the test, every vocabulary level includes 10 clusters; in each cluster, there are six words and three definitions (six options and three stems). It should also be noted that each level has a cluster ratio of 5:3:2, five noun clusters, three verb clusters, and two adjective clusters. The participants need to match the words with their definition, leaving three distractors. Normally, in a pen and paper test, a cluster would look like the example in figure 3.1; however, because the test is done online, it has been adapted to Google Forms' format. Figure 3.2 depicts an example of how the test should be filled in Google Forms.

Figure 3.1. Example of a Cluster in a Pen and Paper Vocabulary Levels Test

1 concrete
2 era _____ circular shape
3 fiber _____ top of a mountain
4 hip _____ a long period of time
5 loop
6 summit

Figure 3.2. Example of a Cluster in the Vocabulary Levels Test Formatted in Google Forms



For the scoring process, for each word properly matched to its definition, the participants get one point, so if a participant answers everything correctly, they earn 150 points in total. That is, 30 points for each level, and three points for every cluster. The data is coded and processed using IBM's SPSS 25 for statistical analysis.

2.2 The Sample

First, before giving any of the participants the test, it was piloted by a few students of the Applied Linguistics and Teaching EFL Master in the Faculty of Sciences of Education, Rabat, Morocco. This was done to determine the estimated time it takes to complete the test and to ensure that no confusion is caused by the definitions and words used in the test. For the actual data collection, after it was gathered, any response showing that the participants did not take the test seriously was deleted, leaving us with 92 Moroccan EFL learners. The majority of them are students from different universities, including the Faculties of Letters and Human Sciences of Ibn Zohr in Agadir, Mohammed V in Rabat, and Ben Msik in Casablanca, as well as the National School of Commerce and Management in Settat. The educational levels of the participants encompassed three high school students, 25 bachelor first years, six bachelor second years, 31 bachelor third years or graduates, and 27 master students or graduates. Of the 92 participants, 54 people play video games, and 38 do not. Henceforth, those who play video games will be referred to as gamers, and those who do not will be referred to as non-gamers.

Throughout the data analysis part of this study, we are comparing between the scores of gamers and non-gamers across different groups and between various types of gamers using six particular scores. These scores are the total scores as well as the scores for the 2000, 3000, Academic, 5000, and 10 000 vocabulary levels, in that order. The significance level was set to .05 in all statistical analyses.

3. Results

The first research question is concerned with the effect of video games on the vocabulary acquisition of English as a foreign language. To answer that question, we opted to compare the scores of gamers and non-gamers at the level of the entire sample. Then, to account for level differences, we are using educational level to compare between the scores of gamers and non-gamers with a similar level of EFL. To be more specific, high school students and bachelor first years are put in one group (Group 1), and then gamers and non-gamers of that group are compared. The same goes for bachelor second years and third years (Group 2). Master students or graduates will form a single group (Group 3). This separation is done under the assumption that the participants within each group have similar language proficiency. It also accounts for the lack of high school and bachelor second year participants. Finally, because the comparisons only include two groups (gamers and non-gamers), we are using the t-test for normally distributed scores and the Mann-Whitney U test for non-normally distributed scores. Table 1 shows the results of these comparisons.

Table 1. Comparison between the Scores of Gamers vs. Those of Non-gamers in the Whole Sample.

	Total Score	2000 level	3000 level	Academic level	5000 level	10 000 level
General comparison	0.538*	0.875**	0.666**	0.241**	0.764**	0.156**
Group 1**	0.382*	0.934**	0.765**	0.433**	0.649**	0.385**
Group 2**	0.31*	0.646**	**0.049****	0.359**	0.569**	0.258**
Group 3**	**-0.563***	0.692**	**-0.281****	0.744**	1**	**-0.646***

*These results were calculated using the T-test since its data was normally distributed.
** These results were calculated using the Mann-Whitney U test since its data was not normally distributed

In Group 1 and Group 2, we see that, in most cases, gamers have performed better than non-gamers. However, the differences were not statistically significant except in the 3000 level in Group 2. Group 3, on the other hand, shows some interesting results. When comparing the total scores, 3000 level scores, and the 10000 level scores, it is the non-games, this time, who outperformed the gamers (signified by a negative p-value). Still, none of the results are statistically significant in Group 3.

For the second research question, we are concerned with whether the gaming habits and the different types of games affect how much vocabulary gamers acquire. This time, we are only comparing the scores of gamers at the levels of their preferred genres (action, adventure, racing, etc.), their preferred aspects (story, gameplay, design, etc.), the number of sessions played per week, and time spent playing per session. The first two variables show us the effect of different types of games. The last two show us the effect of different gaming habits. Table 2 shows the results of these comparisons. As a reminder, in the preferred genres, participants were asked to choose their favorite genre from a list of ten genres. In the preferred aspects, they had to choose the aspect of video games they pay attention to the most from a list of six aspects.

Table 2. Comparison between the Scores of Gamers in Relation to Their Preferred Genes and Aspects and Their Gaming Habits

	Total Score*	**2000 level****	**3000 level****	**Academic level****	**5000 level****	**10 000 level****
Preferred genres	.400	.647	.146	.278	.129	.245
Preferred aspects	**.046**	.261	.193	.121	.412	.061
Sessions per week	.985	.594	.758	.947	.925	.990
Time spent per session	.238	.911	.500	.943	.184	.205

*These results were calculated using the one-way ANOVA test because the data was normally distributed.
**These results were calculated using the Kruskall-Wallis H test because the data was not normally distributed.

In general, the preferences and habits of gamers did not significantly affect the scores. The habit variables had an especially weak effect on the scores. It is the preferred aspects' total scores in which we see a significant difference at a p-value of .046 ($p<.05$). To determine exactly where the difference lies, an LSD post-hoc test was performed at the level of the preferred aspects. Of all the aspects the participants had to choose from, only those who paid attention to dialogs and voice-acting the most had a significantly higher score than the rest. Table 3 shows these results. The total scores of gamers who preferred dialog and voice acting toppled over the other scores with a significant difference ($p<.05$). The only exception is the difference between the former and those who have no particular preferences, but it had a p-value of .078, which was very close to being statistically significant.

Table 3. Comparison between the Scores of Gamers in Relation to Their Preferred Aspects: Dialogs and Voice Acting vs Other Aspects.

Preferred aspect	**Story**	**Gameplay**	**Design**	**Graphics**	**Nothing in particular**
Dialogues and voice-acting	**.002**	**.026**	**.020**	**.015**	.078

4. Discussion

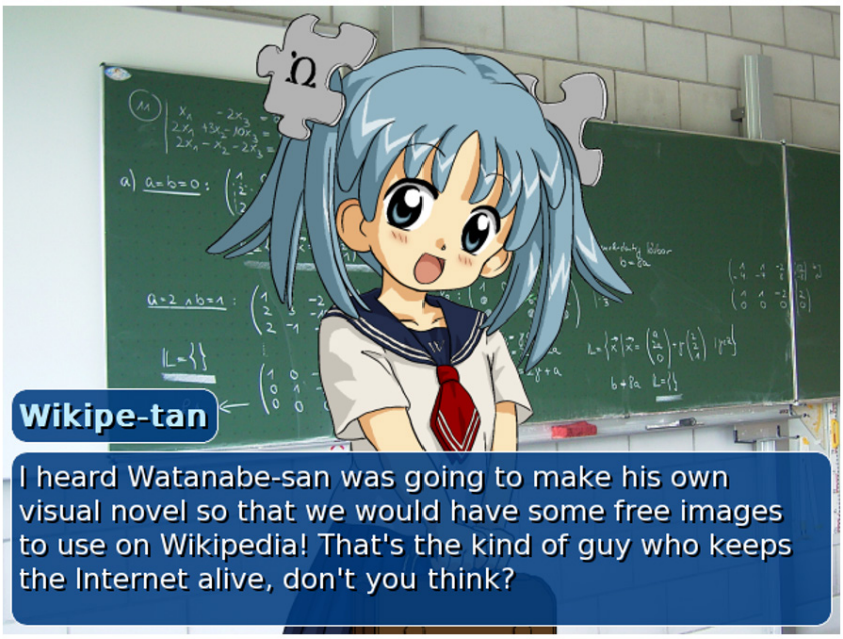
With regards to the comparison between gamers and non-gamers, gamers do not have that much of an edge against non-gamers in the sample. Gamers have, at best, a slightly bigger vocabulary size than non-gamers. However, what was quite interesting was that the higher the level of education, the smaller the difference between them. In fact, in the master level of education, they switched positions; the non-gamers performed slightly better than the gamers did. This could be because the master students were all from English master programs, so their proficiency in English is already advanced. This would also explain why the difference between them in the master level was the most insignificant of the three groups. Regardless, the overall insignificance of the difference between them is suspected to be caused by the inclusion of students from English studies in the sample. In any case, it is possible that video games give players a head start or a good foundation. The rest depends on the learners. In addition to that, because the animations, graphics, and voice acting tell much of the story, there is not much

focus on the language itself, especially when 44% of the gamers in my sample, the majority, prefer gameplay over other aspects. With all that said, overall, there was barely any significant difference between gamers and non-gamers. Hence, we can safely say that, for our sample, the answer to our first research question is that video games do not necessarily have a positive effect on the vocabulary acquisition of students.

For our second research question, however, the results are different. The habits of gamers did not make much of a difference. Their preferences are where a huge gap appeared. While their preferred genres did not display any significant difference, their preferred aspects revealed an immense discrepancy in the gamers' scores. The scores of those who look for dialog and voice-acting (Personalities, conversation with characters, character development, etc.) in their games were incredibly higher than the rest. It is likely that the reason for this is that they pay a lot more attention to the language used in the game than, for example, those who prefer gameplay (Movement, mechanics, etc.). Although this much was expected, what came as a surprise was that those who preferred story (Lore, setting, etc.) fell so far behind those who liked dialog and voice-acting. At any rate, it is safe to say that, for our sample, the effectiveness of video games in teaching vocabulary depends on the aspect they focus on, but not on their genres or the habits of those who play them.

What this means is that L2 learners, who are also gamers, could benefit more from video games that focus on dialog between characters (For example, games such as the previously mentioned Fallout: New Vegas (2010)). This forces them to focus on the language of the game, further improving the acquisition of L2. Keeping that in mind, if we are to use video games in the classroom, practicality and compatibility with the curriculum also become issues that need careful consideration. To that end, we would suggest the implementation of visual novels in the classroom.

Figure 4. A Typical Visual Novel Game



A visual novel (VN) is a type of video game that is multibranching (a story with different endings that depend on the player's choice) and interactive in nature (Cavallaro, 2009). VNs typically express their narrative by using extensive text conversations complemented by, mainly stationary, generic backgrounds and dialog boxes with character sprites determining the speaker superimposed upon them. Figure 4 depicts what a typical visual novel would look like (Rothamel, 2006). At certain crucial moments in the story, more detailed images are drawn especially for these scenes and enhanced by more cinematic camera angles and CGI in some cases (Cavallaro, 2009). However, what really characterizes this video game genre is its production cost. Because of its simple, mostly two-dimensional style, they can be created by small teams of independent game developers (Lebowitz & Klug, 2011). This solves the issue of practicality

without sacrificing its "enjoyability" and quality. Furthermore, making VNs does not necessarily require programming skills. There are many VN-making tools/engines that make the whole process easier, such as the Ren'Py Visual Novel Engine (Rothamel, 2021). As many VNs are inappropriate for the classroom (culturally and/or morally), the best course of action would be making one's own VN or exercising extreme care when choosing a ready-made one. The only issue left to be discussed is suitability for the curriculum. This is also not a problem because with the ability to create any VN that the teacher desires, we can easily adhere to any curriculum. Additionally, the activities that are normally used in the classroom with other media (short stories, short films, etc.) can easily be adapted to VNs (predict the ending, summarize, etc.). As such, we can remake stories that students are already familiar with into VNs. For example, to see a Moroccan folklore story, remade into a VN with different endings would be quite humorous for Moroccan students and may capture their attention.

5. Limitations

Firstly, this research stops at EFL. Considering the sociolinguistic environment existing in Morocco, it would be interesting to see the effects of video games on the acquisition of French or Standard Arabic. However, that would require designing another VLT for each language from scratch, and that is beyond the scope of the current research. The second biggest obstacle to the research was the COVID-19 restrictions. At the time of designing the methodology, Morocco was still in a state of emergency due to the COVID-19 pandemic. Although, it seemed like it was close to ending, we did not want to take the risk of opting for a pen and paper test, as effective as it is at collecting data. This is the reason why the methodology was a fully online test, which brings us to the online test issues.

Because the test was online, no one was present to supervise the participants when they took the test. Although the explanations in the test were made to be as clear as possible, and the researcher's email was available to the participants, if any confusion did arise, unless the participants used the email, there was no way to know. The absence of a supervisor also meant that participants might not have been as motivated to do the test, hence the lack of responses. On the technical side, we received many reports from mobile users about a specific issue; in certain questions, they could not pick the correct responses. This is a problem with Google Forms where sometimes, people cannot respond to forms using their mobile phones. Unfortunately, this problem can only be resolved from the respondent's side by refreshing the page or by using a different browser. However, this problem only affected one question on every test, so their final score can only be reduced by one point, at most, if the problem does occur.

Another technical issue is the problem with multiple response questions, also known as, checkbox questions or checkboxes. In the statistics software we used, SPSS, to account for these types of questions, the coding process is very convoluted; SPSS is not well built for those types of questions. Therefore, in the questions asking for gamer and non-gamer preferences, we opted for multiple-choice questions, not multiple-response questions. The questions were also worded as, for example, "What is the genre you like the most?" to accommodate for this change. This was a problem because if, for example, participants liked to play more than one genre, they would not be able to say so. In addition, video game genres are not necessarily mutually exclusive. Many games exist within more than one category. For example, it is difficult to find role-playing games that are not action or adventure games.

Finally, for this research, there is no separation between online multiplayer and offline single-player games. It is possible that the effects they each have, if any, are different. It would certainly be a topic worthy of research. It would also be interesting to research what sort of changes video games can have on one's language using corpus-driven research design.

6. Conclusions

Overall, this study explored how video games can affect vocabulary acquisition by measuring vocabulary size. Although it was assumed that the effect would be positive, the evidence, however, was inconclusive as the adopted methodology only explored one facet of language acquisition. This calls for further research on the topic using different methodologies. To do that, we would suggest a true experimental study exploring the effects of video games on L2 EFL learners. We could also measure their vocabulary size as well as their vocabulary depth instead

of size only. There are also many other language aspects potentially influenced by video games that can be explored, such as reading comprehension, writing, and critical thinking.

Another reoccurring issue that the paper had trouble with was the scarcity of research in Morocco. As far as we know, there are almost no statistics concerning Moroccan gamers. Therefore, we can only speculate on the number of gamers in Morocco and what they like or dislike. This information is necessary to determine the openness of students toward using video games in the classroom. We also know little of what the attitudes of teachers, policy makers, and stakeholders are towards video games in Morocco. With that said, lack of research is not necessarily a bad thing. That just means that there is plenty of ground to cover. Thus, there are an incredible number of opportunities for Moroccan game designers and researchers from many fields of human sciences.

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APPENDIX

The Vocabulary Levels Test Used in the Methodology

Video Games and Vocabulary Acquisition

You are being invited to participate in a research study about how video games affect language learning. This study is being conducted by Abdennour SABIRI from the faculty of sciences of education at Mohammed V University. This study is conducted as part of my research for the Applied Linguistics and Teaching English as a Foreign Language master program. It aims at investigating video games and their reliability as vocabulary acquisition tools.

Your participation in this study is voluntary. By clicking "Next," and completing the questionnaire, you are voluntarily agreeing to participate.

Please share the questionnaire with your friends, and/or colleagues. If you have any questions about the study, please contact me via email at: abdennour.sabiri@um5r.ac.ma

Thank you for your cooperation.

Background Information

1. What is your gender? □Male □Female
2. How old are you? ……
3. What is your current level of education? (If you have graduated from a level and didn't pursue your education further, choose your last level of education. For example, if you have a bachelor already, but you didn't pursue a master, choose bachelor 3rd year.)

□Highschool □Bachelor 1st year □Bachelor 2nd year
□Bachelor 3rd Year/graduated □Master □Doctorate □Other:

4. Do you play video games? *

□Yes (Go to Gamer Background)
□No (Go to Non-gamer Background)

Gamer Background

In this section, you will talk about your gaming background (Your likes and dislikes, habits, etc.)

5. What genre do you like the most in video games?

□Action (e.g. Call of Duty,League of Legends, Grand Theft Auto)
□Adventure (e.g. Farcry, Tomb Raider, Assassin's Creed)
□Casual (e.g. Sims, Candy Crush, Plants vs Zombies, Minecraft)
□Indie (e.g.Undertale, Celeste, Cuphead, Hollow Knight)
□Massively multiplayer (MMO) (e.g. World of Warcraft, Final Fantasy XIV, Black Desert Online, Destiny 2)
□Racing (e.g. Need For Speed, Forza, Mario Kart)
□Role-Playing Games (Fallout, Borderlands, Skyrim)
□Simulation (e.g. Euro Truck Simulator, Cities Skyline, Grand Turismo, Football Manager)
□Sports (e.g. Pro Evolution Soccer, FIFA, Tony Hawk's Pro Skater)
□Strategy (e.g. Age of Empires, XCOM, Civilization)

6. What do you look for the most in a video game? *

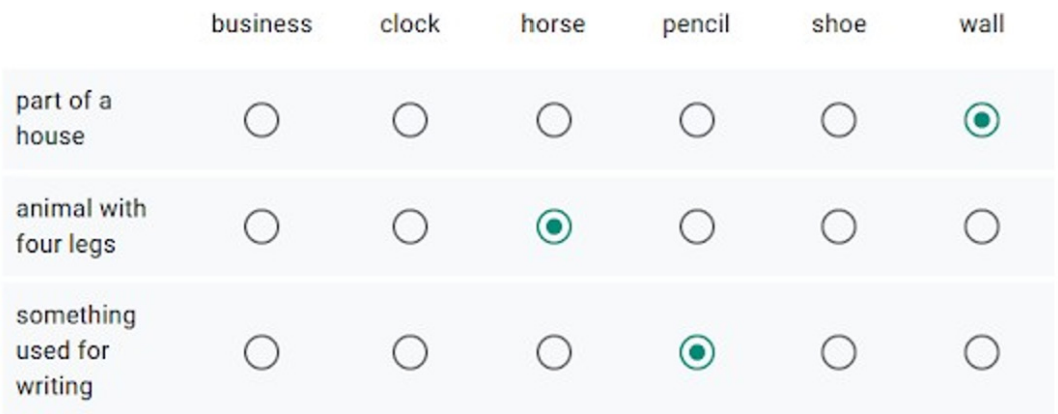
□Story (Lore, setting, etc.)
□Dialogue and voice-acting (Personalities, conversation with characters, character development etc.)
□Gameplay (Movement, mechanics, etc.)
□Design (Architecture, charcter design, map design, etc.)
□Graphics (Photorealism, artstyle, scenery, etc.)
□Nothing in particular.

7. How often do you play games a week? *
□Once a week □Twice a week
□Thrice a week □More than thrice a week □Everyday
8. For how long do you play video games on average when you do play them? *
□An hour or less □1 or 2 hours □2-4 hours □more than 4 hours

Non-Gamer Background
9. Why do you not play video games? (choose the answer that fits you best) *
□I dislike them.
□I'm not interested in them.
□I don't know how to play them.
□I don't get exposed to them.
□I've never dealt with one.
□I don't have time for them.
□Other:

10. What other medium do you most like to spend your time on? *
□Movies (e.g. The Avengers, Titanic, Harry Potter)
□TV series and shows (e.g. Prison Break, Breaking Bad, The Jimmy Kimmel Show)
□Anime and Manga (Japanese, Korean, or Chinese) (e.g. One piece, Solo Leveling, King's Avatar)
□Cartoons and comics (e.g. The Amazing World of Gumball, Invincible, Spider-man Comics)
□Books, plays, and/or poetry (e.g. Tom Sawyer, Romeo and Juliet)
□Other:

The Vocabulary levels test
This is a vocabulary test that is designed to measure your approximate vocabulary size. Match the words to their appropriate definition (as shown in the picture below). You will have to complete five levels in total, and the difficulty escalates with each level.
It will take about 20 minutes to complete. Your progress will be saved even if you quit midway, so feel free to take a break if needed.
This is an example of how the test should be filled out.



Vocabulary Levels Test (Level 1)

	cream	factory	nail	pupil	sacrifice	wealth
extracted from milk						
a lot of money						
person who is studying						

	adopt	climb	examine	pour	satisfy	surround
go up						
look at closely						
be on every side						

	cap	education	journey	parent	scale	trick
teaching and learning						
numbers to measure with						
going to a far place						

	attack	charm	lack	pen	shadow	treasure
gold and silver						
pleasing quality						
not having something						

	cream	factory	nail	pupil	sacrifice	wealth
extracted from milk						
a lot of money						
person who is studying						

	adopt	climb	examine	pour	satisfy	surround
go up						
look at closely						
be on every side						

	bake	connect	inquire	limit	recognize	wander
join together						
walk without purpose						
keep within a certain size						

	burst	concern	deliver	fold	improve	urge
break open						
make better						
take something to someone						

	original	private	royal	slow	sorry	total
the first						
not public						
all added together						

	brave	electric	firm	hungry	local	usual
commonly done						
wanting food						
having no fear						

Vocabulary Levels Test (Level 2)

	belt	climate	executive	notion	palm	victim
idea						
inner surface of your hand						
strip of leather worn around the waist						

	acid	bishop	chill	ox	ridge	structure
cold feeling						
farm animal						
organization or framework						

	bench	charity	jar	mate	mirror	province
long seat						
help to the poor						
part of a country						

	boot	device	lieutenant	marble	phrase	vein
army officer						
a kind or stone						
tube through which blood flows						

	apartment	candle	draft	horror	prospect	timber
a place to live						
chance of something happening						
first rough form of something written						

	betray	dispose	embrace	injure	proclaim	scare
frighten						
say publicly						
hurt physically						

	encounter	illustrate	inspire	plead	seal	shift
meet						
beg for help						
close completely						

	assist	bother	condemn	erect	trim	whirl
help						
cut neatly						
spin around quickly						

	annual	concealed	definite	mental	previous	savage
wild						
clear and certain						
happening once a year						

	dim	junior	magnificent	maternal	odd	weary
strange						
wonderful						
not clearly lit						

Vocabulary Levels Test (Level 3)

	balloon	federation	novelty	pail	veteran	ward
bucket						
unusual interesting thing						
rubber bag that is filled with air						

	alcohol	apron	hip	lure	mess	phase
stage of development						
state of untidiness or dirtiness						
cloth worn in front to protect your clothes						

	apparatus	compliment	ledge	revenue	scrap	tile
expression of admiration						
set of instruments or machinery						
money received by the government						

	bulb	document	legion	mare	pulse	tub
female horse						
large group of soldiers or people						
a paper that provides information						

	concrete	era	fiber	loop	plank	summit
circular shape						
top of a mountain						
a long period of time						

	blend	devise	hug	lease	plague	reject
mix together						
plan or invent						
hold tightly in your arm						

	abolish	drip	insert	predict	soothe	thrive
bring to an end by law						
guess about the future						
calm or comfort someone						

	bleed	collapse	precede	reject	skip	tease
come before						
fall down suddenly						
move with quick steps and jumps						

	casual	desolate	fragrant	radical	unique	wholesome
sweet-smelling						
only one of its kind						
good for your health						

	gloomy	gross	infinite	limp	slim	vacant
empty						
dark or sad						
without end						

Vocabulary Levels Test (Level 4)

	antics	batch	connoisseur	foreboding	hauch	scaffold
foolish behavior						
a group of things						
person with a good knowledge of art or music						

	auspices	dregs	hostage	jumble	saliva	truce
confused mixture						
natural liquid present in the mouth						
worst and most useless parts of anything						

	casualty	flurry	froth	revelry	rut	seclusion
someone killed or injured						
being away from other people						
noisy and happy celebration						

	apparition	botany	expulsion	insolence	leash	puddle
ghost						
study of plants						
small pool of water						

	arsenal	barracks	deacon	felicity	predicament	spore
happiness						
difficult situation						
minister in a church						

	acquiesce	bask	crease	demolish	overhaul	rape
to accept without protest						
sit or lie enjoying warmth						
make a fold on cloth or paper						

	blaspheme	endorse	nurture	skid	squint	straggle
slip or slide						
give care and food to						
speak badly about God						

	clinch	jot	mutilate	smolder	topple	whiz
move very fast						
injure or damage						
burn slowly without flame						

	auxiliary	candid	luscious	morose	pallid	pompous
bad-tempered						
full of self-importance						
helping, adding support						

	dubious	impudent	languid	motley	opaque	primeval
rude						
very ancient						
of many different kinds						

Vocabulary Levels Test (Level 5)

	benefit	labor	percent	principle	source	survey
work						
part of 100						
general idea used to guide one's actions						

	element	fund	layer	philosophy	proportion	technique
money for a special purpose						
skilled way of doing something						
study of the meaning of life						

	consent	enforcement	investigation	parameter	sum	trend
total						
agreement or permission						
trying to find information about something						

	decade	fee	file	incidence	perspective	topic
10 years						
subject of a discussion						
money paid for services						

	colleague	erosion	format	inclination	panel	violation
action against the law						
wearing away or deteriorating gradually						
shape or size of something						

	achieve	conceive	grant	link	modify	offset
change						
connect together						
to create something						

	convert	design	exclude	facilitate	indicate	survive
keep out						
sat alive						
change from one thing into another						

	anticipate	compile	convince	denote	manipulate	publish
control something skillfully						
expect something will happen						
produce books and newspapers						

	equivalent	financial	forthcoming	primary	random	visual
moist important						
concerning sight						
concerning money						

	alternative	ambiguous	empirical	ethnic	mutual	ultimate
last or most important						
something different that can be chosen						
concerning people from a certain nation						