
Vocabulary Learning in Digital-Game Based Learning Using Sega Genesis Video Games

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Abstract: Digital game is not only a tool of entertainment, but it can also be used in pedagogical setting, making it an interesting issue of unconventional technology-integrated learning experience. This research aims to explore the respondents' vocabulary learning which mainly focuses on the use of four Sega Genesis video games, within the Digital Game-Based Learning experience. The research was conducted in Binus University which the respondents were 75 non-English departments' students whose BNEPT (Bina Nusantara English Proficiency Test) scores were 500. The instruments used were four Sega Genesis video games (*ESWAT: City Under Siege*, *Dick Tracy*, *Stargate* and *Demolition Man*) and a Keywords Vocabulary Assignment. The video games were the main instruments of the hypothesis whether DGBL could help the respondents to acquire or reproduce sets of vocabulary specifically based on each of the video game. The vocabulary assignment is in a form of keyword listing for each of the game, there are ten words or phrases for each of the game, ranging from character design, first level design and gameplay. In result, based on the analysis of the filtered ten keywords from each four video games, it is proven that by playing video games, such as the four Sega Genesis video games indeed helps the EFL learners to have certain sets of vocabulary.

Keywords: vocabulary learning, digital game-based learning, sega genesis, video game

1. INTRODUCTION

Learning a language has always been an interesting field to analyze. How an individual is able to learn and retent certain language system is definitely worth investigating for. However, the prominent variable that build the foundation of acquisition is how a person may discover, intentionally or not, ways on learning vocabulary.

Folse (2004) stated that learning a language entails learning numerous aspects; one of them is learning vocabulary. He also stated that learning vocabulary would certainly support an EFL learner to acquire their English proficiency better than just learning grammar in advance. In extension of unconventional field of learning style, digital game has been used by a lot of people and most of them are not even aware of the indirect results of learning language structure or just words from it.

Prensky (2001) defines that nowadays generations are defined as the gamer generation due to their time consumption in both learning and pleasure for gaming experience. This

research aims to see how digital games may have the prominent function as a vocabulary learning tool, in particular for the EFL learners.

By seeing the statements of the problem above this research addresses the two following research questions:

- a. What are the sets of vocabulary from the four Sega Genesis games acquired from the respondents' results?
- b. Do the respondents produce similar sets of vocabulary from the four Sega Genesis games?

The primary objective to this research is to investigate whether by playing a digital game (implying the Digital Game-Based Learning premise) induces sets of vocabulary into the EFL learners' own retention by analyzing the most occurred keywords from the respondents' results. To address this objective, the researcher focuses on 75 respondents. The distinctive ethnographic variables are; the students' BNEPT scores which are 500 stating their homogeneous English level, the majors which are all non-English departments, so there is no

further discussion of age, gender differences nor any unrelated variables that may influence the findings.

Several experts such as Gee, Prensky and the current Squire have defined Digital Game-Based Learning as a new way of learning. Palmberg (1998), Bakar & Nosratirad (2013), Chik (2014), and many of these promising experts also stated that one of the suitable materials for learning is playing a digital game (defines as either computer or video games). In addition, this research focuses only from the findings of prominent sets of vocabulary from the 75 respondents based on the four Sega Genesis games.

The digital games (defined as computer or video game) being used are four Sega Genesis video games which are *ESWAT: City Under Siege* (1990), *Dick Tracy* (1990), *Stargate* (1994) and *Demolition Man* (1995). Why this research uses these games as the Digital Game-Based Learning tool because of its similar genre which is action shooting side-scrolling game. Prensky (2007) defines action game to be a good tool to enhance skills to elaborate and explain facts which in this research, focused on the keywords of the character, level and gameplay designs. Moreover, the research focuses only on the learners' capability in seeing or reading the game's information (text, image, animation and graphic) and not listening since these are all retro games which have no spoken text yet back in the 1990s era.

2. LITERATURE REVIEW

Learning is a process, no matter what the learning tools are. Experts such as Gee and Prensky have open a new door to pedagogical learning approach by introducing and recognizing digital games (computer or video games) as one of the learning tool, henceforth, Digital Game-Based Learning is established. Digital Game-Based Learning is about fun and engagement, combined with serious learning and interactive entertainment into a definite exciting medium of learning, the digital games (Prensky 2001:16). Therefore, to simplify the meaning, Digital Game-Based Learning, as Prensky would defined, can also be defined as the marriage of educational content and

computer games that may achieve better results as through traditional learning methods (pp. 145-6). Prensky realized that the current generation has shifted as the gamer generation which has been exposed to radical changes and innovations in technology (Prensky 2001:37). Each day, teenagers to adult are able to spend time from one and a half to three hours per day to play video games. Why digital games are so interesting is because of its vast content, fast and responsive experience, varied graphic and relinquish the boredom with the challenging and engaging virtual world (pp128-9).

This research used action games due to the nature of focusing a fast paced, easy to play game to see the vocabulary learning experience and getting quick results. Prensky stated that a good game does not need to be original or too long to be played (2001: 95), the fun factor in playing makes video game enjoyable to be used for learning incidentally. He also stated that currently the most used Digital Game-Based Learning is in single player gameplay unless if the goal is to link people together (p. 169), the four Sega Genesis games used here are all one player type of game making the respondents to be more focused as well. Prensky also stated the importance of gaming interface or the look of the gameplay (2001: 172). He acknowledged the importance of these graphical visual aids within the digital games to help the player learn to play the game and in addition, a good interface helps the learner to enjoy the game as well.

Gee (2005:212) defined interesting facts about playing video games, he stated that by playing video games, the player is engage to a virtual world that has a surrogate in this well-assigned and interactive world to accomplish certain objectives. All of this happened in the player's own mindset. These elements can be considered as service to learning (Gee 2005). Gee & Morgdrige (2007:1029) by using a examples and characteristics of next-gen video games stated that video games also encourage the players within their level of intelligence and problems-solving skills. They also stated that young people sometimes seem to engage in

deeper learning in their technology than they do in school (p.1028). By seeing these behaviors, Gee also stated that digital games' challenge and learning are a large part of what makes good video games motivating and entertaining, especially in the premise as learning tool (Gee 2003).

Video game has been acknowledged by many researchers throughout many decades as an excellent unconventional yet successful learning tool. Chik (2014:95) on her research in language learning and autonomy using video game stated that the fun and pleasure factors from playing a video game (or digital games) has been defined to be useful for pedagogical premise rather than reading literary text in school. She also identified that autonomy as one of the keys to facilitate L2 learning by the use of L2 gaming (p.47). Another evidences come from Palmberg (1988) who also stated that computer games (or digital games) gave good example of material which is relevant to young learners which promoted vocabulary learning (p.251). Bakar & Nostratirad (2013:241) also stated in their research using a simulation game, SIM 3, that video game indeed help the EFL learners to set their own goal and motivation of learning making video game a decent tool for learning.

As most teenagers nowadays have the most usage in digital games exposure, the outcome of Digital Game-Based Learning may be positively applied in learning experience as well. Prensky (2001:196) stated that teenagers, especially college students (this research's population) spend an extraordinary amounts of time playing video games due to the nature of being free from parental supervision, by this age range variable, Digital Game-Based Learning is considered excellent to be engaged and instructed as alternative learning premise to conventional in class learning experience.

3. RESEARCH METHOD

3.1 Data Instruments

This research uses the four retro games for as the central instruments because of its simplicity in design and gameplay. The retro Sega Genesis video games back in the 1990s

did not use any voice acting, and the difficulty level of the game was not as hard and complex as the current video games. Due to these variables, the researcher believes that these four retro Sega Genesis games are adequate to be used in this DGBL research because the respondents can focus on the gameplay (at least the first level) and the visual reference within the game.

These four Sega Genesis video games have similar genre of action shooting side-scrolling which all of the main characters use certain type of gun as their weapon, and each of the main character from this video game is a male protagonist. Prensky (2001:156) defined action game to be related with memorization, association and drilling facts and specifications type of learning activities. Each of the video game has different character, level and gameplay designs, ranging from a cyberpunk city police officer, *ESWAT: City under Siege*, a mafia fighting police detective, *Dick Tracy*, a science fiction themed colonel, *Stargate*, and a dystopian police officer, *Demolition Man*.

The other instrument is the *Keywords Vocabulary Assignment*. This is filled after all of them are given four weeks duration to play all of the four games each week consecutively. The Keywords Assignment focuses on each of the game where each of the respondents put their already notebook-listed ten keywords, ranging from *character*, *first level* and *gameplay designs*. There are also pictures of the title screen, the main character image and two screenshots of the gameplay so that the respondents are able to retract the keywords easily with or without their written notebook. In this form, the respondents can only fill with either one word or two-words phrase.

3.2 Data Collections

There are four weeks in conducting the research with the 75 respondents' involvement. The respondents were introduced to the Sega Genesis system and emulator so that they know how to play the game. They were given the Sega Genesis video game ROMs each per week (starting from *ESWAT City Under Siege*, *Dick Tracy*, *Stargate* and *Demolition Man* as the last

given ROM). For those who do not have the Sega Genesis console system, the games can be played either in a computer using emulators such as *Gens*, or in current technology of Android or tablet phones by using applications such as *GENPLUSDroid* or *AndroGens*. Afterwards, each week, they were asked to list ten keywords in the **Keyword Vocabulary Assignment** sheet from the experience of playing the first level of the game given. They were told to focus on the character, first level and gameplay designs for their keywords listing. The keywords listed can only be either in one word or two-words phrase.

3.3 Data Analysis

The keywords are measured by the frequency distribution. *Frequency distribution* is a systematic arrangement of individual or variable (in this case, the keywords for each video game) is measured from highest to lowest. The analysis method from the *Keywords Vocabulary Assignments* is conducted in a three steps method. To make it easier to describe, the four steps are defined in order of the analysis as follows:

1. Word listing from the Keywords Vocabulary Assignment

From each week results, the 75 respondents have evidently been exposed by the video game by playing it—at least until they finished the first level for each video games. For each week, they are given the *Keywords Vocabulary Assignment* to be used to put their list of proposed ten keywords from the video game they have played. After all submissions are received, the researcher lists all of the ten keywords from each of the 75 respondents, making the data to have exactly 750 keywords input, regardless of having similar keywords or not. These keywords have frequency ranging from '1' until the supposedly maximum amount of '75' occurrences based on the amount of the respondents.

2. Finding the ten keywords with the highest frequency from each video game

The researcher then filters ten most frequently occurring keywords (have been listed based on the keywords frequency) from those 750 keywords input making it much more feasible and comparable. This is conducted on behalf of a focused analysis on the impact of the video game with the respondents' keywords listing result. In the data, the *keywords* (X) are the *variable* which is acquired from the respondents; meanwhile the *frequency* (f) is the total number of the keyword inputted from the respondents (n).

3. Discussion based on the findings

The final step is to see whether the produced keywords have significantly shown certain degree of similar keywords production from each of the respondents. Afterwards, by using Microsoft Excel, the produced keywords are then filtered from the highest to the smallest frequencies to make it easier to be analyzed. From here the researcher is then able to discuss the findings from these ten most frequent produced keywords. The keywords are then analyzed based on the frequencies and the possibility on why the respondents input these keywords. Finally, the researcher categorizes the produced keywords into distinctive features to make it more appropriate to be analysed thoroughly

4. FINDINGS AND DISCUSSION

4.1 Data Calculation

The 75 respondents' produced keywords data have shown many similar produced keywords. As have been mentioned before, the keywords that the respondents could fill in were supposedly in any types of part of speech albeit limited only to **one word** until **two-word phrase**. Based on the produced keywords, it is very apparent that there are some keywords which have quite high significant frequencies to be occurring more

than the others, for example, keywords related with these following traits:

- **character's outfit** (*blue uniform, black vest, red tie, yellow fedora, etc*)
- **character's occupation** (*soldier, police officer, mafia, cop, detective, etc*)
- **weapon being used** (*gun, handgun, grenade, etc*)
- **stage background** (*pyramid, brick, red sky, purple sky, desert, etc*)
- **stage atmosphere** (*hot, futuristic, mythic, dark, etc*)
- **gameplay interface** (*life, health bar, life bar, etc*)
- **gameplay concept** (*action, shooter, shot, platformer, etc*)
- **gameplay experience** (*jumping, hanging, hard, etc*)

Answering the second research question, the findings here are very interesting due to the fact that many respondents, although with many various variables of age, study majors, gender, etc, have produced and inputted almost similar results. The researcher also found that these keywords can be defined into specific categories making it easier to analyze, henceforth enabling the discussion to have more valid evidence regarding the word choices. These traits (character's outfit, character's occupation, weapon being used, stage background, stage atmosphere, gameplay interface, and gameplay concept and gameplay experience) are self-defined by the researcher to make the analysis more focused and to be easily investigate in the discussion. To make the discussion of the produced keywords result to be more significant, the researcher concentrates only on the ten highest frequently occurring keywords for each title and then, filters them from the highest frequency to the lowest ones.

- **ESWAT City Under Siege**, the results are "*Gun*" ($f=55$), "*Police Officer*" ($f=55$), "*Enemy*" ($f=44$), "*Life*" ($f=44$), "*Rooftop*" ($f=42$), "*Blue Uniform*" ($f=41$), "*Shot*" ($f=39$), "*Pipe*" ($f=37$),

"*Helicopter*" ($f=34$) and "*Purple Sky*" ($f=30$).

- **Dick Tracy**, the results are "*Detective*" ($f=62$), "*Mafia*" ($f=53$), "*Gun*" ($f=42$), "*Machine Gun*" ($f=41$), "*Red Tie*" ($f=36$), "*Black Pants*" ($f=35$), "*Brick*" ($f=32$), "*Yellow Coat*" ($f=32$), "*Vintage*" ($f=30$), and "*Life*" ($f=29$).
- **Stargate**, the results are "*Desert*" ($f=58$), "*Soldier*" ($f=57$), "*Pyramid*" ($f=56$), "*Green Uniform*" ($f=43$), "*Cave*" ($f=41$), "*Egypt*" ($f=40$), "*Gun*" ($f=40$), "*Grenade*" ($f=34$), "*Bug*" ($f=29$) and "*Blue Sky*" ($f=26$).
- **Demolition Man**, the results are "*Gun*" ($f=52$), "*Grenade*" ($f=51$), "*Cop*" ($f=49$), "*Tower*" ($f=45$), "*Rope*" ($f=42$), "*Futuristic*" ($f=38$), "*Medical Kit*" ($f=38$), "*Black Vest*" ($f=37$), "*Hanging*" ($f=32$) and "*Red Sky*" ($f=29$).

4.2 Data Interpretation

The Keywords Vocabulary Assignment's results stated that out of the four Sega Genesis video game titles, all of them have resulted in many similar keywords to be produced by the 75 respondents. From these data, it can be considered that video games indeed help the respondents to learn and have more similar keywords to be produced from playing the video game. The most occurring keywords are related with several components from overall findings are as follows:

1. **character's design**, this includes several sub-components such as:
 - physical appearance (e.g. *blonde hair, muscular body, etc*)
 - character's outfit (e.g. *blue uniform, black vest, yellow fedora, yellow coat, green beret, etc*)
 - character's occupation (e.g. *soldier, police officer, cop, mafia, thug, etc*)
 - weapon being used (e.g. *gun, handgun, machine gun, grenade, bomb, etc*)
2. **level design** (at least the first level, since the respondents were only asked to

play the first level only), this includes several sub-components such as:

- stage background (e.g. *purple sky, red sky, rooftop, desert, pyramid, cave, etc*)
 - stage atmosphere (e.g. *hot, futuristic, mystic, apocalyptic, dark, night, etc*)
3. **gameplay design**, this includes sub-components such as:
- gameplay interface (e.g. *life, life bar, health bar, etc*)
 - Gameplay concept (e.g. *action, shooter, side-scrolling, platformer, shot, etc*)
 - gameplay experience (e.g. *jumping, hard, enemies, etc*)

From these results, it has been proven that all respondents produced keywords which they mostly see within the game rather than seeing the text written within the layout. The keywords produced are basically resulted from imagery implication.

5. CONCLUSIONS

Based on the findings of this research, it is proven prominently that education world needs to set broader view on finding and using any means of learning tools. DGBL has been identified to be one of a good unconventional learning method, in extension to elaborate digital games (computer and video games) as these prominent learning tools. It is also proven that having the similar themed video games helps the respondents of Non-English department population from an EFL country to learn more focused vocabulary—in this case, the keyword such as the physical appearance and the outfit of the video game characters, the level designs (at least the first level design) and the gameplay designs (weapons, items and game mechanics). The ten most frequent keywords analyzed from each of the four Sega Genesis video games are the evidence for the first research question regarding the most produced and occurring keywords.

In pedagogical implication, it has been proven that video game can be considered to be a good learning tool, albeit due to the needed factor of self-exposure learning experience. It is still impossible to fully apply video game inside

the classroom activity due to neither possible hardware nor time limitations. It is also noted that the enjoyment factor is predominantly essential in the learning process and, video game is one of the tool that can be utilized to promote that factor. However, the researcher also believes that video game cannot be forced to be played or the learning experience' result may not be fully expedient.

To summarize the pedagogical implication, it has been proven that DGBL is more beneficial if an EFL learner plays a more focused-theme game and is being exposed more by playing it, of course with the definition of fun and non-conventional learning atmosphere where the learner is able to play the game anytime and anywhere they want without any disturbance nor external obligation.

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