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Digital Game-Based Language Learning: A Review of Research Trends on Second Language Acquisition

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The purpose of this study is to review empirical research articles regarding Digital Game-based Language Learning focusing on Second Language Acquisitions (DGBLL-SLA) published from 2008 to 2018. Nineteen articles were identified through the Mendeley Literature Search due to its convenience of screening and filtering unpublished articles. A quantitative content analysis technique was adopted to analyze the types of games, the gaming platform as well as the target outcome of the reviewed studies. The types of games employed by these studies were classified into two main categories which are: Commercial-off-the-shelf games (COTS), and Educational Games developed with the sole purpose of language learning (EDUGAME). Apart from that, this study also reveals the trends of DGBLL-SLA implementation which can be divided into two categories which are; Computer Assisted Language Learning (CALL) and Mobile Assisted Language Learning (MALL). Based on the review conducted, it was found that most of the current research have been revolving around game development rather than utilizing ready-made COTS. This review also reports that most studies on DGBLL-SLA focus on the impact of games on learning attitude as well as the implementation of CALL over MALL.

Keywords: game-based learning; second language acquisition; digital game-based language learning

I. INTRODUCTION

Digital Game-based Language Learning (DGBLL) refers to "the design and the use of a diverse array of digital games for the purpose of learning or teaching a second or foreign language" (Hung *et al.*, 2016). As game nowadays plays an important role in the everyday lives of young adults and adolescents in developed countries (Godwin-Jones, 2014), it is crucial for the language educators to acknowledge the use of technology in providing extramural learning to the learners. Godwin-Jones (2014) presented the current issues pertaining to the integration of digital games in language learning which includes the need of the educators to carefully select the type of games suitable to be used in order to create more efficient and meaningful learning as well as to provide enjoyment to the students. However, there are only few researches that reported the type of games which are appropriate to be used for the aforementioned purpose. In other words, there is still a lack of research that compares the advantages of Commercial-off-the-shelf games (COTS) or Educational Games developed by the educators (EDUGAME). In the scope of Second Language Acquisition (SLA), the affordances of a game shall be closely related to the type of game and its use (Godwin-Jones, 2014) as there is a big difference between a vocabulary drilling and an immersive gaming environment. These game affordances are the key elements to a winning situation for both teachers and students. By determining the trends between these two types of games, it allows future researchers, developers and teachers to better allocate their efforts in inventing or utilizing the most appropriate type of games for the purpose of second and foreign language learning.

Godwin-Jones (2014) also argued from the perspective of the feasibility of DGBLL due to the complexity of technical elements which could hinder the learning process compared to commercial games which are not intentionally used for learning but are still able to assist in language acquisition. Consequently, the emergence of mobile applications and

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games are known to be a better alternative to overcome the technical difficulties in creating educational games. Thus, these alternatives introduce a new out of class learning experience. Therefore, there is a need to analyse the shift from the Computer Assisted Language Learning (CALL) to Mobile Assisted Language Learning (MALL) as suggested by Jarvis and Achilleos (2013) who believed that we are now in the post era of CALL due to the relevance and the ease of developing mobile applications for learning. Based on Jarvis and Achilleos (2013) suggestion, this review looks into the current practice in implementing DGBLL-SLA whether the trends have evolved from CALL to MALL. This would be beneficial for readers to understand the needs of instructional platform for language learners.

Blume (2019) on the other hand argued that despite the popularity of DGBLL as a research interest, it is still arguable on the reception of DGBLL among educators. This was said based on his research which revealed that pre-serviced teachers with lack of prior educational experience perceived digital teaching negatively as they believed that not having any technological integration at all is better than having poor integration as this may hinder the language teaching especially on language skills and strategies, as well as beliefs. This raised up the question whether technological integration such as DGBLL shall be used only for language learning strategies or could also be used in different aspects of teaching and learning. Therefore, as a complementary to this study, it is also important to investigate the target outcome of the current research. This is to understand which implementation of game types and platforms would affect the process of teaching and learning among students.

Hence, this review aims to identify the emerging trends of DGBLL articles published within the past 10 years. The following research questions are addressed in this review: 1) What are the common trends in the type of digital games used in second language learning (COTS or EDUGAME)? ; 2) What are the common platforms used for DGBLL-SLA (MALL or CALL)?; and 3) What are the target outcomes in DGBLL-SLA studies?

II. METHOD

The corpus to be searched for these articles relevant to the topic of this review included the search terms related to ludic activities such as “serious games”, “game-based language learning”, “educational games”, and “digital games”. All the articles selected for this review are limited to studies that empirically and scientifically investigated the relationship between the effectiveness of digital games for second language acquisition regardless of any languages used as the second language. The search of the journal articles was conducted with Mendeley, a program software produced by Elsevier to manage and share research paper. One of its features is the literature search that automatically filters out all of the unpublished journal articles and only recommends articles which contain legit Digital Object Identifier (DOI), making the search more convenient. Following the keyword search, the researchers read through the titles and abstracts of the articles published from 2008 to 2018 to select target papers that met the following criteria: (1) the implementation of at least one specific digital game; (2) the use of the digital game should be relat-ed to second language acquisition; (3) articles must provide information on how the game is executed (MALL or CALL); and (4) the full text of the article should be available either in paper or electronic format. After the screening process, nineteen (19) relevant articles met the inclusion criteria and were further to later analysis. The articles screened were fully read in order to match its relevance to the aim of the study. Next, a simple matrix-table was developed using Microsoft Excel in order to manage and organize all the main information needed from the selected articles. Figure 1 shows the flow of the screening process:

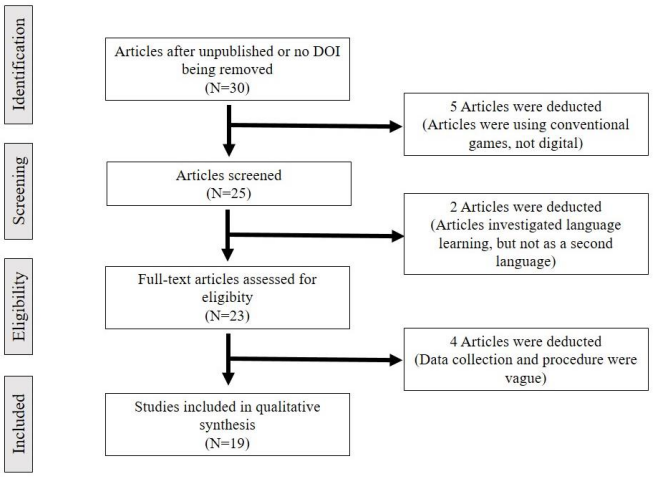

Figure 1. Literature Review Flow Diagram on DGBLL

III. OVERVIEW OF REVIEWED STUDIES

The DGBLL-SLA research trends emerging from the current review with regard to the mentioned research objectives are discussed based on the retrieved articles through the employment of Mendeley literature search. Overall, the total of 19 articles was collected due to their fulfilment of the criteria given. The background information and results of the reviewed studies are presented in the Appendix A section. As shown in Table 1, it was found that Taiwan has contributed the most articles within the past 10 years, with six (N=6) studies pertaining to DGBLL-SLA, followed by USA with four (N=4) retrieved articles while Iran and Spain both have contributed two (N=2) articles. It is no surprise to see Taiwan leading the list of the retrieved literature. This finding could be due to the effort made by the government of Taiwan in making English the nation's official second language. The proposal was made in 2015 when Taiwan aimed to be a nation with higher English language skills within 10 years for the sake of global economy survival ("English proposed as a second language", 2015).

Table 1. Relevant DGBLL Articles Published in between 2008 -2108

Location	Frequency of DGBLL Articles by Location	Percentage (%)
Taiwan	6	31.6
USA	4	21.1
Iran	2	10.5
Spain	2	10.5
Belgium	1	5.3
Canada	1	5.3
Thailand	1	5.3
Turkey	1	5.3
China	1	5.3
TOTAL	**19**	**100.0**

As shown in Table 2, the descriptive analysis also found that the most contributing journal on DGBLL-SLA studies is Computer Assisted Language Learning as well as Procedia (Social & Behavioural Science) with the total of three (N=3) retrieved articles respectively. International Journal of Game-based Learning, ReCall and Journal of Computers and Education have contributed two (2) articles on the scoped topic of the studies. The data shown is contradicted to another review produced by Hung *et al.* (2016) which reported that ReCall is by far the most productive journal in Game-based Language Learning field. Nonetheless, based on the current data, it is found that ReCall might not be putting its focus in contributing studies on the feasibility of games to SLA.

Table 2. Relevant DGBLL Articles Published in Each of Retrieved Journal between 2008 -2108

Retrieved Journals	Frequency of DGBLL Articles Retrieved	Percentage (%)
Computer Assisted Language Learning	3	15.8
Procedia, Social & Behavioural Science	3	15.8
International Journal of Game based Learning	2	10.5
ReCall	2	10.5
Computers & Education	2	10.5
Educational Technology Research & Development	1	5.3
English Language Teaching	1	5.3
Interactive Learning Environment	1	5.3
Language Learning & Technology	1	5.3
Speech Communication	1	5.3
SpringerPlus	1	5.3
Turkish Online Journal of Distance Education	1	5.3
TOTAL	**19**	**100.0**

The findings also reveal that the most common participants selected for DGBLL-SLA studies are students of higher educational institutions (N=13), followed by high school students (N=4) and only one article focusing for primary school kids as well as working adults. The data shown is parallel to Hwang and Wu (2010) that mentioned the frequent selection of university students in any research pertaining to game-based learning. This could be due to the convenience of gathering qualitative information from these students who are old enough to articulately express their thoughts and young enough to engage with the gaming.

A. Types of Games Used in The Studies

One of the prominent purposes of this review is to determine the frequency of the types of game used in the previous studies. Based on the context of this study, the types of game have been categorized into three main categories which are 1) commercial-off-the-shelf game (COTS); 2) educational games developed for the sole purpose of study (EDUGAME), and 3) the combination of both COTS and EDUGAME in the studies. Among all the 19 articles reviewed, as shown in Table 3, it is found that most of the articles encompass the development of educational games for the purpose of the research and six (6) articles had used commercial ready-made games and only one (1) research has been found to conduct a study by using both types of game.

Table 3. Frequencies and Percentage of Types of Games Employed in the Reviewed Studies

	Number of Studies	Percentage (%)
Edugames	12	63.2
Cots	6	31.6
Combined Type	1	5.3
TOTAL	**19**	**100.00**

The findings of this review clearly showed that most of the studies are still advocating the development of educational games for SLA despite the fact that there are a lot of COTS games that could provide extramural learning in SLA (Kerstin & Sundqvist, 2012). Language is not like other subjects that require a lot of mental work in memorizing and formulation. It is a subject that requires students to communicate frequently in order to have better retention (Reinders & Wattana, 2015). Therefore, the use of COTS games might be a plus point to the learning without risking students' engagement that could be jeopardized by the educational value of the game and resulting in students' withdrawal. Among the six (6) studies, four (4) of them also talked about the emergence of Massively Multiplayer Online Role-Playing Games (MMORPG). Among the most popular MMORPG being used for the educational purpose is World of Warcraft. Some of the studies also stressed on the emergence of Augmented Reality (AR) and the utilization of simulation in DGBLL-SLA which boost the students' motivation to practice the second language.

B. Gaming Platform Used in The Studies

Table 4 shows that most of the published studies for the past 10 years revolve around CALL (N=14, 73.7%) compared to MALL (N=5, 26.3).

Table 4. Frequencies and Percentage of Gaming Platform Employed in the Reviewed Studies

	Number of Studies	Percentage (%)
Computer Assisted	14	73.7
Mobile Assisted	5	26.3
TOTAL	**19**	**100.00**

Regardless of the increasing popularity of the MALL, there are still few researches on the implementation of this platform. The data shows that most of the game developed for SLA is made to be executed digitally on the computer. This could be due to the complexity of mobile learning that needs to be further investigated.

C. Target Outcomes of The Studies

In order to determine the target outcome of the studies, all the dependent variables provided by the studies have been coded and divided into two main categories. The first category of research outcome is labelled as Language Literacy Skills which encompasses listening skill, reading skill, speaking skill, writing skill, language retention, and vocabulary acquisition. On the other hand, the second category of the target outcome encompasses achievement, engagement, enjoyment, motivation, perception, and confidence. This second category of outcome is labelled as the Learning Attitude. Based on the frequency data, as shown in Table 5, it is found that most of the research reviewed discuss on how games affect learning attitude (N=8), followed by the studies which cover both outcomes (N=6) and only five (N=5) articles specifically investigated the use of games on language literacy.

Table 5. Frequencies and Percentage of Gaming Platform Employed in the Reviewed Studies

	Number of Studies	Percentage (%)
Learning Attitude	8	42.1
Combined Outcome	6	31.6
Language Literacy	5	26.3
TOTAL	**19**	**100.00**

This current finding coincides with Rahimi and Yadollahi (2011) who conducted research on the correlation between foreign language learning attitude and the use of CALL. According to Rahimi and Yadollahi (2011), students' learning attitude is one of the strongest determinants towards a successful CALL. Therefore, it is undeniable that learning attitude affects the efficiency of the learning and eventually affects language literacy. Thus, making it an ultimate reason behind the selection of research target outcome.

IV. CONCLUSION

This review was conducted to generally depict the trends in DGBLL-SLA. The results can be summarized as follow: 1) most of the research retrieved are from Taiwan, showing the vigorous attempt of the country to improve the nation's

second language fluency which is English; 2) most DGBLL-SLA researchers prefer to develop game for the purpose of the studies rather than to use the ready-made commercial games; 3) it is found that most of the research are still focusing on the employment of CALL despite the emergence of MALL, and 4) this review also reveals that most studies on DGBLL-SLA focus on the impact of games on learning attitude. These results, however, must be considered in the light of its limitation. Since the collection method of the articles only involves the use of Mendeley literature search feature, there might be a possibility for some notable research to be left out. Therefore, it is suggested that future reviews utilize more sources along with longer working time-frame. This review could provide a wide-range discussion on the prominent gaps within the literature. Not only that, the data received from the article collection have clearly shown the scarcity in research within DGBLL-SLA in Malaysia context especially one that involves Bahasa Melayu as the second language. Therefore, more research or in-depth analysis is needed to contribute to this particular line of field and context.

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Appendix A

Year	Author	Location	Journal	Participants	Types of Game	Implementation Platform	Target Outcome
2008	Ranalli, J.	USA	Computer Assisted Language Learning	Tertiary Education	COTS	CALL	Language Literacy Skills
2009	McGraw, I., Yoshimoto, B., & Seneff, S.	Taiwan	Speech Communication	Tertiary Education	EDUGAME	CALL	Language Literacy Skills
2009	Neville, D. O., Shelton, B. E., & McInnis, B.	USA	Computer Assisted Language Learning	Tertiary Education	EDUGAME	CALL	Combined Outcome
2010	Liu, T. Y., & Chu, Y. L.	Taiwan	Computer and Education	Secondary School	EDUGAME	MALL	Combined Outcome
2011	Holden, C. L., & Sykes, J. M.	USA	International Journal of Game-based Learning	Tertiary Education	EDUGAME	MALL	Learning Attitude
2011	Aghlara, L., & Hadidi, N.	Iran	Procedia - Social and Behavioral Sciences	Primary School	EDUGAME	CALL	Language Literacy Skills
2012	Rama, P. S., Black, R. W., van Es, E., & Warschauer, M.	USA	ReCall	Tertiary Education	COTS	CALL	Learning Attitude
2013	Berns, A., Gonzalez-Pardo, A., & Camacho, D.	Spain	Computer and Education	Tertiary Education	EDUGAME	CALL	Combined Outcome
2013	Chen, H. J. H., & Yang, T. Y. C.	Taiwan	Interactive Learning Environment	Tertiary Education	COTS	CALL	Learning Attitude
2013	De Grove, F., Van Looy, J., & Mechant, P.	Belgium	International Journal of Language Learning	Tertiary Education	COMBINED	CALL	Learning Attitude
2014	Chik, A.	Taiwan	Language Learning And Technology	Tertiary Education	COTS	CALL	Learning Attitude
2014	Wu, C. J., Chen, G. D., & Huang, C. W	Taiwan	Educational Technology Research and Development	Secondary School	EDUGAME	CALL	Combined Outcome
2015	Reinders, H., & Wattana, S.	Thailand	ReCall	Tertiary Education	COTS	CALL	Learning Attitude
2015	Perry, B.	Canada	Procedia - Social and Behavioral Sciences	Tertiary Education	EDUGAME	MALL	Learning Attitude
2015	Lin, H.	Taiwan	Procedia - Social and Behavioral Sciences	Tertiary Education	EDUGAME	CALL	Language Literacy Skills
2016	Hwang, W. Y., Shih, T. K., Ma, Z. H., Shadiev, R., & Chen, S. Y.	Taiwan	Computer Assisted Language Learning	Secondary School	EDUGAME	MALL	Combined Outcome
2016	Alyaz, Y., & Genc, Z. S.	Turkey	Turkish Online Journal of Distance Education	Adult Learner	EDUGAME	CALL	Combined Outcome
2017	Ebrahimzadeh, M.	Iran	English Language Teaching	Secondary School	COTS	CALL	Language Literacy Skills
2017	Berns, A., Isla-Montes, J. L., Palomo-Duarte, M., & Dodero, J. M.	Spain	SpringerPlus	Tertiary Education	EDUGAME	MALL	Learning Attitude

Frequencies and percentages of types of games employed: EDUGAME (*f*=12: 63.2%); COTS (*f*=6: 31.6%); COMBINED (*f*=1: 5.3%)

Frequencies and percentages of gaming platform employed: Computer-assisted language learning (CALL) (*f*=14: 73.7%); Mobile-assisted language learning (MALL) (*f*=5: 26.3%)

Frequencies and percentages of target outcome: Learning attitude (e.g. achievement, engagement, enjoyment, motivation, perception and confidence) (*f*=8: 42.1%); Language literacy skills (e.g. listening skill, reading skill, speaking skill, writing skill, language retention, and vocabulary acquisition) (*f*=5: 26.3%); Combined outcome (*f*=6: 31.6%)