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Comparing the Effectiveness of Direct Vocabulary Instruction and Incidental Vocabulary Learning in Improving the Academic Vocabulary of Malaysian Tertiary Students

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ABSTRACT

This study compared the effectiveness of incidental vocabulary acquisition and using direct vocabulary instruction to improve tertiary students' academic vocabulary. Research has shown that Malaysian tertiary students lack exposure to academic vocabulary prior to their tertiary education and that they have an insufficient vocabulary size for tertiary education. Hence, this study explored the feasibility of providing direct vocabulary instruction with gamification through an intervention programme which the researcher named the Accelerated Vocabulary Acquisition (AVA) programme as a method to improve tertiary students' academic vocabulary. Marzano's three-phase framework for vocabulary instruction was adapted and gamification was incorporated through the use of the gaming platform Kahoot!. This study used a quantitative approach and adopted the non-randomized control group, pretest-posttest design. The participants were 180 tertiary students studying for their diploma in various fields. The academic section of the Vocabulary Levels Test (VLT) by Schmitt et al. was used to measure the students' academic vocabulary. The results showed that the AVA programme is a feasible framework to improve tertiary students' academic vocabulary as tertiary students who underwent the AVA programme outperformed the students in the control group who learnt academic vocabulary incidentally.

Keywords: Academic vocabulary, direct vocabulary instruction, gamification, Kahoot!, Malaysian tertiary students

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INTRODUCTION

Vocabulary knowledge is crucial in language learning. Without sufficient vocabulary, communication becomes less effective

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because students would not be able to understand others and they would not be able to express their ideas (Lessard-Clouston, 2013). In the context of tertiary education, students not only require sufficient general vocabulary but also academic vocabulary in order to understand the academic materials. Vocabulary can be learnt incidentally, such as when students encounter new words through reading or peer interaction. Vocabulary items can also be taught explicitly.

Vocabulary knowledge is often studied in terms of size (or breadth) and/or depth. Vocabulary size refers to the understanding of word definitions or their dictionary meanings, however minimal or superficial that understanding may be. Vocabulary depth refers to the understanding of words beyond their dictionary meanings. In the context of this study, only vocabulary size is considered. Vocabulary size is measured in terms of word families which is seen as a reliable measurement (Milton & Treffers-Daller, 2013). A word family consists of the base form of a word and its inflexions which can be readily understood from the base form (Bauer & Nation, 1993). For example, *jump, jumped* and *jumping* would belong to one word family.

Malaysian tertiary students are perceived to have limited vocabulary size. Research shows that Malaysian tertiary students' vocabulary size ranged between 4500 and 6500 word families. This is below the vocabulary size expected of tertiary students (Tan & Goh, 2017; Yunus et al., 2016). In two separate studies, Milton and Treffers-Daller (2013) estimated that native-English-speaking undergraduates had a vocabulary size of 10000 word families while Nation (2006) estimated that English-as-second-language users studying for their advanced degrees had a vocabulary size of about 8000-9000 word families. Furthermore, the vocabulary size of Malaysian tertiary students is insufficient for adequate comprehension of academic texts. Tan and Goh's (2017) research found that Malaysian tertiary students generally needed a vocabulary size of about 8000 word families to achieve adequate comprehension of academic texts.

In addition to the insufficient vocabulary size, Malaysian students also begin tertiary education without adequate exposure to academic vocabulary. The English syllabus for national secondary schools includes over a thousand vocabulary items to be taught, but less than ten are academic vocabulary (Manan et al., 2013). As such, there is a need to help tertiary students improve their vocabulary especially academic vocabulary.

Most tertiary institutions in Malaysia provide general English proficiency courses to improve the four language skills of speaking, listening, reading and writing and to cope with the academic texts they have to read for their courses. However, the courses seldom provide direct vocabulary instruction to help students improve their vocabulary. Rather, it is assumed that students would acquire the necessary vocabulary incidentally. In the Malaysian context, research on explicit efforts to address the lack of vocabulary among

tertiary students has not been plentiful. Tan (2016) explored the use of guided extensive reading and vocabulary instruction to improve tertiary students' vocabulary. In her study, the instruction was carried out as an additional programme for remedial students and did not focus on academic vocabulary. Unfortunately, however, Malaysian students generally do not read widely and are dependent on their lecturers for among other things, lexical input (Kaur et al., 2008).

This study compared the effectiveness of incidental vocabulary learning and direct vocabulary instruction among tertiary students. It explored the feasibility of providing direct vocabulary instruction to help tertiary students improve their academic vocabulary as this is the type of vocabulary most relevant for tertiary students. Marzano's (2010) framework for direct vocabulary instruction was adapted for this study. Direct vocabulary instruction in this study refers to the explicit teaching of vocabulary items rather than vocabulary learning strategies. Instead of merely providing instruction and using the classroom games proposed by Marzano, gamification was incorporated using the gaming platform Kahoot!. Since the current generation of tertiary students is digital natives, it was hoped that technology use would make vocabulary learning more appealing and engaging. Wang's (2015) research had shown that Kahoot! is able to keep students' attention even after prolonged use.

Previous research using computer and games for vocabulary learning in the Malaysian context did not include direct vocabulary instruction. In addition, it involved secondary school students, not tertiary students (Letchumanan, 2012). The direct vocabulary instruction with gamification in this study was carried out within an existing English proficiency course, which did not include direct vocabulary instruction in its syllabus. The researcher named the programme the Accelerated Vocabulary Acquisition (AVA) programme.

Some may argue that students should be taught vocabulary learning strategies rather than vocabulary items so that they can be independent learners. Such strategies should be taught to students in schools rather than at tertiary institutions. Skills involved in vocabulary learning strategies need to be practised and mastered over time. It is not feasible for tertiary students to spend a great amount of time working on vocabulary acquisition skills. At the tertiary level where students are embarking on specialized fields, it would be more useful to teach them the relevant vocabulary so that they can use the knowledge to help them in their studies.

This study was carried out at a private tertiary institution in Malaysia. The participants were second-year students enrolled for various diploma programmes. They entered the tertiary institution immediately after completing their secondary education in Malaysia. The research question that guided this study was: Is there any significant difference in the academic vocabulary scores between students who received direct vocabulary instruction and students who learnt academic vocabulary through incidental learning?

Literature Review

Theoretical Background. This study is associated with two learning theories, namely behaviourism and cognitive constructivism. According to the behaviourist theory, learning is deemed to take place through stimulation and reinforcement (Wu et al., 2012). Cognitive constructivism, on the other hand, emphasizes the mental processes of learning and stresses that learning should involve thinking, meaning-making and motivation (Ertmer & Newby, 2013; Wu et al., 2012). The view is that knowledge is made up of mental representations that are actively constructed by learners based on their existing cognitive structures ("Learning: Theory and research," 2015). New information is assimilated with existing knowledge for it to become meaningful. In vocabulary learning, students must firstly receive some input on the vocabulary items. Only then can they progress to think about the words and make meaning of the vocabulary items.

Thus, in this study, students were given explanations of the vocabulary items as a form of stimulation in the learning process. They then received reinforcement through gamification when they engaged in Kahoot!. Gamification provided reinforcement in two ways: 1) repetition for effective reinforcement, and 2) immediate positive reinforcement for the correct answer(s) with the provision of rewards for the students. According to Ertmer and Newby (2013), the use of reinforcement to impact performance is a specific feature of instructional designs within the behaviourist principle. The use of game rewards is relevant to digital natives since they 'thrive on instant gratification and frequent rewards' (Prensky, 2001).

The students were also encouraged to construct the meaning of what they learnt through the use of a vocabulary notebook, as prescribed in Marzano's framework. Students wrote in the vocabulary notebook and revised, where necessary, their own definitions of the vocabulary items based on their understanding rather than copy definitions from other sources. In addition, students were required to include a non-linguistic representation of the vocabulary item. The purpose is to enable students to assimilate the vocabulary items with their existing knowledge and make meaning to the words learnt. This is consistent with the cognitive constructivist principle for effective learning.

Academic Vocabulary. Academic vocabulary refers to words that occur in academic texts across various fields of study. However, 'academic words are not highly salient in academic texts, as they are supportive of but not central to the topics of the texts in which they occur' (Coxhead, 2000). Although academic words are not central to the content, it is important to understand these words as they can affect students' comprehension of academic texts. The secondary school syllabus does not provide adequate exposure to academic vocabulary. Out of the 1,316 words listed in the syllabus, only seven were academic vocabulary (Manan et al., 2013). Furthermore, academic vocabulary tends

to be neglected in vocabulary instruction because they may seem ordinary to the academician (Manan et al., 2013). Tertiary students should, therefore, be taught academic vocabulary to help them in their comprehension of the academic materials they have to read. The academic vocabulary taught in this study was taken from the Academic Word List (AWL) (Coxhead, 2000). The AWL is a comprehensive compilation of academic words taken from a corpus of 3.5 million running words of written academic text. It contains 570 word families.

Incidental Vocabulary Acquisition. Incidental vocabulary acquisition may happen from learning other language skills such as reading and listening. Although students can get exposure to vocabulary through incidental learning, Schmitt's (2008) review of various studies showed that the pick-up rate was relatively low. Similarly, Won (2008) found that 'the incidental learning process was slow, often misguided and seemingly haphazard' (p.4). Furthermore, there was concern among ESL researchers that incidental learning of vocabulary alone might not be efficient enough to meet the learning needs of students (Won, 2008).

Nevertheless, other studies on incidental vocabulary learning found that students were able to make significant gains in their vocabulary learning (Brown et al., 2008; Restrepo Ramos, 2015). However, they emphasized that the texts had to be carefully chosen to allow incidental vocabulary learning to take place. If vocabulary acquisition is not the main focus of a course, it is unlikely that specific texts would be deliberately selected to enable students to acquire vocabulary incidentally.

In the present study, the materials were not deliberately chosen to allow optimum incidental vocabulary acquisition to take place. Rather, the materials were determined by the tertiary institution to improve students' overall reading, writing, listening and speaking skills. There was no provision for vocabulary instruction in the syllabus.

Direct Vocabulary Instruction. Direct vocabulary instruction refers to the teaching of specific vocabulary items rather than teaching vocabulary learning strategies. Research has shown direct vocabulary instruction to be effective in improving students' vocabulary (Suing, 2012; Stahl & Fairbanks, 1986; Won, 2008). In their meta-analysis of studies concerned with the effects of vocabulary instruction, Stahl and Fairbanks (1986) found that direct vocabulary instruction for words taken from high-frequency lists had an effect size of 0.32 while direct vocabulary instruction for words related to the students' reading materials had an effect size of 0.97. In another meta-analysis of studies on vocabulary instruction, Won (2008) tabulated the overall effect size to be $d = 0.69$. However, Won's (2008) meta-analysis showed that the mean effect size for vocabulary instruction without the use of technology in the form of multimedia was larger ($d = 0.73$, $n = 28$)

than the mean effect size for studies with multimedia use (d = 0.50, n = 13). The studies analysed by Won (2008) were from 1985 to 2006. It is possible that multimedia used at that time was not as advanced as is currently available. Thus, more current research involving the use of technology in vocabulary instruction is needed. Suing (2012) who used Marzano's (2009) Six-Step Vocabulary Process in a more recent study, also found direct vocabulary instruction to be effective with 32-33 percentile gains in student achievement. Her study, however, did not involve the use of technology.

This study adapted Marzano's (2010) framework for direct vocabulary instruction which involves teaching words in semantic clusters. This enables a larger number of vocabulary items to be taught within a shorter period of time. Marzano proposes three phases of direct vocabulary instruction, namely 1) introductory phase, 2) comparison phase and 3) review and refinement phase.

In the introductory phase, the teacher explains the important characteristics of the vocabulary items using everyday language rather than giving a formal definition. The students are shown how the word is used in context. The students then restate the explanation in their own words and create a non-linguistic representation of the vocabulary item in a vocabulary notebook.

In the comparison phase, teachers highlight similarities and differences between vocabulary items in the same semantic cluster as this can improve comprehension (Graves, 2006). For instance, *integration*, *assimilation* and *incorporation* might be taught at the same time. In this study, similarities and differences were highlighted as part of the instruction given and also through the questions in Kahoot!.

In the review and refinement phase, students are given the opportunity to review and refine their understanding of the vocabulary items through multiple exposures to the same word in different contexts. Marzano proposed some conventional classroom activities and games for this purpose, but this study used the online gaming platform Kahoot! to make the lessons more contemporary for the students who are digital natives.

The three phases do not necessarily occur sequentially but may overlap. Figure 1 shows Marzano's framework for direct vocabulary instruction.

As students go through the comparison phase and the review and refinement phase, they may make additions and/or changes to the entries in their vocabulary notebook. This enables students to have a record of the vocabulary they have learnt and allows them to actively revisit their understanding of the new vocabulary items.

In the Malaysian tertiary context, there has been limited research on direct vocabulary instruction. Tan (2016) used graded readers and instruction to improve tertiary students' vocabulary. However, in her research, the instruction was teaching students dictionary skills to complete the vocabulary worksheets rather than providing direct instruction for specific vocabulary items.

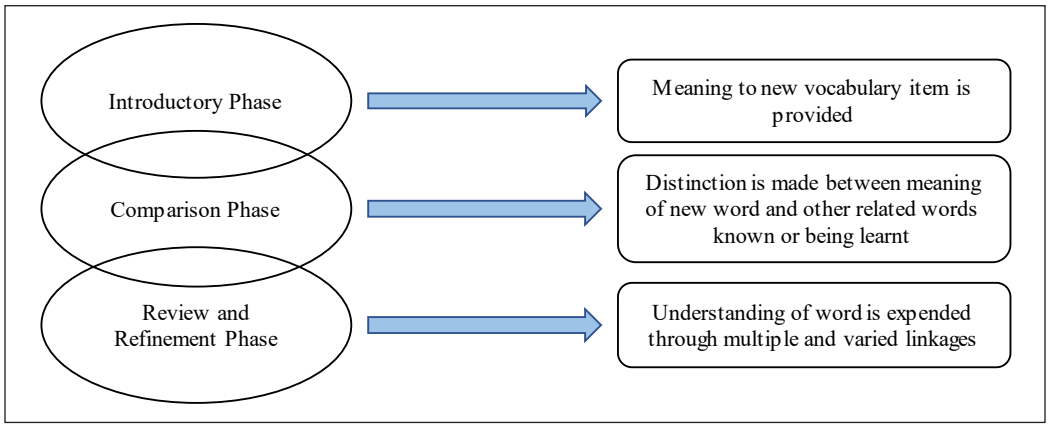

Figure 1. Marzano's framework for direct vocabulary instruction (adapted from Marzano, 2010)

Integration of Technology in Vocabulary Learning in the Malaysian Context. There have been efforts to use technology to help students improve their English vocabulary in Malaysian classrooms (Letchumanan & Tan, 2012; Letchumanan, 2012; Mustafa et al., 2012). The target group of students, however, are generally secondary school students rather than tertiary students. Mustafa et al. (2012) compared the performance of students who read texts and completed activities online to students who read the same texts and did the same activities as printed materials. They found that students who used the Internet showed greater improvement in their vocabulary test scores. The study, however, did not include direct vocabulary instruction. Letchumanan and Tan's (2012) study taught secondary school students the traditional vocabulary learning strategies of using a dictionary, semantic mapping and contextual clues as well as using computer games to improve students' vocabulary through incidental learning. They found that students scored better in the posttest vocabulary scores when using computer games to learn vocabulary and that the difference in scores was statistically significant ($p < 0.001$). One of the reasons cited for the improvement in vocabulary was the immediate feedback which students received when they used computer games to learn vocabulary. It is also highly probable that the current digital native students respond better to game learning given their proclivity to technology. Although there have been studies showing that gamification is effective at tertiary level in various fields in other countries, studies on providing direct vocabulary instruction with gamification to tertiary students in Malaysia seem to be lacking (Lam, 2014; Mousavi & Mohdavi, 2016; Wang, 2015; Wu et al., 2011; Yip & Kwan, 2006).

Gamification. Gamification is 'an emergent approach to instruction which facilitates learning and encourages motivation through the use of game elements, mechanics and game-based thinking … such as earning points, overcoming a challenge or receiving badges for accomplishing tasks' (Kapp,

2013). Gamification can be incorporated into the classroom through the use of online gaming platforms.

According to research, the use of gamification is able to motivate and engage learners (Cheong et al., 2013; Hamari et al., 2014; Vandercruysse et al., 2012). Elements that should be included in using gamification in the classroom are relevance, social interaction, continuous motivation, minimum equipment, comparison of scores among players and audio-visual effects (Yip & Kwan, 2006).

Gamification provides an atmosphere with graphics, speed, interactivity and fun that digital natives are accustomed to (Prensky, 2001). In a survey, Lam (2014) found that students preferred online games to worksheets for reviewing vocabulary as it was more engaging and helped their memory retention. Similarly, Yip and Kwan (2006) reported that more than 70% of students enjoyed online games for learning vocabulary and found the games effective in helping them build their vocabulary. These studies did not involve student interaction as the students played online games individually. In immediate posttests, these studies showed that online games facilitated vocabulary retention. Lin et al. (2011), however, reported that student interaction in vocabulary learning made for better vocabulary retention in a delayed posttest compared to individual learning.

In this study, the gaming platform Kahoot! was used as it promotes interaction among students. Kahoot! creates a game show atmosphere whereby students compete with each other to answer quiz questions on their individual technological devices (mobile phones or laptops). Unlike other quiz-style gaming platforms where students are able to see both questions and answers on their devices, students playing Kahoot! only see the answer codes on their devices. The questions and answers are projected on a common screen at the front of the class. When students are able to see both questions and answer on their own devices, there is a tendency to work in isolation. On the other hand, when students are forced to see the questions and answers on a common screen, it creates a group dynamic that encourages social interaction and discussion among the students. Kahoot! also allows teachers to include videos and sound effects to the quiz to enhance the gaming atmosphere. All these features of Kahoot! promote learning in an engaging manner.

METHODS

Research Design

This study used a quantitative approach and adopted the non-randomized control group, pretest-posttest design (Ary et al., 2013). The research was conducted as a quasi-experiment. Participants were divided into a control group and an intervention group. The students were assigned to either group as intact classes since classes could not be reorganized just to accommodate a research study. All the intact classes had an equal chance of being assigned as a control group or intervention group. The classes were assigned to either a

control group or intervention group without prejudice or bias. It was carried out prior to any contact with the researcher. The groupings were done to achieve an equal number of participants for the control and intervention groups. The Academic Vocabulary section of the Vocabulary Levels Test by Schmitt et al. (2001) was used to determine the participants' academic vocabulary score. All the participants were given a pretest at the beginning of the experiment. The intervention group received direct vocabulary instruction which incorporated gamification while the control group learnt the vocabulary items incidentally as all participants had exposure to the same vocabulary items through the teaching materials used. At the end of the intervention period, all participants were given a posttest. The data were analysed for statistical significance, effect size and mastery score.

Participants

A total of 180 tertiary students at a private tertiary institution in Malaysia participated in the study. The intervention group consisted of 89 students while 91 students made up the control group. All the participants were second-year students studying for their diploma in various fields. The participants were enrolled in diploma programmes which required credit in English in the *Sijil Pelajaran Malaysia* as an entry requirement. During their first year of study, all the participants received 84 hours of formal English lessons through two English proficiency courses provided by the institution. All the participants were from Chinese ethnic background and their age ranged from 19 to 21.

Vocabulary Levels Test

The Vocabulary Levels Test (VLT) consists of two parallel versions (Version 1 and Version 2). In each version, there are five sections which test students' vocabulary size for the most frequent 2000, 3000, 5000 and 10000-word levels as well as academic vocabulary. Each section of the test can be used separately to meet the diagnostic purpose of the researcher. For this study, only the academic section of the test was used to measure the students' academic vocabulary size since this research focuses on academic vocabulary.

Version 1 of the test was used for the pretest. In order to address the threat of pretesting and memory effect in the posttest, Version 2 of the VLT was administered at the end of the intervention period. For comparison purposes, Version 1 was also administered to the participants at the end of the intervention period.

Kahoot!

Gamification was incorporated into direct vocabulary instruction through the free online gaming platform, Kahoot!. Kahoot! is a quiz-style game that allows teachers to create their own questions. Students score points based on the accuracy and speed of their response. In this study, the questions were designed by the teacher in order to reinforce the vocabulary items taught.

In Kahoot!, the questions and answer choices are projected on a large screen at the front of the classroom and the students select the answer from the answer codes displayed on their individual devices. After each question, students receive individual feedback on their devices on the accuracy of their answers. On the large screen, the overall distribution of answers chosen by all the students is displayed. This provides feedback to the teacher on the students' understanding of the vocabulary item(s) and enables the teacher to provide additional guidance on the vocabulary item(s) where necessary. Subsequently, a leader board shows the top scorers before the next question is displayed. This creates an engaging and interactive environment in the class.

The Intervention Programme

The researcher named the intervention programme the Accelerated Vocabulary Acquisition (AVA) programme. The AVA programme was conducted for 7 weeks. It was incorporated within the students' existing English proficiency course. Direct vocabulary instruction integrating gamification using Kahoot! was conducted based on Marzano's framework. As part of the intervention programme, the students maintained an online vocabulary notebook where they recorded the vocabulary items and wrote down their own definitions. They were allowed to use their first language if they found it necessary. For each vocabulary item, they were also required to include a non-linguistic representation, which could be pictures that are downloaded from the Internet or their own illustrations.

Instruction for the control group was carried out as a normal English language class and learning of vocabulary was incidental and part of the routine teaching. No overt action was taken to teach vocabulary directly to the control group.

The students in the intervention group received direct vocabulary instruction as part of their regular English course. They were taught academic vocabulary items relevant to the topic of the day. In each lesson as well, students played Kahoot! to review vocabulary items taught in previous lessons. By using Kahoot!, similarities and differences in vocabulary items could also be highlighted to the students. Students were also given immediate feedback on errors, if any, after each question in Kahoot!. The AVA programme required 10 to 20 minutes of class time. The duration of each English lesson was 90 minutes.

Data Analysis

Each participant was coded individually for the data analysis. The pretest and posttest were marked manually and the scores were entered as raw scores into SPSS. The scores were tested for normality and the data was found to be normally distributed. The Levene's test for homogeneity was used to examine if the students in the intervention group and the control group were homogeneous and the results ($p = 0.12$, $p > 0.05$) indicated that the groups were homogeneous. Paired samples *t*-tests were performed separately for the control group

and the intervention group to determine if there was any significant difference between their pretest and posttest scores. The scores from the two groups were also analysed for their effect size and the ability of the students to achieve mastery score on the vocabulary test.

In order to compare the performance of the control group and the intervention group, the independent samples *t*-test was carried out to determine if there was any significant difference in their posttest scores. In addition, the effect sizes and mastery score of the two groups were compared.

RESULTS

Statistical Significance

Statistical significance was considered within the control group and the intervention group as well as between the two groups. Paired samples *t*-tests were conducted for the control group and the intervention group to determine if there was any significant difference in the academic vocabulary scores of the students within each group. Since the posttest consisted of Version 1 and Version 2 of the VLT (henceforth referred to as VLT Version 1 and VLT Version 2 respectively), separate *t*-tests were conducted for the results of each version. Table 1 shows a summary of the statistical results for the control group and the intervention group.

Students in the control group scored a mean of 22.16 (SD = 4.37) in the pretest. In the posttest, the students' mean score was 23.18 (SD = 4.07) for VLT Version 1 and 23.39 (SD = 3.94) for VLT Version 2. There was a significant difference in the scores for both versions; mean difference = 1.02, SD = 3.22, $p = 0.003$ for VLT Version 1 and mean difference =1.23, SD = 3.47, $p = .001$ for VLT Version 2. For students in the intervention group, the pretest mean score was 21.68 (SD = 3.76). There was significant difference in their posttest scores for VLT Version 1 (M = 25.62, SD = 3.17); $p < 0.000$, mean difference = 3.93, SD = 2.73, and VLT Version 2 (M = 26.94, SD = 2.46); $p < 0.000$, mean difference = 5.25, SD = 3.24.

As seen in Table 1, the intervention group obtained a higher score in the posttest (for both VLT Version 1 and VLT Version 2) than the control group. In order to determine if the difference is statistically significant, the independent samples *t*-test was carried out for VLT Version 1 and VLT Version 2 posttest scores for both groups. The independent samples *t*-test showed that the VLT Version 1 posttest scores for the intervention group (M = 25.62, SD = 3.17) were significantly higher than the scores obtained by the control group (M = 23.18, SD = 4.07), $p < 0.000$. Similarly, the

Table 1
Statistical results

	Pretest Mean	Posttest (VLT Version 1) Mean	Posttest (VLT Version 2) Mean	Statistical Significance
Control group	22.16	23.18	23.39	Yes ($p < 0.05$)
Intervention group	21.68	25.62	26.94	Yes ($p < 0.05$)

independent samples *t*-test showed that the scores in the VLT Version 2 posttest were significantly higher for the intervention group (M = 26.94, SD = 2.46) compared to the control group (M = 23.39, SD = 3.94), $p < 0.000$.

Although students in both the control group and the intervention group showed significant improvement in their academic vocabulary scores, the independent samples *t*-test results showed that direct vocabulary instruction through the AVA programme enabled students in the intervention group to obtain significantly higher scores than students in the control group.

Effect Size

Since statistical significance is affected by the sample size, Coe (2002) advocated that effect size be taken into consideration 'for quantifying the effectiveness of a particular intervention'. Effect size quantifies the size of the difference between the two groups and is not dependent on sample size. The effect sizes are described in terms of whether they are small ($d = 0.2$), medium ($d = 0.5$) or large ($d = 0.8$) (Coe, 2002).

Table 2 shows the effect sizes for the increase in academic vocabulary scores for the control group and the intervention group. The effect size for the control group was small for both VLT Version 1 and VLT Version 2 ($d = 0.32$ and $d = 0.35$ respectively). On the other hand, there was a large effect size ($d > 0.8$) for the intervention group in the posttest, $d = 1.44$ for VLT Version 1 and $d = 1.62$ for VLT Version 2.

Table 2
Summary of effect sizes

	Posttest (VLT Version 1)	Posttest (VLT Version 2)
Control group	0.32	0.35
Intervention group	1.44	1.62

Mastery Score

Students are considered to have mastery of academic vocabulary if they achieve 83% and above on the vocabulary test, the threshold recommended by Nation (1990). For the VLT, that percentage is equivalent to a score of 25 and above (maximum score = 30). From the mean scores (see Table 1), students in both groups were not able to achieve mastery score in the pretest (control group mean = 22.16, intervention group mean = 21.68). After undergoing the AVA programme, the intervention group was able to achieve a mean of 25.62 for VLT Version 1 and 26.94 for VLT Version 2 in the posttest. The control group, however, only obtained mean scores of 23.18 (VLT Version 1) and 23.29 (VLT Version 2) in the posttest. In addition to the mean scores, the number of students who were able to obtain 83% and above was also considered.

Table 3 shows the number of students who scored 83% and above (25 marks and above) in the pretest and posttest. In the pretest, 26 students (28.6%) in the control group and 20 students (22.5%) in the intervention group were able to achieve mastery score. Although there were more students in the control group who had mastery of academic vocabulary

Table 3
Number of students achieving mastery score

	Pretest		Posttest (VLT Version 1)		Posttest (VLT Version 2)	
	Total	(%)	Total	(%)	Total	(%)
Control Group	26	(28.6%)	37	(40.7%)	34	(37.4%)
Intervention Group	20	(22.5%)	77	(86.5%)	58	(65.2%)

at the beginning of the study, students who underwent the AVA programme outperformed students in the control group after the intervention period. The posttest results showed a total of 77 students (86.5%) achieving 83% or more for VLT Version 1 and 58 students (65.2%) for VLT Version 2 in the intervention group. In the control group, on the other hand, only 37 students (40.7%) and 34 students (37.4%) were able to achieve mastery scores for VLT Version 1 and VLT Version 2 respectively.

DISCUSSIONS

The results of this study indicated that students were able to improve their academic vocabulary scores significantly through both incidental learning and with direct vocabulary instruction. However, it is important to observe that the improvement is amplified with direct vocabulary instruction through the AVA programme. This is evident in the difference in the effect size and the number of students who were able to achieve mastery score in the control and intervention groups. The results of this study raise the question of whether incidental vocabulary learning of academic vocabulary is sufficient to help the students in their tertiary education. This concern was also raised by Won (2008) who concluded that students may not achieve the desired rate of learning through incidental vocabulary acquisition. The results of this study using the AVA programme affirms the use of direct vocabulary instruction to improve students' academic vocabulary. This finding is consistent with other research that shows low vocabulary acquisition through the incidental approach compared to the explicit learning approach (Schmitt, 2008).

Considering the limited and almost non-existent exposure to academic vocabulary during their secondary education (Manan et al., 2013), tertiary institutions should attempt to address such need through their English proficiency courses. The academic vocabulary of tertiary students should be addressed through direct vocabulary instruction rather than leaving students to their own devices to acquire vocabulary incidentally.

For this purpose, the researchers proposed the AVA programme, which was informed by two learning theories which are the behaviourist theory and the cognitive constructivist theory. Direct vocabulary instruction incorporating gamification provided stimulation and reinforcement to promote learning among the students in line

with the behaviourist theory. In addition, students were taught vocabulary items in relation to other related words and the students maintained a vocabulary notebook. These steps helped students to construct the meaning of the vocabulary items and assimilate this new knowledge with their existing knowledge (as propagated by cognitive constructivism). This leads to better understanding and retention of the vocabulary items taught. The results of this study attest to the feasibility and viability of the AVA programme for vocabulary instruction.

A key feature of the AVA programme is the incorporation of gamification through the use of Kahoot! to enhance direct vocabulary instruction. With Kahoot!, the teacher is able to obtain immediate feedback on the students' understanding of the vocabulary items taught. The advantage is that the teacher can immediately correct any misunderstanding or misconception of specific vocabulary items which pose a difficulty for the students. The incorporation of Kahoot! also promotes active learning among students as they need to think and make meaning of the vocabulary items in order to answer the questions correctly and quickly since both accuracy and speed of their response affect the scoring. The competitive atmosphere created through the use of Kahoot! also provided motivation for students, an important element for learning to take place from the cognitive constructivist point of view.

Advocates of heuristic learning may deem direct vocabulary instruction to be out of place in language teaching. As the now common saying goes, '*Give a man a fish and he will eat for a day; teach a man how to fish and you feed him for a lifetime*'. Although we should encourage heuristic learning among students, such an approach is not suitable for vocabulary learning at tertiary level. Vocabulary learning strategies should be taught during primary and/or secondary education. At the tertiary level, students are embarking on specialized fields of study. They need to 'learn to fish' in their respective fields, but at the same time, they need to be equipped with the necessary tools to enable them to fish. Students do not need to learn how to make fishing tools, as it were. In this modern era of information overload, students (and educators too) need to choose the kind of information and knowledge to learn and/or retain. With so much to learn in their respective fields of study, vocabulary learning strategies may not be a priority for tertiary students. Direct vocabulary instruction, on the other hand, can be a useful approach to equip tertiary students with some of the necessary 'tools' that aid learning in the students' specialized fields.

The positive statistical results of this study are consistent with Yip and Kwan's (2006) study which found that the use of online games was able to significantly increase the mean scores of students and also yield a large effect size (d = 1.3976). Yip and Kwan's (2006) study used a total of 600 minutes to conduct their vocabulary lessons (two 50-minute lessons per week over a period of six weeks) whereas the

AVA programme only required 200 minutes, which is one-third of the duration, to achieve similar results – even with a slightly higher effect size. This result supports the AVA programme as a useful framework for improving students' vocabulary.

Quite often, programmes to improve students' vocabulary are conducted separately from the students' regular class time (Lin et al., 2011; Tan, 2016; Yip & Kwan, 2006). This study shows that the AVA programme can be included within an existing syllabus and that it is not necessary to conduct additional classes or additional vocabulary activities outside of class hours to improve tertiary students' academic vocabulary.

CONCLUSION

The results of this study show that the AVA programme which employs direct vocabulary instruction with Kahoot! is a feasible framework to improve tertiary students' academic vocabulary. The results also indicate that students may not acquire sufficient academic vocabulary through incidental learning alone. Malaysian tertiary students should be taught academic vocabulary because the secondary school syllabus does not provide sufficient exposure to this type of vocabulary (Manan et al., 2013). Academic vocabulary is important in helping tertiary students comprehend academic texts. As such, it is hoped that direct vocabulary instruction can be incorporated into the English proficiency courses at tertiary institutions to benefit the students.

There is a paucity of studies that examine the feasibility of using direct vocabulary instruction to improve academic vocabulary, especially among Malaysian tertiary students. This study contributes to such genre in the research literature. Although it focused on academic vocabulary, the AVA programme can be adapted to teach any type of vocabulary.

Kahoot! is one example of incorporating gamification into direct vocabulary instruction. Researchers may explore other gaming platforms that may offer other features to suit their own requirements. Researchers with relevant expertise could also design their own gamification platforms to improve vocabulary.

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