Synonym-Aid: Improving Vocabulary Use in Graph Analysis Using Synonym Cards

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Abstract: *English for Second Language (ESL) learners often face problems in writing due to limited vocabulary. Similar issues can be observed when students write essays for graph analysis. The literature suggests that vocabulary cards could improve writing. Undertaking action research in writing class, this study investigated the impact of using synonym cards on vocabulary use in graph analysis writing. This study sought to answer the following research questions: "How does Synonym-Aid improve vocabulary range in students' graph analysis?" and "How does Synonym-Aid improve the students' use of different noun and/or verb phrases?". This qualitative study employed text analysis emphasizing on lexical components to measure word frequency, diversity, and use of specific vocabulary. The data set was essays of 35 students from two classes which were divided into two groups: control group and intervention group. Only the students in the intervention group were given Synonym-Aid during an in-class graph analysis writing task. The students' essays from both groups were then graded using CEFR-aligned writing descriptors to assess vocabulary elements. The finding showed that students in the intervention group used a wider range of vocabulary including different verbs and noun phrases to describe similar trends. It can be concluded that, while students in the control group were able to use verb and noun phrases to describe trends, the vocabulary range was still somewhat limited. The study showed that direct and immediate intervention like synonym cards was able to improve vocabulary use in graph analysis writing.*

Keywords: Vocabulary, Synonym Card, Teaching Aid, Graph Analysis
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1. Introduction

A language learner's vocabulary knowledge highly reflects his or her proficiency because vocabulary acts as the foundation for them in using the language. Vocabulary is among the first basic elements introduced to English as Second Language (ESL) learners, which only then followed by exposure to other grammatical items and more complicated structures.

Several studies (Abd Latip & Yamat, 2022; Mehring, 2015; Rahmawati & Utami, 2019; Sitompul, 2013) highlighted the importance of vocabulary mastery in ESL. When learners acquire a certain level of vocabulary mastery, they would be able to express and understand ideas in the target language. However, it is often observed that most ESL learners face vocabulary mastery problems in ESL learning and this could interfere with communication; both written or spoken (Mojarradi, 2014; Rahmawati & Utami, 2019).

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At present, the same problem can be observed among Centre for Foundation Studies (CFS) IIUM students undertaking English subjects. Their limited vocabulary knowledge is a common problem regardless of proficiency level, causing them to use the same vocabulary repetitively. This would pose an issue for them attempting a proficiency test as they could not demonstrate their ability to use the expected vocabulary to a certain proficiency level.

In CFS IIUM, students are required to sit for the English Proficiency Test (EPT). Their writing proficiency is determined by two writing tasks namely Task 1 (graph analysis essay) and Task 2 (opinion-based essay). Students' essays are graded based on CEFR-aligned descriptors whereby their final writing band is determined by the average bands for both Task 1 and Task 2.

Oftentimes, their essays do not achieve the required band for lexical resource criteria. They fail to meet the standards for bands 5.5 or 6, which are the required bands for students to pass EPT. Their essays would usually fit within the bands 4, 4.5 and 5 criteria. According to IELTS Writing Task 1 Band Descriptors, their essays would only fit the following descriptions "The resource is limited but minimally adequate for the task", "Simple vocabulary may be used accurately but the range does not permit much variation in expression" and "There may be frequent lapses in the appropriacy of word choice, and a lack of flexibility is apparent in frequent simplifications and/or repetitions" (British Council, n.d.).

This clearly shows that students lack the ability to use a wide range of vocabulary with precision and flexibility. Their insufficient vocabulary knowledge is among the reasons for their low marks. They are not able to utilise appropriate words such as verb phrases or noun phrases to describe movement which are paramount in graph analysis. Among the common problems faced by test takers in IELTS Task 1 writing are word choice, word forms and language use, among others (Arham & Ariani, 2020). Therefore, despite the students' ability to achieve the required passing band for their Task 2 writing, it is observed that students often achieve a low overall writing band as a result of the low Task 1 writing band.

As part of the teachers' efforts to find a solution to the problem, the researchers then attempted to undertake classroom action research. According to Ahmadi and Mansoordehghan (2015), compared to Task 2 writing, Task 1 writing is more technical in nature. This means knowing certain strategies like learning the appropriate words and phrases that could be applied to different graph analysis tasks could greatly improve their bands. Thus, Synonym-Aid which is a set of synonym cards was then materialised to aid students in graph analysis writing. Synonym-Aid takes into consideration Piaget's Cognitive Development theory which states that vocabulary is learned through organisation of knowledge and schema development (Abd Latip & Yamat, 2022). It is a compilation of word cards used as reference for writing graph analysis. Students could refer to it to learn how to analyse the different trends, changes and movement of different degrees. In Synonym-Aid, words are categorised into different trends and changes to ease reference. Students are given Synonym-Aid while they attempt data analysis writing in class. The categorisation of words according to their synonymous characteristics eases the use of Synonym-Aid to students. They could refer to Synonym-Aid while writing graph analysis essays with little to no assistance from teachers.

Reviewed literature (Amiruddin & Razaq, 2022; Limantoro, 2018; Nugroho et al., 2012; Rahmawati & Utami, 2019; Sitompul, 2013) on the use of word cards in ESL classrooms mainly concluded that such a method is effective to improve vocabulary knowledge. Interestingly, some related works (Limantoro, 2018; Mathura & Zulu, 2021; Webb et al., 2020)

also revealed that the improvement on learners' vocabulary knowledge as a result of using word cards in the classroom has positively affected their writing progress. Since vocabulary knowledge is directly connected to communication competency, mastering a larger vocabulary range would also mean learners are able to communicate more effectively, including in writing.

Similarly, in their meta-analysis on the effectiveness of vocabulary-learning activities, Webb et al. (2020) reported that the use of flashcards and wordlists lead to relatively larger acquisition in vocabulary knowledge while writing compared to other methods. It is also noteworthy that, apart from improving vocabulary knowledge, learners demonstrated heightened engagement and interest when word cards were introduced in ESL classrooms (Hardiyanti & Herda, 2023; Limantoro, 2018; Rahmawati & Utami, 2019). It is interesting to note that several studies reviewed were done in ESL classrooms in Indonesia. Considering that English is the second language in both Malaysia and Indonesia, the studies conducted in Indonesian ESL classrooms are expected to be adaptable for the ESL classroom practice in Malaysia. In addition, the first languages in both countries are of similar nature.

Based on the background above, this study sought to answer the following research questions:
i. How does Synonym-Aid improve vocabulary range in students' graph analysis?
ii. How does Synonym-Aid improve the students' use of different noun and/or verb phrases?

2. Methodology

The method utilised in this study is classroom action research. Action research method aims to solve an educational problem identified by educators in their own classrooms. Mertler (2013) described action research as a systematic inquiry into educators' own practice whereby they try to evaluate the effectiveness of their practice and make informed decisions about what could be improved, changed or maintained. The process includes identifying a problem, planning an intervention, implementing the intervention, collecting and analyzing data, and reflecting on the results. In the attempt to improve students' vocabulary knowledge for graph analysis, this study has undertaken classroom action research.

The action research model adapted for this study was developed by Kemmis and McTaggart (1988) as cited in Ahmed (2009). Nevertheless, for the action stage of cycle 2, the current study employed an experimental approach in which control and experimental groups were used to investigate the effectiveness of Synonym-Aid to improve vocabulary use in graph analysis writing. Such adjustments were made to observe if the use of Synonym-Aid would really improve graph analysis writing in the experimental group as compared to the control group. According to Ahmed (2009), action research allows educators to decide and make adjustments to assess the effectiveness of data collected from their own classrooms. After all, Corey (1953) in Ahmed (2009) argued that changes that occur as a result of the process would be true to that particular classroom only and not to be generalised to a broader audience.

This particular model of action research outlines two cycles of four stages which include the fundamental steps of 1) planning the action 2) implementing the action 3) observing the action 4) reflecting the results of the observation (Nasrollahi et al., 2012).
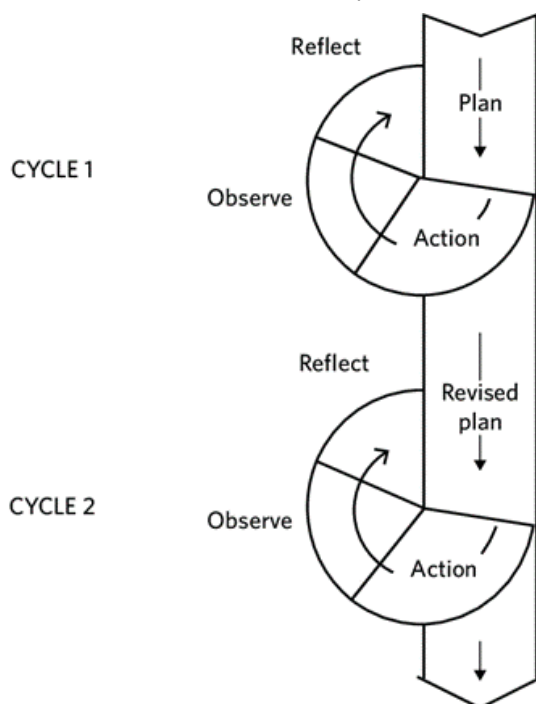
Figure 1: Classroom action research model (Kemmis and McTaggart, 1988)

Table 1: Steps for action research in the current study

Cycle 1	
Plan	The teacher introduces graph analysis essay writing. Different nouns, verbs, adjectives and adverbs to describe trends are taught as part of the lesson/lecture. The list of words is shared on PPT slides.
Action	Students are assigned graph analysis writing tasks.
Observe	Student essays are graded and analysed.
Reflect	Students write using limited vocabulary, some with inaccurate pairing for verb and/or noun phrases.
Cycle 2	
Revised plan	The introduction of Synonym-Aid. In the first part, synonyms of verbs and nouns are categorised into different trends or movements. For the second part, synonyms of adverbs and adjectives are categorised into different degrees of movements. The cards are colour-coded to indicate accurate pairing of verb-adverb and noun-adjective. This is to assist students to use either verb an/or noun phrases correctly.
Action	Students are assigned another graph analysis writing task. In this cycle, students from the same class are divided into two groups; control group (without access to Synonym-Aid) and experimental/intervention group (with access to Synonym-Aid).
Observe	Students' essays are graded and analysed.
Reflect	Control group: used limited vocabulary Experimental group: used a lot more varieties of vocabulary with accuracy and minimal repetition.

For the observation stage in cycle 2, this study employed a text analysis method in which the instrument used for this study was the students' essays. The researchers mainly analyse students' essays from cycle 2 to gather input to answer RQ1 and RQ2. The essays were graded and the vocabulary used was analysed through text analysis. The researchers identified only the words that describe movements, changes or trends in the essays. The data were then tabulated and categorised according to verbs, nouns, verb phrases (verbs and adverbs) and noun phrases (adjectives and nouns).

To answer RQ1, the variety of lexical components used to describe trends and movements was taken into account. The frequency of lexical components of each essay was measured and categorised into verb, noun, verb phrase and noun phrase categories. Repetitive vocabulary and phrases were considered as one entry. As RQ1 attempts to identify how Synonym-Aid improves vocabulary range in students' graph analysis, the variations of verbs, nouns, verb and noun phrases are considered to indicate the extent of vocabulary use. In other words, the more variations an essay has, the wider the vocabulary range.

To answer RQ2, the tabulated lexical components in each essay were compared against IELTS Writing Task 1 Band Descriptors. RQ2 attempts to examine how Synonym-Aid improves the use of different noun phrases and/or verb phrases. As such, apart from the frequency, the accuracy of phrases used to describe trends and movements is also factored in. The researchers refer to lexical resources criteria in the IELTS Writing Task 1 Band Descriptors whereby each essay was given a band. Improvement of students' use of noun and verb phrases would be reflected by the value of graded bands.

3. Findings and Discussions

Answering Research Question 1: How does Synonym-Aid improve vocabulary range in students' graph analysis?

The findings of the text analysis conducted on the students' essays from cycle 2 are presented in the tables below. Table 2 shows the targeted vocabulary used by students in the experimental group while Table 3 is for the control group.

Table 2: Vocabulary to describe trends used by students in experimental group

PARTICIPANTS	VERB	NOUN	VERB PHRASE	NOUN PHRASE	DESCRIPTION	BAND
STUDENT 1	x	x	1. decline slightly	1. upward trends x 2 2. unstable patterns x 2 3. a moderate increase 4. a constant trend 5. slight growth 6. minimal drop 7. steady pattern 8. small fall 9. a significant rise 10. an unstable pattern 11. minimal growth 12. marginal fall 13. minor climb	The resource is generally adequate and appropriate for the task.	6
STUDENT 2	1. drop	x	1. slightly increased	1. an upward trend 2. a gradual rise 3. a stable trend 4. a slight decrease 5. a moderate rise 6. a steady trend 7. a fluctuated trend 8. minimal growth	The resource is generally adequate and appropriate for the task.	6
STUDENT 3	x	1. decrease	1. rise gradually 2. remained constant	1. upward trend 2. an increase 3. a dramatic growth 4. a steady growth 5. a moderate increase	The resource is generally adequate and appropriate for the task.	6

STUDENT 4	1. grow 2. rose	x	1. rose moderately 2. decrease gradually 3. fell slightly 4. dropped minimally	1. upward trends 2. unstable trends 3. a significant rise 4. a constant trend 5. a slight decrease 6. an unchanged trend 7. a small increase	The resource is generally adequate and appropriate for the task.	6
STUDENT 5	1. decrease	x	1. fell slightly 2. remained steady 3. rose mildly	1. an upward trend 2. a sharp increase 3. rapid growth 4. a contrasting trend 5. a steady trend 6. a slight increase	The resource is generally adequate and appropriate for the task.	6
STUDENT 6	1. climb	x	1. grew significantly 2. drop reasonably 3. went up gradually	1. an upward trend 2. a slight rise 3. a fluctuation trend 4. unstable drop	The resource is generally adequate and appropriate for the task.	6
STUDENT 7	1. maintained 2. went up 3. went down	1. a fall 2. a growth	1. rose gradually 2. climb back moderately	1. an upward trend 2. a slight decrease 3. a nearly constant number 4. an increase trend	The resource is generally adequate and appropriate for the task.	6
STUDENT 8	1. peaked 2. skyrocketed 3. plateaued	1. increase	1. gradually increase 2. remained the same 3. slightly rose 4. went back down	1. upward trend 2. no significant changes 3. little fluctuation	The resource is sufficient to allow some flexibility and precision.	7
STUDENT 9	1. maintained	x	x	1. an upward trend x2 2. a gradual rise 3. a slight fall 4. an unstable drop 5. a decreasing number 6. a minimal rise	The meaning is generally clear in spite of a rather restricted range or a lack of precision in word choice.	6
STUDENT 10	1. dropped	x	1. increase moderately 2. remained the same 3. climb marginally 4. rose drastically	1. an upward trend 2. a maintained numbers 3. significant change 4. a downward trend	The resource is generally adequate and appropriate for the task.	6
STUDENT 11	1. went up	x	1. increased drastically 2. went up moderately 3. drop drastically 4. decreased minimally 5. grew slightly	1. a downward trend 2. an upward trend 3. sudden change	The resource is generally adequate and appropriate for the task	6
STUDENT 12	1. remained	1. a growth	1. increased steadily 2. decreased significantly 3. remained almost the same	1. a downward trend x 2 2. an upward trend 3. a minimal growth	The resource is generally adequate and appropriate for the task	6
STUDENT 13	x	x	1. went up significantly 2. increased minimally 3. rose slightly 4. moderately dropped 5. went down minimally 6. went up slightly	x	The meaning is generally clear in spite of a rather restricted range or a lack of precision in word choice	6
STUDENT 14	1. peaked at x 2 2. started increasing	1. a decrease	1. remained constant 2. drastically dropped 3. remained almost unchanged	1. an upward trend 2.a slight downward trend	The meaning is generally clear in spite of a rather restricted range or a lack of precision in word choice	6
STUDENT 15	1. rose 2. starts to climb	1. decline x 2	1. increased significantly 2. droped slightly	1. moderate changes	There are some errors in spelling and/or word. formation, but these do not impede communication.	6
STUDENT 16	x	1. decrease 2. an increase	1. rise gradually 2. remained constant	1. upward trend 2. a dramatic growth 3. a steady growth 4. a moderate increase	The resource is generally adequate and appropriate for the task	6

Table 3: Vocabulary to describe trends used by students in control group

PARTICIPANTS	VERB	NOUN	VERB PHRASE	NOUN PHRASE	DESCRIPTION	BAND
STUDENT 17	1. maintained	x	1. increased significantly 2. remained stagnant 3. went up sharply	1. upward and steady trends 2. a steady trend	The resource is limited but minimally adequate for the task.	5
STUDENT 18	x	x	1. increased significantly 2. remained same 3. remained constant 4. decreased subsequently 5. slightly increased 6. remained stagnant	1. an upward trends 2. a moderate incline	There may be frequent lapses in the appropriacy of word choice, and a lack of flexibility is apparent in frequent simplifications and/or repetitions.	5
STUDENT 19	1. were decreased 2. was maintained	x	x	1. an upward trends	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively.	4
STUDENT 20	1. decreased	x	1. increased gradually 2. remained unchanged 3. rose slightly	1. upward trend 2. a steady trend 3. a fluctuation phase 4. fluctuation trend	Simple vocabulary may be used accurately but the range does not permit much variation in expression.	5
STUDENT 21	1. decrease	x	1. remained constant x 2	1. increasing trend 2. a slightly increase	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively	4
STUDENT 22	1. fell 2. changed x 2	x	1. decreased slightly 2. rose significantly	x	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively	4
STUDENT 23	1. increased 2. decreased	x	1. remain the same 2. increasing dramatically 3. increased progressively	1. a steady trend 2. a constant trend 3. a contrasting trend	Simple vocabulary may be used accurately but the range does not permit much variation in expression.	5
STUDENT 24	x	x	1. increased moderately 2. remained unchanged 3. remain the same 4. fall slightly 5. climb dramatically	1. upward trend 2. moderate trend 3. a slight fluctuation	The resource is limited but minimally adequate for the task.	5
STUDENT 25	x	x	1. slightly decrease 2. remained constant 3. mildly increase	1. upward trend 2. a steady trend x 2 3. a moderate rise 4. a moderate increase 5. a constant trend 6. a slight increase 7. a slight fell	The resource is limited but minimally adequate for the task.	5
STUDENT 26	x	x	1. grew significantly 2. rose dramatically	1. upward trend 2. constant trend 3. declined trend 4. fluctuation phase	The resource is limited but minimally adequate for the task.	5
STUDENT 27	x	1. a climb 2. an increase	1. moderately changed	1. an upward trends 2. a sudden growth 3. a steady trend	The resource is limited but minimally adequate for the task.	5
STUDENT 28	x	1. an increase	x	1. a slight decrease	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively.	4

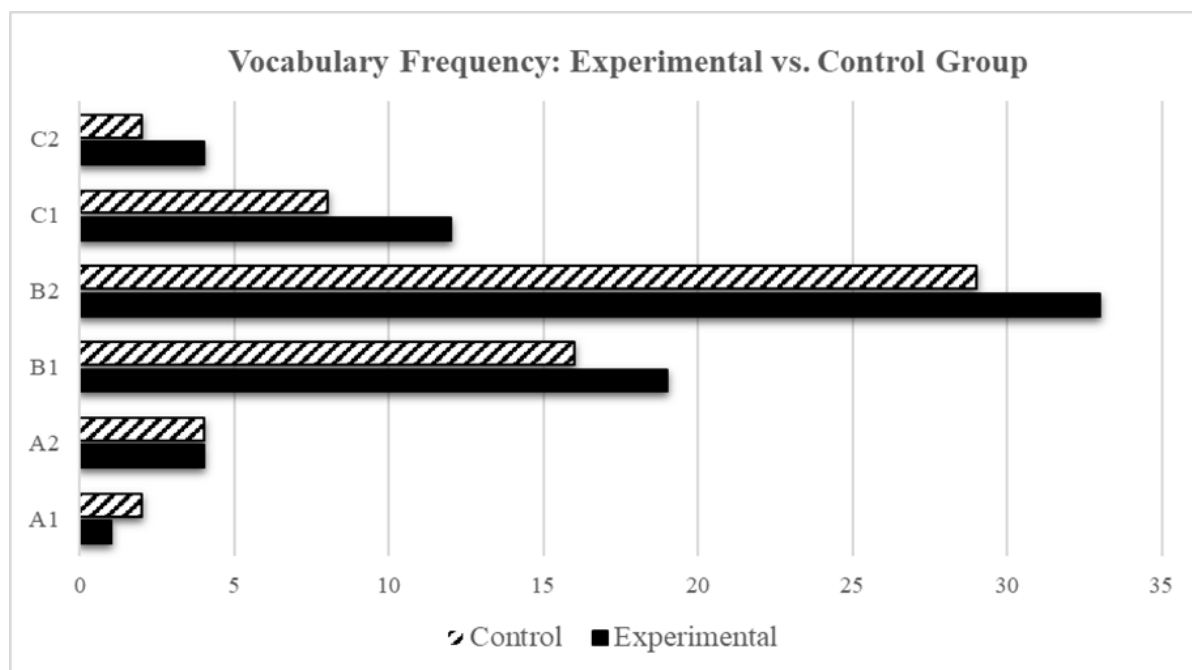| STUDENT						
STUDENT 29	x	1. growth x 2	1. gradually increasing	x	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively.	4
			2. gradually decreasing			
STUDENT 30	1. increased x 2	x	1. remained constant	1. a slight increase	The resource is limited but minimally inadequate for the task.	5
	2. decreased x 2					
STUDENT 31	1. increased	x	1. kept on increasing	1. a great downfall	The resource is limited but minimally inadequate for the task.	5
	2. plunged		2. remain the same			
			3. kept rising			
STUDENT 32	x	x	1. decreased slightly	1. largest increased	Simple vocabulary may be used accurately but the range does not permit much variation in expression	5
			2. increased moderately	2. a major decreased		
			3. increased slightly	3. a great rise		
			4. decreased significantly			
STUDENT 33	1. fell	x	1. going upward	x	The resource is limited and inadequate for or unrelated to the task. Vocabulary is basic and may be used repetitively.	4
			2. goes downward			
STUDENT 34	1. maintained	x	1. increased significantly	1. upward and steady trends	The resource is limited but minimally inadequate for the task.	5
			2. remained stagnant			
			3. went up sharply	2. a steady trend		
STUDENT 35	x	x	1. increased moderately	1. upward trend	There may be frequent lapses in the appropriacy of word choice, and a lack of flexibility is apparent in frequent simplifications and/or repetitions.	5
			2. remained unchanged			
			3. remain the same	2. moderate trend		
			4. fall slightly			
			5. climb dramatically	3. a slight fluctuation		

Figure 2: Vocabulary frequency categorised by CEFR level after using Synonym-Aid

From the findings, as observed in Table 2, most students in the experimental group used variations of verb and noun phrases and some students even employed all four categories i.e. verb, noun, verb phrase and noun phrase to describe the trends in the graph with minimal repetition. As illustrated in Table 3, it is obvious that students in the control group used less variety of vocabulary.

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Figure 2 shows the frequency of vocabulary used to describe trends by both groups after the intervention. CEFR (Common European Framework of Reference for Languages) measures students' language proficiency through a range of levels from A1 (beginner) up to C1 (advanced). It can be seen that students from both groups used words ranging from level A1 to C1 but the frequency for higher level vocabulary was more prominent among students in the experimental group. Vocabulary that falls under CEFR level B1 to C2 recorded a moderate increase in its use by the experimental group.

Meanwhile, students in the control group had limited vocabulary as they recorded a lower frequency of vocabulary used. Repetitions of certain commonly used words such as "increased" and "decreased" were also predominant, which shows that there was a gap between the experimental and the control groups in terms of their vocabulary range. This points to students' lack of exposure to the alternative words to replace the basic terms or their lack of confidence in using synonyms in the right context. Synonym-aid is innovated exactly to address this issue by equipping students with more sophisticated vocabulary.

These findings suggest that the intervention by using Synonym-aid has significant positive impacts on students' vocabulary use. The noticeable increase in the use of higher-level vocabulary according to the CEFR descriptor indicates its ability to facilitate students in analysing graphs. This aligns with previous studies (Amiruddin & Razaq, 2022; Limantoro, 2018; Nugroho et al., 2012; Rahmawati & Utami, 2019; Sitompul, 2013) which emphasised on the effectiveness of flashcards in enriching students' vocabulary. Furthermore, it also proves that apart from expanding students' vocabulary knowledge, Synonym-Aid could also help them in using the words in sentences correctly according to context.

It is important to note that the vocabulary required to write graph analysis effectively is not used frequently on a daily basis by ESL learners. Therefore, the difference in vocabulary range observed between the two groups was expected prior to the action research. As mentioned in Table 1, students have been taught the different vocabulary to describe trends in the first cycle of this action research. This could be a contributing factor to the use of higher CEFR level words by a few students in the control group. Nevertheless, the range is still considered limited or minimally adequate. Thus, it can be concluded that the intervention from Synonym-Aid helps improve students' vocabulary range in their graph analysis writing.

Answering Research Question 2: How does Synonym-Aid improve the students' use of different noun and/or verb phrases?

Table 4: Total number of students according to band scores

Band	Experimental Group	Control Group
7	1	0
6	15	0
5	0	13
4	0	6

The findings in Table 4 show that most students in the experimental group managed to score band 6 for vocabulary component based on the IELTS Writing Task 1 Band Descriptors, with one student scoring as high as band 7. The control group, however, recorded bands 5 or lower, which indicates a failure in producing good analysis of the graph due to vocabulary restrictions. To clarify, the bands were awarded not only based on the vocabulary range of the students, but also based on the effectiveness and accuracy of the vocabulary used. The experimental group

scored better due to wider vocabulary range and effective use of the said vocabulary, exhibiting a better understanding of subtle differences in trend descriptions as well as adding clarity to their analysis. In contrast, the control group scored lower due to limited range of vocabulary and lack of accuracy in their attempts to use varied expressions to describe the trends in the graph. Based on the findings, it is evident that the intervention of Synonym-Aid facilitates students' ability to select more appropriate and varied expressions, thereby improving the quality of their writing.

Graph analysis essays similar to the ones produced by the control group will unlikely allow students to pass EPT Writing. With the intervention through the use of Synonym-Aid, students could learn the variety of noun and/or verb phrases to describe trends early on and continue using these phrases accurately and effectively throughout the semester. It agrees with the studies by Abd Latip and Yamat (2022) and Nugroho et al. (2012) which found that vocabulary flashcards can improve vocabulary mastery and eventually lead to better writing output. Consequently, the improvement in the use of noun and/or verb phrases to describe trends in graph analysis would be reflected by the upgrade in band scores in EPT.

4. Conclusion

The use of Synonym-Aid for graph analysis writing lessons has demonstrated its effectiveness to improve students' vocabulary knowledge. This shows that direct and immediate interventions like using word cards as teaching aids can assist students in improving their vocabulary use in writing. The categorisation of synonyms to describe different trends in the graph coupled with the illustrations of movement have made it easy for students to use the synonym cards with little to no supervision from the teacher. This means that students would also be able to use Synonym-Aid for independent learning when they are revising lessons on graph analysis. Generally, students' feedback and progress of their writing have been positive. Although there is still the question of whether such an approach could help students improve their vocabulary mastery in the long run, in the context of graph analysis writing, Synonym-Aid has achieved its intended purpose.

Acknowledgments

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