Enhancing Students' Motivation and Proficiency on Technical Vocabulary through Flipped Learning

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Abstract. Having sufficient English vocabulary especially the technical one indeed becomes one of the aspects in supporting the English learning for Electrical Engineering students. This classroom action research study, therefore, aims to investigate students' motivation and proficiency on technical vocabulary through the implementation of Flipped Learning. This study was conducted to the second semester students of Electrical Engineering Study Program of Polytechnic of Raflesia. The Flipped Learning was implemented in two cycles consisting of four meetings of each cycle. Pre-test and post-test were given along the learning to assure the improvement on students' vocabulary. The interview then was conducted as well to figure out how Flipped Learning influenced students' motivation. The study reveals that Flipped Learning does contribute positively to the students' motivation and their proficiency on Technical Vocabulary, especially on noun and verb related to the safety precaution and safety equipment.

INTRODUCTION

Vocabulary is crucial and essential in the second language acquisition process and it becomes prerequisites for effective language learning (Yawiloeng, 2020). It is widely agreed that one cannot learn a language without first acquiring a significant vocabulary basis. Vocabulary, which is the foundational knowledge of a language, significantly influences one's proficiency in speaking, listening, reading, and writing in that language (Wangdi, 2022). In term of speaking and listening, sufficient vocabulary becomes the major point to create the effective verbal communication. In reading and writing, in addition, vocabulary plays significant role to support the understanding on the written material. However, in the reality, communication process often runs ineffectively in second language learning class due to the limited vocabulary of students in using the language (Surmanov & Azimova, 2020).

Recently, the need to achieve a proficient language ability especially related to certain profession becomes the core attention among educators in language learning due to the advances of various subject disciplines. Boonkongsaen & intaraprasert (2014) stated the ability to understand and comprehend academic reading materials within students' respective fields is a necessary skill for university students. Furthermore, Musikhin (2016) proposed that language is increasingly required to be relevant to professional domains or subjects, particularly for scientists and engineers. To obtain this ability, students should be able to acquire vocabulary knowledge related to those professions first. This kind of vocabulary well-known in the term of "technical vocabulary" has been defined as vocabulary commonly and frequently used by people

working or studying in certain field and has been acknowledged as a crucial aspect in learning English for specific purposes (ESP) (Nation, 2001; Chung & Nation, 2003). Azmimurad & Osman (2018), in addition, argued that in the age of industry 4.0, it is crucial for academics, such as engineers and professionals, to effectively communicate by becoming proficient in the technical vocabulary specific to their fields. This technical vocabulary consists of words that are commonly used in areas like engineering, science, and medicine (Harmon & Wood, 2018) and conveys the meaning of a concept, process, condition, or characteristic specific to a particular field (Magfirah, Roy & Ariddha, 2022). Indeed, different branches of study have their own specific vocabularies with distinct meanings. Therefore, learning technical vocabulary might not be neglected.

In the same perspective, English language learning in Polytechnic of Raflesia is served specifically to the technical vocabulary dealing with students' study program and also their job in the future. For the Electrical Engineering students, especially, vocabulary learning is focused on providing students the knowledge on the technical vocabulary related to electricity and working area. As Azmimurad & Osman (2018) said it is crucial for students to learn and acquire the vocabulary of their chosen profession before they pursue that profession. Thus, to prepare the students for the profession related to Electrical Engineering field, some certain topics were given such as *Describing Electrical Tools or Equipment, Procedures and Mechanism on Using Electrical Tools or Equipment, Safety Precaution,* and *Safety Equipment.* However, the preliminary research conducted on the Electrical Engineering students of Polytechnic of Raflesia encounters the vocabulary barrier that the students have in English learning. The interview done to the first semester students reveals that it is quite difficult for the students to understand the English module since there are many technical vocabularies which they do not familiar with. In addition, the interview on the fifth semester students shows that students find the problem in understanding the manual instruction and precaution appearing in the working area where they follow the field practice (PKL). According to Tsou and Chen (2014), students often feel frustrated and demotivated when encountering authentic materials or texts containing technical vocabulary that they are unfamiliar with. This insufficient vocabulary proficiency might hinder students' capacity to successfully express themselves verbally, write written works, and comprehend written materials (Karya et al., 2022).

Regarding to the problem encountered above, there should be an appropriate strategy taken to help the students cope with this vocabulary issue. Flipped Learning in this case, is chosen to be implemented do to the side effort to initiate the students to have meaningful and student-centered activities. Over the years, experts and educators have elaborated and enhanced strategies which were believed to have a positive impact on students' skills and achievement. The strategies enabled students to get more opportunities to obtain better understanding on the material as well as on their talent by taking active role in the learning process which indeed became the primary focus and by getting the assistance of the teacher and peers. Flipped Learning is considered to meet this purpose. Crisan & Albulescu (2017) proposed that Flipped Learning is done through the combination of classroom and home learning activities which involves three main phases; teacher provides online material which is commonly in the video format and some tasks to be learned and to be done by students at home, students watch and do the tasks given, and students engage in interactive discussions with the teacher and classmates to further understand the material on the following day. The use of technology which can be accessed online providing support for students learning becomes the main emphasize in Flipped Learning (Yulietri, Mulyoto, & Agung, 2015). This model of learning shifts the traditional homework and classroom activities by engaging students in pre-class tasks to acquire knowledge which is then presented in the form of discussion or project work during in-class activities (Nugroho, 2021). Flipped

leaning is considered as an approach centered on the students to achieve better learning quality in the classroom (Ozdamli & Asiksoy, 2016).

METHOD

This classroom action research was conducted at Electrical Engineering Study Program of Raflesia Polytechnic and involved the second semester students. Considering the problems in the vocabulary the students had, the researchers initiated to choose Flipped Learning model to be implemented on "Bahasa Inggris Teknik II" subject. Second semester students were chosen as research participants since they were considered to have enough technical vocabulary that they had studied in the previous semester on "Bahasa Inggris Teknik I" subject.

The data of the research were collected by doing test, observation, and interview. Pre-test was given before applying Flipped Learning to see students' initial proficiency on the technical vocabulary. It was carried out by conducting a multiple choice written test regarding *"Electrical Tools and Equipment"*. During the implementation of Flipped Learning, direct observation in the classroom was done to observe students' activities in understanding the topic and assignment given. At last post-test was used to evaluate students' learning outcomes after the implementation of Flipped Learning. The post-test was carried out 2 times, namely post-test 1 in cycle 1 regarding *"Safety Precautions"* and post-test 2 regarding *"Safety Equipment"* in cycle 2. The post-test was written in the form of filling gaps and matching items. The improvement on students' technical vocabulary was analyzed by calculating the average score students achieved. The average score of all tests then was adjusted with the result of interview conducted at the last meeting of cycle 2. The interview purposed to find out how the Flipped Learning affected students' motivation and it was served in the form of semi-structured to get more comprehensive responses from the students.

FINDING AND DISCUSSION
Findings
    Preliminary Observation and Pre-Test

Preliminary observations on the second semester students of Electrical Engineering Study Program in the classroom showed that students were lack of vocabulary and motivation which affected the learning. In speaking activities, students were not engaged and contributed actively in answering lecturers' questions and in giving their arguments verbally. Furthermore, in written activities, students took longer time to complete the written task given and they still required assistance from the lecturer or from online dictionary to figure out the vocabulary meaning appeared. This condition of the students' insufficient vocabulary is proven by the result of the pre-test. Pre-test result shows that the average score of students' proficiency on technical noun is only 52.41 while on technical verb is lower at 52.07. The highest score students' could achieve in this pre-test is 70 while the lowest is 30. The results can be clearly seen in the following table:

Table 1. Pre-test Result on Technical Noun and Verb

N	Aspects	Lowest Score	Highest Score	Total Value	Average
29	Technical Noun	30	70	1520	52.41
	Technical verb	40	60	1510	52.07

Considering the pre-test result above, the researchers decided to implement Flipped Learning which was conducted through two cycles with some targets to achieve:

1) Students are able to expand their vocabulary especially on technical noun and verb related to Electrical Engineering.
2) Students are able to use the technical vocabulary appropriately based on the context whether in spoken or in written.
3) Students are highly motivated in the English learning process.

The implementation of Flipped Learning in Cycle 1
Pre-class activity

There are three initial stages in implementing the Flipped Learning. Before teaching, lecturer made a lesson plan consisting the scenario for learning activities in cycle1. After the lesson plan was made, the lecturer searched, selected, and shared a video from YouTube which was significance to the learning topic; *Safety Precaution*. The students were allowed to pause and rewind the video as they wish, but they were not permitted to see the English subtitle. Besides this video, the researcher also shared the assignments along with the instruction the students should complete. The assignments were finding out and taking note as many as sentences conveying safety precaution and underlined the technical noun and verb used. They should figure out the meaning of the complete sentences and the technical noun and verb as well. The students were also suggested to take note on something they thought important to be discussed in the following day.

In-class activity

In-class activity was started by doing brainstorming to refresh and to get attention from the students. Lecturer, then, accommodated discussion session by asking the students in turn to express their answers on the task given previously. Other students could give their responses on the answers and lecturer clarified them to make sure that all students already got the same understanding. During discussion, lecturer also asked about students' difficulties in watching the video at home and in understanding it. Some students admitted that it was hard for them at the beginning to understand the sentences in the video since the speaker spoke quite fast. This condition forced them to rewind the video several times till they got what the speakers actually conveyed. In addition, they still needed to search the meaning of some technical vocabulary that they did not know yet. At the end of the learning, lecturer concluded about the topic and restated the appropriate meaning on the verb found in the video and the students took note.

Post-class activity

Post-class activity covered the assessment on the material learned. Written test regarded as post–test 1 was conducted to evaluate whether the students experienced an improvement on the technical vocabulary which had been discussed at the last meeting. The test was in the form of filling gaps in which the students should write the appropriate technical noun and verb to complete the sentences related to *"Safety Precaution"* provided in the questions. Post-test 1 results are as follow:

Table 2. Post-test 1 Result of Cycle 1 on Technical Noun and Verb

N	Aspects	Lowest Score	Highest Score	Total Value	Average
29	Technical Noun	40	90	1720	59.31
	Technical verb	40	70	1700	58.62

As seen from two tables above, students showed an improvement on the proficiency of technical noun and verb. After implementing Flipped Learning in

cycle 1, the average score of students' proficiency on the technical noun increases from 52.41 to 59.31. Meanwhile, the average score of students' proficiency on the technical verb improves from 52.06 to 58.62. The highest score the students could achieve is 90 and the lowest is 40.

The implementation of Flipped Learning in Cycle 2
Pre-class activity
The same with cycle 1, cycle 2 was also started by planning activities to be done in a lesson plan. After that, lecturer searched, selected, and shared a video from YouTube and which was significance to the learning topic; *Safety Equipment*. Considering the difficulties the students had in the last cycle, lecturer chose the video with English subtitle to help the students to understand it. The same type of assignment as in cycle 1 was given to the students related to the video. Students were instructed to take note as many as sentences appearing in the video concerning *"Safety Equipment"* and underlined technical noun and verb used in those sentences. This same activity was done in purpose to assure that students were able to memorize some technical vocabulary appeared in the previous video in cycle 1 while they observed the new one in the video in cycle 2. Students were also had to understand the meaning of the sentences and wrote them down as well.

In-class activity
The activity began with brainstorming. Lecturer recalled students' memory on some technical noun and verb that had been discussed in cycle 1. After that, lecturer and students came in to discussion session on the assignment. Lecturer and students discussed on the sentences appearing in the video to explain *"Safety Equipment"*. The discussion emphasized more on the technical noun and verb used in the video and the meaning of them. From the observation of discussion, students answered the assignments more easily. This condition was resulted by some reasons which were revealed by the interview results. First, students admitted that they took the benefit of the English subtitle provided in the video. Second, students could match the sound of noun and verb they heard with the written subtitle. Third, the students also could guess the meaning of some verb by matching the activities performed in the video to the written subtitle. Forth, they had already known some technical noun and verb appearing in the video from the previous discussion in cycle 1. At the end of the learning, lecturer concluded about the topic and restated the appropriate meaning on the verb found in the video and the students took note.

Post-class activity
At the last meeting of the implementation of Flipped Learning, another test which was regarded as post-test 2 was conducted. The test was in the form of filling gaps and matching items related to *"Safety Equipment"*. Post-test 2 results are as follow:

**Table 3.** Post-test 2 Result of Cycle 1 on Technical Noun and Verb

N	Aspects	Lowest Score	Highest Score	Total Value	Average
29	Technical Noun	60	90	1990	68.62
	Technical verb	50	80	1740	60.00

After implementing Flipped Learning in cycle 2, the average score of students' proficiency on technical vocabulary shows better improvement. The average score on

the technical noun increases from 59.31 to 68.62. Meanwhile, the average score on the technical verb improves from 58.62 to 60.00. In addition, the highest score student could achieve still 90 but the lowest improves to 50. The comparison of students' proficiency on the technical vocabulary from pre-test to post-test 2 is illustrated in the figure below:
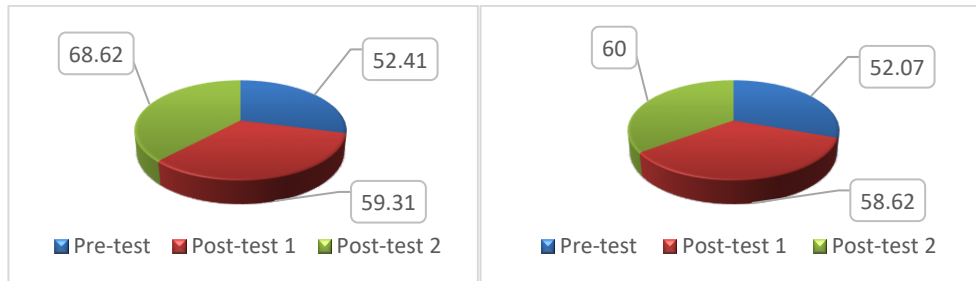
Figure 1. The Comparisons of Students' Average Score on
Technical Noun (at left) and Verb (at right)

Discussion

Flipped Learning in this research was conducted in two cycles. The learning in both cycles was expected to expand students' vocabulary, specifically technical noun and verb, as well as to increase their motivation. The learning focused on interrelated topic *"Safety Precaution"* in cycle 1 and *"Safety Equipment"* in cycle 2. The online video and the written exercise shared to the students at both cycles aimed at providing the opportunity for the students to do self-learning at home to obtain, memorize, and understand as many as technical noun and verb related to the topic. In-classroom discussion then was held the day after to correct students' work and to assure that the students already had the same understanding. At the end of each cycle, post-test was given twice at the end of each cycle to measure any improvement on students' vocabulary proficiency. Based on the result of post-test 1 and 2, students experience an improvement on their technical noun and verb. In post-test 1, students were able to achieve 59.31 average score on technical noun which was higher than the average score in the pretest; 52.41. The improvement of average score is seen also on the technical verb; from 52.07 to 58.62. In post-test 2, the average score proves to show more improvement. The average on technical noun increases from 59.31 to 68.62 while the average on technical verb rises from 58.62 to 60.00. From this data, it can be concluded that students experience more improvement on their technical noun rather than on technical verb. Based on the interview, students considered memorizing and recognizing technical noun is much easier since it has a definite meaning while technical verb may have a variety of meanings depending on the situation or context in which they are used.

The explanation on the implementation of Flipped Learning above indicates that this model of learning does contribute and proves to bring improvement on students' technical vocabulary proficiency which can be seen by the increasing of average score from pre-test, post-test 1 and post-test 2. Another remarkable point of this research is that this learning model is able to positively shift students' learning motivation. Students admitted that they were excited and enthusiast to watch the video and completed the written task given. Further, the students explained that watching video is more interesting and challenging rather than just listening to lecturer's explanation. In addition, they were able to manage the time to watch and to do the exercise by adjusting to their own condition. This finding is supported by Fulton (2012) stated that the benefits of video in Flipped Learning class include students' convenient to access anywhere and anytime they wish and students' ability to learn at their own pace. Saienko & Shenchenko (2020) shows an agreement on the positive impact of watching video activity toward students' motivation. Video might improve students' focus

intention on the audio material and at the same time provides more information through both visual and auditory channels. Moreover, authentic video can establish a realistic language learning setting and ignite students' enthusiasm for learning English while enhancing their overall language skills. This finding is also in line to the research done by Lestari, Nurbaity, & Hadinugrahaningsih (2017) that using video in Flipped Learning class increases students' passionate in doing the assignment. Seen from the findings above, it can be concluded that motivation which might be improved by using video material leads to students' success in the learning. It is obvious that the students with higher motivation will likely complete all activity rather than the lower motivation students. Having a high motivation in learning promotes students' critical thinking and their learning outcomes (Kurnianto, Wiyanto, & Haryani, 2020).

Direct observation done in the classroom during discussion on the written exercises also shows the changes in students' learning attitude and learning process. Flipped Learning provides chance for the students to prepare themselves by studying the material first at home that brings some advantages both on the students and on the learning. Therefore, students were seen more able to answer questions and to receive and offer feedback from lecturer and peers. This condition indirectly influences the learning in which the learning could run effectively and efficiently due to the better utilization of time. However, this active activity was dominated by higher achiever rather than the lower achiever students. This finding is slightly in contrast to Yang, Liu, & Todd (2019) research finding. Yang, Liu, & Todd approved that Flipped Learning brings good impact on students' attitude, but the greatest one is shown on the lower achiever students.

CONCLUSION

From the description of the research data and discussion above, it can be concluded that Flipped Learning can be applied in English learning as one of the solutions to enhance students' vocabulary and motivation. This learning method is proven to improve vocabulary proficiency of the second semester students of the Electrical Engineering Study Program of Raflesia Polytechnic. The higher improvement is especially noticeable in the aspect of technical noun in the field of Electrical Engineering. Thus, the improvement is shown by the increase of the average score of students' vocabulary proficiency obtained in pre-test, post-test 1, and post-test 2. Flipped Learning, in addition, is also found to increase students' motivation. By implementing this learning model, students are highly interested during self-learning in watching videos and in completing the written task at home. This self-learning encourages students to get involved in classroom discussion activity more actively since they already have preparation on the topic. Besides, the students also take benefit on lecturer and peers correction to get more understanding on technical vocabulary discussed.

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