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The Acquisition of Technical Terms using the Online Learning Approach among Aircraft Maintenance Learners

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ABSTRACT

Building a good understanding of the technical terms is an essential achievement for aircraft maintenance learners for their future careers in the field of aircraft maintenance. With the recent evolution in educational technologies, teaching and learning technical terms need to be shaped differently. Most studies on technical terms acquisition have been conducted at college levels via the traditional mode. Hence, this qualitative study explored the implementation of the online learning approach as a medium to learn technical terms. Data were collected from in-depth interviews as well as online observations with fourteen first-year aircraft maintenance learners on how the online platform assists in acquiring technical terms. Additional data was obtained from the instructor teaching them. The results of the interview indicated that the learners improved on their technical terms acquisition in four significant aspects such as blended learning, group learning, the role of the lecturer and the utilisation of an online dictionary. Learners also reported that the implementation of the online learning approach enabled collaboration between the lecturer and the learner to improve their online learning experiences. The results presented a much-needed and currently lacking, view into the actual use and the online learning approach for technical terms acquisition among aircraft maintenance learners in this private university.

Keywords: aircraft maintenance learners; acquisition of technical terms; online learning; blended approach; English for Specific Purpose (ESP)

INTRODUCTION

Words and phrases used and known primarily in a particular profession or trade are referred to as technical vocabulary (Liu & Lei, 2019). Technical terminologies differ greatly from one subject area to another due to their subject-specific character. In addition, technical terms are widespread in a professional language and are essential for those operating in a specific subject field directly or indirectly, as well as learners studying the subject. Therefore, it is worth mentioning that acquisition of vocabulary knowledge is crucial. Learners can improve comprehension and production in L2 by expanding their listening, speaking, reading, and writing vocabularies by learning new words (Al-Jarf, 2016). According to Li and Xiao (2018), specially designed software such as the Tutorial Computer Assisted Language Learning (CALL) programme, online lessons,

animated texts, use of multimedia contexts, interactive multi-modal materials, online dictionaries, e-books, and a hypertext/hypermedia environment are all used to teach vocabulary.

The most appealing aspect of academic use of online learning for educators is that the design of these sites facilitates personalisation, communication, collaboration, and sharing, which is in line with many of the teaching and learning practises of today (McLoughlin & Lee 2008; Subrahmanyam, et al, 2008). In addition, the vast resources provided by the online platform can be used to aid in the study of a second language. Thus, instructors are required to use various online teaching platforms, such as Microsoft Teams, Zoom, Google Classroom or the in-house applications while students are expected to adapt to make themselves comfortable using the required applications (Budsaba–Kanoksilapatham, 2021). In the case of students at a Romanian University, they responded positively to the unexpected changes, even though they did not have any previous experience with online learning. The students believed that online platforms permitted them to complete the tasks faster and improved the quality of the assessments or the assignments they completed (Maier et al., 2020). There are many search engines on the Web which allow for quick access to up-to-date information on about just any imaginable topic. Online learning is extremely popular among language instructors and learners nowadays. This method aids learners and instructors to communicate more effectively, as well as among learners and their peers. By removing the constraints of other learners or instructors, as well as time and space, this form of learning allows learners to have more control over their learning. Furthermore, learners have the option of choosing when they wish to participate in activities. Thai et al. (2019) and Jo'rayev (2020), have emphasised the benefits of online learning. These studies concur that learners can partake in online learning and simultaneously enjoy the freedom of time and space.

Despite the importance of vocabulary instruction and the use of online apps to increase learners' vocabulary retention, using online lectures to improve learners' vocabulary knowledge is not a commonly practised method. This paper reports on how the online learning approach via Microsoft Teams assisted aircraft maintenance learners in acquiring technical vocabulary terms. During the recent global pandemic, Microsoft Teams was one of the online software tools utilised by the private university in this study to hold undergraduate lectures. Microsoft Teams is a digital hub that integrates chats, meetings, data, and apps into a unified learning management system and learners use their laptops, tablets, and smartphones to join lectures via Microsoft Teams.

According to Nation (2001), there are four types of vocabulary in a text. The most significant for English language learning, particularly in the field of English for Specific Purpose (ESP) is the high-frequency words and academic words, however, there are also a few regarding technical terminology. Technical terminology is defined as a vocabulary that has higher frequency words in specific fields such as engineering, science and medicine. In certain disciplines, technical terminology might be a common word with a specialised meaning that differs from its common meaning.

At the tertiary level, students are expected to obtain academic literacy upon entering university to be accepted into the academic community. This community, in turn, is made up of discourse disciplines which include one or more genres as well as specific terminologies for communication among members. Musikhin (2016) notes that the language now needs to be tied to certain professional sectors or fields, particularly for scientists and engineers. Therefore, to be accepted into a discourse community, students must have excellent communication abilities in the community's preferred genre. As a result, good communication within the discourse genre necessitates a working grasp of the community's vocabulary. These include the acquisition of a whole new vocabulary for the second language learners (L2) which might consist of both general

and technical vocabulary (Mohd Nordin, Stapa & Darus, 2015). According to Tsou and Chen (2014), learners may tend to be frustrated and demotivated in reading authentic materials or texts that have technical words that they do not know. This has also become a major challenge for the course instructors, as teaching technical terms can be perplexing and has received little attention.

Therefore, the primary concern in language proficiency should be students' grasp of technical terms and it is the instructor's responsibility to discover the best method to teach technical terms. Students' lack of technical terms can cause unnecessary confusion and lead to additional difficulties in speaking, reading and writing within the category. Hence, this study adopted a qualitative approach to discover how aircraft maintenance learners acquire technical terms using the online learning approach. Specifically, the study attempted to find out how the implementation of an online learning approach assisted the aircraft maintenance students' technical terms acquisition.

LITERATURE REVIEW

Ellis (1994) noted that the process of vocabulary teaching and learning is a very intricate and challenging procedure in the second language (L2) learning process. Accordingly, L2 learners do their best to figure out which vocabulary learning method is most effective for them. Their first strategy for vocabulary learning, however, is to memorise the new vocabulary term. Novice learners prefer to learn items separately by memorising a list of word items. On the other hand, advanced learners try to learn words in context (Akhlaghi & Zareian, 2015). One of the challenges in teaching technical terms is giving new terms without considering the learner's prior knowledge. Thus, the online learning approach offers a wider range of activities and better opportunities for students and teachers to overcome this barrier.

Vygotsky's (1978) social constructivism theory of learning provides the foundation for the online learning approach, collaborative learning, and the writing process that will be used in the research. This learning theory explains that the learner plays an active role in the meaning-making, as learners construct their learning by cooperating and discussing with others to share ideas, language knowledge, and writing experience. Vygotsky's concept of social constructivism reflects important principles of language acquisitions; therefore, it is pertinent to the current investigation. It is also worth noting that the current study's focus was on the essence and shape of online learning. The Zone of Proximal Development (ZPD) and as well as scaffolding and collaborative learning activities are examples of these.

According to Genclter (2015), for more than two decades, rapid improvements in computer technologies have been affecting all elements of language learning in general and vocabulary components in particular. The reading skill and lexical elements, as pointed out by Genclter (2015), are among the most essential L2 learning areas that have been affected by this massive gain. Vocabulary teachings are in line with major changes in other domains of knowledge and developments in network technology (Gorjian et al., 2011). The researchers emphasised that virtual worlds have emerged that are meant to enhance synchronous rather than asynchronous learning activities and practice among students (Gorjian et al., 2011). The online learning approach can be used to assist students and instructors in the process of learning and teaching technical terms more effectively. This also explains how real-time communication with participants would enhance collaboration activities with instructors taking the lead role a 'community'. The instructor

is not only responsible for learning to take place but ensuring his or her growth professionally (Puvaneswary et al., 2012).

According to Long and Dougthy (2009), online learning can be utilised to improve the quality of input, give helpful corrective feedback, and instruct students in the use of technological improvements, all of which are essential abilities in learning new vocabulary items in another language. Consequently, Khosnoud and Karbalaei (2015) pointed out that using the Computer Assisted Language Learning (CALL) to teach will significantly improve vocabulary acquisition, and participants who were elementary learners achieve better results on the retention test compared to students who used the traditional method of learning vocabulary because of the real-life situation where active engagement is present in the learning process.

Burston, Zhang and Song (2011) conducted a comparative study on the impact of traditional and CALL approaches on Chinese and Iranian EFL learners' vocabulary acquisition and retention. The purpose of the study was to see how online-based training may be used to teach second language (L2) vocabulary. One group of students used web-based activities to study a specific list of vocabulary, while the other used paper materials to work on the same list. The findings revealed that students can learn language more efficiently short-term via online activities than with paper material, and students who received learning content through the online-based approach performed better than students who received traditionally learning content.

In another study, Ghorbani and Jahandar (2015) discovered that using computer-assisted vocabulary education had a substantial impact on the word memory of Iranian English as Foreign Language (EFL) students. Eizadpanah, Abedi, and Ghaedrahmat (2014) agree that Computer-Aided Vocabulary Learning (CAVL) had a good influence on intermediate EFL learners' vocabulary achievement and that Electronic Learning (E-learning) improved long-term memory. They discovered that during the instruction period, the learners themselves became aware that e-learning training was beneficial to them.

Puagsang (2017) investigated vocabulary acquisition strategies used by 242 first-year vocational students when acquiring English vocabulary. In comparison to other strategies, social strategies have the highest mean score in terms of frequency of usage among students. The study illustrated the mean scores of each method suggesting that the students sometimes employed vocabulary learning strategies to learn English vocabulary. It can be indicated that there were nine strategies utilised by students with analysing any available photos or gestures having the highest mean scores. The findings of this research also revealed that students in the hotel and tourism industry used language learning strategies more frequently compared to accounting and engineering students' who practise memory strategies.

Ghazali and Ali (2017) examined the impact of using vocabulary games which belong to metacognitive strategies on learning technical words among engineering students in a Malaysian university. A vocabulary game called VocBlast was designed to help in vocabulary learning among engineering students as the words are taken from engineering books. The game consists of ten vocabulary games that can help engineering students learn new technical words. The research concluded that more time is needed for the students to play with VocBlast to measure a more significant impact on vocabulary learning on long exposure to learning aids.

On the whole, studies discussed looked at technical terms acquisition among vocational and engineering students in the L2 classroom. However, there has not been a single study to explore the acquisition of technical terms using the online learning approach among aircraft maintenance learners. For this reason, it is imperative to investigate the technical terms acquisition among aircraft maintenance learners.

METHODOLOGY

14 first-year Advanced Diploma in Aircraft Engineering (ADAE) learners were chosen to participate in this study based on convenience sampling. All participants being Malaysians had sat for their *Sijil Pelajaran Malaysia* (SPM) examination. They had similar results in their English with average grades

Chua (2012) pointed out that such similarities are necessary to avoid undermining reliability and validity, which can emerge when learners have a variety of prior experiences that connect to the study's subjects. Since these participants did not have a strong command of the English language, it was necessary to investigate their acquisition of technical terms in this course. Academic English with Research is a compulsory course offered in the programme.

The study ran for 14 weeks and used a qualitative approach for data collection and analysis. A semi-structured student interview protocol and online observations with a checklist (Table1) were conducted. Interviews were conducted to get insights from the participants on how the implementation of an online learning approach in the aircraft maintenance English language course enhances aircraft maintenance students' technical terms acquisition. To support the findings from the interviews, the lead researcher had simultaneously conducted online observations to understand the use of technical terms in the online classroom, and the instructor put more emphasis on how frequently she drew her attention to them during the lectures. Simultaneously, an audio recording of the lecture was done via MS Teams, to assist the researcher to transcribe and analyse how teaching the technical terms was introduced during the lesson, which may have been overlooked by the researcher during the observations. Emphasis was also given to how the instructor provided extra activities to enhance learners' understanding of the technical terms.

TABLE 1. Observation Checklist

Observations carried out by the researcher	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Lecturer creates an active learning community through: a) forums, b) individual/group/class email, c) discussion boards and/or video/audio recordings	√	√	√	√	√	√	√	×	×
Learners check on technical vocabulary terms by: a) asking their friends; b) asking the instructor	√	√	√	√	×	√	√	×	×
The lecturer provides resources to enhance the quality of online course delivery. (Links to tutorials, videos)	√	√	√	×	×	×	×	×	×
Lecturer's communications (Instructions & explanations) are clear, consistent, and at the students' level of understanding.	√	√	√	√	√	√	√	√	√
The lecturer communicates with the students and provides constructive feedback.	√	√	√	×	×	√	√	×	×
Students use the online dictionary	√	√	√	√	√	√	√	√	√
Learners discuss the technical vocabulary terms on MS Teams	√	×	×	√	×	√	×	×	×

FINDINGS AND DISCUSSION

Data from the interviews and observations were analyzed thematically. The findings that emerged from the learners' experiences with the online learning approach for technical terms in their aircraft maintenance English course are discussed in the section that follows.

FACILITATE BLENDED LEARNING

All 14 participants pointed out that the implementation of online learning enabled them to combine the use of traditional and online learning approaches. The learners' justified their claims by stating that blended learning made it easier to combine technology and traditional learning approach to achieve learning objectives and develop their technical vocabulary knowledge. The extract below highlights participants' responses that suggest the implementation of an online learning approach facilitates blended learning.

> *"sometimes the lecturers will show videos on YouTube*" (Learner 1).
> *But, if we still face difficulties, the lecturer will use Google or YouTube. Then they will go through using PowerPoint slides. Let's say for example fuselage, the lecturer will show us the image. If we still have doubts, the lecturer will show us videos about fuselage on YouTube.* (Learner 6)

> "*Sometimes, he shows us videos, or gives us many examples to help us memorise the terms or vocabulary better".* (Learner 7)

> *"Mostly during the online lessons and sometimes the university's online library the lecturer will show and explain to us"* (Learner 2).

Similar sentiments are held by learner 3, as indicated by the following extract:

> *"For example Horizontal stabiliser, the image can be seen online and the hangar also has quite a lot of the image where the students can see it*".

Some of the learners' indicated that blended learning is facilitated by the implementation of an online learning environment, which increases the chances of the instructor providing better guidance when teaching technical terms during the online lessons, and providing constructive feedback and comments during the acquisition process.

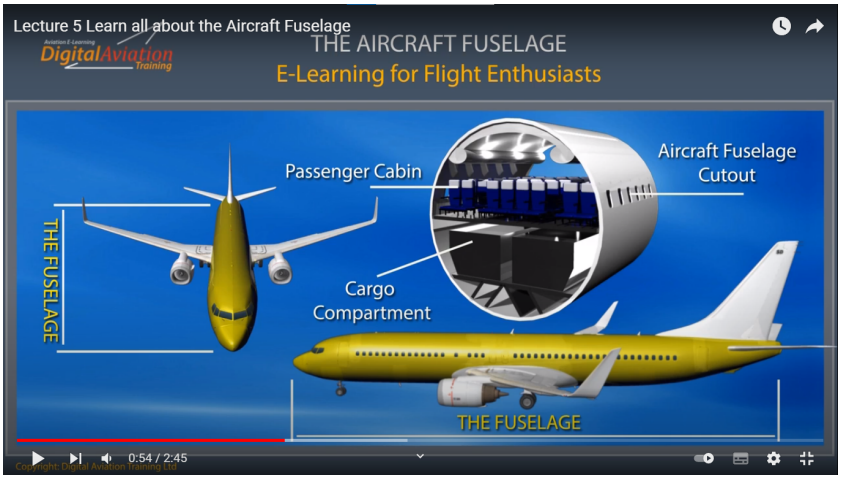

FIGURE 1. Screenshot from YouTube video on Aircraft Fuselage (https://youtu.be/UM4SuFBYxnA)

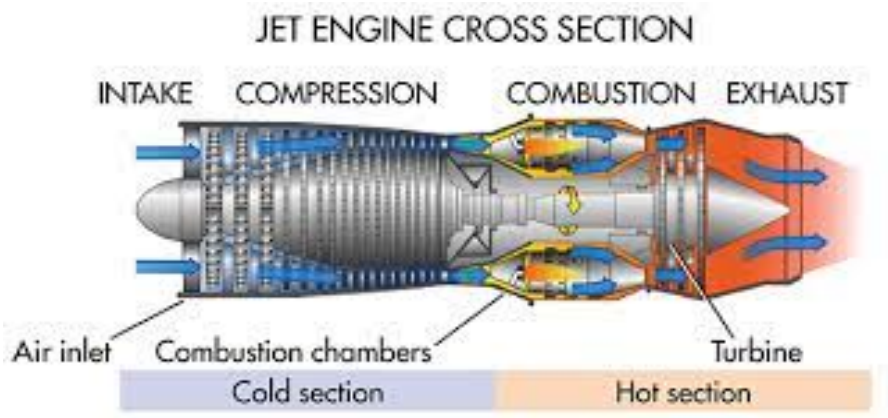

FIGURE 2. Instructor showing an image of an Aircraft Turbine Engine during the lesson

It is worth pointing out that there was a significant improvement in terms of understanding when the learners acquired the technical terms from participating in the online as well as offline discussions with the instructor. Learners developed language expertise that enabled them to integrate technical terms into their essays. Furthermore, learners were impressed by the way they learned and practised technical terms in the online environment since it offered them learning opportunities that allowed them to practise technical terms at any time. Thus, blended learning gives new learning possibilities that magnify traditional modes of instruction and improves the language learning and acquisition process in general. In a blended learning setting, the use of technology facilitates personalised learning. This sort of learning provides students with the freedom and prospect to advance at their own pace, based on their learning requirements and styles. The outcome concurs with the findings by Fryer and Bovee (2018), Johnson (2017) and Kuo and Belland (2016) which all revealed that blended learning is effective in developing English vocabulary abilities. Hence, it can be surmised that blended learning assisted in the improvement of aircraft maintenance learners' technical terms acquisition and performance.

FACILITATE GROUP LEARNING

The analysed data indicated the use of Social Strategies such as collaboration was mostly done using online platforms such as Microsoft Teams, Google Meet and Zoom. Kearsley (2000) pointed out that online learning is as much a social activity than an individual one. Most of the participants agreed that online platforms such as Google Meet, Zoom and Microsoft Teams have been instituted to support group learning activities. All the 14 participants indicated that they conduct their discussions among their classmates regarding the assignments online. It can be pointed out that the learners discover new meaning through group activities by collaborating through Microsoft Teams and Zoom. In addition, they also use WhatsApp and Discord to discuss and acquire essential technical terminology required for the course.

> *"… we have chat box or WhatsApp, so we can quickly message our friends and ask what the lecturer was talking about and clarify quickly"* (Learner 1).
> *"We use Google Meet because it is convenient. We don't prefer Zoom because it ends in forty minutes".* (Learner 2)
>
> *"We will be using our WhatsApp group at that time. The group where all the students are there. We will be discussing the topic and who is taking what. Once we decide, then finalise and send it to our Microsoft Teams chat. Sometimes, besides WhatsApp, we use an application called Discord, or have meetings on Google Meet. These channels are quite useful. The Discord channel is mostly popular among aircraft students".* (Learner 3)
>
> *"We usually use Google Classroom. It lags less and compared to Zoom and other apps, it doesn't have a time limit. We can also do presentations smoothly without any lagging issues".* (Learner 4)

The following excerpt is a dialogue between the learners on Microsoft Teams:

> Learner 1: How does a monocoque structure look like? I do not understand.
> Learner 4: I think in the previous class, the lecturer told me it is a single shell, right guys?
> Learner 6: Yes, look like an eggshell
> Leaner 3: and the skin is responsible for the load placed on it.
> Learner 7: Yes, because the shape provides the strength for it.

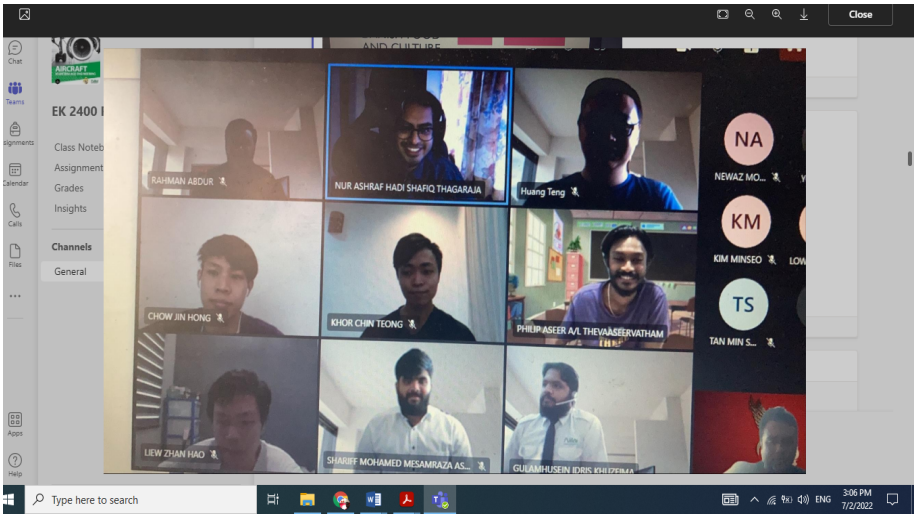

FIGURE 3. Learners' online discussion on Monocoque Structure of an Aircraft (Observation: Week 8)

Therefore, learning in groups has been preferred for boosting interaction and learning. According to Supyan Hussin (2006), online discussions are more than just exchanging and posting messages such as ideas, views and questions among students. Learners would make the most of online discussions if they could see how it relates to class lectures, assignments, and class management. He further pointed out that learners must understand that their involvement in the online discussion holds them accountable not only for their learning but also for contributing to the success of the course objectives. Vygotsky (1978) argues that a person's learning may be enhanced through engagement with others. Thus, the use of group learning offered possibilities for participants to interact with each other to learn new technical terminologies during the course. Effective student interaction would require proper planning, coordination and implementation of curriculum, pedagogy and technology. In facilitating online group learning, learners share a common knowledge pool for accomplishing individual assignments. Inevitably, the participants of this study did recognize that group discussions were significant for them to improve their technical terms acquisition and many concluded that group learning assisted them to make the most of their time together.

ROLE OF THE INSTRUCTOR

All the fourteen participants agreed that their knowledge of technical terms was enhanced after attending the online lectures throughout the semester. The acquisition process relied heavily on the class input, however, very little was mentioned outside the classroom walls. Teaching and learning took place solely during the online lessons with the instructor imparting the knowledge and the learners passively absorbing it. The participants' responses, indicated a great dependence on the instructor:

> *"For me, I depend on the class when the lecturer teaches me new words so from Google search engine I will find the meaning of the word" (Learner 11).*

> *"I learn the aircraft technical terms from the lecturer only" (Learner 7).*

> *"I like to ask my course mates, but my course mates, they do not always know the meaning. So, I feel it is better to ask the lecturer. I do not disturb her during the lecture, but I will ask her after the lesson is over" (Learner 10).*

Learner 11 added, "During the online lessons, the lecturer made me understand what is technical vocabulary, she can teach us the definition. I mean, we can *Google it*, but I prefer the lecturer".

> *"during the online lessons, it will be the lecturer, but after class, if still, I do not know the words, I will ask her by sending a Whatsapp message."* (Learner 6).

> *"Most of the time, it is easier for me to ask the lecturer rather than my course mate because she can tell the meaning straight away, so it is much easier" (Learner 13).*

> One of the participants commented: *"we learn technical vocabulary during the online lessons only and we do not do any homework or extra task to make us understand the terms better"* (Learner 9).

Based on the data gathered from the interviews, all fourteen participants believed that the online lessons throughout the semester was the most influential factor in their acquisition of technical terms. One of the main reasons is because online learning made it easier to communicate with the lecturer, which includes discussions with the lecturer via live chat, email, and group discussions. It is worthy to state that the presence of the instructor throughout the weblog engagement encouraged learners as a community to be critical and ensured that the conversation produced a constructive learning environment (Puvaneswary et al., 2012). They maintain that the learners' discussions are influenced not only by the task's content but also by the group members' abilities to manage the conversation. This is in line with the Social Constructivism theory which identifies the social aspect of learning and the use of communication, interaction with others, and the application of knowledge as essential aspects of learning and meeting the learning objectives. In addition, during the semester, the instructor uploaded supplementary articles, worksheets and PowerPoint slides to the MS Teams Materials folder so that the participants could access and obtain more information about the technical words that they have learned. These findings are consistent with Vygotsky's (1978) Social Constructivism Theory to illustrate the role of the instructor is to questions, research, discover, predict, solve problems, hypothesize, and invent as part of the learning process.

THE UTILISATION OF THE ONLINE DICTIONARY

During the online observations, the participants used a dictionary to assist them to understand the meaning of new technical words. Particularly, all the participants made use of Alphadictionary.com as well as skybrary. aero, an online dictionary to search when unsure of a particular term. These online dictionaries are significant tools for the aircraft maintenance learners during their time studying at the university as they assist them to understand the technical terms better, improve their understanding of the courses that they are undertaking and ensure that they are applying the correct terms in their assignments.

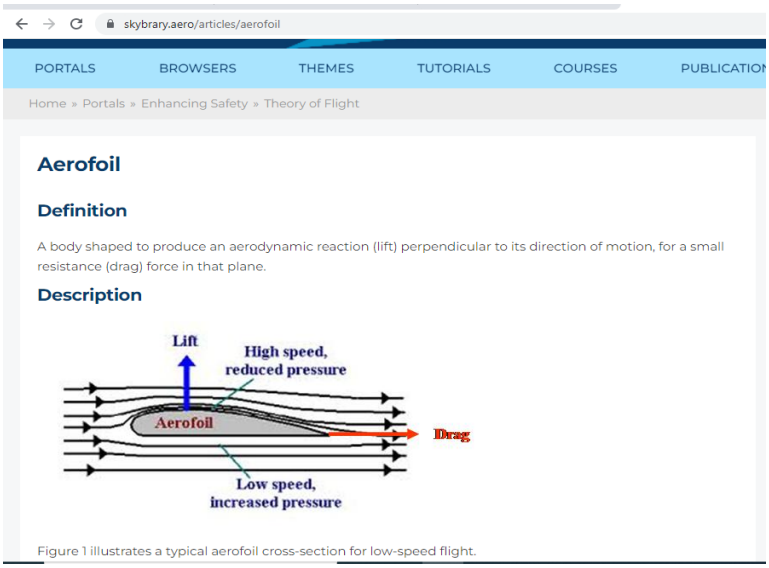

FIGURE 4. Laptop Screenshot from Participant 13 for the definition of Aerofoil from Skybrary. aero website (www.skybrary.aero/articles/aerofoil)

With the help of these electronic dictionaries, most of the participants considered carrying good devices to get good access. The use of the dictionary, especially for this course was seen as easy access, quickness and portability. With the advancement in digital technology, today's students favour the promptness and accessibility of their lightweight gadgets. Therefore, one of the most useful ways to discover a new term is the use of a dictionary as a powerful tool in improving students' vocabulary repertoire as it permits them to not only check the meaning of the words but also learn the pronunciation and usage of the words in the right context.

CONCLUSION

The current study aimed to investigate the acquisition of technical terms using the online approach. It also reflects its novelty in qualitatively studying the aircraft maintenance learners' technical terms acquisition in an online learning environment. Findings of the study showed that aircraft maintenance learners preferred blended learning and group learning when acquiring technical vocabulary. It was also found that the role of the instructor and the utilisation of the online dictionary was the most popular and frequently used among the learners.

Many reasons can be attributed to the success of the online learning approach in acquiring technical vocabulary. The first one is the group learning atmosphere created in the current study which had helped aircraft maintenance learners to feel less apprehensive, achieve a communal closeness, and share their technical terms knowledge in the online learning environment. It also encouraged the aircraft maintenance learners to share knowledge and learning experiences that enriched the content of their assignments and reports. Learners' discussion in the online environment supports the Social Constructivism Theory (Vygotsky, 1978) since participating in group discussions allows learners to generalise and transfer their learning, as well as establish a solid basis for communicating ideas verbally and gaining a deeper comprehension of what they are learning.

Another reason is encapsulated by the online activities of finding the technical terminologies and also assignment writing that had provided students with flexible learning opportunities. It also took into consideration the students' pace and consequently provided students with self-paced learning. Online learning provided opportunities for the aircraft maintenance learners to discuss many aspects of the assignments in advance online and thus they could dedicate the class time to acquiring technical vocabulary.

Longitudinal studies may be necessary to see how the online learning approach affects aircraft maintenance learners' technical vocabulary acquisition skills, especially where more time to learn the target terms is given. Overall, this study adds to the field of knowledge in technical vocabulary acquisition because it may be utilised to conduct more research to improve aircraft maintenance learners' ability to acquire new terms. The research also proposes that further studies in technical vocabulary acquisition among engineering students from other disciplines of study such as marine engineering, biomedical engineering and electric and electronic engineering should be done. It would be interesting to find out whether there are any notable differences in how different other engineering fields acquire technical terminology. This study demonstrated that online learning can assist learners to attain performance by facilitating their technical terminology competence.

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