E-aviation speaking preparation test for aviation vocational school

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Article Info

ABSTRACT

An e-module aviation speaking preparation test has been developed to support cadets of aviation vocational schools in preparing English language proficiency tests. This research aimed to assess whether there was an improvement in cadets' aviation speaking preparation test scores after studying the E-Module. A sample of 120 cadets participated in the study to examine the effect of E-Module aviation speaking preparation test to enhance aviation speaking abilities. The validation test score of 89.5% indicates that the E-Module aviation speaking preparation test is very valid for usage. Independent sample T-test results revealed differences between pretest and posttest scores of the e-module aviation speaking preparation test for cadets at both aviation polytechnics. Paired T-test results indicated that cadets who utilized the E-Module achieved higher learning with a significance value of $(0.000)<\alpha$ (0.05). The correlation between pretest and posttest scores and the learning outcomes of the E-Module aviation speaking preparation test showed a relatively high level of correlation, with a coefficient of 0.480 and a significance value of Sig (2-tailed=0.000)<½ α (0.025). These findings suggest that the E-Module aviation speaking preparation test effectively enhances the aviation English speaking abilities of cadets.

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1. INTRODUCTION

The digital era, which refers to the current cohort of adolescents, and it is responsible for ushering in a wave of technological developments that are fundamentally altering the way people live. Because they were raised in a time and place where digital devices were inexpensive, today's youth may be more familiar with the use of technology in everyday life than previous generations [1]. Web 2.0 technology is a major leap forward in all areas of life, including education. Despite the fact that many teaching resources are either inexpensive or even free, the market for them is currently quite sizable. However, technology alone is not enough to simply exert its influence on children. There is an argument that the classroom experience may be greatly improved by the strategic use of technology and the use of web 2.0 tools for student content creation, distribution, and consumption [2]–[4]. As a result, English language learners (ELLs) can gain greatly in terms of language use, communication with other ELLs, and the ability to put language skills to use in authentic contexts. Beyond what was possible with previous technologies, these instruments allow for the creation of learning settings that present novel chances for a wide range of social interactions [2].

Students learning English as a second language (ESL) who were exposed to web tools outperformed their lecture-based counterparts in multiple tests. Incorporating web 2.0 technologies for ELL has also been linked to improve English grammar and a more organized, well-balanced style of writing [5], [6]. In addition to incorporating previously acquired information into courses to improve student learning [7]. Moreover, ELLs now have greater access to reading materials due to the integration of web 2.0 tools, enabling them to rapidly expand their range of words [8]. However, it is crucial to identify the specific language aspects that pose challenges to ELL children. While certain vocabularies, like concrete nouns, might be easily grasped, abstract concepts (like emotions) or nouns with multiple meanings could prove challenging. Continuous and effective education is necessary to enrich the vocabulary of ELLs. As an attempt to captivate and educate students, English educators have recently introduced diverse free online resources, including virtual reality, into the classroom environment.

The internet has gained prominence in the education sector, allowing students to participate actively in their education [9]. Additionally, the use of technology in school increases cognitive skills and traits [10]. Digital learning has been demonstrated to aid in the academic growth of ELL students [11]. This investigation seeks to answer the following research question about students' classroom use of web tools: how to design and develop Aviation English based on the development of aviation speaking preparation test to improve the speaking skills of aviation vocational school cadets. The cadets of Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya can take the benefit from the incorporation of web tools into the learning process, particularly when it comes to the development of their English language skills.

Many researchers have created modules or applications for language assessments, particularly in English proficiency tests, aimed at enhancing students' overall English language skills. These initiatives encompass diverse areas, such as the creation of a localized academic English listening test using authentic spontaneous audio-visual content [12], the establishment and validation of an English assessment measuring critical thinking skills among EFL learners [13], and the most recent research conducted by Drayton and Coxhead [14], which focuses on the development, evaluation, and application of a specialized technical vocabulary list for aviation radiotelephony. Moreover, this study designs and develops an E-Module aviation speaking preparation test to enrich student-learning activities in preparing English proficiency test for aviation vocational school cadets. The study's overarching goal is to find a novel approach to aid in developing English language skills using digital learning. Furthermore, through granting cadets unrestricted internet access, a variety of resources become readily available. The cadets take an active role in their learning process, constructing and progressing their comprehension of the provided aviation English materials.

Researchers looked at how blended learning affected students' speaking abilities in this study. It would be beneficial if web-based learning could aid students to improve their speaking abilities by various media and communication platforms. Therefore, the authors designed E-Module aviation speaking preparation test as a novelty in practicing aviation English and formulated the issue of whether the E-Module aviation speaking preparation test is beneficial to enhance speaking abilities. E-Module aviation speaking preparation test, which includes aviation-related themes that are assessed to gauge cadets' proficiency in speaking English, is created to make it easier for cadets to learn aviation English. This E-Module takes advantage of technological developments where cadets can access it via the web on a laptop or cell phone and practice aviation English for preparing proficiency test. Therefore, the goal of the following study is to design and develop E-Module aviation speaking preparation test to enrich the speaking skills of aviation vocational school cadets.

In conventional classroom settings, instructors are more engaged than students, claims [15]. They only assign a small number of rules for students to learn, which limits the amount of knowledge that may be acquired. Some students might think that the material covered in class is boring and unimportant to their future jobs. They rarely perceive the environment in the classroom as inspiring or encouraging. As a result, kids are less engaged, exhibit more behavioral problems, or decline to take part. Teachers, mentors, and students are constantly looking for fresh approaches to accelerate and improve student learning.

According to Kim *et al*. [16], the most effective teaching and learning always make use of a variety of techniques, methods, and tactics in order to maximize information acquisition and skill development. It is past time for higher education to start supporting students in successfully adjusting to a technology-based environment, as this is an increasing expectation [17]. Therefore, it is advised that various multimedia sources be used into instruction generally and writing courses in particular in order to maximize superior teaching-learning outcomes.

Academics no longer need to print dozens of lecture handouts or haul around stacks of books [18]. Knowing how to create and implement a highly supportive learning environment that can offer face-to-face (F2F) instruction, self-contained collaborative groups, and at varied locations and distances as needed is one of the issues addressed by the modern method. Elements such as technology, curriculum design, instructors,

technical support, and assignments [19], student involvement [20], and adaptability in learning are some of the pivotal aspects requiring attention to provide students with a high-quality experience. According to Marougkas *et al*. [21], there exists variability in how students absorb knowledge, indicating that conventional teaching methods may not cater to all students. The integration of online learning in blended education can enrich conventional learning by providing increased guidance, versatility, and ease of access.

The most crucial English ability is speaking because it is a common form of communication [22], [23]. This ability is mainly utilized in communication. Students who want to improve their speaking abilities must not only learn and master English vocabulary, pronunciation, grammar, and other skills but also cultivate speaking fluency, public speaking, and self-assurance [24]. Speaking is the oral process of conveying ideas and feelings, thinking back on past events, and imparting information. We talk about ideas, and words are a vehicle for expressing those ideas. Because speaking requires the ability to process ideas, conversation, and social skills, it is a complex endeavor.

According to Deldar *et al*. [25], spoken language is a complicated system that includes pragmatics, semantics, and syntax and is tied to the sound and meaning of a language. These three areas must be understood in order to comprehend how language skills develop, but they are not all the same [26]. Communication competence is not attained, contributing to ineffective classrooms, without knowledge of vocabulary systems (word meanings), syntax (grammar and word order), morphology (meaning of word parts and forms), pragmatics (rules of social communication), and phonics (awareness of sound and rhyme). Due to the complexity of speaking and listening skills, research on spoken language proficiency is limited [27]. A speaker is more likely to participate in conversational exchanges when they are prepared with a variety of linguistic, sociolinguistic, and conversational abilities. This increases communicative competence [28]. Conversations that are conducted with linguistic competence display adequate language ability [29].

One of the most difficult language skills to master is speaking a second language. Speaking is described as "an action that demands the integration of multiple subsystems". Speaking is often seen as the most important ability. Speaking is still challenging since it necessitates the capacity to communicate effectively in social situations [30]. Both verbal and nonverbal components of speech, such as intonation, stress, body language, and facial emotions, are used in communication [31]. Because a person talks around 100 words for every single word written in English, it is crucial to develop speaking and listening abilities [32]. An individual spends 45% of his time listening, 30% of his time talking, 16% of his time reading, and 9% of his time writing when communicating with others [33]. On the other hand, the inability to speak restricts social abilities and causes social isolation [34]. Speech accuracy is a crucial component of developing speech competence and relates to the capacity to communicate naturally while utilizing suitable terminology, grammar, and pronunciation. In order to communicate, speakers of a second language must comprehend the information to be used, create grammatical structures, and express their language. Real-time speaking and spontaneous decision-making require speaking skills.

According to Rahman *et al*. [35], it is crucial to understand the nature of English flight, the relationship between standard and simple English phraseology, and the contexts in which each was used. Even when flight terms are adequate, research [36] has shown that speakers often use simple language when they are involved in unusual events or emergencies. Phraseology causes speakers to employ more intricate vocabulary and structural language, which can lead to communication issues.

Aviation English is a subset of English for specific purposes (ESP) that focuses heavily on aviation and comprises of basic language and aviation idioms for radiotelephony communications [37]–[40]. The necessity of identifying the aeronautical nature of English, both standard and simple English phraseology, their relationship, and the contexts in which each was adopted are emphasized. Research has shown that simple English tends to be adopted when speakers are involved in abnormal or emergency situations, even when the expression flight may suffice [41], [42]. Less of such aviation phraseology use results in the use of structure and vocabulary more complex words and can trigger communication problems between speakers. The Aviation English International Radiotelephony Spelling Alphabet is unique. To prevent confusing listeners, the phonetic alphabet used in aviation English is utilized to spell letters instead of pronouncing them. During radio transmissions, it is easy to mistake letters such as "B" and "D" since both consonants terminate with the same vowel sound /i/. Using the phonetic alphabet, the code words "Bravo" and "Delta" separate them easily. The following alphabet represents a single letter by substituting the complete word. Each word's initial letter corresponds to the letter in question. In addition to letters, the following recommendations govern the pronunciation of numerals in aviation English [43]. All hundreds and thousands are pronounced in aviation radiotelephony as each digit in the hundreds or thousands followed by the words "hundred" or "thousand." Each digit follows each digit in the thousands in the hundreds when pronouncing the combination of thousands and hundreds. Except for integers and combinations of hundreds and thousands, all numbers are sent by pronouncing the individual digits. Whether the total is a hundred or a thousand, decimal-pointed numbers are transmitted individually. When conveying time, each digit of the hour and minute is articulated separately.

Standard phraseology and plain language are both parts of aviation English. The vocabulary of normal air-ground communication, known as standard phraseology, is described as being brief, accurate, and concise when transmitting flight-specific information. Meanwhile, plain English should only be used when standard phraseology cannot suit the intended transmission, which is defined as "the spontaneous, creative, and non-coding use of a particular natural language" [44]. Although there are alternatives to standard phraseology, pilots and controllers tend to utilize English in unusual or emergency situations despite the fact that they are intended to employ standard phraseology to limit the danger of miscommunication [45]. Recent studies have shown that plain language in the context of aviation communication is not literal or colloquial/common, but extremely context-specific and goal-driven, even though it is not standard in form [46].

English proficiency in the context of aviation is the construct being evaluated in this study, and it is based on the interactionist definition, in which the test-performance taker's is used to illustrate the underlying qualities. Performance is also used to demonstrate the impact of the assessment task or the situational context in which it is delivered. The construct in this situation is aviation English proficiency. An indicator of aviation English competency in context is performance on an aviation English test. In the air traffic controller (ATC) tower, task performance tests are regarded as performance samples. Additionally, the interactionist construct definition takes into account not only nature and context but also strategic competence, or the abilities needed to employ language knowledge [47], in which test-takers utilize their language knowledge in a specific assessment setting. In order to incorporate communicative expertise of aviation English with strategic abilities to direct and evaluate its usage, a construct definition of aviation English skills based on an interactionist approach is required. Thus, test results are meant to serve as markers of this construct.

2. METHOD

The framework chosen to guide this research is analysis, design, development, implementation dan evaluations (ADDIE). It is considered as one of the most prominent and effective tools in the academic world [48]. ADDIE consists of five phases, analyzing, designing, developing, implementing, and evaluating [49]. Derived from the study conducted by researchers concerning the development of an E-Module for aviation speaking preparation test, outcomes from the research and discussion have been achieved across the phases of analysis, design, development, implementation, and evaluation, as stated in Table 1.

Table 1. Stages of research

No	Stage	Information
1.	Analysis	The aviation speaking test method using paper-based tests for cadets and manual correction of test results is considered less effective in its implementation. Therefore, the researchers use a new method to support aviation speaking test, namely using the development of the E-Module aviation speaking preparation Test.
2.	Design	In this stage, the researchers design an application that includes the main display and the menu and sub-menu display models in the application to be developed.
3.	Development	In this application development stage, the researchers make an application that will be used as a test support medium. This application development uses the web. Because this application is easy to operate and can be accessed anywhere. In the development process, changes will be made, such as adding application features, changing the appearance of questions, and improving the application to make it even better. So that the application made will suit the needs.
4.	Implementation	The implementation stage is to apply the results of the development stage to the target of the learning device. The application of E-Module aviation speaking preparation test has been applied to 120 cadets of Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya.
5.	Evaluation	The evaluation stage is the last step of the ADDIE learning system design model. The data at the evaluation stage comes from the opinions and suggestions of the validators, instructors and cadets based on the implementation that has been done. The data was obtained based on a questionnaire that had been filled out by them.

After completing the phase of development of E-Module aviation speaking preparation test then the application was implemented to the students. As the major goal of this study is to help students improve their aviation English proficiency in order to get ready to take the internationally recognized ICAO Language Proficiency test, so the researchers designed E-Module aviation speaking preparation test that can be assessed by logging in on website (https://emodul-astp.poltekbangmedan.ac.id). Illustrated in Figure 1 is the E-Module aviation speaking preparation test, a dynamic platform encompassing a comprehensive array of 22 thematic sets, each centering on abnormal situations frequently encountered in aviation contexts. This E-Module serves as a valuable resource for students seeking to enhance their proficiency in aviation English.

Upon accessing the module, students are presented with a diverse selection of themes, each inviting them to engage in a range of purposeful activities meticulously outlined in the instructions. These themes

encapsulate a spectrum of scenarios, including aircraft electrical breakdown problem, volcanoes, dangerous goods, collision, fuel problems, airfield activity, aerodrome airfield environment, airfield and navigation equipment failure, ground services, lack of fuel, landing gear failure, hydraulic loss, delivery on board, disruptive passenger, missed approach, wild life, holding, blocked frequency, turbofan engine malfunctions, natural disaster, communication failure, and wind shears. This comprehensive array of themes ensures that students are equipped with a multifaceted understanding of aviation English language nuances in diverse and intricate circumstances. Each theme within the E-Module aviation speaking preparation test is intricately structured into four autonomous parts, as visually depicted in Figure 2. This meticulous division ensures that learners can readily select and engage with specific components based on their learning preferences and needs.

This pedagogical approach aims to provide a tailored and flexible learning experience for students. Importantly, every thematic set is thoughtfully segmented into four distinct sections, each uniquely designed to encompass a wide spectrum of question formats, as seen in Table 2. This strategic arrangement serves to offer students a comprehensive exposure to the intricacies of aviation English language usage across diverse scenarios. In addition to its well-structured framework, the E-Module takes a step further by incorporating cutting-edge features to enhance the learning process. Notably, the integration of speech-to-text and voice recording functionalities empowers students to actively engage with the learning material. Through these advanced features, learners can practice their spoken English skills and receive real-time feedback on pronunciation and articulation. This interactive approach not only fosters language proficiency but also nurtures learners' confidence in utilizing aviation-specific language in practical contexts.

Figure 1. Display of 22 sets of themes

Start with SPEAKING TEST 16 : WILD LIFE

PART 1

Hi. Good morning. How are you? Are you ok? Are you ready for the questions?

Firstly, I want to give you some personality questions.

Interrogate your friends about their personal data to answer this question.

What?s your name   Your Answer

[🎤 Start Rec] [🏃 Finish]   [🎤 Rec Answer] [🏃 Finish Answer]   [💾 Simpan Data]

PART 2

This section you will speak with one another. Every of you will ask and answer questions. Cadet 1, notice at the explanation concerning Flight radar. Cadet 2, you are not familiar about the Flight Radar. Cadet 2, gives some question about Flight Radar and Cadet 1, reply them. Start speaking.

Give the picture cards, so cadet 2 has job for asking the questions and cadet 1 answer them.

Explain the picture   Your Answer

[🎤 Start Rec] [🏃 Finish]   [🎤 Rec Answer] [🏃 Finish Answer]   [💾 Simpan Data]

PART 3

In part three, I would like each of you to speak on by yourself. I will give each of you a picture.

Cadet 1, here is your card picture. Would you describe us what you see in your picture detail. We give you one minute for describing the picture.

Cadet 1, you can describe the picture now!

Give the photograph to Cadet 1.

Let the cadet speak up approximately one minute. Please do not ask any questions. You can appoint in the picture, if you need it.

Explain the picture   Your Answer

[🎤 Start Rec] [🏃 Finish]   [🎤 Rec Answer] [🏃 Finish Answer]   [💾 Simpan Data]

PART 4

Cadet 1, I want to explain the condition to you. Speak to your friend and say to me some explanation about the situation.

The collocutor always starts give questions first.

What is the definition of missed approach   Your Answer

[🎤 Start Rec] [🏃 Finish]   [🎤 Rec Answer] [🏃 Finish Answer]   [💾 Simpan Data]

Figure 2. A set of topics consisting of four parts

Table 2. Parts of the topics

No	Part	Information
1.	Part 1	Debriefing: provides an individual explanation (responding to common questions about personal themes).
2.	Part 2	Communication task: playing card activity (cooperative assignments with interviews and problem-solving using playing cards).
3.	Part 3	Photo illustration: personality discourse (using a photograph to represent a personal soliloquy)
4.	Part 4	Authentic situation: framework conversation (discussing a real situation with the other person in a framework conversation).

Incorporating an interactive approach, each segment of the E-Module aviation speaking preparation test is equipped with a series of thoughtfully crafted questions, as demonstrated in Figure 3. This design encourages active student engagement as they undertake various practice exercises by formulating responses to these questions. Additionally, the E-Module offers a unique feature - the capability to record and analyze students' spoken responses. Through this functionality, learners are guided to record their speech in response to the posed questions using an integrated voice recorder. Subsequently, the recorded speech is seamlessly converted into text through the innovative speech-to-text feature. This conversion process allows students to review and assess their recorded responses in textual format. This step proves to be instrumental in helping learners identify areas of improvement in terms of pronunciation, fluency, and language accuracy. Furthermore, the recorded and transcribed responses serve as valuable practice and self-assessment tools.

Importantly, this comprehensive learning cycle extends beyond the students' realm. The accumulated data, including both recorded speech and transcribed text, is made available to the instructor in a centralized database. This database enables instructors to review and evaluate students' performances in depth. The evaluation process informs instructors about each student's proficiency level, enabling personalized guidance and feedback. This synergistic blend of technology, interactivity, and instructor involvement ensures a dynamic learning experience that actively refines aviation English speaking skills.

To attain the outlined objective, a quantitative analysis was systematically conducted, primarily focusing on the utilization of the E-Module aviation speaking preparation test. This approach was executed as illustrated in Table 3, delineating the intervention process adopted during the research. The research design employed two key instruments for data collection: the pretest and posttest. The pre-posttest, derived from the E-Module aviation speaking preparation test, played a pivotal role in gauging the effectiveness of the learning intervention. This investigation transpired over the course of a semester and was carried out at both Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya. The research population encompassed 120 participants, comprising 24 cadets enrolled in the air traffic control program at Politeknik Penerbangan Medan and 96 cadets enrolled in the air traffic control and aeronautical communication program at Politeknik Penerbangan Surabaya.

The data collection process centered on a comprehensive test encompassing both a pretest and posttest. This dual-pronged assessment mechanism facilitated a direct comparison between the students' performance prior to and subsequent to their engagement with the E-Module aviation speaking preparation test. The objective was to ascertain whether the innovative blended learning approach, facilitated by the E-Module, could foster tangible development in the cadets' aviation English speaking skills. Through this research, the endeavor was not only to evaluate the efficacy of the technology-driven learning tool but also to assess its potential in elevating the language proficiency of the students. By meticulously employing a mixed-methods approach, this study aimed to offer valuable insights into the effectiveness of the E-Module aviation speaking preparation test, laying the foundation for enhanced language learning strategies in the aviation domain.
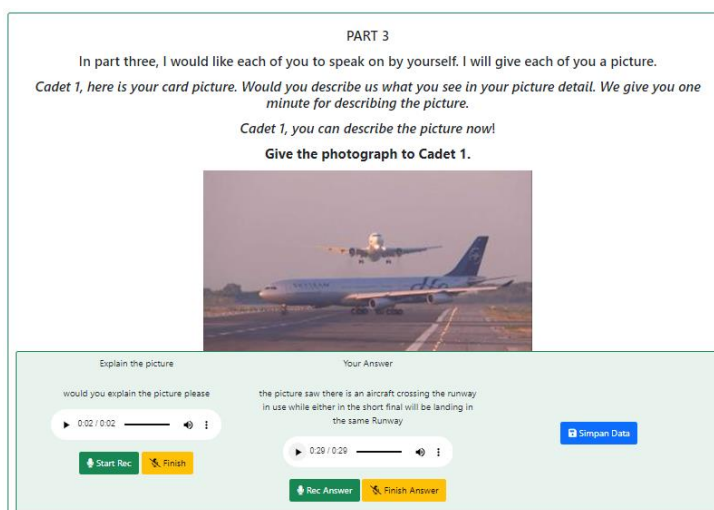

Figure 3. Feature of voice record and speech to text

Table 3. Research design

Screening (pretreatment)	Group	Pre-test	Treatment	Post-test
Speaking section	Cadets of Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya	O_1	X E-Module aviation speaking preparation test	O_2

3. RESULTS AND DISCUSSION

3.1. Validity

The validation process was undertaken to assess the structural integrity of the e-Module aviation speaking preparation test. The panel of validators comprised three experts, including an English professor from Politeknik Penerbangan Surabaya, a lecturer from Politeknik Penerbangan Indonesia Curug and another lecturer from Universitas Negeri Surabaya. The validation outcomes, as shown in Table 4, illuminate the test's design validity.

Table 4. Validity test results of E-Module aviation speaking preparation test by experts

Criteria	Expert	
	Score (%)	Category
Presentation/Display	90.5	Strongly valid
Content	87.5	Strongly valid
Purpose	94.4	Strongly valid
Effectiveness	85.7	Strongly valid
Overall	89.5	Strongly valid

The validation examination was guided by four pivotal criteria: presentation/display, content, purpose and effectiveness, culminating in a collective value of 89.5%. This robust validation score underscores the E-Module aviation speaking preparation test's pronounced suitability for both cadets and instructors. Each criterion was thoroughly evaluated, with presentation/display garnering an impressive value of 90.5%, signifying its strong validity. Content achieved a value of 87.5%, reaffirming its substantial validity. The criteria of purpose garnered a highly valid value of 94.4%. The effectiveness obtained a value of 85.7%, which is also indicative of strong validity. The validation exercise encompassed a comprehensive evaluation of the E-Module aviation speaking preparation test, where validators furnished valuable feedback on its design. Additionally, a practice test, facilitated by the E-Module aviation speaking preparation test, was implemented to gauge its practicality among users.

Table 5 shows the outcomes of the practical test conducted by English teacher. The result of this test indicates, based on the teacher's evaluation that E-Module aviation speaking preparation test is highly practical to use, with an overall value of 79.8%. This is evidenced by the evaluations of the usability test of 81.0%, content of 83.3% and media of 75.0%. Students' practical test is evaluated based on the same three criteria as that of teachers: usability, content, and media [50]–[53]. With a total score of 73.1% on the practicality test administered by students, it was determined that the E-Module aviation speaking preparation test was practical.

Table 6 shows the result of practical test by the students. This is demonstrated by the practicality evaluation of the usability of 75.0%, the content aspect of 71.0% and the media aspect 73.2%. The result indicated that E-Module aviation speaking preparation test was practical to be used as a preparation to conduct aviation English test.

Table 5. Practicality test results of E-Module aviation speaking preparation test by teacher

Criteria	Teacher	
	Score (%)	Category
Usability	81.0	Highly practical
Content	83.3	Highly practical
Media	75.0	Highly practical
Overall	79.8	Highly practical

Table 6. Practicality test results of E-Module aviation speaking preparation test by student

Criteria	Student	
	Score (%)	Category
Usability	75.0	Highly practical
Content	71.0	Practical
Media	73.2	Practical
Overall	73.1	Practical

The statistical figure information is described in Table 7. The pre-test, with an average score of 84.48, a minimum of 75, and a maximum of 94, is indicative of the students' initial standing. Meanwhile, the post-test, with values ranging from 80.00 to 99.00, has an average of 89.41, reflecting their scores after the implementation of the E-Module. The range and standard deviation show how dispersed the scores are in the sample, while the mean, median, and mode show the overall central trend. Comprehensive data from 120 cadets who took the pretest; scores ranged from 75 to 94, with an average of 84.48. A total of 120 cadets took the exam, and the results ranged from a low of 80 to a high of 99, with an average of 89.41.

Table 7. Descriptive statistics

			Statistic	Std. error
Pre-test	Mean		84.4833	.38820
	95% Confidence Interval for	Lower bound	83.7147	
	Mean	Upper bound	85.2520	
	5% Trimmed Mean		84.4537	
	Median		84.0000	
	Variance		18.084	
	Std. Deviation		4.25250	
	Minimum		75.00	
	Maximum		94.00	
	Range		19.00	
	Interquartile Range		6.00	
	Skewness		.090	.221
	Kurtosis		-.414	.438
Post-test	Mean		89.4167	.34778
	95% Confidence Interval for	Lower bound	88.7280	
	Mean	Upper bound	90.1053	
	5% Trimmed Mean		89.3611	
	Median		89.5000	
	Variance		14.514	
	Std. Deviation		3.80973	
	Minimum		80.00	
	Maximum		99.00	
	Range		19.00	
	Interquartile Range		5.75	
	Skewness		.217	.221
	Kurtosis		-.096	.438

3.2. Normality test

According to the Shapiro-Wilk normality test in Table 8, these results were normally distributed. Pre-test and post-test readings have normal levels, indicating that they follow a normal distribution. Shapiro-p-value Wilk's is significant, indicating that the data are normally distributed, as seen in Table 8. The normality test is used to determine whether the data under investigation are regularly distributed It should be mentioned that the data normality test is tailored to the requirements of the employed method and the type of test conducted. If the significance level is more than 0.05 (sig.>0.05), the data is considered to be regularly distributed for testing purposes. The results of the pre-test speaking ability in aviation English for cadets at Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya used the E-Module aviation speaking preparation test based on the normality test of Shapiro-Wilk data normally distributed, and the significance value (p) in the Shapiro-Wilk test was 0.79 (p>0.05). Based on the normality test of the Shapiro-Wilk data from the post-test results of speaking skills in aviation English for cadets of Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya using the E-Module aviation speaking preparation test, the significance value (p) in the Shapiro-Wilk test was 0.163 (p>0.05).

Table 8. Test of normality for pre-test and post-test

Test	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test	.103	120	.003	.980	120	.079
Post-test	.106	120	.002	.984	120	.163

3.3. T-test results

Comparing the means of two variables within the same group can be done through paired-sample t-test analysis. The purpose of this analysis is to compare the average of a sample taken before and after data treatment to that of a sample taken without the treatment. Table 9 reveals the paired samples statistics that show that the average pre-test score is 84.48 and the post-test score is 89.41. The correlation coefficient between the two variables in the paired sample is presented in Table 10. This coefficient is computed by employing the bivariate Pearson correlation coefficient, accompanied by a two-tailed significance test. Since the significance value (0.000) is less than α (0.05), the null hypothesis (Ho) is rejected. Consequently, a correlation between the pretest and posttest, facilitated by the utilization of the E-Module aviation speaking preparation test, is affirmed. Notably, this correlation exhibits a substantial level, reaching 0.480.

The paired samples test shown in Table 11 displays the different test values of the pretest and posttest after taking E-Module aviation speaking preparation test. The results showed that the value of Sig (2-tailed=0.000)<½ α (0.025). As a result, the null hypothesis (Ho) is rejected, signifying the presence of variations between pretest and posttest scores post the utilization of the E-Module aviation speaking

preparation test. In simpler terms, the adoption of the E-Module significantly influences the outcomes of the posttest, inducing an enhancement in aviation English speaking proficiency.

Table 9. Paired samples statistics

	Test	Mean	N	Std. deviation	Std. error mean
Pair 1	Pre-test	84.4833	120	4.25250	.38820
	Post-test	89.4167	120	3.80973	.34778

Table 10. Paired samples correlations

	Test	N	Correlation	Sig.
Pair 1	Pre-test and post-test	120	.480	.000

Table 11. Paired samples test

Test	Mean	Std. deviation	Std. error mean	95% confidence interval of the difference Lower	95% confidence interval of the difference Upper	t	df	Sig. (2-tailed)
Pair 1 Pre-test - post-test	-4.93333	4.12969	.37699	-5.67981	-4.18686	-13.086		.000

3.4. Discussion

3.4.1. Effectiveness of the E-Module aviation speaking preparation test

The objective of this research was to determine the efficacy of the E-Module aviation speaking preparation test in enhancing the aviation English speaking proficiencies of the participating cadets. Through a rigorous analysis of both pretest and posttest scores, the study revealed a noteworthy and statistically significant improvement in the participants' speaking abilities. Prior to undergoing the E-Module intervention, the cadets' average score in the pretest was notably lower than their average score in the subsequent posttest. This substantial difference between the two scores strongly implies a positive and constructive influence of the E-Module approach on the cadets' language proficiency development. The observed increase in the posttest scores distinctly suggests the beneficial impact of the E-Module in bolstering the participants' competence in aviation English speaking. This outcome underscores the potential of technology-assisted learning to effectively contribute to the enhancement of specialized language skills in aviation contexts. The finding was consistent with the result from previous study [54] that the application surpassed that of traditional printed modules.

3.4.2. Notable increase in learning scores

A comparative analysis was conducted to discern the variations in learning outcomes between two groups of cadets: those who undertook the E-Module aviation speaking preparation test and those who did not. The results exhibited a substantial distinction in the learning scores of the two groups. Specifically, cadets who actively participated in the E-Module demonstrated noticeably higher scores in comparison to their counterparts who did not engage with the module. This disparity in scores strongly signifies the efficacy of the E-Module in augmenting the aviation English speaking capabilities of the cadets. To reinforce this observation, a statistical analysis was performed on the data. The obtained p-value, which was less than the significance level of 0.05($<$0.05), confirmed the statistical significance of the score disparity between the two groups. This statistical validation adds a robust layer of evidence to the observed improvement in the speaking abilities of cadets who utilized the E-Module. Thus, it substantiates the role of the E-Module in fostering enhanced linguistic skills in the context of aviation communication.

3.4.3. Correlation between E-Module usage and improved performance

The study revealed a strong correlation between the utilization of the E-Module aviation speaking preparation test and the noticeable enhancement in the participants' speaking competence. This positive connection between the two variables was illuminated through the relatively high correlation coefficient of 0.480. This coefficient value signifies a robust positive relationship between the engagement with the E-Module and the subsequent improvement in speaking performance among the cadets. What further bolsters the credibility of this finding is the statistical significance attached to the correlation. The obtained p-value, which was found to be less than the predetermined significance level of 0.025, firmly established that this correlation was not a chance occurrence. In fact, the statistical significance implies that the positive correlation between the usage of the E-Module and the heightened speaking performance is indeed valid and

could not have emerged due to random fluctuations. This statistically underpinned association reinforces the assertion that the E-Module's integration substantially contributes to the elevation of aviation English speaking skills among the cadets.

3.4.4 Implications for language learning

The outcomes of this research carry significant implications for the realm of language acquisition and instructional methods. The integration of cutting-edge tools like the E-Module stands as a promising avenue with the potential to revolutionize language education. By harnessing such innovative technology, language instruction can experience a noteworthy improvement. Web technologies bring benefits to students [2], [55]–[57]. The E-Module serves as a dynamic and interactive platform that not only captivates learners but also nurtures the development of their aviation English speaking proficiencies in a highly effective manner. This signifies that pedagogical strategies enhanced by technology, such as the E-Module, possess the capacity to shape more dynamic and engaging language training programs [55], [58]–[60]. By offering a stimulating and interactive environment for language learning, this approach appeals to the diverse learning styles and preferences of the cadets. Additionally, the positive impact observed in this study underlines the transformative potential of technology-assisted language learning, thereby underscoring the importance of integrating such tools into the broader landscape of language pedagogy. Ultimately, these findings advocate for a shift towards technology-infused language education that can significantly enhance the effectiveness and inclusivity of language training programs

3.4.5. Recommendations for future research

This study opens avenues for future research in the field of language education and technology integration. Further investigation could explore the long-term impact of the E-Module on cadets' speaking abilities and how such approaches can be tailored to different learning styles and proficiency levels. Additionally, comparative studies with larger sample sizes and diverse learner backgrounds could provide deeper insights into the effectiveness of similar modules. In conclusion, the findings of this study underline the potential of the E-Module aviation speaking preparation test in enhancing the aviation English speaking abilities of cadets. The positive outcomes suggest that technology-enabled tools like E-Modules can play a significant role in improving language proficiency and pedagogical practices.

4.   CONCLUSION

E-module aviation speaking preparation test is designed as a technology-based instructional media to enrich student-learning activities in practicing aviation English skills to prepare themselves for taking the international standard of aviation English language proficiency. The data analysis is based on the validity aspect of the application comprises of physical/display quality, material quality, usefulness and role quality, and instructional/learning quality. It was employed to validate the findings of the E-Module aviation speaking preparation test. With an overall score of 89.5% the validation test indicates that the E-Module aviation speaking preparation test is very valid for usage by cadets and instructors. This indicates that both cadets and instructors can utilize the E-Module of aviation speaking preparation test. Tests of usefulness yielded the following results indicated that the E-Module aviation speaking preparation test had a practical value in terms of usability, content, and media.

Upon completion of the E-Module aviation speaking preparation test, a substantial correlation emerges between the pretest and posttest, denoted by a relatively robust correlation coefficient of 0.480, the value of Sig (0.000)<(0.05). The difference between the pretest and posttest scores following the studying of E-Module Aviation Speaking Preparation indicated by the value of Sig (2-tailed=0.000)<½ α (0.025). In other words, the posttest outcomes, which reveal a notable enhancement in participants' proficiency in aviation English speaking, are inherently associated with the utilization of the E-Module aviation speaking preparation test. These findings collectively underscore the substantial impact of incorporating this instructional tool on participants' language learning journey, validating its efficacy in advancing their speaking abilities in the aviation domain.

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