



# The Efficacy of Blended Learning in Enhancing Oral Proficiency in Aviation School: An In-depth Investigation

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Blended learning has been identified as a highly promising instructional approach within vocational education institutions. The objective of this study is to examine the disparities in speaking skills learning strategies between traditional (face-to-face) instruction and blended learning. Additionally, the study seeks to ascertain the impact of these learning strategies on students' speaking abilities in both traditional and blended learning environments. The present study employs a quantitative research approach, utilizing an experimental design. The sample for this study comprised 120 participants, 24 participants representing Politeknik Penerbangan Medan and 96 participants representing Politeknik Penerbangan Surabaya. The results of this study suggest that the mere adoption of technology and the removal of the traditional classroom setting do not suffice in establishing an optimal learning environment for individuals learning a second or foreign language. Nevertheless, there exists a considerable opportunity to amalgamate conventional educational settings with contemporary technological advancements in order to enhance students' academic achievements across various abilities and sub-skills, with a particular emphasis on oral communication proficiency. Based on the results obtained from the study, it is possible to draw the following conclusions: 1) A statistically significant disparity exists in the proficiency of English speaking skills when employing the blended learning approach. 2) A statistically significant discrepancy is observed in the proficiency of English speaking skills for the experimental group, thereby corroborating the efficacy of post-implementation learning strategies.

**Keywords:** blended learning, speaking skills, vocational schools, instructional strategy

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## INTRODUCTION

The optimization of information acquisition and skill development in teaching and learning is achieved through the utilization of many methods, approaches, and strategies (Haleem et al., 2022). The rapid advancements in technology have had a profound impact on the behavior, attitudes, and academic performance of students, significantly influencing their learning and communication patterns within and outside the confines of the classroom. The educational approach has undergone a transformation, transitioning from a teacher-centered model where the instructor is the exclusive provider of knowledge, to a student-centered approach that emphasizes active participation and collaboration between students and teachers. Educators desiring to implement a constructive pedagogical approach, characterized by student engagement and enhanced knowledge acquisition, can achieve this objective through the integration of information and communication technologies within the educational setting.

In the present era, the field of higher education is confronted with the imperative of fulfilling escalating demands in order to facilitate students' successful adjustment in a society that is predominantly influenced by technological advancements ([Singh, 2021](#)). The present study builds upon the author's past research and aims to provide a full analysis in continuation of prior investigations. The study commenced by designing an e-module for aviation speaking preparation, aimed at enhancing the speaking proficiency of participants from Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya in the year 2022. In addition, the author conducted a study on the effectiveness of an e-module aviation speaking preparation test in enhancing aviation English speaking skills through e-learning. The findings of the study indicated a positive impact on English language learning outcomes when utilizing this particular media.

The author's ongoing research is to investigate the efficacy of a blended learning program, specifically focusing on the use of an e-module for aviation speaking preparation tests. The objective is to determine how this program can enhance students' speaking skills, by comparing it to traditional learning methods.

In order to maintain a competitive edge in the field of education, it is imperative to enhance the academic standards at Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya by implementing innovative pedagogical strategies and educational curricula. This can be achieved by integrating conventional classroom instruction with online learning modalities, as suggested by ([Müller & Mildenerger, 2021](#); [Alom et al., 2023](#)). Failure to adapt to the constantly changing environment may result in both institutions being left behind, perhaps leading to adverse consequences for students who require a diverse range of skills and abilities.

One method that can achieve balance in teaching is blended learning (BL) or semi-attendance based learning. This teaching approach combines elements of traditional teaching with strategies typical of non-attendance based distance learning or E-learning ([Jin et al., 2021](#); [Salta et al., 2022](#)). This method is also considered as a way to provide meaningful learning experiences, because it facilitates independent and collaborative learning ([Chowdhury, 2021](#); [Almulla, 2020](#)). Additionally, it helps students gain a better understanding of the subject matter and develop cognitive and social skills simultaneously. The use of technology in language learning, especially in speaking skills, provides various opportunities for language learners to improve their abilities in learning languages ([V. Sosas, 2021](#); [Rochmawati et al., 2021](#)). In addition to regular face-to-face teaching where teachers have direct control over students' learning and progress, technological developments have led educators towards a new approach to learning known as "hybrid" or "blended learning" ([Omorieg & Baruwa, 2023](#); [Omorieg & Baruwa, 2023](#)).

Blended learning, as described by ([Martanto et al., 2021](#); [Tong et al., 2022](#); [Rasheed et al., 2020](#); [Dziuban et al., 2018](#); [Anthony et al., 2022](#)), refers to the integration of online learning or web-based

training with conventional learning and teaching approaches. Blended learning has emerged as a prominent instructional approach employed by numerous specialists and educational institutions in the field of English as a Second Language (ESL) and English as a Foreign Language (EFL). Blended learning exhibits a fundamental attribute wherein a portion of the instructional content is disseminated via online platforms, while the remainder is conveyed through in-person interactions inside a classroom setting ([Chang, 2023](#)). Online education can provide valuable assistance to traditional face-to-face learning, and conversely, traditional face-to-face learning can also enhance the effectiveness of online education. Hence, the primary objective of the blended learning strategy is to establish a cohesive equilibrium between digital access to information and in-person engagement among students ([Liu et al., 2024](#)).

Blending internet-based learning with traditional in-person instruction offers numerous advantages, yet there's a lack of research in higher vocational education, especially for enhancing English as a second language. This study addresses this gap, emphasizing the significance of language acquisition through social interactions. The significance of language acquisition through effective social interactions has been a topic of discussion among researchers, emphasizing the need to prioritize this approach over cognitive components and memory alone ([Spence, 2020](#)). Blended learning, combining online and face-to-face methods, represents a shift from traditional classrooms, enabling learning beyond physical and time constraints. Learners can access materials conveniently, aligning with effective second language acquisition approaches that transcend traditional boundaries. Blended learning aims to engage all students in the educational process.

The concept of technology integration refers to the incorporation of technology-based resources and practices in educational settings ([Consoli et al., 2023](#)). This approach aims to promote learning in various subject areas by enabling students to utilize computer and technology abilities to engage in meaningful learning and problem-solving activities. Educational technology encompasses not just physical devices, software applications, and online resources, but also encompasses systematic methodologies that facilitate the process of teaching and learning, as well as enhance overall performance. The accomplishment of this objective is accomplished by the right creation, utilization, and administration of technology resources ([Javaid et al., 2022](#); [Vinuesa et al., 2020](#); [He et al., 2021](#)). Technology integration refers to the process of merging technology equipment with the specific requirements and objectives of a curriculum. Technology assumes a crucial role in shaping the functioning of the classroom, with the primary emphasis of each classroom being on curriculum objectives and achievements. In the subsequent analysis, the concept of technology integration is explored via the lens of educators' effective utilization of technology in their current classroom practices, as highlighted by ([Abedi, 2023](#)).

This examination delves into the ways in which educators incorporate technology into their instructional methods, thereby reshaping these activities to align with curriculum objectives. There exists a strong correlation between foreign language instruction and the utilization of technology to facilitate the creation of courses and completion of learning tasks ([Bećirović et al., 2021](#)).

The cultivation of oral communication abilities has significance due to the substantial disparity between the number of words said and written in English, with individuals typically uttering around 100 words for every one word written ([Suzuki, 2020](#)). In interpersonal communication, it has been observed that individuals allocate approximately 45% of their time to the act of listening, 30% to speaking, 16% to reading, and 9% to speaking ([Numanovich & Abbosxonovich, 2020](#)). On the other hand, the incapacity to generate verbal communication constrains social interaction and results in a state of social seclusion ([Channell & Mattie, 2023](#); [Adams et al., 2022](#)). Speaking can be defined as a complex activity that involves the integration of multiple subsystems ([Kearney & Guenther, 2019](#)). They consider speaking to be a fundamental ability. The act of speaking poses challenges due to the necessity of employing language in a socially suitable manner during interpersonal exchanges ([Hossain, 2024](#)). The act of speaking encompasses both verbal and nonverbal components, which encompass aspects such as pronunciation, intonation, stress, body language, and facial emotions ([Del Giacco et al., 2020](#)). The concept of speaking correctness pertains to the capacity to engage in spontaneous speech while utilizing suitable vocabulary, grammar, and pronunciation. It holds significant importance in attaining proficiency in speaking skills ([Ghafar & Raheem, 2023](#)). The utilization of speaking skills occurs in real-time, necessitating the ability to make decisions spontaneously ([Ironsi, 2023](#); [Qiao & Zhao, 2023](#)). In addition to the aforementioned obstacle, the development of speaking abilities necessitates the incorporation of response rate timing, the elimination of hesitation, the ability to adhere to grammatical structures, and the generation of vocabulary ([Annandale et al., 2021](#)). The insufficiency in the command of vocabulary, grammar, and pronunciation leads to diminished speaking proficiency, hence warranting the inclusion of instructional interventions targeting these areas ([Saed et al., 2021](#)). Other investigation focused on the examination of techniques employed by first semester students at a vocational school to address challenges encountered during oral communication in classroom settings ([Maji et al., 2022](#)). Linguists suggest that the focus of listening comprehension should be on enhancing speaking abilities. In order to effectively engage with spoken messages, learners must possess the receptive skill of listening, which enables them to comprehend the intended meaning ([Vani & Veeranjanyulu Naik, 2023](#)).

The process of technology integration in the foreign language classroom has been described as the use of a computer by a learner, leading to enhancements in their proficiency in the target language ([Hafner & Miller, 2021](#)). Furthermore, the proliferation of novel technologies has

resulted in the widespread adoption of technology applications within the realm of foreign language instruction. During the initial stages of foreign language instruction, computers emerged as a valuable tool for facilitating drill-based language practice. Nevertheless, the acquisition of foreign languages is commonly perceived as a communicative and interactive endeavor, facilitated by students' access to genuine language resources and engagement with others who are proficient in the target language ([Han et al., 2024](#)).

According to the findings of ([Abbasi, 2020](#)), previous research in the sector has emphasized the significant influence of technology in facilitating language acquisition. Consequently, the successful incorporation of technology in the language classroom necessitates a strong foundation in pedagogical principles and a proficient grasp of essential technological competencies. The integration of technology in the curriculum has the potential to enhance student learning and academic achievement within the classroom setting. In a more precise manner, the utilization of technology serves as the foundation for four fundamental elements of the learning process: active engagement, involvement in collaborative settings, regular contact and feedback, and access to real-world authorities. The mere integration of technology into the classroom environment does not inherently ensure the automatic resolution of educational challenges ([Grassini, 2023](#); [Xu et al., 2021](#)). The effectiveness of technology in the teaching and learning process is contingent upon instructors possessing a comprehensive comprehension of its significance and implementation within the curriculum and classroom instruction ([Yu, 2024](#); [Major et al., 2021](#); [Muhammad & Dabbagh, 2021](#)).

The absence of a well-defined overarching aim and underlying logic renders the utilization of technology as an additional burden, superficial and inconsequential, hence failing to facilitate effective teaching or learning ([Yu, 2024](#)). The crucial to engage in reflective practices that examine the underlying motivations for utilizing technology in order to establish solid rationales and justifications for integrating technology ([Merta et al., 2023](#); [Crompton & Sykora, 2021](#); [Reyneke et al., 2020](#)). Consequently, the integration of technology can effectively facilitate student engagement in meaningful learning when well strategized and applied to curriculum activities and assignments. The necessity for purposeful creation and execution in the learning environment is emphasized ([Mhlongo et al., 2023](#); [Gramaje & Buenviaje, 2023](#)). In online settings, learners are not passive recipients of knowledge ([Rhim & Han, 2020](#)). Instead, they actively construct their understanding of the subject matter by engaging in experiences and interacting with other individuals and surroundings. The integration of technology in educational settings, guided by constructivist principles, facilitates meaningful learning experiences ([Ayse, 2018](#)). This approach includes activities that encourage discourse, reflection, collaboration, connecting with the learning context, and transferring information. Proper use of technology enhances comprehension, structured thinking, and critical inquiry.

Technology should prioritize practical applications, written expression, interaction, and investigation.

The prevailing belief is that blended learning has consistently been the standard for students, as it aligns with the notion that learning naturally takes place through diverse interactions (Anthony et al., 2022; Su et al., 2023; Halverson & Graham, 2019). However, the integration of online and face-to-face teaching does not meet the criteria for blended training according to numerous other academics. Several scholars have made efforts to quantify the extent of online engagement that qualifies as blended learning (Huang et al., 2022). Courses that do not incorporate any online content are categorized as traditional courses (Coman et al., 2020). Courses that include 1-29% online content are classified as web-facilitated courses, while those with 30-49% online content are referred to as blended/hybrid courses. Finally, courses that consist of more than 80% online content are termed fully online courses. In contrast, (Dhawan, 2020) provide a generic definition of blended learning (BL) as instructional courses that integrate face-to-face classroom components with the judicious incorporation of technology. The phrase "technology" encompasses a range of contemporary technologies, including but not limited to the Internet, CD-ROMs, and interactive whiteboards. Table 1 presents the taxonomy of blended learning as delineated (Smith & Kurthen, 2007).

**TABLE 1** | Blended Learning Taxonomy Terms (Smith & Kurthen, 2007).

Terms	Definition
Web-enhance	Courses that incorporate online materials to a limited extent, namely utilizing them for less than 30% of the course content, such as sharing syllabi and making course announcements.
Blended	Subjects employed a number of notable online activities within the context of face-to-face learning, albeit at a proportion lower than 50 percent.
Hybrid	Subjects in which online activities substitute for 50-80 percent of in-person class sessions.
Fully online	Subjects in which a significant majority, specifically 80 percent or more, of the instructional content is delivered using online platforms.

The present study adopts the definition of blended learning as outlined in the 2008 report published by the North American Council for Online Learning. The approach utilized is based around the learner and promotes interactivity, combining compelling online content with the most effective aspects of classroom engagement.

When examining BL design, the primary objective is to identify the optimal combination of learning modes that is both successful and efficient for specific learning subjects, settings, and goals (Lalian et al., 2021). Blended learning (BL) aims to achieve a suitable equilibrium between technological endeavors and in-person interactions. Consequently, it continues to hold significance in the field of language teaching, as it primarily focuses on determining the ideal combination of instructional methods to offer the most efficient language learning experience. Consequently, BL encompasses more than the mere identification of an optimal combination of technologies or the mere enhancement of students' availability to information in new media. The essence of this concept lies in the reconsideration and restructuring of the dynamic between teaching and learning. The mixed design approach seeks to optimize the advantages of several learning modalities based on the specific requirements of learners. The essential for online course management systems to include user-friendly interfaces, promote interactive discussions to foster a sense of community among learners, and incorporate effective mechanisms for expressing expectations and delivering feedback. In addition, it is imperative for educators to actively participate in the online setting in order to effectively oversee, direct, and foster purposeful educational encounters.

The significance of investigating the impact of blended learning is growing as educational technology is being integrated into foreign language classes in higher education. This study seeks to examine the efficacy of blended learning in enhancing students' speaking abilities, rather than solely examining the learning behaviors and tactics employed by teachers and students. Furthermore, this study holds significance due to the pressing need for substantial reforms in the education system to cater to the needs of the next generation. Specifically, there is a demand for the seamless integration of technology within the educational framework. Hence, the researcher intends to undertake a study titled "The Efficacy of Blended Learning in Enhancing Oral Proficiency: An In-depth Investigation". This study aimed to investigate the effects of blended learning on the enhancement of students' speaking abilities. The utilization of virtual learning, encompassing a range of multimedia and communication tools, has the potential to confer benefits through facilitating the enhancement of students' oral communication abilities. Therefore, it can be stated the problems of the research are: 1) what is the comparison between speaking learning strategies of traditional and blended learning? 2) what is the influence of speaking learning strategies of traditional and blended learning on students' speaking abilities?

## METHODS

### Research Design

The present study employs a quantitative research approach, utilizing an experimental design. In experimental investigations, participants are typically allocated into two distinct groups. The first group, known as the experimental group, receives blended learning methodologies, while the second group, referred to as the control group, does not get any form of treatment. The experimental group was provided with blended learning education, whereas the control group received face-to-face instruction, as indicated in [Table 2](#). Therefore, the observed variations in their oral proficiency, as demonstrated in the post-speaking assessment, can be linked to the intervention or treatment itself.

**TABLE 2** | Design of Research

Screening (pretreatment)	Group	Pre test	Treat ment	Post test
Speaking outcome	A Experim ental	O <sub>1</sub>	X <sub>1</sub> Blended Learning	O <sub>2</sub>
Speaking outcome	B Control	O <sub>1</sub>	X <sub>2</sub> Normal Class	O <sub>2</sub>

The research sample comprised 120 participants, including 24 participants enrolled in Air Traffic Control course at Politeknik Penerbangan Medan and 96 enrolled in Air Traffic Control course and Aviation Communications course at Politeknik Penerbangan Surabaya. The samples were partitioned into an experimental group and a control group.

**TABLE 3** | Data Analysis Techniques

Statement of Problem	Measure ment	Data Analysis
Comparison between speaking learning strategies of traditional and blended learning	Pretest and posttest of speaking	Test the average of two paired groups with Paired T-Test
Influence of speaking learning strategies of traditional and blended learning on students' speaking abilities	Pretest and posttest of speaking	ANOVA

[Table 3](#) provides data analysis techniques as the comprehensive overview of the tools and materials employed in the course of the investigation. Commencing with an elucidation of the devices employed for assessing participant accomplishment, namely the pretest and posttest. Subsequently, a concise elucidation about the process of acquiring knowledge is shown, followed by an in-depth discussion on the utilization of the aircraft speaking preparation exam e-module as a primary resource by researchers in the control group. Lastly, an additional exposition is provided on the platform that facilitates the integration of blended learning tools.

To answer research question no 1 regarding the comparison between speaking learning strategies of traditional and blended learning, the researchers use a paired T-test because it is suitable for analyzing the pretest and posttest data from the same group of participants. In this research design, the same participants are exposed to both traditional and blended learning strategies, and their speaking abilities are measured before and after the treatment. The paired T-test compares the means of two related groups (pretest and posttest) while accounting for the individual differences among participants. By using a paired T-test, the researchers can determine whether there is a statistically significant difference in the speaking abilities of participants after they have been exposed to traditional learning compared to blended learning. Additionally, the paired T-test helps to control for individual variability, making it a powerful tool for detecting changes within the same group over time. This statistical test is thereby enabling the researchers to evaluate the effectiveness of traditional and blended learning strategies in improving students' speaking skills.

To answer research question no 2 about the influence of speaking learning strategies of traditional and blended learning on students' speaking abilities, the researchers use pretest and post test of speaking and analyze it using ANOVA. In this case, the researchers are comparing the influence of speaking learning strategies on students' speaking abilities between traditional learning and blended learning to tests whether there are statistically significant differences in the means of these groups. ANOVA is utilized in this research scenario to determine whether there are significant differences in speaking abilities across different learning strategies, thus providing insights into the effectiveness of these strategies in enhancing students' speaking skills.

The utilization of pretest and posttest measures is a reliable method employed to evaluate the educational achievements of the specific population under study. Standard or locally customized options are available. The primary objective of the pretest is to gather pretest measures and evaluate learning outcomes, namely the pre-existing knowledge of the two groups regarding the

targeted speaking skills, prior to their exposure to blended learning. The results of the participants pretest serve as an indicator of the first level of proficiency. In addition to assessing prior knowledge, it serves as a foundation for evaluating protest outcomes. This assessment can provide participants from both groups with an accurate evaluation of their present proficiency in spoken language acquisition. Furthermore, drawing upon the participants' prior knowledge, this study serves as a guiding framework for researchers in determining the specific subjects and tasks that will be addressed within the context of speaking skills through the implementation of blended learning methodologies. Nevertheless, the posttest, which evaluated the attainment of treatment learning objectives following an entire semester, exhibited similarities to the pretest in terms of its structure and content. On one hand, it was specifically created to gauge the learning outcomes subsequent to the implementation of online learning tools for enhancing speaking skills.

This study employed examinations to assess the speaking abilities and knowledge of participants in both the control and experimental groups, both before to and during the implementation of the treatment. Conversely, it has the potential to facilitate the evaluation of learning objectives' appropriateness and offer valuable insights into areas of speaking abilities and material that require further enhancement. The evaluation of participants' speaking abilities is conducted using an assessment criterion derived from the ICAO Language competency Rating Scale. This rubric encompasses six key components of language competency, including pronunciation, grammatical structure, vocabulary usage, fluency, understanding, and interactive skills.

The research data, consisting of pretest and posttest results for each subcomponent collected from participants, are then processed and analyzed using SPSS 25 software. Subsequently, the data is entered into the SPSS 25 software to be checked and ensured that there are no input errors, such as missing or invalid data. Descriptive statistical analysis is then conducted to describe the basic characteristics of the collected data, including statistical calculations such as mean, median, mode, standard deviation, and range for each relevant variable in the study. Furthermore, a t-test is performed to compare the means between two groups and provide information on whether there is a significant difference between the two groups. Hypothesis testing with ANOVA is conducted to provide information on whether there is a significant difference between the compared groups. After the analysis is completed, the interpretation results can be used to answer the research questions.

## RESULTS AND DISCUSSION

### Experimental Group

The experimental group consisting of 60 participants who were exposed to the blended learning strategy. It was observed that the average score for speaking ability was higher in the post-test, as indicated in [Table 4](#).

**TABLE 4** | Descriptive Statistics for Experimental Group

		Min.	Max.	Mean	Std. Deviation
Pre-Test (Experiment)	60	55.00	70.00	66.2000	2.76663
Post-Test (Experiment)	60	75.00	86.00	78.0000	2.30695
Valid N (listwise)	60				

[Table 4](#) presents the results of the pre-test and post-test mean scores for the participants. It shows that the pre-test mean score was 66.20, with a standard deviation of 2.76663, indicating the average speaking ability of the group before the intervention. Following the implementation of the speaking learning strategies, the post-test mean score increased to 78.00, with a standard deviation of 2.30695. This suggests a notable improvement in the participants' speaking abilities, with a rise of 11.80 points in the mean score within this particular group. This increase indicates the effectiveness of the learning strategies in enhancing the students' speaking skills over the course of the intervention period.

### Subcomponent for experimental group

The study analyzes six speaking proficiency elements scored by maximum point as follows: pronunciation (5), structure (10), vocabulary (20), fluency (20), understanding (20), and interactions (25). Table 5 shows improvements in average scores across these components, ranging from 3.3067 to 19.5000, with an overall increase from 66.20 to 78.00. Pronunciation 0.5933, structure 1.18, vocabulary 2.3533, fluency 2.34, comprehension 2.36, and interaction 2.9625 improved, respectively. Minimum and maximum scores varied between pretest and post-test phases, with an overall rise in minimum scores across all subcomponents.

**TABLE 5** | Descriptive Statistics for Subcomponents (experimental group)

	N	Min.	Max.	Mean	Std. Deviation
Pronunciation1	60	2.75	3.50	3.3067	.14275
Pronunciation2	60	3.75	4.30	3.9000	.11535
Structure1	60	5.50	7.00	6.6200	.27910
Structure2	60	7.50	8.60	7.8000	.23070
Vocabulary1	60	11.00	14.00	13.2467	.55524
Vocabulary2	60	15.00	17.20	15.6000	.46139
Fluency1	60	11.00	14.00	13.2600	.55148
Fluency2	60	15.00	17.20	15.6000	.46139
Comprehension1	60	11.00	14.00	13.2400	.55087
Comprehension2	60	15.00	17.20	15.6000	.46139
Interaction1	60	13.75	17.50	16.5375	.70082
Interaction2	60	18.75	21.50	19.5000	.57674
Valid N (listwise)	60				

The experimental group receiving blended learning showed a significant 11.80 improvement in mean speaking ability scores from pre-test to post-test, with significant increases observed in all six subcomponents. Specifically, the interaction component increased by 2.4625. However, further analysis comparing these results to control groups is needed to determine the exact cause of these improvements.

### Control Group

The researchers conducted a comparative analysis of the speaking proficiency outcomes between the experimental and control groups, with the aim of examining the impact of the blended learning intervention. The control group consisted of a cohort of 60 participants [TABLE 8](#) who were subjected to conventional learning methodologies.

**TABLE 6** | Descriptive Statistics for Control Group

	N	Min.	Max.	Mean	Std. Deviation
Pre-Test (Control)	60	64.00	67.00	65.2000	0.70830
Post-Test (Control)	60	64.00	70.00	65.9333	1.74537
Valid N (listwise)	60				

[Table 6](#) displays the descriptive statistics. The mean score on the pre-test was recorded as 65.2000, which subsequently rose to 65.9333 on the post-test, suggesting a marginal improvement of merely 0.7333.

### 4.2.2 Subcomponent score for control group

In [Table 7](#), descriptive statistics for pronunciation, structure, vocabulary, fluency, comprehension, and interaction components are presented. The Wilcoxon Signed Ranks test was used to assess statistically significant differences between pre-test and post-test scores. This choice was made due to non-normal score distributions based on the Shapiro-Wilk normality test. The findings show a prevalence of positive ratings, indicating score improvement between pairs of individuals, across all components. The p-values for all six components were statistically significant ( $p < 0.05$ ), indicating substantial score improvements.

**TABLE 7** | Descriptive Statistics for Subcomponents (control group).

	N	Min.	Max.	Mean	Std. Deviation
Pronunciation 1	60	3.20	3.35	3.2600	.03542
Pronunciation 2	60	3.20	3.50	3.2967	.08727
Structure1	60	6.40	6.70	6.5200	.07083
Structure2	60	6.40	7.00	6.5933	.17454
Vocabulary1	60	12.80	13.40	13.0400	.14166
Vocabulary2	60	12.80	14.00	13.1867	.34907
Fluency1	60	12.80	13.40	13.0400	.14166
Fluency2	60	12.80	14.00	13.1867	.34907
Comprehension1	60	12.80	13.40	13.0400	.14166
Comprehension2	60	12.80	14.00	13.1867	.34907
Interactions1	60	16.00	16.75	16.3000	.17708
Interactions2	60	16.00	17.50	16.4833	.43634
Valid N (listwise)	60				

[Table 7](#) shows pronunciation 0.0367, structure 0.0733, vocabulary 0.1467, fluency 0.1467, comprehension 0.1467, and interaction 0.1833. The findings indicate that there is no significant difference in the beginning abilities of students on the pre-test and posttest.

### Initial Score of Speaking Skill: experimental (BL) versus control

[Table 8](#) provides a visual representation of the initial language competence levels of the s in both the experimental and control class.

**TABLE 8** | Descriptives Pre-Test for experimental (BL) versus control (TA)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Pre test-experiment	60	66.2000	2.76663	.35717	65.4853	66.9147	55.00	70.00
Pre test-control	60	65.2000	.70830	.09144	65.0170	65.3830	64.00	67.00
Total	120	65.7000	2.07263	.18920	65.3254	66.0746	55.00	70.00

The findings indicate that there is no significant difference in the beginning abilities of s between the experimental class and control class, as both groups obtained average scores on the pre-test. Specifically, the experimental group had an average score of 66.2000, while the control group had an average score of 65.2000 on the pre-test.

**TABLE 9** | ANOVA Pre-Test for experimental (BL) versus control (TA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	30.000	1	30.000	7.357	0.008
Within Groups	481.200	118	4.078		
Total	511.200	119			

The study conducted in [table 9](#) yielded an estimated F value of 7.357, with a significance level (sig) of 0.008. Based on the obtained significance value of greater than 0.05, it can be inferred that there is no statistically significant distinction in the mean initial ability score between s who will receive blended learning techniques and those who will receive traditional learning strategies.

**Final Score of Speaking Skills: experimental (BL) versus control**

[Table 10](#) provides a visual representation of the comparative speaking capabilities of s in both the experimental class and the control class at the end of the study.

**TABLE 10** | Descriptive Post-Test for experimental (BL) versus control (TA)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Post Test experiment	60	78.0000	2.30695	.29783	77.4041	78.5959	75.00	86.00
Post test control	60	65.9333	1.74537	.22533	65.4825	66.3842	64.00	70.00
Total	120	71.9667	6.39187	.58350	70.8113	73.1220	64.00	86.00

The findings indicate that there are disparities in the overall performance of s between the experimental class and the control class. Specifically, the average score for the post-test in the experimental group was 78.0000, but the average score for the pre-test in the control group was 65.9333. The analysis of [table 11](#) indicated an estimated F value of 1043.964, with a significance level (sig) of 0.000. Based on the obtained significance value exceeding the threshold of 0.05, it can be inferred that a disparity exists in the mean final ability score between s who were exposed to blended learning strategies and those who received traditional learning strategies.

**TABLE 11** | ANOVA Post-Test for experimental (BL) versus control (TA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4368.133	1	4368.133	1043.964	.000
Within Groups	493.733	118	4.184		
Total	4861.867	119			

**The influence of speaking skills learning strategies between traditional and blended learning on students' speaking abilities**

The two-tailed significance value (0.000) is less than half of the alpha level (0.025). The findings of this study indicate that there exists a disparity between the pre-test and post-test scores following the implementation of treatment/learning, specifically in relation to individuals who were exposed to blended learning strategies as opposed to traditional learning strategies. In essence, the post-test outcomes are influenced by either blended learning tactics or traditional learning strategies as shown in Table 12.



**TABLE 12** | Paired Samples Test Post-Test for experimental (BL) versus control (TA)

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pre-Test Experiment – Post-Test Experiment	-11.80000	3.25108	.41971	-12.63984	-10.96016	-28.115	59	.000
Pair 2	Pre-Test Control Post-Test Control	-.73333	1.45982	.18846	-1.11044	-.35622	-3.891	59	.000

The paired samples test was conducted to compare the post-test scores between the experimental group (BL) and the control group. The standard deviation for the experimental group (BL) was found to be 3.25108, while for the control group, it was 1.45982. Additionally, the mean post-test score for the experimental group was 0.41971, and for the control group, it was 0.18846. These findings suggest that there is variability in the post-test scores within both groups, with the experimental group (BL) exhibiting a higher standard deviation compared to the control group. Furthermore, the mean post-test score for the experimental group is notably higher than that of the control group. These results indicate potential differences in the effectiveness of the learning strategies employed between the experimental and control groups, with the experimental group showing a greater improvement in speaking abilities compared to the control group.

Using the information provided in Table 13, it was observed that the experimental group exhibited a substantial increase in scores, with a difference of 11.80 compared to the control group, which only showed a minor improvement of 0.7333. To assess the statistical significance of this difference in progress between the two groups, a two-sample t-test was conducted. The analysis confirmed a statistically significant disparity between the two percentages, namely 11.80 and 0.7333, resulting in a difference of 11.0667.

**TABLE 13** | Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pre-Test Experiment	66.2000	60	2.76663	.35717
Post-Test Experiment	78.0000	60	2.30695	.29783
Pair 2 Pre-Test Control	65.2000	60	.70830	.09144
Post-Test Control	65.9333	60	1.74537	.22533

**Comparison of speaking ability subcomponents between traditional and blended learning on students' speaking ability.**

**Experimental Class**

To analyze the subcomponent of oral proficiency for the speaking test, the researchers collected data from both pretest and posttest assessments. They then conducted a paired t-test to compare the scores obtained before and after the intervention. The significance value obtained from the paired t-test (0.000) is less than half of the alpha level (0.025), indicating a significant difference between the pretest and posttest scores in the experimental group. [Table 14](#) illustrates this difference in scores, showcasing a clear disparity between the pretest and posttest results.

**TABLE 14** | Paired Samples Test for Experimental Group

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	Lower	Upper			
Pair 1	Pronunciation1 Pronunciation2	-.59333	.16608	.02144	-.63624	-.55043	-27.673	59	.000
Pair 2	Structure1 Structure2	-1.18000	.32770	.04231	-1.26465	-1.09535	-27.892	59	.000
Pair 3	Vocabulary1 Vocabulary2	-2.35333	.65392	.08442	-2.52226	-2.18441	-27.876	59	.000
Pair 4	Fluency1 Fluency2	-2.34000	.65178	.08414	-2.50837	-2.17163	-27.809	59	.000
Pair 5	Comprehension1 Comprehension2	-2.36000	.64708	.08354	-2.52716	-2.19284	-28.251	59	.000
Pair 6	Interaction1 Interaction2	-2.96250	.81800	.10560	-3.17381	-2.75119	-28.053	59	.000

The results of this study reveal a statistically significant difference between the pre-test and post-test scores, as evidenced by the mean and standard deviation obtained from the paired t-test analysis of each subcomponent. These findings suggest that the implementation of blended learning methodologies has a significant impact on the outcomes of the posttest assessments. Specifically, the use of mixed learning techniques has led to substantial improvements in the participants' speaking abilities, as indicated by the significant disparity between their pre-test and post-test scores. This underscores the effectiveness of blended learning approaches in enhancing students' speaking skills and highlights the potential of such methodologies to facilitate meaningful learning outcomes in language education.

### Control Class

The analysis of the subcomponent of oral proficiency for the control group involved collecting data from both pretest and posttest assessments using a t-test, containing the pairs of pronunciation, structure, vocabulary, fluency, comprehension and interaction. The obtained significance value (2-tailed = 0.000) was found to be less than half of the alpha level (0.025), indicating a significant difference between the pretest and posttest values after treatment.

**TABLE 15** | Paired Samples Test for Control Group

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	Lower	Upper			
Pair 1	Pronunciation1 Pronunciation2	-.03667	.07299	.00942	-.05552	-.01781	-3.891	59	.000
Pair 2	Structure1 Structure2	-.07333	.14598	.01885	-.11104	-.03562	-3.891	59	.000
Pair 3	Vocabulary1 Vocabulary2	-.14667	.29196	.03769	-.22209	-.07124	-3.891	59	.000
Pair 4	Fluency1 Fluency2	-.14667	.29196	.03769	-.22209	-.07124	-3.891	59	.000
Pair 5	Comprehension1 Comprehension2	-.14667	.29196	.03769	-.22209	-.07124	-3.891	59	.000
Pair 6	Interactions1 Interactions2	-.18333	.48465	.06257	-.30853	-.05813	-2.930	59	.005

These results show that there is a difference in pretest and posttest scores, as evidenced by the mean and standard deviation, after treatment with traditional learning strategies. [Table 15](#) provides a detailed depiction of these findings, showing significant differences in the pretest and posttest scores for all components (pronunciation, structure, vocabulary, fluency, comprehension and interaction) except for the interaction component, which has a value of 0.005, slightly higher than the alpha level. These results suggest that there is indeed a notable disparity between the pretest and posttest scores following treatment with traditional learning strategies.

### **Comparison of speaking skills learning strategies between traditional (face-to-face) and blended learning**

The experimental group demonstrated notable enhancements in average scores across various components, resulting in an overall increase from 66.20 to 78.00 in mean speaking ability scores from pre-test to post-test. Specifically, improvements were observed in pronunciation (0.5933), structure (1.18), vocabulary (2.3533), fluency (2.34), and comprehension (2.36), indicating a significant improvement of 11.80%. Conversely, the control group exhibited marginal improvements, with slight increases in pronunciation (0.0367), structure (0.0733), vocabulary (0.1467), fluency (0.1467), comprehension (0.1467), and interaction (0.1833). The mean score on the pre-test for the control group was 65.2000, which slightly increased to 65.9333 on the post-test, reflecting a minimal improvement of only 0.7333%. The results of the paired t-test indicate a statistically significant difference between the pre-test and post-test scores. The obtained significance value of 0.000 is less than half of the alpha level of 0.025, suggesting a highly significant difference. This implies that the intervention, likely involving blended learning methodologies, has had a substantial impact on the participants' speaking abilities. The mean and standard deviation obtained from the paired t-test analysis further support this finding, providing evidence of significant improvements across each subcomponent of the speaking test.

The findings of the study indicated a statistically significant disparity in the average scores of speaking proficiencies between the pre-implementation and post-implementation phases of the blended learning (BL) approach. The post-intervention speaking ability score was found to be higher than the pre-intervention score, indicating that the implementation of the BL strategy had a beneficial influence on the speaking ability performance of

students in the experimental group. This finding demonstrates the effectiveness of blended learning, namely the utilization of online teaching resources such as E-Module Aviation Speaking Preparation Test, in enhancing students' speaking abilities. This phenomenon may occur due to the heightened learning desire among students when they are exposed to the same educational content through several modalities, such as technology and simulations.

The aforementioned findings are consistent with previous studies conducted ([Menggo & Darong, 2022](#); [Yudhana, 2021](#); [Asaad Hamza Sheerah, 2020a](#)). These studies have demonstrated the efficacy of blended learning in enhancing English speaking abilities, as well as indicating a notable improvement in overall student skills. These studies collectively demonstrate the advantages of blended learning and its efficacy in instructing diverse subjects.

In the blended learning program, feedback plays a significant role in enhancing students' speaking skills. External feedback, provided through the E-Module Aviation Speaking Preparation Test on an online platform, helps learners identify mistakes and receive suggestions for improvement. This digital platform encourages students to review and correct errors independently. Instructor feedback guides discussions and provides relevant information, while peer feedback promotes open exchange of perspectives among students. The integration of the E-Module and online activities boosts dedication to oral communication and increases teacher feedback. Asynchronous learning in the speaking class enhances flexibility and effectiveness, making speaking practice more convenient. This collaborative learning approach fosters student engagement and contributes to a student-centered educational setting. Effective pedagogical approaches are essential for motivating learners, sustaining focus on the subject matter, assessing progress, and promoting critical thinking. Such approaches drive learner motivation and involvement in the educational program.

Blended Learning promotes independent, active, and responsible learning. It empowers students to engage actively with course material, fostering a sense of ownership over their learning. Online tools enhance students' ability to express ideas confidently and organize them effectively. Differences in student performance can be attributed to increased motivation, independence, engagement, creativity, and willingness to review and revise their work. Combining in-class and online activities encourages collaboration and effectively develops speaking skills, creating an engaging learning environment.

### **The influence of speaking skills learning strategies, between traditional and blended learning on students' speaking abilities.**

The results of the ANOVA test for the pretest between the experimental group and the control group yielded an estimated F value of 7.357, with a significance level (sig) of 0.008. With a significance value exceeding the threshold of 0.05, it can be inferred that there is no statistically significant distinction in the mean initial ability score between those who will receive blended learning techniques and those who will receive traditional learning strategies. However, for the posttest, the ANOVA test indicated an estimated F value of 1043.964, with a significance level (sig) of 0.000. This significance value is below the threshold of 0.05, indicating a statistically significant difference in the mean final ability score between participants who were exposed to blended learning strategies and those who received traditional learning strategies. This suggests that blended learning techniques have had a significant impact on improving the final ability scores compared to traditional learning strategies.

The findings indicate a positive correlation between the use of the blended teaching learning strategy and students' performance in speaking. The findings revealed a substantial impact on the overall speaking score of students who were exposed to the blended learning approach compared to those who were not. Upon analyzing the academic performance of students that engage in blended learning, it becomes evident that there exists a statistically significant disparity in their average results. The observed phenomenon can be linked to the presence of abundant resources, particularly interactive ones, which learners perceive as being conducive to linguistic accuracy and cohesiveness. An intriguing observation pertains to the differential impact of the blended learning (BL) approach on the speaking scores of the experimental group compared to the control group. While the control group had a general increase in their mean speaking score, the BL approach group exhibited statistically significant improvements across all speaking subcomponents. This outcome suggests a potential association between the online communication materials utilized in the BL method and the observed effects on speaking proficiency.

The findings of this investigation are consistent with a number of prior studies on blended learning and computer-assisted language acquisition. Numerous studies have demonstrated the beneficial impact of blended learning on student performance ([Li & Wang, 2022](#); [Zeqiri et al., 2020](#)), learner engagement and motivation ([Tiedemann, 2020](#); [Tong et al., 2022](#)), enhanced accessibility and flexibility, cost-effectiveness, and the promotion of active and profound learning when compared to traditional

classroom settings ([Asaad Hamza Sheerah, 2020b](#); [Dhawan, 2020](#); [Kamalov et al., 2023](#)). The investigation conducted revealed that, on average, students who utilized computers as a means to enhance their speaking abilities had heightened motivation levels and demonstrated superior written work in terms of both length and quality. The findings of the study suggest that the web search instruction model proves to be an efficacious approach in enhancing students' speaking performance and fostering a favorable learning environment. It was reported that the experimental group in the study saw significant advantages in their speaking learning through the utilization of computers. The findings indicated that computers shown efficacy as an instructional tool in English as a Foreign Language (EFL) speaking assignments. The findings of their research align with those of the present study, corroborating the favorable impact of technology on students' oral proficiency.

Online learning offers several advantages for students in speaking classes. It provides flexibility, allowing students to access assignments at their convenience and complete them on their own schedules. Students take responsibility for their learning and acquire knowledge independently through interactions with peers and educators. They observe various levels of oral communication abilities, engage in discussions, and provide feedback on peers' work. This approach encourages self-monitoring and allows exercises to serve as references at the end of the course.

In the experimental group, learners engage in ongoing self-assessment and utilize feedback to foster independent learning habits. They correct errors in both classroom and online sessions using E-Module Aviation Speaking Preparation Test platform. The study reveals that Blended Learning (BL) cultivates speaking skills through collaborative and logical approaches, significantly impacting learner performance. BL proves to be an effective and motivating approach for enhancing oral communication, potentially expediting English language acquisition and enabling interdisciplinary learning. However, further research with control measures for variables like gender, major, and IQ levels is needed to validate these findings.

### **Research limitations**

The research has several limitations. Firstly, it is confined to two aviation polytechnics, Politeknik Penerbangan Medan and Politeknik Penerbangan Surabaya, with participants from different majors, which may cast doubt on the generalizability of the findings regarding the efficacy of blended learning strategies in enhancing speaking skills. Secondly, the study relies on self-prepared online teaching strategies, potentially impacting results depending on

student participation and other factors. Thirdly, the analysis is based on a limited dataset, warranting a larger and more diverse sample for more robust conclusions. Additionally, the duration of learning is restricted to one semester, potentially affecting data outcomes, and material design is limited to level three, suggesting the need for broader scope and replication in other courses. Moreover, the evaluation of online learning materials solely by English instructors and the researcher's dual role as an instructor may introduce subjectivity to results and bias, along with challenges such as frequent connection failures and slow internet access. Lastly, the research solely relies on pretest and posttest instruments, indicating a need for additional assessment tools for comprehensive evaluation.

### Implications and Suggestions

Suggestions and implications of the study are as follows:

1. **Teacher skills development:** it is essential for teachers to develop skills in designing and managing effective blended learning. They should be proficient in selecting media that align with students' needs and interests and be able to integrate technology effectively into teaching.
2. **Increase student motivation and engagement:** blended learning can enhance student motivation and engagement, especially for shy or less confident students in communication. Using diverse and flexible teaching methods can make students more active and confident in interaction.
3. **Learning material development:** material designers should utilize these findings to create more interactive and varied learning materials. This may involve the use of multimedia, online activities, and virtual platforms to enhance students' learning experiences.
4. **Technology infrastructure strengthening:** colleges need to enhance their technology infrastructure to support blended teaching and learning. This includes providing fast and stable internet access and developing user-friendly online platforms that are easily accessible.
5. **Further research:** future research should further explore the use of blended learning in higher education contexts, focusing on specific disciplines and the impact of multimedia integration in speaking learning. Additionally, research can involve all education stakeholders, including curriculum designers, management, teachers, and students, to ensure effective and sustainable implementation of blended learning.

## CONCLUSION

Based on the results of the study, it can be concluded that: The experimental group showed significant improvements in their average scores across different aspects, leading to a substantial rise in mean speaking ability scores from pre-test to post-test, increasing from 66.20 to 78.00. Specifically, enhancements were observed in pronunciation, structure, vocabulary, fluency, and comprehension, indicating an overall improvement of 11.80%. In contrast, the control group demonstrated minimal improvements, with slight increases in various components. Their mean score on the pre-test slightly increased from 65.2000 to 65.9333 on the post-test, reflecting a minor improvement of 0.7333%. The paired t-test results revealed a statistically significant difference between the pre-test and post-test scores, indicating the effectiveness of the intervention, likely involving blended learning methodologies, in significantly improving participants' speaking abilities. Additionally, the mean and standard deviation obtained from the paired t-test analysis further corroborate these findings, providing substantial evidence of significant enhancements across all subcomponents of the speaking test.

The ANOVA test results for the pretest showed an F value of 7.357 and a significance level of 0.008, indicating no statistically significant difference in the mean initial ability score between participants exposed to blended learning techniques and those receiving traditional learning strategies. However, for the posttest, the ANOVA test revealed an F value of 1043.964 and a significance level of 0.000, indicating a significant difference in the mean final ability score between participants who underwent blended learning strategies and those who followed traditional methods. This implies that blended learning approaches have significantly enhanced final ability scores compared to traditional methods.

Blended learning provides students with a better learning environment through various multi-media sources, such as E-Module Aviation Speaking Preparation Test, that improve independent learning strategies and are reflected in their speaking achievements. This underscores the importance of incorporating blended learning approaches in language education to achieve better learning outcomes and enhance students' language proficiency. The findings of this study are in line with many previous studies showing the various benefits of blended learning compared to face-to-face teaching. Providing online resources can provide added value to students and their use can improve performance.

Speaking lessons that use blended learning can be effective in helping English language learners improve their speaking skills according to students' needs and interests.

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**Conflict of Interest Statement:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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