



Digital shift in ELT: Impact of technology on Indonesian high school students' language proficiency

Choiril Anwar,^{*1} Hartono Hartono,¹ Lim Seong Pek,² Fatih Yavuz,³ Kurniawan Yudhi Nugroho,¹ Isna Nuzullul Ilmi¹

¹Universitas Islam Sultan Agung, Indonesia, ²INTI International University, Negeri Sembilan, Malaysia

³Mudanya University, Türkiye

The use of technology in English Language Teaching (ELT) has revolutionized the field of education by providing previously unheard-of chances for language acquisition. High school students in Indonesia who are learning English as a foreign language (EFL) stand to gain a great deal from technology-enhanced training. The purpose of this research is to examine how technology-enhanced instruction affects the language competency and learning outcomes of high school students in Indonesia. A quantitative method was used. Thirty-one Indonesian high school students were selected for the study using stratified random sampling. Speaking, reading, and writing language competency tests were among the ways used to obtain the data. Statistical Packages for Social Sciences (SPSS) version 25 was used for data analysis, which included descriptive statistics and inferential statistics (t-tests). This study shows how technology-enhanced instruction can transform ELT in Indonesian high schools and offers stakeholders, educators, and policy-makers useful information for creating successful language learning initiatives. The results highlight the significance of using technology to improve language learning outcomes and have ramifications for language instruction around the world.

Keywords: Technology-enhanced instruction, English Language Teaching, language proficiency, Indonesian high school students, language learning outcomes

INTRODUCTION

With the emergence of mobile-assisted language learning (MALL), the integration of technology into the teaching of English as a foreign language (EFL) has fundamentally changed teaching approaches (Nariyati et al., 2020; Zou et al., 2018; Metruk, 2020; Krasulia & Saks, 2020; Latypova et al., 2018; Hwang et al., 2024; Barjesteh et al., 2022; De Vega et al., 2023; Al-Abri et al., 2025). Both students and teachers are increasingly using mobile applications and platforms to improve language acquisition as digital devices become more widely available (Chen et al., 2020; Wang et al., 2020; Gao & Shen, 2021; Chang & Lan, 2021; Haerazi, 2024). A trend toward student-centered and technology-enhanced environments is evident in the ways that various mobile applications have been used to address the traditional difficulties of vocabulary acquisition, motivation, and learner autonomy in EL countries (Diari et al., 2023; Liu, 2022; Muslimin et al., 2023; Tella, 2020). Even though mobile learning is becoming more popular, more research is necessary to completely comprehend how technology affects language abilities.

OPEN ACCESS

ISSN 2503 3492 (online)

*Correspondence:

Choiril Anwar

choirilnwar@unissula.ac.id

Received: 25th September 2025

Accepted: 17th March 2026

Published: 30th April 2026

Citation:

Anwar, C., Hartono, H., Pek, L.S., Yavuz, F., Nugroho, K.Y., Ilmi, I.N. (2026). Digital shift in ELT: Impact of technology on Indonesian high school students' language proficiency. *JEES (Journal of English Educators Society)*, 11(1). <https://doi.org/10.21070/jees.v11i1.2038>

Technology integration into English language teaching (ELT) has drawn a lot of interest from people all around the world, especially in Indonesia. Information and communication technology (ICT) has been used in the Indonesian educational system more and more to improve language acquisition, especially in circumstances where English is being taught as a foreign language (EFL). This change attempts to raise students' language skills and get them ready for a world that is becoming more interconnected and where knowing English is essential. Notwithstanding the possible advantages, there are obstacles to the adoption of technology-enhanced instruction in Indonesian high schools, including poor infrastructure, a lack of training for teachers, and disparities in students' and teachers' ICT literacy ([Chen et al., 2020](#); [Dewi et al., 2020](#); [Wang et al., 2020](#); [Wijayatiningsih et al., 2023](#); [Gao & Shen, 2021](#); [Chang & Lan, 2021](#); [Haerazi, 2024](#)).

There are various reasons why this study is important. It can guide future investments in educational technology by providing legislators with information about how well technology-enhanced instruction improves language competence ([Hafifah & Sulisty, 2020](#); [Kristiawan et al., 2022](#); [Yaqin et al., 2023](#)). According to the findings, specific professional development programs are required to give teachers the tools they need to successfully incorporate technology into their lessons ([Silviyanti & Yusuf, 2015](#)). Additionally, the study can help enhance high school students' English language learning results by identifying effective tactics and potential obstacles, thereby preparing them for postsecondary education and worldwide prospects ([Chang & Hung, 2019](#); [Hao et al., 2021](#); [Sailer et al., 2024](#)). Additionally, it can help with the digital divide and guarantee that all children have access to high-quality language instruction, irrespective of their socioeconomic status ([Saddhono et al., 2019](#)). By tackling these issues, the study hopes to contribute to the larger conversation about technology-enhanced language learning and how it may influence Indonesian education going forward.

Previous research has demonstrated the positive impact of technology on language learning. A meta-analysis revealed that technology interventions significantly improve students' second language acquisition, particularly when using mobile applications and immersive technologies ([Yi et al., 2025](#); [Sailer et al., 2024](#)). Studies in various contexts, including China and Oman, have shown that technology-enhanced Task-Based Language Teaching (TBLT) and community of practice models can lead to substantial gains in language proficiency ([Al-Habsi et al., 2022](#); [Zainuddin, 2023](#)). In Indonesia, higher education settings have seen successful integration of ICT in ELT, with teachers reporting high levels of ICT literacy and frequent use of digital tools in their teaching practices ([Hafifah & Sulisty, 2020](#); [Kristiawan et al., 2022](#); [Muthmainnah et al., 2022](#)). However, challenges such as lack of training and support, and issues with internet connectivity, persist ([Hafifah & Sulisty, 2020](#); [Silviyanti & Yusuf, 2015](#); [Yaqin et al., 2023](#)).

While there is substantial evidence supporting the benefits of technology in language learning, there is a paucity of research specifically focusing on the impact of technology-enhanced instruction on Indonesian high school students'

English proficiency. Most studies have concentrated on higher education or other countries, leaving a gap in understanding the unique challenges and outcomes in Indonesian high schools ([Saddhono et al., 2019](#); [Kristiawan et al., 2022](#); [Silviyanti & Yusuf, 2015](#); [Yaqin et al., 2023](#)). Additionally, the voices of teachers and students in these settings are often underrepresented, particularly in rural and low-resource areas ([Eve, 2022](#); [Marwan & Sweeney, 2010](#)). In summary, the state of the art in this study highlights the promising potential of technology-enhanced instruction in language learning, the existing research gaps specific to Indonesian high school students, the challenges faced in implementation, and the emerging technologies that could further transform language education. This study aims to contribute to this evolving field by providing insights into the specific context of Indonesian high schools and the impact of technology on students' language proficiency.

The novelty of this study lies in its focus on Indonesian high school students, a demographic that has been underexplored in existing research. By examining the specific context of Indonesian high schools, this study aims to provide insights into how technology can be effectively integrated into ELT to enhance language proficiency. It also seeks to highlight the unique challenges and opportunities within this context, contributing to a more nuanced understanding of technology-enhanced language learning in diverse educational settings. Thus, this study aims to address the following research question: "What is the impact of technology-enhanced instruction on the English language proficiency of Indonesian high school students?" This question seeks to explore both the effectiveness of such interventions and the contextual factors that influence their success.

METHODS

This study adopted a quantitative research design to investigate the impact of technology-enhanced instruction on Indonesian high school students' English language proficiency. A pre-experimental approach using a one-group pretest-posttest design was utilized to measure changes in students' speaking, reading, and writing abilities following exposure to technology-integrated English instruction. The quantitative approach facilitates objective measurement and statistical analysis of data collected from standardized proficiency tests ([Sciberras & Dingli, 2023](#); [Buchholz, 2021](#)).

The study involved 31 Indonesian high school students, drawn from multiple public and private schools across urban and suburban areas. A stratified random sampling technique was employed to ensure balanced representation across different grade (11th and 12th grades) and educational backgrounds. Inclusion criteria included regular attendance, prior exposure to basic digital learning tools, and consent to participate in the research. All participants were enrolled in English classes during the data collection period.

To assess students' language proficiency, the study employed standardized English proficiency tests covering speaking, reading, and writing skills. Speaking proficiency was assessed through an oral performance test rated on fluency, pronunciation, and coherence by trained evaluators.

Reading proficiency was measured using a multiple-choice comprehension test aligned with CEFR Level B1 standards. Writing proficiency was evaluated through a structured writing task focusing on content, organization, grammar, and vocabulary. The pretest was administered before the introduction of technology-enhanced instruction, while the posttest followed a 10-week period of intervention involving digital tools such as mobile apps, online platforms, and interactive media used during English lessons.

During the 10-week intervention, students engaged with a variety of technology-enhanced learning activities designed to promote active language use and learner autonomy. These activities included the use of mobile learning applications for vocabulary building, online collaborative platforms for writing practice, and multimedia resources such as videos and interactive quizzes to support reading comprehension and speaking fluency. Teachers facilitated the integration of these tools into regular classroom instruction, ensuring alignment with the existing curriculum objectives. Additionally, students were encouraged to practice independently out of classroom hours, fostering continuous exposure to English in authentic and engaging contexts.

Data analysis was conducted to determine the significance of differences between pretest and posttest scores across the three language skill areas (speaking, reading, and writing). Prior to selecting the appropriate inferential statistical test, the distribution of the data was examined for normality using the Shapiro–Wilk test, given the relatively small sample size ($n = 31$).

The results of the normality tests indicated that the data for some variables did not meet the assumption of normal distribution and homogeneity ($p < 0.05$). Therefore, non-parametric alternatives of Kruskal-Wallis were then employed to ensure the robustness of the analysis. Furthermore, the Wilcoxon signed-rank test was then used to compare pretest and posttest scores of the paired samples.

Descriptive statistics, including medians, means, and standard deviations, were calculated to summarize students' performance. Effect sizes were also computed to assess the magnitude of the observed changes. To ensure the reliability and validity of the findings, scoring rubrics were standardized, and inter-rater reliability was established for the speaking and writing assessments. These procedures strengthened the consistency and interpretability of the results regarding the effectiveness of technology-enhanced instruction in improving students' English language proficiency.

RESULTS AND DISCUSSION

To collect the actual data on the contribution of the technology integration into Teaching English as a Foreign Language to EFL Indonesian High School Students' English Language Skills, statistical measures using SPSS (Statistical Package for the Social Sciences) were conducted. SPSS is a software program used by researchers in various disciplines for quantitative analysis of complex data.

In this study, there were 31 students with 3 tests to be analyzed in the pretest and posttest, namely 1) Speaking, 2)

Reading, and 3) Writing. After the pretest data were collected, it was necessary to check whether the pretest data were normal and homogeneous because it influences what analysis can be chosen to test the hypothesis. The following are the results of the pretest normality and homogeneity test:

Pretest

In this study, there were three tests, including speaking, reading, and writing in a class of 31 students. There were actually 36 students in the class, but there were five students who were not active in doing the pretest and posttest. Therefore, they were excluded to ensure that the data were valid and reliable. The first test conducted was called as a pretest. The pretest consisted of speaking, reading, and writing. In a pretest of speaking, the students were asked to describe a picture of a Korean boyband named BTS showed to them. This picture was selected based on what was the trend during the time of study.

1. Describing the picture



Source: https://c.inilah.com/2023/05/0526_025450_2801_inilah.com_.jpg

Tell me about the picture above within five or seven minutes.

You could describe them dealing with the following questions:

- 1) Who are they?
- 2) Where are they from?
- 3) Which one do you like most? Why do you like him?
- 4) What song from them you like so much? Why do you like it?
- 5) Is there any singer from Indonesia you like so much? Why?

2. On your closest friend

Tell me and your classmates about your closest friend, please.

You could tell me his/her appearance, the reasons why you are close to him/her, what makes you like him/her, what things you *don't* like from him/her that you want to cover. Explain those things within five or seven minutes.

FIGURE 1 | The Pretest of Speaking

The students were asked, as seen in [FIGURE 1](#), to tell the examiner to describe the picture within five or seven minutes. They could describe the picture on 1) who they are, 2) where they are from, 3) which one from the picture they like very much as their idol, 4) why do they like him, 5) what song from them the students like so much, 6) why they like that song, and 7) whether there is a singer from Indonesia that the students like so much and why.

Moreover, in the pretest of speaking, students were also asked to tell the examiner about their closest friend. They could explain about his/her friend's appearance, the reasons why they are close to him/her, what makes them like him/her, and what things they do not like about him/her that they want to cover. They were asked to explain those things within five or seven minutes. To do this speaking test, each student was asked to come forward one by one in order to be interviewed

using the speaking test material. The speaking test material was explained to the students beforehand so that they could prepare for the concepts they had to deliver in front of the examiner.

In the pretest of reading, there were two reading comprehension passages to read by the students, and they were asked to answer the questions following them based on the passages. The reading passages (FIGURE 2) were entitled "My Timmy" and "My Very Best Friend." The first reading passage contained four multiple-choice questions, while the second one has 10 (questions). To do the reading test, the students were given paper sheets containing the reading passages. They just needed to choose the possible options there.

B. READING TEST

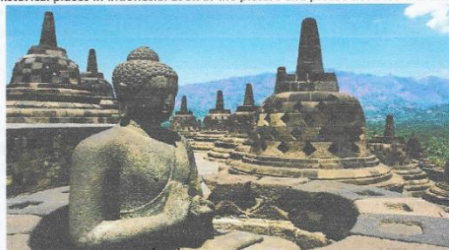
My Timmy

I have some pets. However, my favourite pet is Timmy. Timmy is a male tabby cat. He is very adorable with his soft stripes fur. He has innocent round eyes and feeble sweet voice. He always meows when I come home, he usually gives me a kiss. Timmy is a nice playmate. I am so happy to spend my time with him. Most of the time, he is a good cat. It is almost impossible for me to be angry at him. In the morning, he always wakes up early. When he wakes up earlier, he waits quality by my bedside until I wake up.

FIGURE 2 | The Reading Passage 1 of Reading Pretest

In the pretest of writing, the students were asked to complete the text about Mike Mohede with the words in the box. The artist was selected to be the model because the students were quite familiar with this singer from Indonesian Idol. Additionally, the students were asked to describe the picture of Borobudur Temple in the written form of some sentences, as seen in FIGURE 3.

b) This is one of historical places in Indonesia. Look at the picture and please describe it in some sentences.



Answer: Borobudur
 Borobudur is build the history in Indonesia. It located in the Magelang. The build since on Rong Jorjorang and Bandung. Borobudur story. The build is so beautiful and good looking. This canid us in privacy. Feng Buddhist.

FIGURE 3 | The Sample of Students' Writing in Pretest

FIGURE 3 shows one of the students' works on the writing pretest. It was easily found that most of the students could not write longer than five sentences. Some of them only wrote one or two sentences. Even some students did not write a word. There were still many grammatical errors in almost all the sentences found here and there. After being distributed to the students, the all-language skill tests were then done by the students within an hour. The results of the three language skill tests can be seen in TABLE 1.

Dealing with the statistical measure of the pretest, something to also consider in the pretest was that there were 2 criteria in the normality test to make sure that the data collected were normal. If the data were normal, the t-test could then be done. The followings are the formulas of the normality test measured by SPSS version 25 to be considered.

If sig. > 0.05, the data were normal.

If sig. < 0.05, the data were not normal.

TABLE 1 | Pretest Scores of Students' English Language Skills

No	Student's name (pseudonym)	English Language Scores		
		Speaking	Reading	Writing
1	Student 1	60	90	50
2	Student 2	80	70	70
3	Student 3	50	100	70
4	Student 4	75	30	70
5	Student 5	50	70	50
6	Student 6	50	70	70
7	Student 7	50	50	30
8	Student 8	50	80	20
9	Student 9	50	60	20
10	Student 10	50	90	40
11	Student 11	50	70	70
12	Student 12	50	80	70
13	Student 13	70	90	70
14	Student 14	60	90	70
15	Student 15	75	60	60
16	Student 16	50	70	30
17	Student 17	60	70	70
18	Student 18	85	70	70
19	Student 19	60	70	70
20	Student 20	65	60	70
21	Student 21	60	80	70
22	Student 22	80	80	40
23	Student 23	50	90	20
24	Student 24	65	90	70
25	Student 25	50	70	20
26	Student 26	60	80	70
27	Student 27	50	90	60
28	Student 28	65	90	50
29	Student 29	50	90	20
30	Student 30	55	70	30
31	Student 31	60	90	70

Before examining the data normality, I show the statistical descriptive results of the pretest containing the scores of Mean, 95% Confidence Interval for Mean, 5% Trimmed Mean, Median, Variance, Standard Deviation, Minimum, Maximum, Range, Interquartile Range, score of at each test. The results of the speaking, reading, and writing pretest can be seen in TABLE 2.

TABLE 2 shows that the mean scores of the speaking, reading, and writing tests are 59.19, 76.13, and 53.55 respectively. The Mean score was data that showed the average student score and could later be used to differentiate pretest and posttest scores. The Mean was calculated based on the average per test, so there were three Mean scores because there were three tests of language skills done.

TABLE 2 | Statistics Descriptives of Pretest

Score	Tests		Statistic	Std. Error	
Speaking	Mean		59.19	1.927	
	95% Confidence Interval for Mean	Lower Bound	55.26		
		Upper Bound	63.13		
	5% Trimmed Mean		58.37		
	Median		60.00		
	Variance		115.161		
	Std. Deviation		10.731		
	Minimum		50		
	Maximum		85		
	Range		35		
	Interquartile Range		15		
	Skewness		.980	.421	
	Kurtosis		-.069	.821	
	Reading	Mean		76.13	2.651
		95% Confidence Interval for Mean	Lower Bound	70.72	
			Upper Bound	81.54	
		5% Trimmed Mean		77.17	
Median			80.00		
Variance			217.849		
Std. Deviation			14.760		
Minimum			30		
Maximum			100		
Range			70		
Interquartile Range			20		
Skewness			-1.001	.421	
Kurtosis			1.744	.821	
Writing		Mean		53.55	3.608
		95% Confidence Interval for Mean	Lower Bound	46.18	
			Upper Bound	60.92	
		5% Trimmed Mean		54.50	
	Median		70.00		
	Variance		403.656		
	Std. Deviation		20.091		
	Minimum		20		
	Maximum		70		
	Range		50		
	Interquartile Range		40		
	Skewness		-.709	.421	
	Kurtosis		-1.201	.821	

Normality

[TABLE 3](#) shows the normality test result of the pretest data.

TABLE 3 | Normality Data of Pretest

Score	Tests	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Score	Speaking	.256	31	<.001	.814	31	<.001
	Reading	.181	31	.011	.886	31	.003
	Writing	.310	31	<.001	.756	31	<.001

a. Lilliefors Significance Correction

To find out whether the data gathered is normal or not, it can be seen from the significance value based on 2 criteria, namely as mentioned at the beginning, as follows:

- If sig. > 0.05, then the data is normal
- If sig. < 0.05, then the data is not normal

From the SPSS version 25 output, the significance value can be seen. From [TABLE 3](#), it can be seen that all tests, namely speaking, reading, and writing, show a significance value below 0.05, so that the data is not normally distributed. Therefore, non-parametric alternatives were employed to ensure the robustness of the analysis. Specifically, the Wilcoxon signed-rank test was used to compare pretest and posttest scores for each language skill. The next test is homogeneity.

Homogeneity

Like the normality test, the homogeneity test also has 2 criteria, namely:

- If sig. > 0.05, the data are homogeneous.
- If sig. If < 0.05, the data are not homogeneous.

The following table ([TABLE 4](#)) is the result of the homogeneity test.

TABLE 4 | The Results of Homogeneity Test

		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	10.773	2	90	<.001
	Based on Median	2.745	2	90	.070
	Based on Median and with adjuzted df	2.745	2	50.070	.074
	Based on the trimmed mean	9.904	2	90	<.001

From the SPSS version 25 output, as shown in [TABLE 4](#), the significance value can be seen. [TABLE 4](#) shows that all English language tests, namely speaking, reading, and writing, show significance values that were lower than 0.05, so that the data were neither homogeneous nor normal. Because the requirements for normality and homogeneity were not met, parametric statistics could not be used. Another alternative is to use non-parametric statistics of Kruskal-Wallis.

Posttest

The same as the test material in the pretest, in this study, there were three posttests, namely, speaking, reading, and writing, in a class of 31 students. In the posttest of speaking, the students were asked to describe a picture of a footballer named Cristiano Ronaldo (CR7). This picture was selected based on what was the trend during the time of the study. This player was well-known among senior high school students, even those students from high school as the participants of this test. The students were asked to describe the picture within five or seven minutes. They could describe the picture in the following questions:

You could describe them as dealing with the following questions:

- 1) *Who is this?*
- 2) *Where is he from?*
- 3) *Do you like football?*
- 4) *What football club do you like very much?*
- 5) *Is there any football player from Indonesia you like so much? Why do you like him/her?*
- 6) *Any other sports do you like? Tell me.*

To do this speaking test, each student was asked to come forward one by one in order to be interviewed using the speaking test material. The speaking test material was explained to the students beforehand so that they could prepare for the concepts they had to deliver in front of the examiner.

A. SPEAKING TEST

1. Describing the picture below.



Source: https://www.worldfootball.net/player_summary/cristiano-ronaldo/

Tell me about the picture above within five or seven minutes.

You could describe them dealing with the following questions:

- 1) Who is this?
- 2) Where is he from?
- 3) Do you like football?
- 4) What football club do you like very much?
- 5) Is there any football player from Indonesia you like so much? Why do you like him/her?
- 6) Any other sports do you like? Tell me.

FIGURE 4 | The Posttest of Speaking

Kecak Dance

Kecak is a form of Balinese music drama, originated in the 1930s and is performed primarily by men. Also known as the Ramayana Monkey Chant, the piece, performed by a circle of 100 or more performers wearing checked cloth around their waists, percussively chanting "cak" and throwing up their arms, depicts a battle from the Ramayana where the monkey-like Vanara helped Prince Rama fight the evil King Ravana. However, Kecak has roots in sanghyang, a trance-inducing exorcism dance.

Kecak was originally a trance ritual accompanied by male chorus. German painter and musician Walter Spies became deeply interested in the ritual while living in Bali in the 1930s and worked to recreate it into a drama, based on the Hindu Ramayana and including dance, intended to be presented to Western tourist audiences. This transformation is an example of what James Clifford describes as part of the "modern art-culture system" in which, "the West or the central power adopts, transforms, and consumes non-Western or peripheral cultural elements, while making 'art' which was once embedded in the culture as a whole, into a separate entity." Walter Spies worked with Wayan Limbak and Limbak popularized the dance by traveling throughout the world with Balinese performance groups. These travels have helped make the Kecak famous throughout the world.

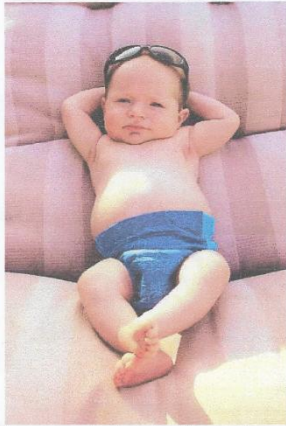
FIGURE 5 | The Reading Passage of Posttest

In the posttest of reading ([figure 5](#)), there was a three-paragraph reading comprehension passage to read by the students, and they were asked to answer the following questions based on these passages. The reading passages were entitled "Kecak Dance." The test comprised five multiple-choice questions. To do the reading test, the students were given paper sheets containing the reading passages. They just needed to choose the possible options there.

In the posttest of writing ([figure 6](#)), the students were asked to complete the text about a very cute baby lying on a bed with the written form of at least ten sentences.

[FIGURE 6](#) shows one of the students' works on the writing posttest. It can be said that most of the students' writings were longer than the pretest ones. There were only a few grammatical errors found. Here are the results of the English Language Skills Posttest in numbers ([TABLE 5](#)).

1. Please describe this picture below in at least 10 sentences.



Source: <https://quotesgram.com/img/no-sleep-funny-baby-quotes/1215059/>

Answer: "Baby Boy"
 The picture is of a baby boy. He looks so cute. Wearing blue pants makes him more handsome. Besides, the glasses he wears make him even cooler. The baby boy is about 1.5 years old. But the poses he does make him not like a small baby for his age. The baby is named Rafator. He has a nice smile. He has curly eyelashes. That's what made him liked by everyone.

FIGURE 6 | The Sample of Students' Writing in Posttest

TABLE 5 | Posttest Scores of Students' Language Skills

No	Student's name (pseudonym)	English Language Scores		
		Speaking	Reading	Writing
1	Student 1	80	90	50
2	Student 2	80	100	50
3	Student 3	75	100	70
4	Student 4	75	30	70
5	Student 5	75	70	50

6	Student 6	80	70	70
7	Student 7	75	50	30
8	Student 8	80	60	50
9	Student 9	80	60	20
10	Student 10	70	90	40
11	Student 11	75	70	70
12	Student 12	75	80	70
13	Student 13	90	100	50
14	Student 14	75	100	70
15	Student 15	85	60	60
16	Student 16	80	70	30
17	Student 17	85	70	70
18	Student 18	80	70	70
19	Student 19	75	70	70
20	Student 20	80	60	70
21	Student 21	70	100	50
22	Student 22	85	100	50
23	Student 23	75	100	50
24	Student 24	85	90	70
25	Student 25	75	60	50
26	Student 26	70	100	50
27	Student 27	75	90	60
28	Student 28	85	90	50
29	Student 29	75	90	20
30	Student 30	80	70	30
31	Student 31	80	90	70

The following table (TABLE 6) is the Mean score from each test for the posttest of language skills.

TABLE 6 | The Result of Language Skills Posttest

Score	Test		Statistic	Std. Error
	Speaking	Mean		
		Mean	78.23	.884
		95% Confidence Interval for Mean	Lower Bound	76.42
			Upper Bound	80.03
		5% Trimmed Mean	78.13	5% Trimmed Mean
		Median	80.00	Median
		Variance	24.247	Variance
		Std. Deviation	4.924	Std. Deviation
		Minimum	70	Minimum
		Maximum	90	Maximum
		Range	20	Range
		Interquartile Range	5	Interquartile Range
		Skewness	.349	Skewness
		Kurtosis	-.216	Kurtosis
	Reading	Mean	79.03	3.291
		95% Confidence Interval for Mean	Lower Bound	72.31
			Upper Bound	85.75
		5% Trimmed Mean	80.20	5% Trimmed Mean
		Median	80.00	Median
		Variance	335.699	Variance
		Std. Deviation	18.322	Std. Deviation

	Minimum	30		Minimum
	Maximum	100		Maximum
	Range	70		Range
	Interquartile Range	30		Interquartile Range
	Skewness	-.578	.421	Skewness
	Kurtosis	-.128	.821	Kurtosis
Writing	Mean		54.19	2.850
	95% Confidence Interval for Mean	Lower Bound	48.37	
		Upper Bound	60.01	
	5% Trimmed Mean	55.22		5% Trimmed Mean
	Median	50.00		Median
	Variance	251.828		Variance
	Std. Deviation	15.869		Std. Deviation
	Minimum	20		Minimum
	Maximum	70		Maximum
	Range	50		Range
	Interquartile Range	20		Interquartile Range
	Skewness	-.698	.421	Skewness
	Kurtosis	-.399	.821	Kurtosis

The Mean score for speaking was 78.23, reading was 79.03, while writing was 54.19. The pretest and posttest scores are used for the "discussion" analysis section of a research article. Because the data were not normally distributed and not homogeneous, the next analysis was using a non-parametric test, namely the Kruskal-Wallis test. The following is the Kruskal-Wallis test table.

TABLE 7 | The Result of the Kruskal-Wallis Test

	Score
Kruskal-Wallis H	41.981
Df	2
Asymp. Sig.	<.001
a. Kruskal-Wallis Test	
b. Grouping Variables: Test	

Further examination of the pretest and posttest data using Kruskal-Wallis found that the significance value less than 0.05. Therefore, it can be concluded that the null hypothesis (H0) was rejected, and Ha was then accepted. This result means that there was a significant difference in the achievement of English language skills of EFL Indonesian high school students, especially speaking, reading, and writing skills, between students before receiving treatment with the integration of technology into English language learning and the achievement of students' English language skills after receiving treatment in the form of teaching English with a technology integration framework.

The findings of this study can be more clearly interpreted when situated within established ELT frameworks such as Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), and constructivist learning theory. The statistically significant improvement in students' English proficiency suggests that technology-enhanced instruction functions not only as a supplementary tool but also as a facilitator of pedagogical practices aligned with these approaches, thereby supporting second language acquisition as highlighted in prior research (e.g., [Chang & Hung, 2019](#); [Yi et al., 2025](#)).

First, the substantial improvement in speaking skills—from a mean of 59.19 to 78.23—strongly reflects the principles of CLT, which emphasize authentic communication and meaningful interaction. Studies by [Hwang et al. \(2024\)](#) and [Zou et al. \(2018\)](#) demonstrate that mobile-assisted language learning (MALL) environments provide learners with authentic input and increased opportunities for oral practice. In this study, technology is proven to support CLT-oriented classroom practices such as digital storytelling, video-based discussions, and voice recording tasks, allowing students to practice speaking in low-anxiety, repeatable contexts. The use of familiar visual prompts (e.g., popular figures) further aligns with [Liu \(2022\)](#) and [Tella \(2020\)](#), who argue that technology enhances learner engagement and motivation, key components of communicative competence.

From a TBLT perspective, these improvements can be attributed to the use of structured, technology-mediated task cycles. For example, students may have engaged in pre-task activities (watching or analyzing digital content), task performance (recording spoken responses), and post-task reflection or feedback using digital platforms. Such practices reflect TBLT's emphasis on meaning-focused tasks and explain why speaking—an interaction-driven skill—showed the greatest improvement.

Second, the improvement in reading skills—from 76.13 to 79.03—can be attributed to constructivist and strategy-based reading approaches, where learners actively construct meaning through interaction with texts. Research by [Chen et al. \(2020\)](#) and [Chang and Lan \(2021\)](#) shows that digital reading platforms enhance comprehension through features such as interactive glossaries, annotations, and embedded comprehension tasks. In classroom practice, this may include guided online reading, collaborative annotation, or discussion forums, which promote deeper engagement with texts. From a constructivist perspective, these tools provide scaffolding that supports learners in developing vocabulary and comprehension strategies. However, as noted in the literature, reading gains tend to be more gradual due to factors such as

prior knowledge and cognitive processing demands, which may explain the relatively modest improvement observed.

Third, the limited quantitative improvement in writing—from 53.55 to 54.19—can be better understood through the lens of the process-based writing approach. Writing is a complex skill that develops over time through iterative stages of drafting, feedback, and revision. Studies by [Hao et al. \(2021\)](#) and [Sailer et al. \(2024\)](#) suggest that technology supports writing development through tools such as grammar checkers, collaborative writing platforms, and multimedia prompts. In practice, these tools enable activities such as peer editing in shared documents, automated grammar feedback, and multimodal composition tasks. However, the small numerical gain in this study indicates that such tools may not have been fully embedded within a sustained process-writing framework. This aligns with the broader understanding that writing development requires long-term, structured intervention, and that short-term gains may be more qualitative (e.g., increased text length, improved accuracy) than quantitative.

Furthermore, the overall findings support student-centered and autonomous learning frameworks, as highlighted by [Diari et al. \(2023\)](#) and [Wang et al. \(2020\)](#). Technology enables classroom practices such as self-paced learning, independent practice, mobile apps, and asynchronous interaction, allowing students to take greater control of their learning. These practices are consistent with constructivist principles, where learners actively engage with content and regulate their own progress. The observed improvements in student performance may therefore result not only from the technology itself but also from the shift toward learner-centered pedagogy.

At a broader level, these results align with meta-analytical findings by [Chang and Hung \(2019\)](#) and [Yi et al. \(2025\)](#), which confirm the positive impact of technology-enhanced language learning across contexts. This study extends those findings to the Indonesian high school setting, demonstrating that technology can effectively support ELT frameworks such as CLT and TBLT even in underexplored educational contexts.

However, consistent with [Hafifah and Sulistyono \(2020\)](#) and [Yaqin et al. \(2023\)](#), the effectiveness of technology integration depends on contextual factors such as ICT access, digital literacy, and teacher preparedness. From a pedagogical perspective, this highlights the importance of Technological Pedagogical Content Knowledge (TPACK), ensuring that teachers can align digital tools with appropriate instructional strategies. Without this alignment, technology risks being underutilized or disconnected from learning objectives.

In summary, this study demonstrates that technology-enhanced instruction is most effective when integrated with established ELT frameworks. Technology supports CLT through interactive speaking activities, TBLT through task-based digital learning cycles, and constructivist approaches through scaffolded and student-centered practices. At the same time, the varying levels of improvement across language skills underscore the need for skill-specific and pedagogically grounded implementation, particularly for complex skills such as writing.

CONCLUSION

This study aimed to examine the impact of technology-enhanced instruction on Indonesian high school students' English language proficiency. The findings indicate a statistically significant improvement in students' performance across speaking, reading, and writing skills after the implementation of technology-integrated learning. Among these, speaking showed the most notable progress, followed by reading, while writing demonstrated only slight improvement. These results confirm that technology-enhanced instruction can effectively support language learning and promote more student-centered and engaging learning environments, particularly in the context of EFL classrooms in Indonesia.

However, several limitations should be acknowledged. The use of a one-group pretest–posttest design without a control group restricts the ability to establish strong causal relationships. The relatively small sample size and short duration of the intervention may also limit the generalizability of the findings, especially for more complex skills such as writing. In addition, the reliance on quantitative data alone may not fully capture students' experiences and challenges in using technology for language learning.

Therefore, future research is recommended to adopt more rigorous experimental designs, involve larger and more diverse samples, and extend the duration of intervention to better capture long-term effects. Incorporating qualitative methods could also provide deeper insights into learners' perspectives. From a practical standpoint, teachers should receive continuous training in integrating technology effectively, while schools and policymakers must address issues of infrastructure and digital literacy to ensure equitable access. With proper support, technology-enhanced instruction has strong potential to improve English language learning outcomes.

ACKNOWLEDGEMENTS

We thank Universitas Islam Sultan Agung for supporting us in conducting numerous varied research projects that are beneficial to be applied to societies.

REFERENCES

- Al-Abri, A., Ranjbaran Madiseh, F., & Morady Moghaddam, M. (2025). Exploring learning-oriented assessment in enhancing students' lexical fluency through MALL. *The Asia-Pacific Education Researcher*, 34(1), 1-13. <https://doi.org/10.1007/s40299-024-00832-7>
- Al-Habsi, T., Al-Busaidi, S., & Al-Issa, A. (2022). Integrating technology in English language teaching through a community of practice in the Sultanate of Oman: implications for policy implementation. *Educational Research for Policy and Practice*, 21(1), 43-68. <https://doi.org/10.1007/s10671-021-09291-z>
- Barjesteh, H., Movafaghardestani, E., & Modaberi, A. (2022). COVID-19's impact on digitalization of education: incorporating a visual vocabulary learning

- application to foster vocabulary knowledge. *Asian Education and Development Studies*, 11(1), 172-187. <https://doi.org/10.1108/AEDS-05-2020-0111>
- Buchholz, S. W. (2022). Quantitative designs for practice scholarship. *Research for Advanced Practice Nurses, Fourth Edition: From Evidence to Practice*, 143-172.
- Chang, M. M., & Hung, H. T. (2019). Effects of technology-enhanced language learning on second language acquisition. *Journal of Educational Technology & Society*, 22(4), 1-17. <https://www.jstor.org/stable/26910181>
- Chang, M. M., & Lan, S. W. (2021). Flipping an EFL classroom with the LINE application: Students' performance and perceptions. *Journal of Computers in Education*, 8(2), 267-287. <https://doi.org/10.1007/s40692-020-00179-0>
- Chen, Z., Chen, W., Jia, J., & An, H. (2020). The effects of using mobile devices on language learning: A meta-analysis. *Educational Technology Research and Development*, 68(4), 1769-1789. <https://doi.org/10.1007/s11423-020-09801-5>
- De Vega, N., Basri, M., & Nur, S. (2023). Integrating mobile-assisted learning for a dynamic blended approach in higher education. *Indonesian Journal of Electrical Engineering and Computer Science*, 32(2), 819-827. <https://doi.org/10.11591/ijeecs.v32.i2.pp819-827>
- Dewi, D. N., Irmawati, D. K., & Asri, T. M. (2020). Investigating EFL Teachers' Barriers of Using Internet Application at University Level. *JEES (Journal of English Educators Society)*, 5(1), 61-65. <https://doi.org/10.21070/jees.v5i1.375>
- Diari, K. P. Y., Suwarna, S., & Suweta, I. M. (2023). Mobile Technology-Mediated Language Learning: A Quantitative Study to Unravel Language Learners' Achievement and Autonomy. *World Journal of English Language*, 13(5), 354-354. <http://dx.doi.org/10.5430/wjel.v13n5p354>
- Eve, P. H. D. (2022). Teaching LSRW skills through the test, teach, test (TTT) method. In *Contemporary ELT Strategies in Engineering Pedagogy* (pp. 83-94). Routledge India. <https://doi.org/10.4324/9781003268529-8>
- Gao, C., & Shen, H. Z. (2021). Mobile-technology-induced learning strategies: Chinese university EFL students learning English in an emerging context. *ReCALL*, 33(1), 88-105. <https://doi.org/10.1017/S0958344020000142>
- Haerazi, H. (2024). ICT integration into English language teaching-learning: Insights from some private higher education institutions. *Englisia: Journal of Language, Education, and Humanities*, 11(2), 48-66. <http://dx.doi.org/10.22373/ej.v11i2.19913>
- Hafifah, G. N., & Sulisty, G. H. (2020). Teachers' ICT literacy and ICT integration in ELT in the Indonesian higher education setting. *Turkish Online Journal of Distance Education*, 21(3), 186-198. <https://doi.org/10.17718/TOJDE.762050>
- Hao, T., Wang, Z., & Ardasheva, Y. (2021). Technology-assisted vocabulary learning for EFL learners: A meta-analysis. *Journal of Research on Educational Effectiveness*, 14(3), 645-667. <https://doi.org/10.1080/19345747.2021.1917028>
- Hwang, G. J., Rahimi, M., & Fathi, J. (2024). Enhancing EFL learners' speaking skills, foreign language enjoyment, and language-specific grit utilising the affordances of a MALL app: A microgenetic perspective. *Computers & Education*, 214, 105015. <https://doi.org/10.1016/j.compedu.2024.105015>
- Krasulia, A., & Saks, K. (2020, July). Students' perceptions towards mobile learning in an English as a foreign language class. In *2020 IEEE 20th International Conference on Advanced Learning Technologies (ICALT)* (pp. 238-240). IEEE. <https://doi.org/10.1109/ICALT49669.2020.00078>
- Kristiawan, D., Carter, C., & Picard, M. (2022). Impact of Call Professional Development for EFL Materials on Teacher Agency and Technological Pedagogical Content Knowledge (TPACK) in Indonesian Islamic Schools. *Teaching English with technology*, 22, 20-42. <https://www.cceol.com/search/article-detail?id=1080606>
- Latypova, L. A., Polyakova, O. V., & Sungatullina, D. D. (2018). Mobile applications for English learning performance upgrade. In *Innovative Technologies and Learning: First International Conference, ICITL 2018, Portoroz, Slovenia, August 27-30, 2018, Proceedings 1* (pp. 403-411). Springer International Publishing. https://doi.org/10.1007/978-3-319-99737-7_43
- Liu, Y. (2022). Investigating the role of English as a foreign language learners' academic motivation and language mindset in their grit: a theoretical review. *Frontiers in psychology*, 13, 872014. <https://doi.org/10.3389/fpsyg.2022.872014>
- Marwan, A., & Sweeney, T. (2010). Teachers' perceptions of educational technology integration in an Indonesian polytechnic. *Asia Pacific Journal of Education*, 30(4), 463-476. <https://doi.org/10.1080/02188791.2010.519554>
- Metruk, R. (2020). EFL learners' perspectives on the use of smartphones in higher education settings in Slovakia. *Electronic Journal of E-learning*, 18(6), pp. 537-549. <https://doi.org/10.34190/JEL.18.6.006>
- Muslimin, A. I., Mukminatien, N., & Ivone, F. M. (2023). TPACK-SAMR Digital Literacy Competence, Technostress, and Teaching Performance: Correlational Study among EFL Lecturers. *Contemporary Educational Technology*, 15(2). <https://doi.org/10.30935/cedtech/12921>
- Muthmainnah, A. J., Mahdawi, R. S. A., & Khalaf, H. A. (2022). Adoption Social Media-Movie Based Learning Project (SMMBL) To Engage Students' Online Environment. *Educational Administration: Theory and Practice*, 28(1), 22-36. <https://doi.org/10.17762/kuvey.v28i01.321>
- Nariyati, N. P. L., & Pratiwi, N. P. A. (2020). EFL Pre-Service Teachers' Perception toward the Use of Mobile Assisted Language Learning in Teaching English. *International Journal of Language Education*, 4(1), 38-47. <https://doi.org/10.26858/ijole.v4i2.10052>

- Saddhono, K., Sudarsana, I. K., & Iskandar, A. (2019, November). Implementation of Indonesian language the learning based on information and communication technology in improving senior high school students' achievement in Surakarta. In *Journal of Physics: Conference Series*, 1254(1), p. 012059. IOP Publishing.
<https://doi.org/10.1088/1742-6596/1254/1/012059>
- Sailer, M., Maier, R., Berger, S., Kastorff, T., & Stegmann, K. (2024). Learning activities in technology-enhanced learning: A systematic review of meta-analyses and second-order meta-analysis in higher education. *Learning and Individual Differences*, 112, 102446.
<https://doi.org/10.1016/j.lindif.2024.102446>
- Sciberras, M., & Dingli, A. (2023). Quantitative Research. *Lecture Notes in Networks and Systems*, 568, 43-115. Springer. https://doi.org/10.1007/978-3-031-19900-4_11
- Silviyanti, T. M., & Yusuf, Y. Q. (2015). EFL Teachers' Perceptions on Using ICT in Their Teaching: To Use or to Reject?. *Teaching English with Technology*, 15(4), 29-43. <https://tewtjournal.org/download/4-efl-teachers-perceptions-on-using-ict-in-their-teaching-to-use-or-to-reject-by-tengku-maya-silviyanti-and-yunisrina-qismullah-yusuf/>
- Tella, A. (2020). Exploring the relationships among autonomy, engagement, and motivation in English language learning in Ghana. *Educational Research and Evaluation*, 26(7-8), 612-631.
<https://doi.org/10.1080/13803611.2020.1863545>
- Wang Y, Shi L, Chen G. (2020). Enhancing learner autonomy in Chinese language learning: The role of a mobile learning platform. *Journal of Educational Technology & Society*, 23(1), 56-68.
<https://www.jstor.org/stable/26974669>
- Wijayatiningsih, T. D., Muhammad Muhibbi, Dodi Mulyadi, & J-Roel B.Semilla. (2023). Integrating hybrid learning and team-based project in EFL writing class. *JEES (Journal of English Educators Society)*, 8(2).
<https://doi.org/10.21070/jees.v8i2.1738>
- Yaqin, L. N., Prasajo, L. D., Haji-Othman, N. A., Yusof, N., & Habibi, A. (2023). Addressing the digital divide in Indonesian higher education: Insights, implications, and potential solutions. In *From digital divide to digital inclusion* (pp. 291-307). Springer, Singapore.
https://doi.org/10.1007/978-981-99-7645-4_13
- Yi, S., Li, W., Zhang, Y., & Shadiev, R. (2025). Exploring the impact of technology on foreign language learning: A multivariate meta-meta-analysis study. *Educational technology research and development*, 73(1), 35-58.
<https://doi.org/10.1007/s11423-024-10412-7>
- Zainuddin, N. (2023). Technology enhanced language learning research trends and practices: A systematic review (2020-2022). *Electronic Journal of e-Learning*, 21(2), 69-79.
<https://doi.org/10.34190/ejel.21.2.2835>
- Zou, B., Yan, X., & Li, H. (2018). Students' perspectives on using online sources and apps for EFL learning in the mobile-assisted language learning context. In *Handbook of research on integrating technology into contemporary language learning and teaching* (pp. 328-344). IGI Global. <https://doi.org/10.4018/978-1-5225-5140-9.ch016>

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.

Copyright ©2026 Choiril Anwar, Hartono Hartono, Lim Seong Pek, Fatih Yavuz, Kurniawan Yudhi Nugroho, Isna Nuzullul Ilmi. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.