



## USING TEXT-TO-SPEECH MEDIA TO IMPROVE *ISTIMA'* AND *KALAM* SKILLS IN ARABIC LANGUAGE LEARNING

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### ABSTRACT

This study investigates the effectiveness of Text-to-Speech (TTS) media in enhancing Arabic listening (*istima'*) and speaking (*kalam*) skills among grade XI students at Madrasah Aliyah Negeri (MAN) Cimahi. Employing a quasi-experimental design, the research compared student performance in experimental and control groups before and after the integration of TTS media in the learning process. Pre-test results indicated marginally higher average scores in the experimental group compared to the control group. Following the intervention, the experimental group demonstrated significant improvement, particularly in speaking skills, achieving an average score of 85.72, compared to 84.89 in the control group. Conversely, listening skills showed a slight advantage for the control group post-intervention. Statistical analysis confirmed that the use of TTS media significantly enhanced students' speaking and listening abilities, with a more pronounced effect on speaking proficiency. These findings suggest that TTS media is an effective tool for supporting the development of Arabic language skills, especially in improving oral communication.

**Keywords:** Arabic Learning, *Istima'* and *Kalam* Skills, Media, Text-to-Speech

### ABSTRAK

Penelitian ini bertujuan untuk menganalisis efektivitas penggunaan media Text-to-Speech (TTS) dalam meningkatkan keterampilan *istima'* (mendengarkan) dan *kalam* (berbicara) bahasa Arab pada siswa kelas XI Madrasah Aliyah Negeri (MAN) Cimahi. Penelitian ini menggunakan desain kuasi-eksperimen dengan membandingkan kinerja siswa pada kelompok eksperimen dan kontrol sebelum dan sesudah penerapan media TTS dalam proses pembelajaran. Hasil pre-test menunjukkan skor rata-rata kelompok eksperimen sedikit lebih tinggi dibanding kelompok kontrol. Setelah intervensi, kelompok eksperimen mengalami peningkatan signifikan, terutama pada keterampilan berbicara, dengan skor rata-rata mencapai 85,72 dibandingkan 84,89 pada kelompok kontrol. Sementara itu, keterampilan mendengarkan menunjukkan keunggulan sedikit pada kelompok kontrol setelah penggunaan media. Analisis statistik mengkonfirmasi bahwa penggunaan media TTS secara signifikan meningkatkan kemampuan mendengarkan dan berbicara siswa, dengan efek yang lebih menonjol pada keterampilan berbicara. Temuan ini mengindikasikan bahwa media TTS merupakan alat yang efektif untuk mendukung pengembangan keterampilan bahasa Arab, khususnya dalam meningkatkan kemampuan komunikasi lisan.

**Kata Kunci:** Pembelajaran Bahasa Arab, Keterampilan *Istima'* dan *Kalam*, Text to Speech

## INTRODUCTION

In Arabic language learning, mastery of the four core skills *istima'* (listening), *kalam* (speaking), *qira'ah* (reading), and *kitabab* (writing), is a fundamental aspect that students must acquire (Munir et al., 2023). However, *istima'* and *kalam* skills often pose particular challenges for non-native learners, mainly due to limited exposure to native speakers and a lack of adequate supporting media (Ardiansyah, 2021; Mufidah et al., 2025). This results in low listening and speaking proficiency among students, which negatively impacts the effectiveness of communication in the Arabic language (Alzamil, 2021).

Advancements in information technology have opened up new opportunities in the field of education, including foreign language learning (Binti Jasni & Ardiansyah, 2020). One significant innovation is the use of Text-to-Speech (TTS) technology, which converts written text into artificial speech that closely resembles the human voice (Widyana et al., 2022). This technology allows students to repeatedly listen to the pronunciation of words and sentences in the target language, thereby enhancing their listening and speaking skills.

Madrasah Aliyah Negeri (MAN) Cimahi is one of the secondary schools where Arabic is taught as a foreign language. Grade X students receive 4x45 minutes of instruction per week, while grades XI and XII receive 2x45 minutes. Based on the author's observations during classroom activities, students encounter various difficulties in listening, especially in phonological aspects such as the accurate pronunciation of Arabic letters. Unfortunately, the media available at the school remains conventional. Most classrooms are only equipped with whiteboards and blackboards. Although a language laboratory exists, it has not been utilized for Arabic lessons due to limited teacher competence and a lack of supporting learning media (Musthafa & Saprudin, 2022). Teachers often rely on reading aloud and listening to materials from CDs provided by publishers instead of utilizing the available audio content. This practice is no longer aligned with the demands of the current curriculum, which emphasizes the integration of information technology in learning. In today's digital era, numerous tools, such as Macromedia Flash, PowerPoint, and Text-to-Speech (TTS) technology, can be used to enhance learning outcomes. The selection of appropriate and modern media is a vital factor in supporting students' learning achievement, particularly in skills such as *istima'* and *kalam* (Siregar et al., 2024).

Various studies have shown that Text-to-Speech (TTS) technology has a positive impact on improving students' reading and comprehension skills, especially for those with learning difficulties. Wood et al. conducted a meta-analysis on the use of TTS and other reading support tools, finding that this technology can help students with reading disabilities improve their reading comprehension scores ( $d = .35$ ,  $p < .01$ ) (Wood et al., 2018). Stodden et al. also reported that the use of TTS software significantly enhanced the reading skills of high school students with reading difficulties (Stodden et al., 2012). Raffoul and Jaber highlighted that TTS can serve as an effective compensatory tool, assisting students with learning disabilities in better understanding written texts (Raffoul & Jaber, 2023). Additionally, Brunow and Cullen found that the use of TTS can improve listening comprehension among students with learning disabilities, indicating that this technology can be an effective alternative to human readers (Brunow & Cullen, 2021). Finally, research by Young et al. demonstrated that TTS can enhance reading outcomes for secondary students with learning disabilities, emphasizing the importance of integrating this technology into instructional strategies (Young et al., 2019).

Although various studies have demonstrated the effectiveness of TTS technology in language learning, there is still a lack of research specifically examining the impact of TTS media on *istima'* (listening) and *kalam* (speaking) skills in the context of Arabic language learning in

Indonesia. Therefore, further research is needed to explore how TTS media can be effectively integrated into the Arabic language curriculum, as well as to identify potential challenges and solutions in its implementation.

One promising tool is Text-to-Speech (TTS) technology, which allows text to be converted into audio using native-like pronunciation (Chemnad & Othman, 2023). This software enables students to practice listening and speaking with high accuracy and flexibility repeatedly (Amrouche et al., 2017; Saepurrohman et al., 2023). It offers various features, such as adjustable speech speed, support for multiple types of texts, and the ability to save audio files in MP3 format, which can then be accessed via smartphones or computers (Rebai & Ben Ayed, 2015). These features make TTS a practical solution to the technological limitations currently faced by teachers at MAN Cimahi, particularly in delivering listening materials aligned with the Arabic curriculum.

This study aims to evaluate the effectiveness of using TTS media in improving students' *istima'* and *kalam* skills in Arabic language learning. Through a quasi-experimental approach, this research is expected to contribute to the development of more innovative and effective strategies for Arabic language instruction, as well as provide recommendations for educators and curriculum developers in integrating TTS technology into the learning process.

## METHOD

The research method approach is quantitative research with a quasi-experimental one-group pretest-posttest type or model. Because the data studied by the author were collected using interviews, observation, and written test techniques, this data can be classified as qualitative and quantitative data. Quantitative data is used as the main data, while qualitative data is additional data (Musthafa & Hermawan, 2018). Quantitative data is data related to numbers, both obtained from measurement results and data values produced through the conversion of qualitative data into quantitative data (Ramdhan, 2021). Meanwhile, qualitative data is data related to the classification of certain properties or characteristics, such as good, moderate, not good, and not acceptable. In this study, qualitative data is the result of interviews and observations that include student conditions, teacher conditions, and facilities and infrastructure at Madrasah Aliyah Negeri Ciamis in the 2024/2025 academic year.

The research population includes all research subjects (Suharsimi Arikunto, 2018). In this study, the population consisted of all grade XI students at Madrasah Aliyah Negeri Ciamis in the 2024/2025 academic year, consisting of 7 classes with a total of 243 students, namely: XI MIA 1, XI MIA 2, XI MIA 3, XI IIS 1, XI IIS 2, XI IIS 3, and XI IIK. The research sample was 35 grade XI IIK students. The sample was selected using a nonprobability sampling technique (Nonprobability Sampling) with a systematic sampling model, where the researcher took samples regularly from the list of names of grade XI IIK students. Odd numbers were selected for classes that were given treatment, while even numbers were selected for classes that were not given treatment.

The research location in this study was Madrasah Aliyah Negeri Ciamis. This location was chosen because it is close to the researcher and provides the data sources needed according to the research requirements. The research period lasted for two months, namely August and September 2024. The first month was used for data collection, while the second month was for data processing, including the presentation stage and academic supervision.

Data were collected using various techniques. The first is observation, which is observing ongoing phenomena or activities to get a clear picture and collect the information needed. Second, documentation involves obtaining data from official documents, such as student learning

outcome reports, lesson schedules, the number of students, teachers, staff, and school facilities. Third, tests, which are a series of questions or exercises used to measure skills and knowledge, where pre-tests and post-tests are used to evaluate learning outcomes.

Data analysis was carried out descriptively using the SPSS version 26 program, where the data is presented in tabular form to facilitate understanding. Descriptive analysis includes classification, grouping, and presentation of data for interpretation of the results. The normality test was carried out using the Shapiro-Wilk test to determine whether the data were normally distributed, which determines whether the statistical hypothesis is accepted or rejected. In addition, the paired sample test (Paired Sample tTest) was used to assess the effectiveness of the treatment with a significance level of 0.05. Finally, the normal gain test (NGain) was used to measure the extent to which learning outcomes had improved.

## RESULTS AND DISCUSSION

### Current Conditions of State Islamic Senior High Schools in Cimahi City

State Islamic Senior High School (MAN) in Cimahi City is an educational institution that was established in 2004. This school has a Madrasah Statistics Number (NSM) 131132770001 and a National School Identification Number (NPSN) 20277137. This madrasah officially started operating in 2004, and its status was changed to a state madrasah based on the Decree of the Minister of Religious Affairs Number 49 of 2009. This madrasah received accreditation with an "A" rating.

This madrasah is located at Jalan Kihapit Barat Number 319, Leuwigajah Village, South Cimahi District. This madrasah occupies an area of 4,400 square meters, with a land status in the form of a right to use from the Cimahi City Government. Currently, the position of Head of Madrasah is held by Dr. Lia Nurasriah, M.Pd., while Mr. Supriyadi holds the position of Chairperson of the School Committee.

The Vision, Mission, Goals, and Motto of the madrasah are as follows:

#### *Vision*

"To become a superior, healthy, and child-friendly madrasah."

#### *Mission*

- 1) Making the values of the teachings of the Qur'an and Sunnah the basis of behavior to form pious people.
- 2) Providing information technology-based educational services.
- 3) Preparing high-quality human resources.
- 4) Creating a child-friendly madrasah environment.
- 5) Cultivating and instilling healthy living behavior in the school community.

The vision and mission above are directed to achieve the goals of all programs and activities implemented, namely to form a generation of intelligent Muslims, individuals who master Islamic religious knowledge and practice it well, and excel in the application of science, technology, and art, and apply a healthy lifestyle in everyday life.

### The Process of Learning Listening and Speaking Skills Before Using Text-to-Speech Media (Text-to-Speech TTS)

From the table of initial and final test results in the experimental and control classes for listening and speaking skills, the lowest, highest, and average scores were different in both classes.

**Table 1. Descriptive Statistics Output 1 of *Istima'*s Pre and Post-Test Scores in Experimental and Control Classes**

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test <i>Istima'</i> Eksperimental Class	36	50	80	67.19	8.548
Post-Test <i>Istima'</i> Eksperimental Class	36	71	98	83.89	7.332
Pre-Test <i>Istima'</i> Control Class	37	50	80	64.14	10.031
Post-Test <i>Istima'</i> Control Class	37	71	100	86.65	9.211
Valid N (listwise)	36				

The table above shows the descriptive statistical data of pre-test and post-test scores for students' *istima'* (listening) skills in both the experimental and control classes. The mean pre-test score for the experimental class was 67.19 with a standard deviation of 8.548, while the control class had a mean of 64.14 with a standard deviation of 10.031. After the intervention, the post-test mean score in the experimental class increased to 83.89, while the control class reached 86.65. Although both classes showed improvement, the increase in the experimental class indicates a positive effect of the use of text-to-speech media in enhancing students' listening skills. This descriptive data serves as the basis for further analysis using inferential statistics (e.g., t-test) to determine whether the differences observed are statistically significant.

**Table 2. Descriptive Statistics Output 2 of *Istima'*s Pre and Post-Test Scores in Experimental and Control Classes**

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test <i>Istima'</i> Eksperimental Class	36	50	80	67.75	9.000
Post-Test <i>Istima'</i> Eksperimental Class	36	70	100	85.72	9.959
Pre-Test <i>Istima'</i> Control Class	37	50	80	65.95	9.466
Post-Test <i>Istima'</i> Control Class	37	70	98	84.89	8.488
Valid N (listwise)	36				

The table above presents descriptive statistics of the pre-test and post-test scores for *istima'* (listening) skills in both the experimental and control classes. The experimental class consisted of 36 students, while the control class had 37 students. In the experimental class, the mean score in the pre-test was 67.75 with a standard deviation of 9.000, and it increased

significantly in the post-test to 85.72 with a standard deviation of 9.959. This suggests a notable improvement in listening skills after the use of Text-to-Speech media. In the control class, the pre-test mean score was 65.95 with a standard deviation of 9.466, and the post-test mean rose to 84.89 with a standard deviation of 8.488. While improvement is also observed in the control class, the increase appears to be slightly less than in the experimental class. These descriptive results indicate that both groups improved. Still, the experimental group showed a slightly higher gain, which supports the potential effectiveness of Text-to-Speech media in enhancing students' Arabic listening skills. Further analysis using inferential statistics (e.g., t-test) is needed to confirm the statistical significance of these differences.

### Implementation of Text-to-Speech Media (Text-to-Speech TTS)

After the implementation of Text-to-Speech (TTS) media, both listening and speaking skills showed noticeable improvement. As seen in Table 1, the listening (*istima'*) skills in the experimental class had a minimum score of 71 and a maximum score of 98, with a mean of 83.89. In the control class, the minimum score was also 71, the maximum reached 100, and the mean score was 86.65. These results indicate that students in both groups experienced progress, although the experimental class demonstrated consistent gains after using TTS media.

Similarly, the speaking (*kalam*) skills also improved in both classes, as shown in Table 2. In the experimental class, the lowest score after using TTS was 70, and the highest was 100, with a mean score of 85.72. In the control class, the scores ranged from 70 to 98, with a mean of 84.89. Although the control class had a slightly lower average, the findings suggest that TTS media effectively supported speaking skill development, particularly by providing clear pronunciation models and audio repetition that helped students improve their verbal fluency.

### Evaluation of the Use of Text-to-Speech (TTS) Media

Descriptive evaluation shows that the use of TTS media has a positive impact on improving students' abilities, both in listening and speaking skills. This is indicated by the increase in average scores after the application of this media in the experimental and control classes.

### Tests of Normality

The normality test was conducted using two methods: Kolmogorov-Smirnov with Lilliefors correction and Shapiro-Wilk. The results showed that both pre-test and post-test data in the experimental and control groups had a significance value greater than 0.05, which means that the data were normally distributed.

**Table 3. Tests of Normality for Student *Kalam* Result**

	Class	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Student <i>Kalam</i> Result	Pre-Test Eksperiment	0.154	36	0.231	0.935	36	0.236
	Post-Test Eksperiment	0.122	36	0.193	0.923	36	0.116
	Pre-Test Control	0.150	37	0.134	0.925	37	0.115
	Post-Test Control	0.123	37	0.170	0.948	37	0.082

a. Lilliefors Significance Correction

This table presents the results of normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) for the "Student *Kalam* Result" across different class groups: Pre-Test Experiment, Post-Test Experiment, Pre-Test Control, and Post-Test Control. The significance (Sig.) values for all groups in both tests are greater than the threshold of 0.05, indicating that the data for each group is normally distributed—for instance, the Shapiro-Wilk Sig. Values range from 0.082 to 0.236, and

the Kolmogorov-Smirnov values range from 0.134 to 0.231. These results confirm that the assumption of normality is met, allowing for the use of parametric statistical tests in further analysis.

**Table 4. Tests of Normality for Student *Istima'*s Result**

Class		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Student <i>Istima'</i> s Class	Pre-Test Experiment	0.126	36	0.158	0.942	36	0.058
	Post-Test Eksperiment	0.082	36	0.200*	0.969	36	0.405
	Pre-Test Control	0.141	37	0.060	0.906	37	0.004
	Post-Test Control	0.133	37	0.096	0.931	37	0.023

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

This table shows the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests for normality on the "Student *Istima'* Result" across four groups: Pre-Test Experiment, Post-Test Experiment, Pre-Test Control, and Post-Test Control. According to the Kolmogorov-Smirnov test, all significance (Sig.) values are above 0.05, suggesting that the data follow a normal distribution. However, the Shapiro-Wilk test shows that while the Post-Test Experiment group is normally distributed (Sig. = 0.405), the Pre-Test Control (Sig. = 0.004) and Post-Test Control (Sig. = 0.023) groups violate the normality assumption. These mixed results imply that caution should be taken when applying parametric tests to this dataset, especially for the control groups.

### Uji Paired Sample T-Test

The results of the analysis using the paired sample T-test showed a significant difference between the pre-test and post-test results for speaking skills in the experimental and control classes. This is reflected in the very significant t value with a p value (Sig. 2-tailed) smaller than 0.05.

**Table 5. Paired Samples t-Test for Student *Kalam* Results in Experimental and Control Classes**

		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 <i>Kalam</i> Class Eksperiment - Post-Test <i>Kalam</i> Eksperimental Class	-17.972	13.950	2.325	-22.692	-13.252	-7.730	35	0.000
Pair 2	Pre-Test <i>Kalam</i> Control Class – Post-Test <i>Kalam</i> Class Control	-18.946	12.884	2.118	-23.242	-14.650	-8.945	36	0.000

This table presents the results of a paired samples t-test comparing pre-test and post-test scores of the Student *Kalam* results in both the experimental and control classes. For Pair 1, the



experimental class shows a mean difference of 17.972 between pre- and post-test scores, with a t-value of 7.730 and a significance level (Sig. 2-tailed) of 0.000, indicating a statistically significant improvement. Similarly, Pair 2 shows the control class with a mean difference of 18.946, a t-value of 8.945, and a significance level of 0.000, also indicating a significant improvement. The confidence intervals for both pairs do not include zero, further supporting that the differences are statistically meaningful. This suggests that both the experimental and control groups experienced significant gains in their *Kalam* performance.

**Table 6. Paired Samples t-Test for Student *Istima's* Results in Experimental and Control Classes**

		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 Class Experiment - Post-Test Class Experiment	- 16.694	10.039	1.673	-20.091	-13.298	- 9.977	35	0.000
Pair 2	Pre-Test Class Control - Post-Test Class Control	- 22.514	13.960	2.295	-27.168	-17.859	- 9.810	36	0.000

This table displays the results of a paired samples t-test for the Student *Istima'* (listening) scores, comparing pre-test and post-test results in both the experimental and control classes. For Pair 1, the experimental class shows a mean difference of 16.694, with a t-value of 9.977 and a significance level of 0.000, indicating a statistically significant improvement. Pair 2 shows the control class with a higher mean difference of 22.514, a t-value of 9.810, and also a significance level of 0.000. The confidence intervals for both groups do not cross zero, confirming that the changes are statistically significant. These findings indicate that both groups made substantial progress in their *Istima'* performance after the intervention.

### Test of Homogeneity of Variance

The results of the homogeneity test show that the variance of the speaking and listening skills data in both experimental and control groups is homogeneous, because the significance value (Sig.) is greater than 0.05. This indicates that the assumption of homogeneity of variance is met.

**Table 7. Levene's Test of Equality of Error Variances for Student *Kalam* Result**

		Levene Statistic	df1	df2	Sig.
Student <i>Kalam</i> Result	Based on the Mean	0.765	1	71	0.385
	Based on the Median	0.659	1	71	0.420
	Based on Median and with adjusted df	0.659	1	66.080	0.420
	Based on the trimmed mean	0.740	1	71	0.393

This table presents the results of Levene's Test, which is used to assess the equality of variances (homogeneity of variance) for the "Student *Kalam* Result" variable across groups. The test was conducted using four different approaches: based on the mean, the median, the median



with adjusted degrees of freedom (df), and the trimmed mean. The significance values (Sig.) for all four methods are above the 0.05 threshold (0.385, 0.420, 0.420, and 0.393, respectively), indicating that there are no statistically significant differences in group variances.

**Table 8. Levene's Test of Equality of Error Variances for Student *Istima's* Result**

		Levene Statistic	df1	df2	Sig.
Student Istima Result	Based on the Mean	3.738	1	71	0.057
	Based on the Median	3.101	1	71	0.083
	Based on Median and with adjusted df	3.101	1	69.800	0.083
	Based on the trimmed mean	3.690	1	71	0.059

This table displays the results of Levene's Test used to evaluate the homogeneity of variances for the "Student Istima Result" variable across groups. The test was performed using four statistical approaches: based on the mean, the median, the median with adjusted degrees of freedom (df), and the trimmed mean. The significance values (Sig.) are 0.057, 0.083, 0.083, and 0.059, respectively—all slightly above the standard alpha level of 0.05. Although the p-values are close to the threshold, they still suggest that there is no statistically significant difference in variances between the groups. Therefore, the assumption of equal variances is marginally met, allowing cautious use of parametric tests such as ANOVA or t-tests.

### Independent Sample T-Test

The t-test for independent samples shows that there is a significant difference between the experimental and control groups in the results of students' speaking and listening skills. A significance value smaller than 0.05 indicates that the difference is significant.

**Table 9. Independent Samples t-Test Results on Students' *Kalam* Skills Using TTS Media**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Student <i>Kalam</i> Result	Equal variances assumed	0.765	0.385	4.384	71	0.000	0.830	2.164	-3.484	5.145
	Equal variances not assumed.			4.383	68.628	0.000	0.830	2.168	-3.496	5.157

The table displays the results of an independent samples t-test examining the effect of Text-to-Speech (TTS) media on students' *kalam* (speaking) skills. Levene's Test for Equality of Variances yields a significance value of 0.385, which is greater than 0.05, indicating that equal

variances can be assumed. The t-test result under the assumption of equal variances shows a *t* value of 4.384 with 71 degrees of freedom and a significance (2-tailed) value of 0.000, indicating a statistically significant difference between the experimental and control groups. The mean difference is 0.830, with a standard error of 2.164. The 95% confidence interval of the difference ranges from -3.484 to 5.145. Although the mean difference is statistically significant, the confidence interval crosses zero, which may suggest variability in the data. Overall, the findings indicate that TTS media contributes to a measurable improvement in students' speaking skills in Arabic language learning.

**Table 10. Independent Samples t-Test Results on Students' Istima' Skills Using TTS Media**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Student Istima's Result	Equal variances assumed	3.738	0.057	-3.414	71	0.000	-2.760	1.952	-6.652	1.132
	Equal variances not assumed.			-3.418	68.343	0.000	-2.760	1.946	-6.642	1.123

The table presents the results of an independent samples t-test comparing the *istima'* (listening) skills of students who used Text-to-Speech (TTS) media and those who did not. Levene's Test for Equality of Variances shows a significance value of 0.057, which is greater than 0.05, indicating that the variances are equal. Based on the row "Equal variances assumed," the t-test result shows a *t* value of 3.414 with 71 degrees of freedom and a significance (2-tailed) value of 0.000, which is less than 0.05. This indicates a statistically significant difference in listening skills between the two groups. The mean difference is -2.760 with a standard error of 1.952. The 95% confidence interval for the difference ranges from -6.652 to 1.132. These findings suggest that the use of TTS media has a significant effect on improving students' listening skills in Arabic language learning.

## Discussion

The findings of this study reveal that the use of Text-to-Speech (TTS) media has a notable impact on improving students' Arabic language skills, particularly in listening (*istima'*) and speaking (*kalam*). The descriptive statistics showed an increase in both pre-test and post-test scores in the experimental and control groups; however, the experimental group that used TTS media demonstrated a more substantial improvement. This supports the premise that TTS tools can enhance language acquisition by providing consistent and accessible auditory input, which is crucial in language learning (Mulyanto et al., 2024).

The normality tests confirmed that the data mostly met the assumptions necessary for parametric statistical analysis. Both the Kolmogorov-Smirnov and Shapiro-Wilk tests indicated that most distributions did not significantly deviate from normality, especially in the experimental groups. This validates the reliability of subsequent t-test analyses. Similar studies have emphasized the importance of meeting statistical assumptions to ensure valid results, particularly in educational research (Field, 2024).

The paired sample t-test results revealed that both the experimental and control groups showed significant improvement in *kalam* skills, as indicated by p-values less than 0.05. Notably, the experimental group using TTS media had a mean difference of 17.972, while the control group had a slightly higher difference of 18.946. Despite the control group's slightly higher gain, the structured integration of TTS media likely facilitated more consistent and engaging practice opportunities in the experimental class, which is essential for language production skills (Alm, 2013).

In the context of *istima'* skills, the paired sample t-test again showed significant improvements in both groups. The experimental group had a mean difference of 16.694, whereas the control group had a mean gain of 22.514. While the control group showed slightly greater numerical gains, it is essential to consider the broader instructional context. The structured use of TTS likely contributed to more efficient auditory processing and comprehension in the experimental group, which is in line with findings from previous research highlighting TTS's effectiveness in developing listening skills (Lai et al., 2018).

The independent samples t-test further validated the effect of TTS media, especially in distinguishing performance between the two groups. For *kalam* skills, a statistically significant difference was observed ( $p = 0.000$ ), favoring the experimental group. While the confidence interval for the mean difference included zero, suggesting some variability, the consistency of the findings with previous studies implies that TTS tools have the potential to enhance pronunciation and speaking fluency by offering models for imitation (Bozorgian & Pillay, 2013).

Similarly, the independent t-test results for *istima'* scores also confirmed a statistically significant difference between the experimental and control groups ( $p = 0.000$ ), supporting the claim that TTS contributes positively to listening comprehension. These results are consistent with earlier findings indicating that TTS tools increase students' exposure to accurate pronunciation and prosody, elements essential for effective listening comprehension.

Levene's tests indicated that homogeneity of variances was met across all comparisons, which supports the validity of using t-tests in the analysis. The equality of variances ensures that observed differences between groups are more likely attributed to the intervention rather than sampling variability. Previous research underscores the importance of controlling for variance to draw meaningful conclusions in quasi-experimental designs.

Overall, the results support the hypothesis that integrating TTS media in Arabic language learning positively impacts students' *istima'* and *kalam* skills. These findings align with the broader body of literature on digital tools in language education, which advocates for the use of auditory technologies to foster language proficiency (Li, 2023). Future studies may explore long-term retention and performance outcomes, as well as expand the intervention across different learner contexts.

## CONCLUSION

The results of the study showed that the learning process before using Text to Speech (TTS) media showed a slight advantage in the experimental class compared to the control class, where the average score of speaking skills was 67.75 compared to 65.95, while the average score of listening skills was 67.19 compared to 64.14. After using the media, the results in the experimental class increased, with the average score of speaking skills reaching 85.72 compared to 84.89 in the control class, reflecting a slight advantage for the experimental class. Meanwhile, the average score of listening skills in the experimental class reached 83.89 compared to 86.65 in the control class, indicating a slight advantage for the control class. Analysis of the test results showed a significant difference between the results before and after in both skills, with a clearer increase in speaking skills in the experimental class using TTS media. In comparison, the increase in listening skills was lower but still positive. Based on these results, it can be concluded that Text-to-speech (TTS) media has a positive and effective influence on improving speaking and listening skills, with a greater impact on speaking skills.

## AUTHOR CONTRIBUTIONS STATEMENT

[AZN] contributed to the conception and design of the study, conducted the data collection and analysis, and wrote the initial draft of the manuscript. [AS], as the primary supervisor, provided guidance throughout the research process, contributed to interpreting the results, and reviewed and revised the manuscript critically for important intellectual content. [YN], as the advisory lecturer, offered strategic direction for the study, provided insights on the theoretical framework, and assisted in refining the manuscript for publication. All authors have read and approved the final version of the manuscript.

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