

The Effectiveness of PEGON Media Based on the Hikayat Tanah Hitu Manuscript of Maluku on the Arabic Text Reading Ability of Eighth-Grade Students at MTs Al-Islam Telaga Biru

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ABSTRACT

This study aims to examine the effect of using the Pegon Arabic script as an instructional medium on students' ability to read Arabic texts. The research was conducted at MTs Swasta Al-Islam Telaga Biru with a sample of 60 students divided into an experimental group and a control group. A descriptive quantitative method with a pretest–posttest design was employed to measure changes in reading ability before and after the implementation of Pegon-based materials. Statistical analysis included mean scores, standard deviation, and inferential tests. The findings show a substantial improvement in the experimental group, with the average pretest score increasing from 62.063 to 75.032 on the posttest, reflecting a gain of 12.969 points. The paired samples t-test confirms the significance of this improvement ($t (59) = -8.440$, $p = 0.000$). In contrast, the independent samples t-test shows a significant difference between the experimental and control groups in the posttest ($t (58) = 6.514$, $p = 0.000$). These results demonstrate the effectiveness of Pegon in facilitating grapheme–phoneme decoding and supporting students' comprehension through cultural familiarity and local Islamic identity. The study further highlights Pegon as an adaptive and contextually relevant medium for teaching Arabic reading skills. It suggests that integrating local scripts can strengthen students' Islamic literacy within the context of Arabic language education in Indonesia.



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Introduction

The study of local writing systems such as the Pegon script shows that Islamic literacy traditions in Southeast Asia possess distinctive characteristics shaped by the synthesis of local cultures and the Arab–Islamic intellectual heritage. Since the sixteenth century, Pegon has served as one of the primary media for disseminating Islamic teachings across the Indonesian archipelago, particularly in Java, Madura, and parts of Sumatra.[1] This writing system employs modified Arabic letters to accommodate local phonemes, resulting in a unique orthographic structure that is highly adaptive to regional linguistic needs. Within the broader context of Islamic intellectual history, Pegon functioned not only as a means of communication but also as a medium for knowledge transmission and the internalization of Islamic values within society. Numerous religious texts, hikayat, tafsir works, and pesantren literary manuscripts were composed in Pegon, indicating a high level of Islamic literacy among traditional communities.[2]

Furthermore, the Pegen script plays a crucial role in maintaining continuity between pesantren writing traditions and the development of modern Islamic education in Indonesia. Its use in manuscripts and classical texts reflects a form of cultural resistance to the dominance of the Latin script introduced through Western colonialism.[3] Pegen functions not only as a writing system but also as a symbol of religious and cultural identity within the Islamic tradition of the Nusantara, reinforcing the continuity of Islam-based literacy practices evident in various Islamic educational institutions, particularly pesantren.[4] Through this script, Muslim communities in the archipelago constructed a distinctive literacy space where local languages could interact harmoniously with classical Arabic texts without losing their theological nuance. Thus, the study of Pegen entails tracing the dynamic intersections of religion, language, and culture that have shaped the character of Indonesian Islam to the present day. Similar comparative studies have highlighted structural parallels between Arabic and local languages such as Gorontalo, where clause structures reveal both similarities and differences.[5]

Linguistically, the Pegen orthographic system offers a compelling field of inquiry for understanding the relationships between phonology, graphemes, and semantics within the context of language adaptation. The presence of additional characters such as ئ (nga), ئ (pa), and ئ (ca) illustrates how local speakers creatively modified Arabic letters to represent phonemes absent in the source language.[6] This phenomenon reflects a form of linguistic syncretism, in which the structure of Arabic was adapted to meet the phonetic needs of Javanese speakers and those of the broader Nusantara region.[7] Consequently, Pegen stands as concrete evidence of the Indonesian Muslim community's capacity for orthographic innovation without abandoning its religious and cultural foundations. This phenomenon of orthographic adaptation aligns with previous research on the distinction between Tā' Marbūṭah and Tā' Maftūḥah in Rasm 'Uthmānī, which indicates that modifications in Arabic script entail substantial linguistic and semantic consequences.[8]

From a sociolinguistic perspective, the Pegen writing system also represents a mechanism of interaction between language and social identity. It serves as a bridge between Arabic, regarded as the language of knowledge and religion, and local languages, as the medium of everyday community communication.[9] Through the tradition of writing kitab kuning in pesantren, Pegen facilitated the dissemination of Islamic sciences to wider segments of society while simultaneously reinforcing the role of ulama as agents of literacy and religious authority.[10] Within the framework of Islamic literacy, the presence of Pegen underscores that the transmission of religious knowledge is not confined to standard Arabic but can be carried out through local, inclusive, adaptive, and contextual forms. Therefore, Pegen is not merely an alternative orthographic system but a manifestation of Islamic and national identity shaped by the harmonious interaction between language, religion, and the cultural landscape of the Nusantara.

Although research on the Pegen script has been carried out extensively, most studies remain concentrated in the Javanese and Sundanese regions.[11] This limited focus has resulted in a lack of understanding regarding Pegen orthographic variations in eastern Indonesia, including Maluku. Historically, Maluku played a significant role in the network of Islamization across the archipelago and possesses linguistic characteristics distinct from other regions. The absence of in-depth research in this area creates a scholarly gap in understanding how Pegen adapted to local phonology and cultural contexts.

In addition, the use of Pegen within the context of modern education has rarely been examined empirically. Most previous studies have focused on historical or descriptive aspects rather than on its effectiveness as an instructional medium.[12] This finding contrasts with prior research that emphasizes the effectiveness of the role-playing method in enhancing mahārah al-kalām. Nevertheless, this comparison indicates that both locally rooted media, such as Pegen, and interactive instructional methods, like role playing, contribute significantly to the improvement of Arabic language proficiency.[13] Yet, given the low proficiency in reading Arabic texts among madrasah students, innovative learning approaches are required to bridge phonological and semantic difficulties. In this regard, Pegen holds significant potential as a relevant medium because its phonetic structure aligns more closely with the local languages spoken by students. The use of Pegen can serve as a linguistic transition strategy that helps learners understand Arabic script without losing connection to their mother tongue.[14] Several studies have shown that approaches based on local writing systems can significantly enhance learning motivation and reading retention in Arabic compared to conventional methods.[9] Therefore, exploring the effectiveness of Pegen as a learning medium is not only academically important but also carries practical value for developing madrasah curricula rooted in local wisdom.[15]

This gap opens research opportunities that are both creative and contextually grounded. By shifting the focus to the Maluku region, this study not only contributes to expanding the corpus of Nusantara Islamic literacy but also introduces a local wisdom-based learning model that is adaptive to contemporary challenges.[16] This research highlights a new trend in Islamic education namelyrole, the integration of

tradition and modernity to strengthen the continuity of Islamic literacy in the global era. In this regard, the incorporation of local values and distinctive writing systems such as Pegan can serve as a pedagogical bridge that connects cultural identity with students' Islamic literacy competencies.[17] Such a learning model demonstrates that Islamic education does not have to choose between traditional heritage and modern demands; instead, it can synthesize both to enhance its relevance and effectiveness.

The absence of research on the Pegan orthography of Maluku needs to be addressed, as it has direct implications for developing Arabic language instruction that is more contextual and relevant to students' cultural backgrounds. In practice, many madrasah students struggle to recognize Arabic letters, associate sounds with meaning, and comprehend texts holistically. [18]. The use of Pegan adapted to regional phonology has the potential to serve as an effective solution to help learners overcome these barriers and foster greater interest in the Arabic language.

Pedagogically, the application of the Maluku Pegan orthography aligns with constructivist approaches that emphasize the importance of meaningful learning experiences.[19]. Through scaffolding and familiar sociocultural contexts, students can more easily grasp the linguistic concepts of the Arabic language. Thus, this study is not only linguistic in nature but also pedagogical, as it examines the effectiveness of Pegan as an instructional medium oriented toward the actual needs of learners.

Therefore, this study aims to examine the effectiveness of the Maluku Pegan orthography in improving the Arabic reading skills of eighth-grade students at MTs Al-Islam Telaga Biru. The findings are expected to strengthen local wisdom-based learning models, enrich Arabic language teaching methods in madrasah, and contribute to preserving the Nusantara Islamic literacy heritage within the context of modern education.

Method

This study employs a quantitative approach using a Pretest–Posttest Control Group Design to examine the effectiveness of the Pegan Arabic script as an instructional medium for enhancing students' Arabic reading skills. This design enables the researcher to compare learning outcomes between an experimental group that receives instruction using Pegan and a control group taught through conventional methods, both before and after the intervention. Through this design, the influence of Pegan-based instruction on improving students' reading proficiency can be assessed objectively.

The study was conducted at MTs Swasta Al-Islam Telaga Biru, a madrasah located in the Gorontalo region yet culturally affiliated with Maluku, where local Islamic literacy traditions remain strongly preserved. The research took place during the second semester of the 2024/2025 academic year and included the stages of preparation, implementation of the treatment, as well as data collection and analysis.

The population of this study consisted of all eighth-grade students at MTs Swasta Al-Islam Telaga Biru, totaling 60 learners. The sampling process employed a simple random sampling technique to ensure equality in baseline abilities. Class VIII A was designated as the experimental group with 30 students, while Class VIII B served as the control group with an equal number of participants. The randomization procedure was carried out systematically to minimize bias and ensure the internal validity of the study.

The research instrument consisted of a 20-item Arabic reading comprehension test that measured three key aspects: (1) vocabulary mastery (mufradāt), (2) understanding of sentence structure (tarkīb), and (3) comprehension of textual meaning (mafhum al-maqrū'). Content validity was established through expert judgment by two specialists in Arabic language and instructional media, while reliability was tested using Cronbach's Alpha, yielding a coefficient of 0.87, indicating high reliability. The instructional materials, consisting of Maluku Pegan texts, were adapted to the students' linguistic characteristics and underwent readability testing prior to their use.

The study was carried out in three stages. The preparation stage included the development of lesson plans utilizing Pegan-based media, the preparation of Pegan text materials, and the pilot testing of the research instruments. The implementation stage consisted of four meetings (90 minutes each), during which the experimental group received reading instruction using Pegan texts, while the control group used standard Arabic texts. Both groups were administered a pretest before the intervention and a posttest afterward. Throughout the instructional process, monitoring was conducted to ensure teacher consistency and maintain the study's internal validity. The data analysis stage involved tests of normality and homogeneity as statistical prerequisites, followed by an independent samples t-test at a 0.05 significance level to determine whether significant differences existed between the two groups.

This study was conducted with full consideration of educational research ethics, including obtaining official permission from the madrasah, securing participant consent, and ensuring the confidentiality of student identities. External variables such as motivation, baseline ability, and learning environment were controlled through randomization and the standardization of instructional conditions. Nevertheless, the researcher acknowledges the limitations related to the duration of the intervention and the scope of the study, which involved only one madrasah. External validity was maintained through the use of a representative sample and the high reliability of the research instruments employed.

Results and Discussions

This study aimed to determine the effectiveness of using the Pegan Arabic script as an instructional medium in improving the Arabic reading skills of eighth-grade students at MTs Al-Islam Telaga Biru. A total of 60 students participated in the study, consisting of 30 students in the experimental group and 30 in the control group. The experimental group received instruction using Pegan-based learning materials, while the control group was taught using conventional methods with standard Arabic texts (without Pegan).

Table 1. Distribution of Students' Pretest and Posttest Scores (N = 60)

		Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation	
Pretest	60	42.1	75.6	62.063	7.5166	
Posttest	60	55.6	93.2	75.032	8.3446	
Valid (listwise)	N 60					

Based on the results of the descriptive analysis, the total number of participants in the study was 60 students. In the pretest stage, students' scores ranged from 42.1 to 75.6, with a mean score of 62.063 and a standard deviation of 7.5166, indicating that their initial ability to read Arabic texts fell within the moderate category with relatively moderate variation.

After the implementation of the Pegan Arabic script-based learning media, the posttest results showed an improvement in students' performance, with scores ranging from 55.6 to 93.2, a mean of 75.032, and a standard deviation of 8.3446. The increase in the mean score from 62.063 to 75.032 indicates an improvement in reading ability following the treatment.

Overall, the descriptive data demonstrate an average score increase of 12.969 points, providing an initial indication that the use of the Pegan Arabic script media has the potential to effectively enhance students' ability to read Arabic texts.

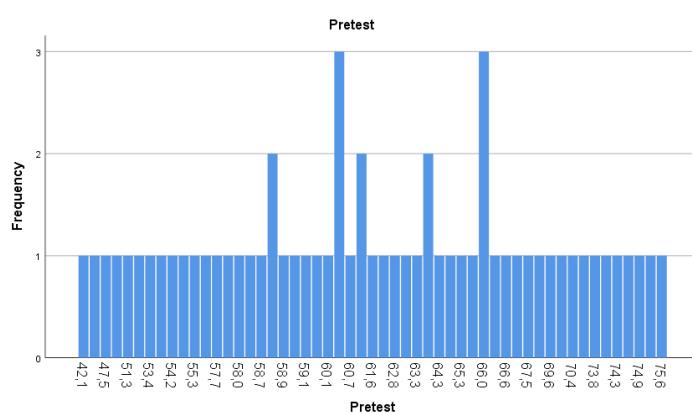


Figure 1. Distribution Graph of Pretest Scores

The distribution graph of the pretest scores shows that students' initial ability to read Arabic texts was spread across a relatively wide range, from 42.1 to 75.6. The distribution pattern appears relatively even, with no dominant concentration of frequency at a particular point, indicating that students' initial abilities varied considerably.

Several score points show higher frequencies (for instance, around the 60–63 range), yet overall, the graph does not display extreme skewness. This suggests that prior to the treatment, students' abilities were neither clustered at the high nor low levels, but were moderately dispersed across the entire score range.

This distribution characteristic reflects that students entered the learning process with heterogeneous initial abilities, giving the Pegon Arabic script-based learning media sufficient space to provide a potential improvement effect.

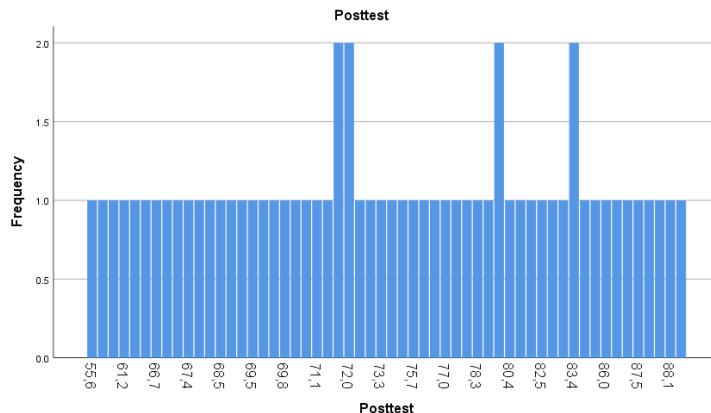


Figure 2. Distribution Graph of Posttest Scores

The posttest graph shows a significant change in the distribution pattern compared to the pretest. The score range shifted to higher values, from 55.6 to 93.2, with an increased concentration of frequencies in the upper-medium range (around 72–84). The graph displays a distribution that is more concentrated at higher ability levels, indicating an overall improvement in students' academic performance.

There are no signs of extreme deviations or unusual distribution patterns. Instead, the frequency spread shows that most students achieved scores in the medium-to-high range, which is consistent with the increase in the mean score from 62.063 to 75.032.

This shift in distribution indicates that the instructional intervention using the Pegon Arabic script media was able not only to improve the average score but also to shift the overall distribution of students' reading abilities toward a higher level.

Table 2. Normality Test Results

		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Kelompok	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	Eksperim	.089	30	.200*	.975	30	.686
	Kontrol	.094	30	.200*	.963	30	.364
Posttest	Eksperim	.089	30	.200*	.984	30	.910
	Kontrol	.164	30	.039	.948	30	.152

The normality test was conducted to ensure that the research data, both in the pretest and posttest stages, followed a normal distribution so that the analysis could proceed using parametric statistical techniques. The testing was carried out using two methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, with Shapiro-Wilk used as the main reference because it is more appropriate for a sample size of approximately 30 respondents per group.

Based on the results, all pretest scores in both the experimental and control groups showed Shapiro-Wilk significance values above 0.05 ($p = 0.686$ for the experimental group and $p = 0.364$ for the control group). These findings indicate that the pretest data distribution in both groups is normal. Thus, students' initial reading ability before the treatment can be considered statistically homogeneous and does not show distributional deviations.

In the posttest analysis, the experimental group also showed very favorable results with a significance value of $p = 0.910$, confirming that the data were normally distributed. Meanwhile, the control group obtained

a significance value of $p = 0.152$, which also exceeds the 0.05 threshold. Although the Kolmogorov-Smirnov test for the control group produced a lower significance value ($p = 0.039$), the decision still refers to the Shapiro-Wilk test, which is more sensitive for the sample size used in this study. Since the Shapiro-Wilk value remained above 0.05, the posttest data in the control group are still classified as normal.

Overall, the results of the normality test show that all pretest and posttest data in both the experimental and control groups are normally distributed. Fulfillment of this assumption ensures that the analysis can proceed using parametric tests, namely the paired samples t-test to examine within-group improvement and the independent samples t-test to examine differences in learning outcomes between the two groups. With the normality assumption fulfilled, the validity of the statistical analyses used in this study is strengthened.

Homogeneity Tests

The homogeneity of variance test was conducted to determine whether the variance of the pretest data in the experimental and control groups was equivalent before the treatment was administered. This test is important because homogeneity of variance is one of the main prerequisites for using parametric statistics, particularly the independent samples t-test.

Table 3. Homogeneity Test Results

Independent Samples Test		
Levene's Test for Equality of Variances		
		F
Pretest	Equal variances assumed	.290
	Equal variances not assumed	

Based on the results of Levene's Test for Equality of Variances, a significance value of 0.592 was obtained, which is far above the 0.05 threshold. This finding indicates that there is no significant difference in variance between the two groups. Thus, the pretest data can be declared homogeneous, and the assumption of equal variance is fulfilled. This condition suggests that both groups had an equivalent level of score dispersion, allowing for fair comparison in the subsequent statistical analysis.

In line with these findings, the analysis proceeded using the "Equal variances assumed" row in the t-test for Equality of Means table. The t-test significance value of 0.248 shows that there was no significant difference in the pretest mean scores between the experimental and control groups. This confirms that both groups were in an equivalent initial state before the treatment involving the use of the Pegon Arabic script media. In other words, the improvement in reading ability in the later stage can be more convincingly attributed to the treatment rather than to differences in baseline abilities between groups.

Overall, the results of the homogeneity of variance test ensure that the data meet an essential assumption for the use of parametric tests and that the comparison between the experimental and control groups can be conducted with a high level of validity.

Hypothesis Testing (t-Test)

Paired Samples Test

The paired samples t-test was used to determine whether there was a significant improvement between the pretest and posttest scores after students received the treatment in the form of Pegon Arabic script learning media. The analysis results indicate that there is a very clear mean difference between the two measurements. The mean difference between the pretest and posttest scores was -12.9683 , indicating an increase in students' learning scores after the treatment was given (the negative value shows that the posttest scores were higher than the pretest scores).

Table 4. Results of the T-Test (Paired Sample Test)

Paired Samples Test						
Paired Differences				95% Confidence Interval		
	Std. Deviation	Std. Error	Mean	of the Difference	Lower	Upper
Mean				t	df	Sig. (2-tailed)

Pair 1	Pretest - Posttest	-12.9683	11.9015	1.5365	-16.0428	-9.8939	-8.440	59	.000
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The standard deviation of the difference, which was 11.9015, indicates variation in the level of improvement among students, but it remains within a reasonable range for a heterogeneous classroom. The 95% confidence interval ranges from -16.0428 to -9.8939, all of which lie on the negative side. This strengthens the evidence that the increase in scores occurred consistently among almost all participants.

Furthermore, the t-test statistic shows $t (59) = -8.440$, with a significance value of $p = 0.000$, which is far below the 0.05 threshold. Thus, it can be concluded that there is a highly significant difference between the pretest and posttest scores. This finding indicates that the use of the Pegan Arabic script media had a positive and significant effect on improving the Arabic reading ability of eighth-grade students.

Overall, the results of the paired samples t-test provide strong empirical evidence that the instructional intervention through Pegan Arabic script media is effective in enhancing students' reading performance. This improvement is not only statistically significant but also substantial in practical terms, as reflected in the magnitude of the mean difference between the pretest and posttest scores.

Independent Samples t-test

The independent samples t-test was conducted to determine whether there was a difference in Arabic text reading ability between the experimental group and the control group after the treatment was given. Before the analysis, a homogeneity of variance check was performed through Levene's Test, which produced a significance value of 0.757, far above the 0.05 threshold. This result indicates that the variances of both groups were homogeneous, and therefore, the analysis proceeded using the "Equal variances assumed" row in the t-test output.

Table 5. Independent Sample Test
Independent Samples Test

	Pos ttest	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								
Equal variances assumed		.096	.757	6.51	58	.000	10.756	1.6514	7.4510 14.0624								
Equal variances not assumed																	

Based on the results of the t-test for Equality of Means, the value obtained was $t (58) = 6.51$ with a significance level of $p = 0.000$, indicating a highly significant difference between the experimental and control groups at the posttest stage. The significance value, which is far below 0.05, suggests that the use of the Pegan Arabic script media had a substantial effect on improving students' reading ability compared to the instruction received by the control group.

The mean difference between the two groups was 10.7567, indicating that the posttest scores of the experimental group were approximately 10.76 points higher than those of the control group. The 95% confidence interval ranged from 7.4510 to 14.0624, all of which lie on the positive side, confirming that the difference was consistent and did not occur by chance.

Overall, the results of the independent samples t-test provide strong statistical evidence that the use of Pegan Arabic script media is significantly more effective in improving Arabic reading ability than instruction without such media. Thus, the treatment given to the experimental group is proven to have a greater positive impact on students' learning outcomes.

Discussion

The findings of this study, which show that Pegen media can enhance students' ability to read Arabic texts, have a strong connection to the Islamic literacy tradition in the Maluku region. However, previous studies have noted that the effectiveness of Arabic language learning is also influenced by non-linguistic factors such as students' motivation, curriculum design, and infrastructural support, which function as external variables that must be taken into account in research on Pegen-based instruction.[20] Since the 17th century, the Hitu community in Central Maluku has used the Arabic–Malay script to write historical, da'wah, and Islamic knowledge texts, including the Hikayat Hitu manuscript. These findings are consistent with technology-based instructional innovations such as e-learning, as documented in previous studies, despite differences in contextual settings.[21] While e-learning relies on digital media, Pegen employs local wisdom as a linguistic bridge. Furthermore, research on Arabic and Andio clauses highlights the importance of preserving local languages as integral components of cultural identity, paralleling efforts to sustain the use of Pegen in Maluku.[22]

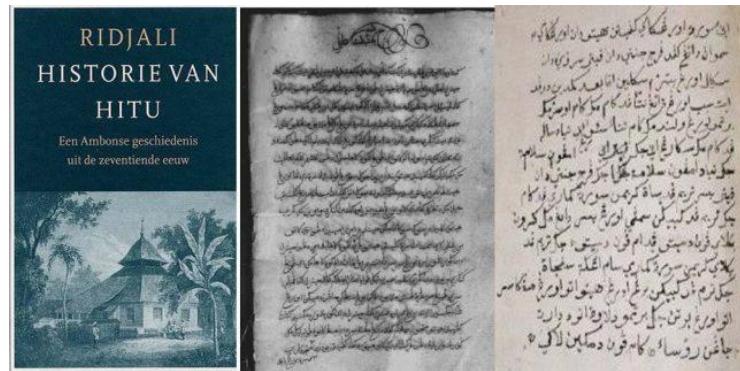


Figure 3. The Hikayat Hitu Manuscript, Maluku

One important piece of evidence of this literacy tradition is the Hikayat Hitu manuscript, a 17th/18th-century Arabic–Malay text originating from the Hitu region of Central Maluku. This manuscript illustrates how the Arabic script has long been adapted to write the Eastern Malay language, making the relationship between letters and sounds more transparent and accessible to the local community. The orthographic adaptation patterns found in the Hikayat Hitu share similar principles with the Pegen media used in this study, namely, providing phonological representations that are closer to the language of its speakers. Thus, the findings of this study not only reflect the technical effectiveness of Pegen media but also represent a continuation of the deeply rooted religious literacy practices within Maluku society. This condition helps explain why students more readily understand Arabic texts when using media that are historically and culturally connected to their local literacy traditions.

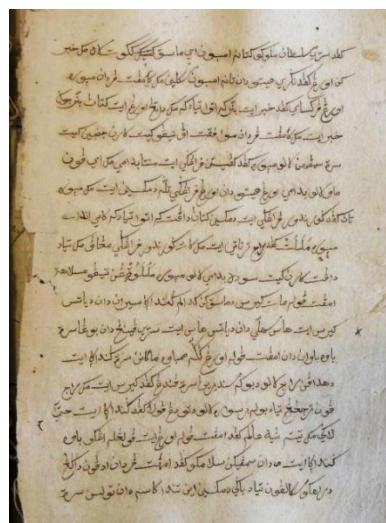


Figure 4. The Hikayat Hitu Manuscript, Maluku

As an example of the Islamic literacy tradition in Maluku, one of the lines from the Hikayat Hitu manuscript below shows the use of the Arabic–Malay script that adapts the phonology of Eastern Malay:

هڪا عن تانه هيڪو، دا فرملڪ ايٽ کامي موهون ڦ توهن يٽ مها کو اسه أغمبرنکن کمي دالم رهمت دان سلامت.

(A tale about the land of Hitu, in the beginning, we ask God the Almighty to grant us mercy and safety.)

This example shows how the Arabic script was modified for local needs, which in principle aligns phonologically with the use of Pegan media in this study.

دالم تاهون يٽ داهولو، ڦ ايٽ نيكري هيڪو، بانيق اور غ منقوٽ علم دن برموله کيسه ايني دري ڦوليس يٽ فرنه مخدبوٽ ڪينز.

(In the earlier years, in the land of Hitu, many people sought knowledge, and this story began from a writer who once conveyed the truth.)

This example shows how the Arabic script has long been modified to represent Eastern Malay sounds, thereby assisting local readers in the process of decoding letters and words. Such orthographic adaptation patterns are, in principle, phonologically consistent with the Pegan media used in this study, as both employ the Arabic script as a medium for transliterating local languages to facilitate the learning of religious texts.

Understanding this historical context is important because it demonstrates that the adaptation of the Arabic script for local phonological needs is not a new phenomenon, but part of a longstanding Islamic literacy tradition in Maluku. In other words, the use of Pegan in learning is not merely a modern pedagogical innovation, but reflects continuity with orthographic representation patterns already familiar to the local community. This historical and cultural closeness forms a strong foundation for explaining why Pegan media can be well received by students and produce positive effects in the learning process.

The findings of this study demonstrate that the use of the Pegan Arabic script has a significant positive impact on improving students' ability to read Arabic texts. This success can be explained through both cognitive and cultural dimensions. Cognitively, Pegan letters, which adapt the phonetic system of local languages such as Malay and Javanese, help students recognize the relationship between letters and sounds (grapheme-phoneme correspondence), thereby facilitating the decoding process in reading.[23]

From a cultural perspective, students feel a stronger emotional connection to the Pegan script because it carries historical value and reflects local Islamic identity. This enhances motivation and learning participation, as the use of culturally familiar linguistic symbols can strengthen students' engagement. [4]. These findings are also consistent with previous studies that affirm the role of local scripts, such as Pegan, in enriching students' Islamic literacy experiences. [24]

Although the findings indicate a high level of effectiveness, several limitations must be acknowledged. First, the relatively short duration of the study (six instructional sessions) restricts the ability to observe long-term retention. Second, the control group used only simple printed texts without additional visual support, which may have influenced their level of engagement. Furthermore, improvements in reading ability may also be affected by external factors such as students' interest in Arabic or prior experience with Arabic-script texts. Future research should control these factors more rigorously.

Pedagogically, the findings of this study indicate that the Pegan Arabic script can serve as an effective alternative medium for teaching Arabic reading skills in madrasah, particularly in regions with strong Islamic literacy traditions. The use of Pegan not only strengthens students' linguistic competence but also fosters cultural awareness and reinforces local Islamic identity.[25]

Future studies may broaden their focus to other language skills such as writing and speaking, or explore the use of Pegan-based digital media within online learning contexts. Cross-regional comparative studies (e.g., Java, Sulawesi, Maluku) would also be valuable for mapping variations in the effectiveness of Pegan across different sociolinguistic settings.

1. Integration of Reading Theories: Orthographic Depth Hypothesis & Dual Route Reading Model

The findings of this study strongly align with the Orthographic Depth Hypothesis (ODH), which posits that the degree of orthographic depth in a language determines the level of decoding difficulty for beginning readers. Arabic is categorized as a "deep" orthography because its grapheme-phoneme correspondences are not always consistent, particularly in unvowelled texts. When students are expected to read standard Arabic script directly, they are required to infer numerous phonological elements, thereby increasing cognitive load and slowing down the reading process.

The use of Pegan introduces a mechanism of orthographic shallow alignment, which renders the writing system significantly shallower. Pegan characters such as ڦ (nga), ڦ (ca), and ڦ (pa), which represent

local language phonemes, provide a more consistent and predictable phonological mapping. This enables students to decode text more quickly and automatically. These findings support Bishara's research, which demonstrates that shallow orthographies facilitate phonological awareness and enhance reading accuracy.[26]

In addition, the Dual Route Reading Model provides a strong theoretical foundation for the findings of this study. This model explains that readers utilize two pathways in processing text:

- a. the sublexical route, in which letters are gradually converted into sounds, and
- b. the lexical route, in which words are recognized directly as whole units.

Madrasah students at the lower secondary level (MTs) are generally still in the early stages of literacy and rely primarily on the sublexical route. Therefore, instructional tools that provide consistent letter–sound correspondences are crucial. PEGON offers a stable phonological pathway, preventing confusion when students convert Arabic graphemes into phonemes. This consistency accelerates the automatization of reading, in line with the role of the phonological route in early reading acquisition.[23] Thus, the improvement in reading ability observed in this study is not merely a result of media novelty but is deeply rooted in the cognitive principles outlined in contemporary reading theories.

2. Comparison with Previous Studies: PEGON, Lontara Makassar, and Jawi Malaysia

The findings of this study are consistent with a number of previous works highlighting the effectiveness of local scripts as transitional learning tools. First, the study by Jahuri and Fauji found that PEGON in Javanese Islamic manuscripts facilitates text comprehension because its structure closely aligns with the everyday phonetic patterns of learners [6]. According to their analysis, PEGON functions as an intermediate orthography that enables readers to gradually engage with classical Arabic texts before fully transitioning to the standard Arabic script.

Khoirotunnisa et al. also reported that PEGON-based instructional materials enhance students' writing and reading abilities because they provide a more intuitive representation of sounds.[12] This further reinforces the findings of the present study, indicating that familiar phonetic representations enable learners to master letter-decoding skills more rapidly.

The results of this research also align with studies on other local scripts in the Indonesian archipelago. For instance, Aziz's study on the Lontara script in Makassar shows that the use of local scripts in traditional education facilitates learners' understanding of the Bugis–Makassar language structure because its representation closely matches local phonological systems.[27] The use of Lontara as a literacy support medium demonstrates motivational and cognitive effects comparable to those of PEGON. The similarities between PEGON and Lontara lie in their shared functions as:

a. Phonological Scaffolding

Both writing systems provide an orthographic framework that aligns with local phonology: PEGON modifies Arabic letters to represent regional Nusantara phonemes not found in standard Arabic, while Lontara employs an abugida system that closely corresponds to the syllabic structure of the Bugis–Makassar language. As linguistic scaffolds, these scripts facilitate learners in connecting sounds (phonemes) with written symbols (graphemes) within the context of their own languages before transitioning to more abstract or foreign texts. Consequently, both scripts help reduce cognitive load when students learn new writing systems because they begin with structures that are phonologically familiar. For instance, studies on Lontara note that the script's phonetic characteristics directly relate to students' challenges in understanding traditional writing systems [28].

In orthographic studies, graphemes are generally divided into two main categories: graphemes oriented toward a phonetic system and graphemes oriented toward a phonemic system. Phonetically based graphemes are often referred to as phonetic spelling, because their written form attempts to represent speech sounds directly as articulated by speakers. In the Arabic orthographic tradition, this form of sound representation is known as *at-tahajji as-ṣawtī* (التهجي الصوتى), namely a type of writing that emphasizes correspondence between written symbols and their sound realization.[29]

b. Transitional Literacy Media

As transitional literacy media, PEGON and Lontara can function as bridges between culturally rooted traditional literacy and more "formal" or standardized literacy (e.g., Arabic literacy or national writing systems). Because students are already familiar with linguistic elements or scripts that are culturally close to them, they can use these media as initial steps toward more complex texts. This supports a gradual learning trajectory: from scripts perceived as "familiar" to those considered "foreign." Research on PEGON in pesantren

contexts demonstrates that its use plays a significant role in facilitating the translation of *kitab kuning* and improving students' access to religious texts [30].

c. Local Cultural Representation that Enhances Learning Motivation

Learning media that reflect students' local cultural identity significantly enhance motivation and engagement in the learning process. When students perceive the writing system they are learning as part of their cultural heritage rather than as a purely "foreign" or external script their sense of ownership and the perceived relevance of learning increases. This effect is evident in the context of traditional literacy systems such as Lontara, where the use of local-script-based learning media has been shown to strengthen student interest and participation [28].

At the international level, studies on the Jawi script in Malaysia also support these findings. Rosila's research indicates that using Jawi as an initial stage in Qur'anic instruction helps students acquire Arabic phonemes more quickly because Jawi provides an orthography closely aligned with Malay phonology. Their results show a significant increase in reading accuracy when Jawi is employed as a literacy bridge.[27]

By comparing these three contexts, Pegen, Lontara, and Jawi, a consistent pattern emerges: local scripts are proven effective as transitional literacy media due to their phonological stability and cultural familiarity. This study extends that understanding to the Maluku context, which has remained largely underexplored.

3. Cultural Interpretation: The Relevance of Pegen in the Context of Maluku and Kei

One of the key contributions of this study is its demonstration that the Pegen script operates not only at the cognitive level but also at the sociocultural level.[31]. Maluku, including the Kei and Seram regions, has a long history of Islamic literacy rooted in Arab Malay traditions, local manuscripts, and culturally embedded forms of *da'wah*.

Ulum et al. reveal that the Kei community integrates local language and cultural traditions into Islamic education as a means of fostering social harmony and religious identity. This indicates that local culture holds strong pedagogical potential when integrated into the classroom environment [11]. The use of Pegen in this study operates across three cultural layers:

a. Historical Layer

Although Pegen is not the dominant tradition in Maluku as it is in Java, the Arab–Malay literacy tradition has long been deeply rooted in eastern Indonesia. The use of Pegen can therefore be interpreted as an effort to revive a Nusantara variant of Islamic literacy.

Furthermore, historical records from various eastern Indonesian regions document the use of the Arab–Malay script in royal correspondence and religious manuscripts, indicating that Pegen represents a continuation of local Islamic literacy practices. This also demonstrates how the people of Maluku adopted elements of Islamic literacy while maintaining their linguistic identity. Such practices align with findings from manuscript studies in Eastern Indonesia, which emphasize the critical role of local scripts in the internalization of religious knowledge.[32].

b. Identity Layer

Students perceive the learning media as culturally familiar, which enhances their motivation in accordance with cultural literacy theory. When instructional materials align with students' cultural identities, the internalization of foreign-language concepts becomes more natural and does not generate psychological barriers. Culturally grounded approaches have been shown to strengthen students' sense of belonging, ultimately increasing their engagement and participation in the learning process. Studies on local-wisdom-based literacy in Maluku similarly emphasize that cultural proximity between learning media and students' sociocultural environment exerts a significant influence on academic motivation.[33]

c. Socio-Phonological Layer

The vowel-rich phonology of the Kei and Central Maluku languages aligns well with the phonetic representations provided by the Pegen script, making it an effective transitional medium. The diversity of vowel sounds in Maluku's local languages offers pedagogical advantages because Pegen provides more flexible graphemic representations compared to the standard Arabic script. This compatibility enables students to more easily understand sound–symbol correspondences, thereby making the decoding of Arabic text more

structured. These findings are consistent with phonological research on local languages in Eastern Indonesia, which highlights the influence of regional vowel systems on students' early literacy development.[34]

Moreover, culturally grounded education in Maluku's schools has long contributed to enhancing students' tolerance, discipline, and engagement. The use of Pegan is therefore not only linguistically relevant but also supports educational practices rooted in local culture. [35].

Thus, the improvement in reading ability observed in this study can be understood as an integrated outcome of cognitive, phonological, and cultural factors. Pegan functions not merely as a linguistic code but as a medium of identity that connects students to the historical tradition of Islamic literacy in the Nusantara.

4. Synthesis of Findings

Overall, the findings of this study provide strong evidence that three key factors drive the effectiveness of the Pegan script in teaching Arabic reading skills:

a. Phonological Transparency (Cognitive–Linguistic Factor)

Phonological transparency facilitates consistent letter decoding in accordance with the Orthographic Depth Hypothesis (ODH) and the Dual Route Reading Model. Phonological transparency refers to the degree to which a writing system (orthography) maintains consistent correspondences between graphemes (letters or written symbols) and phonemes (sounds). The higher the transparency, the easier it is for readers to apply letter-sound relationships when decoding unfamiliar words, as the rules tend to be predictable. Conversely, opaque orthographies contain numerous exceptions or ambiguities in grapheme phoneme mapping, requiring readers to rely more heavily on lexical recognition or alternative processing routes. [36].

The Orthographic Depth Hypothesis explains that "shallow" or highly transparent orthographies support direct phonological decoding, whereas "deep" or opaque orthographies require readers to depend more on lexical pathways or visual strategies. For instance, in transparent orthographies such as Italian or Finnish, beginning readers quickly develop automatic letter-to-sound conversion skills [37].

In other words, when phonological transparency is high, students can apply letter–sound rules more consistently and efficiently through the sublexical route, enabling the rapid decoding of unfamiliar or novel words. Conversely, when transparency is low, direct phonological decoding becomes more difficult, causing readers to rely more on memorized words or the lexical route, where words are recognized as whole units.

b. Representational Proximity (Pedagogical Factor)

This factor facilitates students' understanding of written symbols that feel familiar to them. Representational proximity refers to the degree of correspondence between new writing symbols and those already familiar within a learner's literacy experience. In the context of the Pegan Arabic script, students find it easier to understand the symbols because Pegan characters share visual similarities and representational patterns with the Latin letters they encounter daily. This visual and conceptual familiarity reduces initial cognitive load, allowing students to focus more effectively on decoding sounds and interpreting meaning in Arabic texts. Consequently, Pegan functions as a "representational bridge" that enables learners to transition gradually and confidently into the standard Arabic script [16].

c. Cultural Connectivity (Cultural–Identity Factor)

This factor enhances motivation, emotional resonance, and the meaningfulness of learning. Cultural connectivity refers to the extent to which instructional media are aligned with the identity, values, and cultural practices embedded within students' communities[38]. The Pegan script carries deep historical roots across many regions of the Indonesian archipelago, including Java, Sunda, and Maluku, as well as within local religious communities, thereby creating a sense of emotional familiarity and collective identity when used in instruction. [39].

When students perceive that their learning materials reflect their own cultural traditions, intrinsic motivation increases, as reading is no longer viewed merely as an academic task but also as an act of preserving cultural heritage. This emotional connection strengthens engagement, deepens students' attachment to the text, and enhances the meaningfulness of the learning process, resulting in more rapid and more meaningful development of reading skills.

Conclusions

This study has addressed the central question concerning the effectiveness of the Pegan Arabic script as an instructional medium for improving the Arabic reading skills of lower secondary students. The findings

indicate that the use of Pegan not only facilitates the decoding of letters and sounds but also enhances learning motivation through its cultural proximity and connection to local Islamic identity. Accordingly, the study affirms that integrating local cultural elements into Arabic language instruction plays a crucial role in improving learning outcomes while reinforcing the contextual relevance of the learning process.

These findings hold significant implications for the future development of Arabic language pedagogy. The use of Pegan as an alternative learning medium is not only pedagogically relevant but also strategically important for revitalizing the Nusantara Islamic literacy tradition within modern classrooms. This demonstrates that educational innovation does not always require high-tech approaches; rather, it can emerge from the preservation and revitalization of culturally meaningful local literacy practices.

Educational institutions are encouraged to explore broader applications of Pegan, whether in reading instruction, writing activities, or other language skills. The development of digital versions of the Pegan script is also recommended so that it can be integrated into online learning platforms and interactive teaching materials. Furthermore, future research with a broader scope and longitudinal designs is needed to assess the long-term effects of Pegan on retention and transfer of language skills.

In conclusion, this study not only provides empirical evidence for the effectiveness of Pegan as a learning medium but also underscores the importance of preserving local cultural heritage as a foundation for educational innovation. The integration of linguistics with the cultural wisdom of the Nusantara offers a strategic direction for developing Arabic language education that is more meaningful, sustainable, and firmly rooted in national identity.

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