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Exploring Learning Difficulties and Causal Factors in Javanese Scripts: Student and Teacher Perspectives in Indonesian High School

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ABSTRACT

Teaching Javanese script at the senior high school level still faces challenges from student limitations and pedagogical aspects. This study aims to explore the difficulties experienced by senior high school students in learning Javanese script and to identify the factors causing these difficulties from the perspectives of both students and teachers. This study employs a qualitative descriptive approach, with data collected through a questionnaire administered to 2.437 students and in-depth interviews with 14 Javanese language teachers. The data were analyzed through data condensation, data presentation, and drawing and verifying conclusions. The results of the study indicate that the main difficulties experienced by students include reading Javanese script sentences (72.9%), understanding Javanese vocabulary (71.3%), memorizing script forms (64.1%), identifying word divisions (59%), and distinguishing specific phonemes. The factors contributing to these difficulties include low literacy habits, minimal technology use, teaching methods unsuitable for the students' characteristics, limited learning resources, and inadequate learning feedback. This study offers novelty by formulating a contextual, technology-based learning strategy for the Javanese script that aligns with students' characteristics. Its contribution lies in enriching the field of local language education and providing new directions for the development of more adaptive educational policies.

ARTICLE INFORMATION

Keywords:
causal factors; exploratory study; high school students; javanese script; learning difficulties

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INTRODUCTION

Javanese is a local content-based subject taught from elementary to high school. According to Agustin and Insani (2024) and Maghfirotun and Robik (2021), Javanese language learning is directed at increasing Javanese language competence. Meanwhile, Kholiq et al. (2024) and Kurniawan et al. (2021) view that Javanese language learning aims to increase students' understanding of local wisdom and Javanese culture. In addition, learning the Javanese language is also expected to shape students' character (Maesyaroh & Insani, 2021; Sukowati & Subrata, 2022). In line with this, Fatmawati and Wiranti (2024) argue that learning the Javanese language serves to instill values of ethics and politeness. Thus, Javanese language learning not only teaches language skills but also encompasses culture, ethics, and local wisdom that are essential for student character development.

According to the Decree of the Head of the Central Java Provincial Education and Culture Office Number: 423.5/04678, Javanese language learning is implemented through several main subjects, like language, modern Javanese literature, classical Javanese literature, non-literary texts, and Javanese script. The language aspect focuses on material related to the principles of unggah-ungguh basa, a form of courtesy that pays attention to each dialect. Furthermore, modern Javanese literature materials focus on using *geguritan*, *cerkak*, movies, and so on to develop the character of *njawani*

among students. Classical Javanese literature employs various forms, including *piwulang* literature, chronicles, legends, and puppets, to strengthen identity. Besides that, the subject of non-literary texts focuses on increasing knowledge and skills to support needs through learning texts such as *pawarta*, *pariwara*, *sesorah*, and others. Finally, the subject of Javanese script is focused on efforts to maintain identity through learning Javanese *nglegena, pasangan, murda, swara, angka, rekan,* and so on. The subject reflects a comprehensive effort to instill Javanese character and strengthen students' identity through contextual integration of Javanese language, literature, and script elements.

The Javanese script is one of the primary materials for learning the Javanese language. Insani (2024) emphasizes that learning the Javanese script aims to improve reading and writing skills, identify errors in Javanese script writing encountered in the surrounding environment, and preserve the Javanese script as a form of world heritage. In line with this, Asrianti and Fauziah (2023) argue that learning Javanese script is an effort to preserve and care for Javanese culture. In addition, Insani et al. (2022) also view that the Javanese script is rich in philosophical values relevant to shaping student character. Azhima and Ardianto (2025) and Susilo and Indira (2021) also argue that the philosophical meaning in Javanese script reflects the characteristics or perspective of Javanese society towards life. For example, a Javanese proverb that reads *Jawa iku dipengkal tetep urip ning yen dipangku mati,* which means that if a Javanese person gets into trouble, it is considered harmless, but it is more dangerous if they are pampered, favored, or exalted because they fall by their pride (Wibawa et al., 2023; Widayat, 2021). This philosophy highlights the significance of the Javanese script, which serves as a means of communication and reflects the values and local wisdom of the people. Thus, learning Javanese script not only functions to improve literacy but also reflects efforts to preserve culture and internalize philosophical values that shape student character.

In reality, the results of Javanese script learning in schools are still very far from expectations. Javanese script is considered a difficult material by most students (Febrianti & Insani, 2023; Ni'mah et al., 2023). Avianto and Prasida (2018) and Wijayanti et al. (2024) also note that the Javanese script is seen as outdated and irrelevant to modern life. Furthermore, the Javanese script learning methods currently in use tend to be monotonous and less interesting, failing to motivate students to learn optimally (Hartina et al., 2024; Ichsani & Hizbullah, 2024). This is exacerbated by the generally low learning achievements in the Javanese script. Muhammad et al. (2024) report that the average learning achievement of the Javanese script among students is 50.04, with a learning completion rate of 22.72%. Meanwhile, Absari and Surana (2024) show that student completion in Javanese script learning only reaches 3.22% with an average score of 58.7. Thus, it can be concluded that Javanese script learning in schools has not yet achieved the expected results.

An initial survey conducted randomly in various high schools and vocational schools in Central Java found that 76.7% of teachers stated that Javanese script was the most challenging subject for students to understand. Teachers admitted that many students still struggle to distinguish one character from another. For example, students may still struggle to distinguish all Javanese script forms, including *aksara rekan, aksara swara, aksara murda, sandhangan*, and *pasangan*. This condition prevents students from writing or reading Javanese script texts, even in short sentences. Meanwhile, learning outcomes records from Javanese language teachers at SMAN 1 Dukun, SMAN 1 Ngluwar, SMAN 1 Purwokerto, SMAN 1 Muntilan, SMAN 1 Cleper, and SMAN 9 Purworejo also indicate that the average student score on Javanese script material falls within a score range of 30 to 60. Learning outcomes records from teachers at SMAN 1 Ceper and SMAN 1 Ngluwar also indicate that only 1-2 students can memorize Javanese script forms. Thus, most students at various high schools/vocational schools in Central Java face difficulties understanding Javanese script, as reflected in their low ability to distinguish script forms and low learning outcomes scores.

Difficulties in learning Javanese script among high school students are a real and complex problem, as reflected in the findings of an initial survey in various high schools/vocational schools in the Central Java region. Learning difficulties generally refer to conditions in which students experience obstacles in understanding, processing, and mastering subject matter optimally (Amanda et al., 2024; Kartika & Arifudin, 2024). The low ability of students to identify letter forms, understand writing rules, and pronounce sounds accurately indicates that literacy competencies have not yet been maximally achieved (Ariani & Subrata, 2020; Febrianti & Insani, 2023). These difficulties affect students' learning outcomes and impact efforts to preserve culture, as reflected in the Javanese script. Various factors contribute to these difficulties, both internal and external, for the students. Internal factors include students' limited familiarity with the Javanese script, low interest and motivation to learn, and minimal exposure to the Javanese script in daily life. Meanwhile, external factors include limited access to adequate learning resources, a lack of variety in learning materials, and teaching methods that remain one-sided and lack innovation (Febriani & Insani, 2024; Kholiq et al., 2024). Both factors create a learning environment not conducive to comprehensive mastery of the script, exacerbating the challenges in achieving Javanese script literacy competencies at the high school level.

In addition, Javanese script, as part of the local curriculum, often receives insufficient attention in school learning practices (Cahyani & Subrata, 2022). The position of Javanese script as a subject based on local content makes it less prioritized by students (Asdarina et al., 2023; Wiratna, 2015). The low integration of Javanese script into daily life and the limited relevance of the material to the current context also affect students' interest in learning. However, mastery of Javanese script not only reflects literacy skills but also plays a crucial role in preserving local culture (Jannah et al., 2024; Pratiwi & Rofi'ah, 2024). Therefore, in-depth mapping of the problem is important to identify the difficulties experienced by students and the factors behind them comprehensively.

To fully understand the root causes of difficulties in learning the Javanese script, it is essential to consider two perspectives: students as subjects of learning and teachers as facilitators of learning. Research on the exploration of difficulties in learning the Javanese script and its causes among high school students is important, given the students' low ability to recognize, understand, and use the Javanese script appropriately. These learning difficulties hinder the achievement of Javanese literacy competencies and potentially erode the sustainability of local cultural heritage that should be preserved through education. By exploring the views of students and teachers, this research can provide a comprehensive picture of the obstacles faced in learning practice and the factors that influence them, thereby forming the basis for developing more contextual and effective learning strategies.

Previous research has explored difficulties in learning Javanese script and their causes among high school students. Ramadhansyah et al. (2022) investigated issues in Javanese language learning and alternative solutions. Kholiq et al. (2024) examined the challenges of learning the Javanese script and proposed alternative solutions. Fitriani and Insani (2024) examined the influence of a game-based learning model using Snakes and Ladders on the learning outcomes of Javanese script. Sukoyo et al. (2021) investigated the development of a Montessori-based model for learning the Javanese script. Previous studies have shown that no research has been conducted on exploring the difficulties high school students face in learning the Javanese script. Previous studies have discussed Javanese script learning from the perspectives of solutions, models, and media, but have not specifically explored the forms of learning difficulties experienced by high school students. Therefore, research is needed that focuses on identifying difficulties and their underlying causes in depth to gain a more comprehensive understanding of the root of the problem in the field.

Based on the above discussion, it is necessary to research the exploration of learning difficulties in the Javanese script and their causal factors among high school students. This study aims to explore

the difficulties high school students face in learning the Javanese script and identify the factors contributing to these difficulties from the perspectives of both students and teachers. The novelty of this study lies in its exploratory focus on the forms of difficulties students encounter when learning Javanese script and their causes, as perceived by both students and teachers at the high school level. This approach provides a deeper insight that previous studies have not explored extensively. Theoretically, this research contributes to enriching studies on regional language learning difficulties, particularly those related to the Javanese script, at the secondary education level. Practically, the results of this research can serve as a reference for teachers, schools, and policymakers in designing more engaging, practical, and contextually relevant learning strategies.

METHOD

This study uses a qualitative descriptive method. According to Sugiyono (2021), qualitative descriptive research emphasizes providing an in-depth and objective account of a phenomenon by generating data in the form of words or images rather than numerical figures. This method was chosen because the study will explore students' and teachers' experiences, views, and perceptions regarding the difficulties they encounter in learning the Javanese script.

The study was conducted from May to July 2024 on 2.437 students and 14 Javanese language teachers in 14 high schools in Central Java. School selection was conducted randomly using area sampling, dividing Central Java into five regions, while student selection was conducted through random sampling. The use of area sampling techniques ensures a more representative sample, given the vast and elongated geographical extent of Central Java Province. The number of students and the names of the high schools selected as research locations are presented in Table 1.

Table 1. Research Location

School Name	Number of Students
SMAN 1 Purwokerto	62
SMAN 1 Ceper	129
SMAN 12 Semarang	281
SMAN 2 Ungaran	216
SMAN 1 Dukun	92
SMAN 1 Ngluwar	23
SMAN 1 Kembang	350
SMAN 1 Jumapolo	350
SMAN 2 Slawi	184
SMAN 1 Comal	92
SMAN 1 Purbalingga	129
SMAN 1 Dempet	59
SMAN 1 Pulokulon	235
MAN 1 Kudus	235

The data collection techniques used include questionnaires and interviews. The questionnaires were distributed to students using Google Forms, and in-depth interviews were conducted with Javanese language teachers in person and via Zoom. The validation of the research instrument was conducted using content validity testing through expert judgment, involving three validators. The data collected, subjects, and research instruments are explained in Table 2.

Table 2. Data, Subject, and Research Instrument

Collected data	Research subject	Instrument
Difficulty learning Javanese script	2.437 students in 14 schools	Questionnaire
Causes of difficulties in learning the Javanese script	14 Javanese language teachers in 14 schools	Interview guide

Data from the questionnaires and interviews were then analyzed descriptively using NVivo 12 software. The data analysis technique used was developed by Miles et al. (2014), with the following steps: 1) data condensation, 2) data presentation, and 3) drawing and verifying conclusions. This technique enables researchers to analyze data systematically, allowing for a thorough, structured, and valid exploration of students' difficulties in learning the Javanese script and the factors contributing to them. Data validity was measured using source triangulation, where the diversity of perspectives between teachers and students on the subject of the problem can enhance data validity.

RESULTS AND DISCUSSION

Learning Javanese script often poses a unique challenge for students because it requires a deep understanding of its forms, rules, and usage. This difficulty becomes more apparent when students face classroom instruction that does not fully address their needs and characteristics. From the teachers' perspective, these difficulties can affect the continuity of the learning process. The teachers' perspective offers a broader understanding of the various factors contributing to students' difficulties in learning the Javanese script. The results of a questionnaire distributed to students show that most students experience difficulties in recognizing and memorizing the forms of Javanese script. This finding suggests a limited understanding of the fundamentals of script as a crucial component in reading and writing Javanese script. Students' ability to memorize the Javanese script is presented in Figure 1.

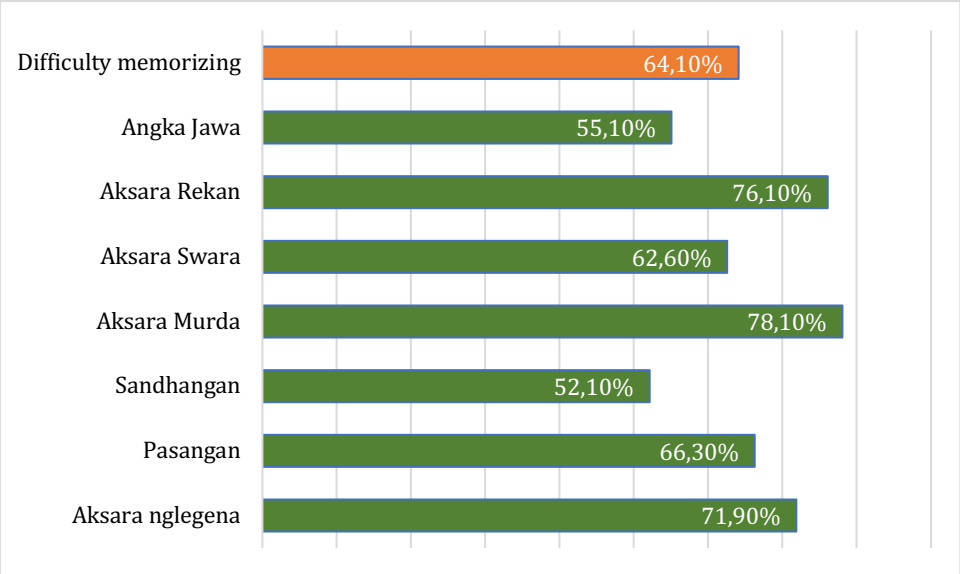


Figure 1. Students' Ability to Memorize Javanese Script and Types of Script that are Difficult to Memorize

Based on Figure 1, most students experience difficulties in memorizing the forms of the Javanese script. As many as 64.1% of students stated they could not remember the forms of Javanese script letters well. Meanwhile, only 35.9% of students reported that they could memorize the Javanese script well. This finding aligns with Praheto and Utomo (2020), who reported that many students

continue to struggle with memorizing and understanding the basic forms of the Javanese script, ultimately leading to difficulties in reading it. In line with these findings, Adyningsih et al. (2022) also stated that most students had difficulty memorizing the 20 basic forms of Javanese script. Fardani (2023) also found that 80% of students struggled to recognize the Javanese script well. They can recognize Javanese scripts well when arranged from ha to nga, but they find it difficult when the Javanese script is jumbled. These findings suggest that mastery of script forms is a significant obstacle to learning. This emphasizes the need for teaching strategies to strengthen students' memory and visual understanding of Javanese script forms.

The achievement of Javanese script learning competencies at the high school level essentially boils down to reading and writing paragraphs in Javanese script. However, to date, the majority of high school students still have difficulty memorizing the forms of Javanese script (Insani et al., 2021; Rinata et al., 2023). Teachers must revisit the basics of Javanese script when teaching Javanese script material at the high school level. This reinforces the assumption that the complexity of the Javanese script system is a primary barrier to learning. According to Sariyanti et al. (2024), the Javanese script consists not only of basic forms, or carakan characters, but also includes *pasangan*, *sandhangan*, *murda*, *rekan*, and punctuation marks, all of which have distinct visual forms and specific usage rules. Wardhana et al. (2022) also emphasize that the Javanese script system does not use spaces, further complicating learning for students. The diversity of forms and complexity demands that students' cognitive and visual abilities be able to recognize, distinguish, and remember the forms of the Javanese script accurately, which is not easily achieved in practice. Therefore, a learning strategy is needed to address the cognitive challenges and students' lack of basic mastery of the Javanese script.

More specifically, students acknowledge that several types of Javanese script are difficult to memorize due to their large number and the similarity in form between characters. These types of characters include *nglegena* as the basic form, *pasangan* used to end syllables, *sandhangan* as markers for additional vowels or consonants, *aksara murda* that function like capital letters, *aksara swara* for pure vowels, *aksara rekan* for borrowed sounds, and Javanese numbers as a number system. The complexity and variety of this system require a high level of memorization from students, which often poses a challenge in learning Javanese characters at the high school level.

Based on Figure 1, the type of Javanese script that is most difficult for students to memorize is the *aksara murda*, with a percentage of 78.1%, followed by the *aksara rekan* at 76.1%, and the *aksara nglegena* at 71.9%. Next, the *aksara pasangan* ranks fourth with a percentage of 66.3% of students, followed by the *aksara swara* at 62.6%. Meanwhile, the Javanese numerals (*angka Jawa*) are considered challenging to memorize by 55.1% of students, and the sandhangan script by 52.1% of students. This data shows that special characters such as *murda* and *rekan* pose a particular challenge for students because they are rarely used, making them unfamiliar and difficult to remember. This suggests the need for more contextual and repetitive learning strategies, enabling students to more easily recognize and remember the various forms of these characters comprehensively.

The findings show that students experience the most difficulty in memorizing *Aksara Murda* (78.1%) and *Aksara Rekan* (76.1%). In line with this, Farkani (2020) also revealed that many students have not yet mastered *Aksara Murda*, with 56.67% still struggling. Meanwhile, Febrianti and Insani (2023) also revealed that *Aksara Rekan* is a unique and distinctive script, making it challenging for students to memorize, let alone write and read it. Both types of scripts fall under the category of special scripts, whose usage in the writing system is still minimal. *Aksara murda* is capital letters, and *aksara rekan* represents sounds borrowed from foreign languages, such as Arabic (Kinanti & Sulistyowati, 2022). However, field observations show that students rarely use both scripts, as characters that should be written using *aksara murda* and *aksara rekan* are instead written using *aksara carakan.*

Students also face difficulties memorizing the *aksara nglegena* (71.9%) and *aksara pasangan* (66.3%), basic scripts frequently used in Javanese script writing. Similar to these findings, Febriana and Asfuri (2024) also show that the percentage of student mastery in learning the nglegena script reaches only 23.07%. Hakim and Yulianasari (2021) further indicate that students' mastery of Javanese script pairs needs improvement, as it currently reaches only a mastery rate of 47.36%. These findings indicate that although both types of scripts are frequently encountered, the complexity of the forms and the large number of nglegena characters and pairs make it difficult for students to remember them. According to the curriculum guidelines, students have been targeting the competency of reading and writing *nglegena* characters and *pasangan* for mastery since elementary school. However, the reality in the field shows that high school students still have not mastered these basic competencies, making it a recurring problem from previous levels.

Meanwhile, students also struggle to memorize *sandhangan* (52.1%), *aksara swara* (62.6%), and *angka Jawa* (55.1%), indicating that small yet important aspects of the Javanese script system remain obstacles if not taught in a meaningful way. Fardani (2023) also revealed in their findings that students' mastery of Javanese *sandhangan* is highly concerning, reaching only 16.67%. In line with these findings, Wardani et al. (2023) revealed that students' mastery of Javanese numbers is also very low, as evidenced by a completion rate of 13.34% and an average score of 57. These findings are supported by Rohmawati et al. (2020) and Ningrum (2023), who also report similar patterns of difficulty. Sometimes, students cannot recognize the rules and functions of Javanese numerals or vowel letters. This indicates that Javanese script learning has not yet fully developed a deep understanding among students.

The second difficulty experienced by students in learning Javanese script is their inability to read Javanese sentences fluently. This condition is a matter of concern because at the high school level, Javanese script learning is oriented toward the ability to read and understand Javanese sentences. However, in practice, many students still stumble when reading, have difficulty connecting letters, and often make mistakes in pronunciation. This difficulty is evident when students are presented with simple texts requiring continuous reading skills in words and sentences. They tend to be slow in recognizing letter sequences, stop in the middle of a sentence, or hesitate in continuing to read. Students' fluency in reading Javanese script is presented in Figure 2.

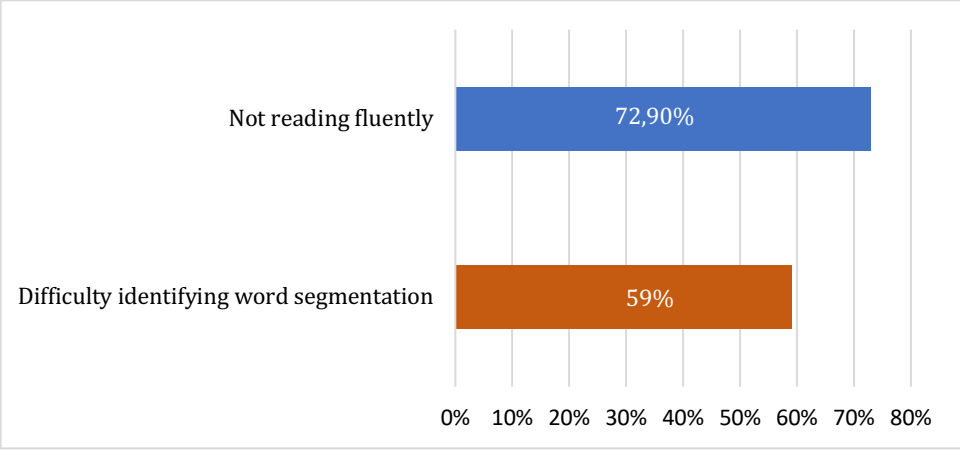


Figure 2. Students' Fluency in Reading Javanese Script and Ability to Identify Word Segmentation

Based on Figure 2, 72.9% of students stated that they were not fluent in reading Javanese script sentences. Only 27.1% of students felt they had good reading skills in Javanese script. This percentage

shows that most students experience significant obstacles in reading skills, which should be one of the primary learning outcomes of script learning at the high school level. In line with this, Fitriani et al. (2022) also revealed that most students still experience difficulties reading the Javanese script, as reflected in the low percentage of learning completion, which reached only 25%. Hidayati et al. (2019) also found that the level of Javanese script reading completion among students was still low, at only 30%.

Additionally, Lestari et al. (2024) also noted that students' ability to read the Javanese script remains at a very low level, with an achievement rate of only 37%. These findings indicate that high school students' ability to read the Javanese script is still far from meeting the curriculum expectations and signify the need for more meaningful and sustainable learning strategies. Thus, the low level of Javanese script reading ability reflects the failure to achieve optimal learning objectives at the high school level.

The survey results show that most students, 72.9%, admit to not being fluent in reading Javanese script sentences. This percentage indicates a significant obstacle to mastering reading skills, which is a crucial achievement in Javanese language learning at the high school level. This lack of fluency is evident in the way students still stumble when reading, often pausing when breaking down syllables, and being unsure when pronouncing the letter forms that make up words (Handayani et al., 2025; Nofiyanti et al., 2024). This condition suggests that reading skills are not only related to phonetic ability but also heavily dependent on the ability to recognize and recall letter forms quickly and accurately (Anwar & Sukoyo, 2025; Kholiq et al., 2024). During the reading process, students must immediately recognize the form of the letters, understand their sounds, and arrange them into a coherent and meaningful sequence. However, this requirement has not yet been optimally fulfilled.

Difficulties in reading Javanese script sentences cannot be separated from the fundamental difficulties that students first experience in memorizing the shapes of letters (Ma'rifah & Insani, 2025; Nasihah et al., 2025). Previously, it was revealed that most students experienced difficulties remembering and recognizing Javanese letter forms. When mastery of letter forms is still weak, the reading process becomes severely hindered because students must recognize each form slowly and often guess its shape. This slows reading fluency and causes students to lose focus on the sentence's meaning. Thus, the ability to memorize letter forms is a crucial prerequisite for developing reading skills, and weaknesses in this aspect directly impact the low reading fluency of students.

The third difficulty in learning Javanese script is identifying the correct word divisions, which is compounded by the continuous writing technique. In practice, the continuous writing of letters without spaces between words often makes it difficult for students to distinguish the boundaries between individual words. This difficulty becomes even more complex when students have not fully grasped the morphological structure of the Javanese language or are not accustomed to reading entire Javanese script texts. As a result, students often experience confusion when reading or writing sentences because they cannot determine the appropriate word division based on the contextual meaning. Students' ability to identify Javanese script word segmentation is presented in Figure 2.

Based on Figure 2, 59% of students struggle with identifying word segmentation in Javanese script texts. This percentage indicates that more than half of the students struggle to read Javanese script sentences, particularly concerning correct word segmentation. This is in line with Mahastama (2022), who reveals that most errors in reading Javanese script are caused by inaccuracies in syllable segmentation, with the frequency of errors tending to increase when the text being read is in sentence form. This suggests that students have not yet fully grasped the fundamental linguistic aspects of learning the Javanese script. Proper word segmentation is crucial for understanding the meaning of sentences, particularly in the Javanese script writing system, which differs from the Latin alphabet (Anggraeni et al., 2025; Kobepa et al., 2024). Therefore, these findings suggest that students' ability to

read and understand the structure of Javanese script sentences remains relatively low. This fact shows that Javanese script learning at the high school level has not yet fully succeeded in optimally developing students' basic literacy skills.

Another difficulty in learning Javanese script is students' limited understanding of Javanese vocabulary. This condition directly impacts their ability to read and write the Javanese script. Students are not only required to recognize the form of the script but also to understand the meaning and structure of words in readings or writings. Students who do not understand vocabulary will struggle to comprehend morphological aspects, such as prefixes, suffixes, and derived word forms, which are crucial rules in word formation and meaning. As a result, reading ability becomes merely reading symbols without understanding their meaning. Meanwhile, writing ability becomes inaccurate in terms of Javanese script writing rules. Students' understanding of the Javanese script is presented in Figure 3.

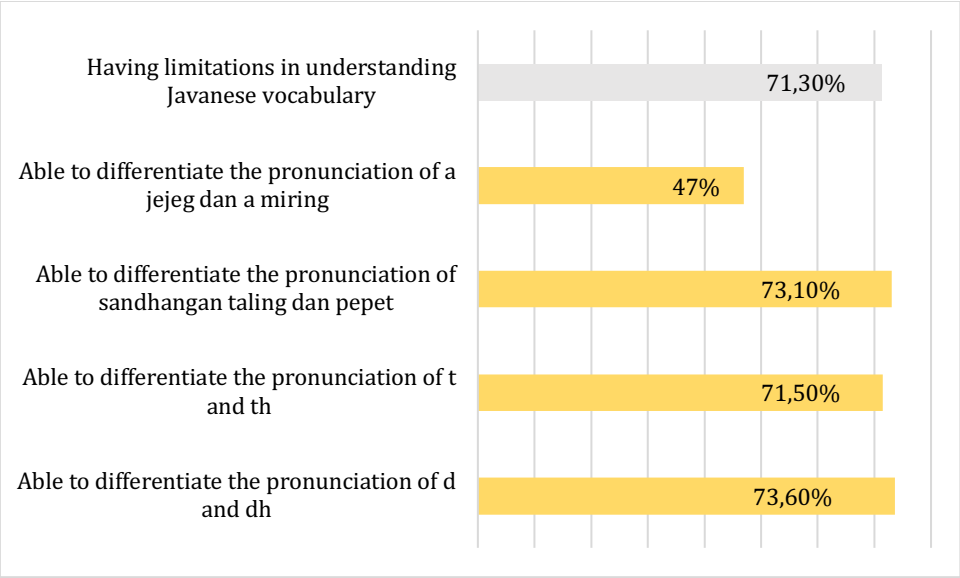


Figure 3. Students' Understanding of Javanese Vocabulary and Students' Ability to Distinguish the Pronunciation of Javanese Phonemes

Based on Figure 3, 71.3% of students have limitations in understanding Javanese vocabulary. This percentage indicates that most students encounter difficulties in understanding the meaning of words in Javanese, which is a crucial foundation for mastering the Javanese script. This finding aligns with the results of Kinasih et al. (2023). This shows that the average class score for mastering Javanese vocabulary only reached 42.5, reflecting students' low ability to understand Javanese vocabulary. Additionally, Kholiq et al. (2024) also found that students' mastery of Javanese vocabulary is still very low. These findings reflect the suboptimal achievement of basic competencies in understanding and interpreting Javanese texts at the high school level, both orally and in writing.

Students' limited mastery of Javanese vocabulary affects their reading and writing skills in the Javanese script, particularly when viewed from a morphological perspective. Students' limited understanding of word structures, such as prefixes, suffixes, and derivative forms, hinders their ability to recognize and comprehend the meaning of words as a whole (Hasanah & Sofa, 2025; Wulandari et al., 2024). This is crucial because the rules for writing Javanese script differ from the Latin alphabet system. Errors in understanding word forms and meanings can lead to mistakes in writing and reading Javanese script accurately. As a result, students may incorrectly divide syllables, pronounce sounds, and interpret the content of Javanese-script texts. Thus, mastering vocabulary is not only related to

understanding meaning but also is a crucial foundation for developing reading and writing skills in the Javanese script.

The fifth difficulty in learning the Javanese script is the students' inability to distinguish the pronunciation of several phonemes in the Javanese language. These phonemes include consonant pairs such as *d* and *dh*, *t* and *th*, and vowels *a jejeg* and *a miring*, including vowel sounds represented by *sandhangan* such as *taling* and *pepet*. The inability to distinguish these pronunciations hinders the understanding of language sounds, which is essential for accurately reading Javanese script. In the reading process, the inability to distinguish phonemes can lead to the misunderstanding of words. This phonological issue suggests that mastery of Javanese language sounds needs to be strengthened as part of learning the Javanese script.

Based on Figure 3, 73.6% of students can distinguish between the pronunciations of d and dh, while 71.5% of students can distinguish between the pronunciations of *t* and *th*. Additionally, 73.1% of students can distinguish between sandhangan taling and pepet pronunciation. However, only 47% of students can distinguish between the pronunciation of *a "jejeg" and a "miring"*. These findings align with Djokowidodo (2023), which indicates that some students still struggle to distinguish between the pronunciations of *d* and *dh*, as well as *t* and *th*. Meanwhile, Prasetyo and Jadmiko (2019) also found that students still make mistakes in pronouncing sandhangan taling and pepet. Additionally, Maruti (2023) also indicates that many students still make mistakes pronouncing *"jejeg" and "miring".*

The findings indicate that most students already have sufficient phonological ability to distinguish between some consonant and vowel sounds characteristic of the Javanese language. However, there are still significant weaknesses in distinguishing between *a jejeg* and *a miring*, with only 47% of students able to pronounce them correctly. This suggests that vowel sounds, which may seem simple, can pose a unique challenge for students. Errors in distinguishing between the vowels a jejeg and a miring can lead to misunderstandings of word meanings in Javanese texts, as these phonemes serve a meaning-distinguishing function (Pristyasiwi, 2018; Wiratsiwi & Sari, 2020). This weakness indicates the need for reinforcement in the phonological aspect, particularly more intensive training in vowel pronunciation, so that students can understand the meaning of words in their entirety.

The results of in-depth interviews with 14 Javanese language teachers at the high school level revealed various causes of students' difficulties in learning Javanese script. These findings are important for understanding the root causes of learning Javanese script at the high school level. Several crucial aspects, both internal and external, were identified from the perspective of teachers directly involved in the learning process. The following presentation systematically describes the findings, providing a basis for formulating more effective learning strategies.

The first cause of learning difficulties in Javanese script for high school students is the low level of habituation in reading and writing Javanese script. Habituation plays a crucial role in gradually and continuously building mastery of the form, structure, and writing rules of the script (Insani et al., 2024). When students rarely use Javanese characters in learning activities or outside the classroom, their ability to understand and apply Javanese script material is limited. The following presents the results of interviews with Javanese language teachers, who share their views on the low habituation of reading and writing Javanese characters among students.

> "*Ingkang sipatipun pakulinan utawi pembiasaan dereng nate. Piwucalan aksara Jawa ngantos samenika namung nengenaken transliterasi. Menika katindakaken namung rikala mlebet dhateng materi aksara Jawa.*"

"There has never been any habituation. Learning Javanese script until now has only been oriented towards transliteration. This is done only when entering Javanese script material." (Interview with Javanese language teacher A, May 23, 2024)

"*Menawi pembiasaan menika dereng nate nggih. Program kangge* pembiasaan *maos aksara Jawa tembe dipunrancang programipun*."
"If habituation has never been. The program for habituation of Javanese script reading has just been designed." (Interview with Javanese language teacher E, May 24, 2024)

"Pembiasaan ingkang sipatipun kados literasi belum nate dipucakaken. Literasi namung dipuntindakaken rikala mlebet dhateng materi kanthi cara nyawisaken waosan aksara Jawa."
"Habits that are literacy in nature have never been implemented. Literacy is done when entering the material by providing literacy materials in Javanese characters." (Interview with Javanese language teacher F, May 26, 2024)

Interviews with several Javanese language teachers revealed that Javanese script learning in schools has not been accompanied by systematic practice, especially in literacy activities such as regular reading and writing. Teacher A revealed that learning is limited to transliteration and only occurs when Javanese script material is taught without supporting activities outside of the learning process. Teacher E echoed this sentiment, stating that a program to practice reading Javanese script has never been implemented and is now being designed. Teacher F added that Javanese script literacy has not been incorporated into students' learning habits because it is only introduced when the material is taught through the provision of Javanese script reading materials. These findings align with Rohmawati et al. (2020), who stated that students typically use the Javanese script only when teaching it. Similarly, Jonathan and Wasito (2023) also revealed that Javanese scripts are not very popular among the younger generation today. Meanwhile, Walidah and Sukartono (2024) also note that the Javanese script has been taught in schools but is rarely used in daily communication. Thus, Javanese script literacy has not become part of students' learning habits because instruction tends to be limited, non-continuous, and lacks supporting activities outside the classroom.

The findings indicate that the low intensity of reading and writing among students is one of the effects of the lack of habit formation in Javanese script learning. The lack of regular reading activities with Javanese script texts makes it difficult for students to recognize the script's form and understand its meaning within the context of sentences (Handayani et al., 2025; Nasihah et al., 2025). For example, students rarely engage in literacy activities involving reading and writing Javanese script outside of Javanese script lessons. This situation directly impacts the emergence of various learning difficulties in Javanese script, particularly in the aspects of reading and writing Javanese script correctly. Additionally, their ability to apply Javanese script writing rules is weak due to a lack of practice. These difficulties not only affect students' learning outcomes in understanding and using the script correctly but also reduce their confidence when asked to read or write in Javanese script (Joeniarni & Mulyoto, 2022). Thus, the low intensity of reading and writing is not merely a consequence of a lack of practice but also the leading cause of the gap in Javanese script proficiency among students.

The second cause of difficulties in learning Javanese script among high school students is the limited utilization of technology in learning. In interviews, it was found that some teachers have not yet used technology-based media to teach the Javanese script. Meanwhile, others have begun to utilize technology in learning, but its use is still limited to instant messaging apps, such as WhatsApp Groups. This condition shows that technology has not been optimally utilized to support interactive mastery of the Javanese script. As a result, students lose the opportunity to access more interesting and helpful

digital-based materials. The following are the results of interviews with Javanese language teachers who provided their views on the lack of technology utilization in Javanese script learning.

> "*Kula namung ngginakaken buku amargi langkung nengenaken praktek*."
> "I only use books because they emphasize practice." (Interview with Javanese language teacher J, May 26, 2024)

> "*Namung ngginakaken teks saha buku teks*."
> "I only use texts and textbooks." (Interview with Javanese language teacher B, May 23, 2024)

> "*Supados pasinaon efektif kula ngginakaken papan tulis, WAG, saha buku cathetan."*
> "To make learning effective, I use a whiteboard, WAG, and a notebook." (Interview with Javanese language teacher G, May 26, 2024)

Interviews with several Javanese language teachers suggest that the use of technology in Javanese script learning remains minimal and has not become a significant element in teaching strategies. Teachers J and B stated that they only rely on textbooks and conventional practice exercises in the learning process. Meanwhile, Teacher G has begun to utilize technology but is still limited to simple media such as whiteboards, WhatsApp Groups (WAG), and notebooks. This aligns with the findings of Rinata et al. (2023), which revealed that most Javanese language teachers have not integrated technology into the learning of the Javanese script. Kartikasari and Rahmawati (2022) also argue that the use of technology in Javanese language learning, including the Javanese script, remains minimal, negatively impacting learning effectiveness. Thus, the use of technology in Javanese script learning remains very limited and cannot support the learning process optimally and sustainably.

The above findings confirm that the limited use of technology in Javanese script learning is one of the obstacles in creating an engaging and relevant learning experience for students. Technology should be an integral part of learning strategies in the digital era. Technology in learning enables the presentation of Javanese script material in a visual, interactive, and dynamic manner (Febrianti & Insani, 2023; Insani et al., 2021). Such an approach not only enhances the appeal of learning but also fosters students' enthusiasm and active engagement in the learning process (Anwar & Sukoyo, 2025; Mishra et al., 2023). Suppose Javanese script learning is not integrated with technology. In that case, students struggle to recognize and remember the complex forms of the script, understand the use of sandhangan and pairs, and apply them in sentence contexts. Conventionally delivered materials, such as textbooks or blackboards, often fail to meet the learning needs of Generation Z students, who are more responsive to visual and interactive media (Hardiana et al., 2023; Paramita et al., 2022). As a result, the learning process becomes less effective, and student motivation is reduced. Therefore, technology plays a crucial role in enhancing students' understanding and skills in mastering the Javanese script effectively.

The third cause of difficulties in learning Javanese script among high school students is the use of teaching methods and models that are not aligned with students' characteristics. Many teachers still employ conventional, one-way, teacher-centered approaches. This approach becomes less effective, especially for Generation Z students who prefer participatory, visual, and contextual learning methods. The mismatch between the learning approach and students' learning styles can hinder material comprehension, reduce learning interest, and make it difficult for students to internalize the forms and rules of Javanese script writing (Insani, 2024). The following presents the results of an interview with a Javanese language teacher who shared insights on using teaching methods and models that are not aligned with students' characteristics.

"Menawi model pamulangan aksara Jawa, kula ngginakaken model konvensional ingkang langkung nengenaken praktik."
"When it comes to teaching Javanese script, I use a conventional model that emphasizes practice." (Interview with Javanese language teacher J, May 26, 2024)

"Dereng kalampahan nyobi maneka warni model pamulangan. Kathah-kathahipun kula ngginakaken LKS, ngandharaken materi wonten ing papan tulis, lajeng share materi wonten ing WAG."
"I have not tried various teaching models yet. I often use worksheets, explain the material on the blackboard, and then share it on WAG." (Interview with Javanese language teacher C, May 23, 2024)

"Kula ngecakaken metode ceramah."
"I apply the lecture method." (Interview with Javanese language teacher E, May 24, 2024)

"Ngginakaken metode ceramah saha praktek."
"I use the lecture and practice methods." (Interview with Javanese language teacher C, May 23, 2024)

"Kula asring ngginakaken metode drill menawi mulang aksara Jawa"
"I often use the drill method when teaching Javanese script." (Interview with Javanese language teacher G, May 26, 2024)

Interviews with several Javanese language teachers revealed that the methods and models used to teach Javanese script are still conventional and lack variety. Teacher J said that he uses a conventional model that emphasizes practice. In contrast, Teachers E and C more often use lecture methods and utilize worksheets, whiteboards, and WhatsApp groups (WAG) as media for delivering material. Additionally, Teacher G mentioned that he often employs the drill method in his teaching. On the other hand, some teachers admitted that they have not tried various more participatory learning models. This reliance on traditional teacher-centered models and methods has resulted in low student engagement in the learning process. These findings are similar to those of Sukoyo et al. (2023), who state that most teachers still teach conventionally by explaining the material and giving assignments. In addition, Susilowati and Sukoyo (2025) also revealed that learning the Javanese script, including the script itself, is still one-way and does not involve students. Febriani and Insani (2024) also successfully revealed that most teachers still rely on conventional methods in teaching Javanese script. Thus, Javanese script learning is still dominated by conventional teacher-centered methods, hindering students' active participation in the learning process.

The above findings suggest that the methods and models of Javanese script learning employed thus far are still predominantly teacher-centered, relying on conventional approaches such as lectures, drills, worksheets, and blackboards. Such approaches tend to make the learning process rigid, monotonous, and uninteresting for students (Ma'rifah & Insani, 2025; Rahmawati et al., 2024). In today's era, teachers are expected to employ more engaging and enjoyable teaching methods and models (Khusna & Insani, 2025). This is important because today's students are predominantly from Generation Z, characterized by active, visual learners who are quick to respond and more interested in participatory and contextual learning. The use of varied methods can create a more engaging learning atmosphere and motivate students to actively engage (Kholiq et al., 2024; Zahra & Insani,

2025). When learning relies solely on the same model continuously, students often become bored and lose interest in the subject. Therefore, diversity in learning methods and models is crucial in creating an effective learning process that is relevant to today's students' characteristics.

The fourth cause of difficulties in learning Javanese script among high school students is the limited availability of Javanese script texts that students can access and understand independently. In learning, students are highly dependent on teachers' explanations and materials from textbooks. Meanwhile, Javanese script texts, which should be used as reading practice materials, are still scarce and difficult to access. The absence of such reading materials deprives students of sufficient opportunities to practice reading skills independently and continuously. However, the availability of diverse and easily accessible texts is crucial for supporting contextual understanding and mastery of the script. The following are the results of interviews with Javanese language teachers who provided their views on the limited availability of Javanese script texts that can be accessed and understood independently.

> "*Sumber sinau siswa kados teks-teks aksara Jawa taksih winates, minim sanget. Wonten ing perpustakaan dereng wonten."*
> "Learning resources for students, such as Javanese script texts, are very limited, extremely scarce. There are none in the library." (Interview with Javanese language teacher C, May 23, 2024)

> *"Winates sanget. Namung buku modul, buku paket, saha koleksi pribadhi."*
> "Very limited. Only module books, package books, and personal collections." (Interview with Javanese language teacher D, May 26, 2024)

> *"Minim sanget. Padatan pados teks ingkang temanipun pariwisata, lajeng dipunserat mawi aksara Jawa piyambak"*
> "Very limited. Usually, I look for articles on tourism and then write them using Javanese script." (Interview with Javanese language teacher G, May 26, 2024)

There are very few Javanese script reading texts in schools, and even the library does not have a relevant collection. Teacher D also emphasized that learning resources have only come from module books, package books, and teachers' collections, which are still very limited. Meanwhile, Teacher G explained that due to the lack of reading materials, teachers often have to search for articles on specific topics, such as tourism, and transcribe them into Javanese script to use as teaching materials. These limitations suggest that students lack sufficient access to engaging and diverse Javanese script reading materials. The existence of these texts is crucial in supporting reading skills, strengthening understanding, and fostering independent literacy habits. These findings align with those of Febrianti et al. (2018), who emphasized that the low learning achievement of students in Javanese script material was attributed to the limited learning resources available. Similarly, Aribowo (2018) also revealed that one of the problems in learning Javanese script is the lack of learning resources relevant to students. Thus, the limited availability of resources for learning the Javanese script can hinder the strengthening of students' literacy and understanding independently.

The foremost findings emphasize the importance of having access to learning resources in Javanese script texts that students can understand independently. The absence of adequate reading materials makes it difficult for students to practice their reading and comprehension skills in Javanese script outside of class hours. Ideal learning resources should not only be available in sufficient quantities but also be designed in an engaging, contextual, and generation-appropriate manner

(Fadillah et al., 2022; Fatmawati, 2025). Reading texts compiled with consideration of students' interests and needs, such as popular cultural topics, daily life, or local phenomena, in the Javanese script will make the learning process feel more relevant and meaningful. Thus, relevant and easily accessible Javanese script teaching materials are important for encouraging student independence and literacy.

The fifth cause of difficulties in learning the Javanese script among high school students is that there is insufficient and too little learning feedback for students. In Javanese script learning, learning feedback includes various stimuli that encourage students to engage actively, think critically, and interpret the material more deeply. When the Javanese script learning material provided is too monotonous, limited, or lacking in context, students tend to experience boredom and lose motivation to learn. The following are the results of interviews with Javanese language teachers who provided their views on the learning feedback that students receive, which they find to be too limited and not challenging enough.

> *"Kangge mangertosi katrampilan siswa kula ngginakaken metode drill, siswa majeng mbaka setunggal."*
> "To assess students' skills, I use the drill method, with students coming forward one by one." (Interview with Javanese language teacher D, May 26, 2024)

> *"Kula ngginakaken tes tulis, dereng nate ngecakaken ingkang sipatipun lisan."*
> "I use written tests; I have never used oral tests." (Interview with Javanese language teacher E, May 24, 2024)

> *"Dipunsukani soal praktek, majeng mbaka setunggal. Kajawi menika ugi ngginakaken soal pilihan ganda saha uraian. Saben siswa soalipun beda."*
> "They are given practical questions, one by one. In addition, multiple choice and essay questions are also used. Each student has different questions." (Interview with Javanese language teacher F, May 26, 2024)

Based on interviews with several Javanese language teachers, it can be identified that the learning feedback given to students in Javanese script learning is still limited and tends to be less challenging. Teacher D relies on a drill method with a system where students advance individually, focusing on repetition without any stimulus. Teacher E said that he only uses written tests and has never implemented oral evaluation, which means that students do not have the opportunity to explore their understanding verbally. Meanwhile, Teacher F tries to vary the questions by combining multiple-choice and essay questions. These findings indicate that the learning feedback provided is not yet fully capable of encouraging active participation, creativity, or deep conceptual understanding among students. These findings align with Setianingrum's (2021) findings, who argues that Javanese language teachers often give assignments to students without delivering material and providing feedback. Meanwhile, Yunitasari (2024) also views that teachers more often give lectures and assignments without providing feedback to students. Thus, learning feedback that is not varied and lacks stimulation limits student participation and conceptual understanding in learning Javanese script.

The above findings further reinforce that the limited learning feedback in Javanese script learning is not only caused by monotonous evaluation methods but is also closely related to the limited time available to teachers. According to Muhammad and Rochmiyati (2022) and Novitasari et al. (2023), Javanese language teachers stated that the limited allocation of learning time led them to

prefer practical approaches, such as drill methods or conventional written tests. This situation caused teachers to provide comprehensive feedback rarely, and they did not even have time to correct all of the students' work. As a result, students do not receive clarity on the correctness of their answers and do not understand the progress they have made in developing their skills. This lack of feedback impacts the low level of student activity in the learning process and limits opportunities for reflective error correction. Thus, time constraints, unvaried evaluation methods, and the lack of individual correction are interrelated factors that weaken the effectiveness of Javanese script learning at the high school level.

CONCLUSION

This study concludes that high school students face various difficulties in learning Javanese script, especially in memorizing the forms of the script (64.1%), which include *murda* (78.1%), *rekan* (76.1%), and *nglegena* (71.9%) characters, which are fundamental obstacles to reading and writing skills. Additionally, most students also struggle to read sentences written in Javanese script (72.9%), have difficulty identifying word divisions (59%), and have limitations in understanding Javanese vocabulary (71.3%), which impacts the accuracy of their reading and writing. Meanwhile, the majority of students still struggle to distinguish between a straight "a" (*a jejeg*) and a slanted "a" (*a miring*) (only 47% can do so), indicating weaknesses in phonological aspects. The difficulties in learning Javanese script among high school students are identified as being caused by five main factors: 1) low familiarity with reading and writing Javanese script; 2) limited use of technology in learning; 3) the use of teaching methods and models that are not suitable for the characteristics of the students; 4) limited access to relevant and interesting Javanese script learning materials, and; 5) limited challenging and meaningful learning feedback. These factors are interrelated and impact students' ability to recognize Javanese script forms, understand word structures, and apply writing rules accurately. As a result, learning the Javanese script becomes less effective, uninteresting, and unable to develop strong literacy skills in students. The findings of this study suggest that efforts to enhance Javanese script learning at the high school level should focus on developing approaches tailored to students' needs and characteristics. Javanese script learning needs to be designed contextually, make optimal use of technology, and be supported by continuous literacy habits and the availability of varied learning resources. In addition, challenging learning feedback is also necessary so that students are more actively engaged and can develop meaningful Javanese script literacy skills.

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