



Implementing the Experiential Learning Approach through the Accessible Bagong Smart Website for Javanese Script Learning among Visually Impaired Students

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Abstract

Javanese script instruction in inclusive education continues to face challenges, particularly for visually impaired students who primarily learn through braille transliteration without understanding the visual structure of Javanese characters. This condition creates a gap between symbolic mastery and conceptual understanding of the script. This study aimed to describe the implementation of the Experiential Learning approach through the accessible Bagong Smart website in teaching Javanese script literacy to six purposively selected visually impaired students representing elementary, junior high, and senior high school levels at a state special school in Semarang. The learning activities focused on the letters *ra* and *ha*, represented using the *Mbata Sarimbag* style. A qualitative descriptive case study design was employed. The learning implementation was conducted across three 60-minute sessions. Data were collected through classroom observations, semi-structured interviews, and documentation, and analyzed using the interactive model of data reduction, data display, and conclusion drawing. The findings indicate progressive changes in students' engagement, accuracy in following letter-stroke sequences, ability to construct Javanese script characters based on horizontal and vertical linear patterns, and learning independence throughout the three learning sessions. These findings suggest that implementing the Experiential Learning approach through the accessible Bagong Smart website supported the development of students' conceptual and kinesthetic understanding of Javanese script structures within the context of this qualitative case study. The study further indicates that accessible audio-guided learning integrated with kinesthetic activities has the potential to complement braille-based instruction and support regional-script literacy for visually impaired students in special education settings.

Keywords: Experiential learning; Bagong Smart; Javanese script; Visually impaired students; Inclusive education

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INTRODUCTION

Local wisdom-based literacy, such as Javanese script literacy, is an important part of inclusive education because it not only reflects cultural identity but also serves as a means of developing students' language skills and social participation (Hamidah et al., 2025). In this context, literacy is not limited to the ability to read and write Latin script, but also includes mastery of regional scripts that contain high historical and cultural values (Simanjuntak et al., 2025). However, Javanese script literacy still faces various challenges, especially in special education institutions such as Special Schools (SLB) that serve visually impaired students. These challenges are mainly related to the limited

availability of learning media that are not yet fully accessible for students with visual impairments (Nagara et al., 2024; Sudarma et al., 2024; Wibowo et al., 2025). Consequently, ensuring equitable access to Javanese script learning remains a major challenge for visually impaired students in special education settings.

Javanese script literacy learning for visually impaired students has not yet received optimal attention from the government. In fact, Law Number 8 of 2016 concerning Persons with Disabilities emphasizes that every child with special needs has the right to receive quality, inclusive, and accessible education according to their needs (Dhuha & Astutik, 2025; Nusaibah et al., 2025). Various studies also indicate that the limited availability of disability-friendly learning media, including accessible audio features, screen-reader-compatible navigation, and experience-based instructional media, remains a major challenge in supporting inclusive learning (Laksana, 2024; Sofiana et al., 2025). Although visually impaired students have learned Javanese script through braille transliteration, existing instructional practices primarily enable them to recognize symbolic braille codes without understanding the original graphemic and spatial structures of Javanese characters. Consequently, their learning remains limited to symbolic transcription rather than conceptual representation of the script. This distinction between symbolic mastery and graphemic understanding constitutes the central educational problem addressed in this study.

Preliminary observations at SLBN Semarang further confirmed this issue, showing that although visually impaired students were able to read Javanese script through braille, they did not recognize the original forms of the characters as commonly used in written texts. Previous studies similarly reported that braille-based Javanese script instruction enables students to identify braille codes but provides limited opportunities to develop conceptual understanding of the original character structures (Nagara et al., 2024; Nugraheni et al., 2025). Understanding the original structure of Javanese script is educationally important because literacy extends beyond symbolic decoding to include conceptual understanding of written language. Such understanding enables visually impaired learners to participate more meaningfully in regional-language learning, supports curriculum objectives concerning local script literacy, and strengthens cultural participation through authentic engagement with Javanese writing traditions. Therefore, learning approaches should facilitate not only symbolic recognition but also the development of conceptual graphemic representations through meaningful auditory and kinesthetic learning experiences (Winarto et al., 2024; Jannah & Shalihah, 2025; Wasi et al., 2025).

One learning approach considered relevant to address these challenges is the Experiential Learning approach, which emphasizes direct experience as the primary source of learning (Dharlina et al., 2025). According to Kolb, learning occurs through a continuous cycle consisting of concrete experience, reflective observation, abstract conceptualization, and active experimentation (Morris, 2019). Rather than relying on passive information transfer, this approach encourages learners to construct knowledge through meaningful experiences, reflection, concept formation, and repeated application. Previous studies have shown that experiential learning enhances students' engagement, conceptual understanding, and literacy development, including in inclusive educational settings (Fasa & Purwanti, 2023; Samudra et al., 2023; B. Setiawan & Insani, 2025; Kholifaturrohman & Insani, 2025). For visually impaired students, whose learning depends primarily on auditory and kinesthetic modalities, this approach is particularly relevant because it facilitates the development of conceptual representations through structured listening, guided movement, and reflective practice rather than visual observation alone. Therefore, experiential learning provides a strong pedagogical

foundation for helping visually impaired learners understand the structural organization of Javanese script through meaningful multisensory experiences.

The integration of the Experiential Learning approach with accessible digital technology provides opportunities to create more inclusive and meaningful learning experiences for visually impaired students. In particular, learning websites equipped with audio guidance, screen-reader-compatible navigation, and interactive learning activities enable students to explore learning materials independently while actively engaging in each stage of the experiential learning cycle (Cipto et al., 2022; Nugraheni et al., 2025). Compared with conventional digital media, websites offer greater accessibility and flexibility because they can be accessed across multiple devices without installation, support keyboard-based navigation integrated with screen readers, and allow continuous content updates (Syahindra et al., 2023; E. Susanti et al., 2025). Accessible web-based learning is particularly relevant for implementing the Experiential Learning approach because it enables structured auditory guidance, sequential interaction, and immediate learner responses through screen-reader-compatible navigation. These characteristics support visually impaired learners in constructing conceptual representations of Javanese script through active auditory and kinesthetic exploration rather than passive information reception, thereby providing an appropriate technological foundation for inclusive regional-script literacy learning (Nur'aisah et al., 2022; Riskyana et al., 2022; Fasa & Purwanti, 2023)

To address the instructional challenges described above, this study implemented the Bagong Smart website as an accessible learning medium that integrates the Experiential Learning approach with disability-friendly digital technology. Rather than functioning merely as a digital repository of instructional materials, Bagong Smart was specifically designed to facilitate the development of conceptual representations of Javanese script through structured auditory and kinesthetic experiences. The implementation focused on the letters *ra* and *ha*, represented using the linear *Mbata Sarimbag* style, whose horizontal and vertical stroke patterns can be systematically segmented into sequential audio instructions. The website combines four complementary instructional components: accessible navigation compatible with screen readers, segmented audio guidance, a stop-and-go instructional strategy, and linear *Mbata Sarimbag* representations of Javanese characters. These integrated features enable students to actively explore, reflect upon, conceptualize, and reconstruct the structural organization of each character in accordance with the stages of the Experiential Learning cycle. Consequently, Bagong Smart supports visually impaired learners not only in recognizing braille transliterations but also in developing conceptual graphemic representations of Javanese script as an authentic writing system, thereby bridging the gap between symbolic transcription and conceptual understanding.

Previous studies have consistently demonstrated that digital learning media contribute positively to improving students' learning motivation, engagement, and accessibility across various educational contexts (Arifin et al., 2024). In the context of Javanese script education, digital media such as Android-based multimedia and augmented reality applications have also been developed to facilitate students' understanding of Javanese characters (Hartiyani et al., 2023; Putri et al., 2023). However, these instructional media primarily target sighted learners and rely on visual interaction, providing limited support for the learning characteristics of visually impaired students. Meanwhile, studies involving visually impaired learners have mainly emphasized braille literacy as a means of reading and writing accessibility without addressing how students develop conceptual understanding of the original graphemic structures of Javanese script (Nugraheni et al., 2025). Consequently, empirical evidence remains limited regarding the integration of accessible website-based technology and the Experiential Learning

approach to facilitate conceptual representations of Javanese script through structured auditory and kinesthetic experiences for visually impaired learners. This unresolved issue constitutes the research gap addressed in the present study.

The novelty of this study lies in integrating four complementary instructional components into a single Experiential Learning framework for Javanese script literacy among visually impaired students: accessible website navigation compatible with screen readers, segmented audio guidance, a stop-and-go instructional strategy, and linear *Mbata Sarimbag* representations of Javanese characters. Unlike previous studies that primarily emphasized braille transliteration or the general use of digital media for Javanese script instruction, this study focuses on facilitating the development of conceptual graphemic representations through structured auditory and kinesthetic learning experiences. Scientifically, this study contributes to the development of an inclusive regional-script literacy model that integrates accessible digital technology, experiential learning principles, and the preservation of local cultural heritage within a coherent instructional framework.

Based on the foregoing discussion, this study aims to analyze the implementation of the Experiential Learning approach through the accessible Bagong Smart website in Javanese script literacy learning for visually impaired students at SLBN Semarang, using the letters *ra* and *ha* as case studies represented in the linear *Mbata Sarimbag* style. To achieve this objective, the study addresses the following research questions: (1) How is the Experiential Learning approach implemented through the accessible Bagong Smart website in Javanese script learning for visually impaired students? (2) How do visually impaired students experience each stage of the Experiential Learning cycle during the learning process? and (3) What developmental patterns emerge in students' engagement, stroke-sequence accuracy, letter construction, and learning independence throughout the implementation?

METHOD

Research Design

This study employed a bounded qualitative descriptive case study to examine the implementation of the Experiential Learning approach through the accessible Bagong Smart website in Javanese script learning for visually impaired students. The case was bounded by place (SLB Negeri Semarang, Indonesia), participants (six purposively selected visually impaired students), learning content (the Javanese script letters *ra* and *ha* represented using the linear *Mbata Sarimbag* style), technology (the accessible Bagong Smart website accessed using NVDA screen reader), and time (three instructional sessions, each lasting 60 minutes). This bounded design enabled an in-depth exploration of students' learning experiences within their natural educational context while maintaining the integrity of the case.

Participants

Participants were selected through purposive sampling based on information-rich case selection (Asrulla et al., 2023). Rather than aiming for statistical representation, participant selection focused on identifying students who could provide rich information regarding the implementation of the learning approach. The inclusion criteria were: (1) students had previously received Javanese script instruction through the braille system beginning in Grade 4 of elementary school, enabling them to possess prior symbolic knowledge of Javanese script; and (2) students were able to operate laptops and independently access websites using the NVDA screen reader. These criteria ensured that participants had sufficient braille literacy and digital competence to participate actively in the learning activities.

Based on these criteria, six visually impaired students participated in the study. The participants consisted of one senior high school student (Grade 11), three junior high school students (Grades 8 and 9), and two elementary school students (Grades 4 and 6). Three participants were categorized as totally blind, while the remaining three were classified as low vision. Despite these differences in visual functioning, all participants completed the same learning activities using identical instructional procedures and accessibility features to ensure consistency in the implementation of the learning intervention. Information regarding participants' age and gender is intentionally withheld to protect confidentiality. Although participants represented different educational levels and degrees of visual impairment, all students followed identical learning activities, received the same instructional procedures, and used the same accessible features of the Bagong Smart website. During the implementation, all participants used the researcher's laptop to ensure consistency in hardware, software configuration, and accessibility settings. In qualitative case study research, these participants were regarded as information-rich cases because they directly experienced the learning intervention and provided detailed descriptions of their learning experiences. The adequacy of participant selection was further supported by the consistency and depth of the data obtained throughout the three learning sessions, indicating sufficient information power for addressing the research questions (Malterud et al., 2016).

Ethical Considerations

Prior to the study, formal permission was obtained from the principal of SLB Negeri Semarang and the classroom teacher responsible for assisting the learning activities. Written informed consent was obtained from parents or legal guardians, and assent was obtained from all participating students before data collection commenced. Participants were informed about the purpose of the study, research procedures, voluntary participation, confidentiality, and their right to withdraw from the study at any time without academic consequences. To protect participants' privacy, all personal information was anonymized using participant codes (S1–S6). No identifiable photographs of students were included in the manuscript. Observation records, interview transcripts, and students' learning products were treated confidentially and used exclusively for research purposes.

Research Procedures

Before the learning implementation, preliminary classroom observations and semi-structured interviews were conducted to identify students' prior knowledge of Javanese script. The interviews explored students' previous learning experiences with braille-based Javanese script, their understanding of the original graphemic structures of Javanese characters, and their familiarity with digital learning technologies. The preliminary findings indicated that although all participants had learned Javanese script through braille transliteration since Grade 4 of elementary school, they primarily recognized symbolic braille codes without understanding the original graphemic structures of the letters, particularly the *ra* and *ha* characters represented in the *Mbata Sarimbag* style. These findings served as the basis for designing the subsequent learning activities.

The learning implementation was conducted over three instructional sessions, each lasting 60 minutes, outside the regular Javanese language class in a classroom at SLB Negeri Semarang with assistance from the classroom teacher. Throughout the implementation, the researcher acted as both facilitator and observer, while the classroom teacher assisted students when technical difficulties occurred and participated in member checking by reviewing observation records and interview summaries to confirm the accuracy of the researcher's interpretations.

Each instructional session followed Kolb's Experiential Learning cycle consisting of concrete experience, reflective observation, abstract conceptualization, and active experimentation (Morris, 2019). During the concrete experience stage, students explored the accessible Bagong Smart website using the NVDA screen reader and listened to segmented audio instructions describing the writing sequences of the *ra* and *ha* characters. During reflective observation, students discussed their learning experiences, identified difficulties in following stroke sequences, and reflected on the differences between braille transliteration and the original letter structures. During abstract conceptualization, students constructed conceptual understanding of the letters by identifying the horizontal and vertical segments presented through the Mbata Sarimbag representation using the stop-and-go audio guidance. Finally, during active experimentation, students independently reproduced the letters through repeated writing practice while receiving immediate feedback from both the website and the researcher.

Although the same experiential learning cycle was implemented in every session, the instructional emphasis gradually changed across the three meetings. The first meeting focused on familiarizing students with the accessible website, NVDA navigation, and segmented audio guidance. The second meeting emphasized strengthening students' understanding of stroke sequences through repeated stop-and-go practice and guided reflection. The third meeting focused on independent letter construction, allowing students to reproduce the *ra* and *ha* characters with reduced facilitator assistance while receiving confirmatory feedback.

This iterative learning cycle enabled students to progressively construct conceptual understanding of the graphemic structures of the *ra* and *ha* characters through repeated auditory, reflective, and kinesthetic experiences. The instructional content focused exclusively on these two letters because they represent different levels of structural complexity. The *Mbata Sarimbag* representation was selected because its linear horizontal and vertical structure allowed complex graphemic forms to be segmented into systematic stop-and-go auditory instructions compatible with the learning characteristics of visually impaired students.

Data Collection

Data were collected through classroom observations, semi-structured interviews, documentation, and researcher field notes to obtain complementary evidence regarding students' learning experiences throughout the implementation of the Bagong Smart website. Observations were conducted during each instructional session using structured observation sheets developed based on Kolb's experiential learning cycle (Morris, 2019). The observation instrument focused on four learning dimensions corresponding to the experiential learning stages, namely students' engagement during concrete experience, reflective responses during reflective observation, conceptual understanding of letter structures during abstract conceptualization, and independent application during active experimentation. These dimensions were operationalized into observable indicators including students' engagement in following segmented audio instructions, accuracy in following letter stroke sequences, ability to construct the *ra* and *ha* characters according to their original graphemic structures, and learning independence during writing practice. Throughout each session, the researcher also maintained field notes to record contextual events, unexpected learning behaviors, students' verbal responses, and technical issues that were not fully represented in the observation sheets.

Semi-structured interviews were conducted twice, namely before the learning implementation to identify students' prior knowledge and after the third instructional session to explore their learning experiences, perceived difficulties, and responses toward the accessible Bagong Smart website. The interview guide was developed according to

the objectives of the study and focused on students' experiences with braille-based Javanese script learning, conceptual understanding of letter structures, accessibility of the website, and perceptions of the stop-and-go auditory guidance.

Documentation consisted of students' writing products produced during the learning activities, researcher field notes, and learning records documenting the implementation process. These documents were used to complement observational and interview data by providing tangible evidence of students' developing ability to reproduce the *ra* and *ha* characters across the three instructional sessions. The credibility of the data collection instruments was strengthened through expert consultation with the accompanying classroom teacher before implementation to ensure that the observation indicators and interview questions were appropriate for the characteristics of visually impaired learners and aligned with the objectives of the study.

Data Analysis

Data were analyzed using the interactive analysis model of Miles and Huberman (1994), consisting of data reduction, data display, and conclusion drawing, with analysis conducted continuously throughout the study. During data reduction, observation records, interview transcripts, students' writing products, and researcher field notes were first organized and repeatedly reviewed. Meaningful units relevant to the implementation of experiential learning and students' learning experiences were identified through open coding. Similar codes were subsequently grouped into broader analytical categories representing students' engagement, stroke-sequence accuracy, letter construction, learning independence, and learning experiences. These analytical categories were subsequently interpreted deductively using Kolb's four experiential learning stages (Morris, 2019)—concrete experience, reflective observation, abstract conceptualization, and active experimentation—as the analytical framework for understanding students' learning experiences.

During data display, the categorized findings were organized into narrative descriptions and summary tables comparing students' developmental patterns across the three instructional sessions. This organization enabled the researcher to identify similarities, variations, and changes in students' engagement, stroke-sequence accuracy, letter construction, and learning independence throughout the implementation. Finally, during conclusion drawing and verification, findings from classroom observations, interviews, students' writing products, field notes, and teacher feedback were triangulated to establish consistent interpretations. Source triangulation was conducted by comparing information obtained from students and the accompanying classroom teacher, whereas method triangulation involved comparing findings from classroom observations, interviews, documentation, and researcher field notes. To further enhance the credibility of the findings, member checking was conducted by asking the classroom teacher to review the observation summaries and interview interpretations to confirm that the researcher's conclusions accurately reflected students' actual learning experiences.

RESULTS AND DISCUSSION

Results

Overall, the findings answered the three research questions by demonstrating how experiential learning was implemented through the Bagong Smart website, how students experienced each stage of Kolb's learning cycle (Morris, 2019), and what developmental patterns emerged across engagement, stroke-sequence accuracy, letter construction, and learning independence during the three instructional sessions. Rather than showing uniform progress, the observations indicated gradual development accompanied by individual differences in adaptation to website navigation, audio-guided instruction, and stroke-sequence mastery.

The case involved six visually impaired students who participated in three instructional sessions using the accessible Bagong Smart website. At the beginning of the study, all participants had previously learned Javanese script through braille transliteration but had not yet developed an understanding of the original graphemic structures of the *ra* and *ha* characters. During the three sessions, learning activities followed Kolb's experiential learning cycle comprising concrete experience, reflective observation, abstract conceptualization, and active experimentation (Morris, 2019). Students explored segmented audio instructions using the NVDA screen reader, reflected on their learning experiences, constructed understanding of the linear *Mbata Sarimbag* representations, and repeatedly reproduced the letters through stop-and-go writing activities.

The qualitative categories were assigned based on the overall consistency of evidence across the four data sources. "Not Yet Developed" indicated that most participants still required continuous guidance and were unable to demonstrate the indicator independently. "Developing" indicated emerging competence with occasional assistance, whereas "Achieved" indicated that most participants demonstrated the indicator independently despite minor individual variations.

Table 1. Observed Developmental Patterns Across Three Instructional Sessions

Indicators	Meeting 1	Meeting 2	Meeting 3
Engagement in following audio instructions	Developing (Low–Moderate): All participants engaged in the activities but still required repeated audio instructions.	Developing (Moderate): Participants became more focused and responsive during the learning activities.	Achieved (High): Most participants independently and actively followed the audio instructions with minimal repetition.
Accuracy in following letter stroke patterns	Not yet developed (Low): Most participants experienced difficulties following the correct stroke sequence.	Developing (Moderate): Four participants systematically followed the segmented stroke sequence, while two still required repeated guidance.	Achieved (High): All participants reproduced the basic stroke sequence, although variations in movement precision remained.
Ability to form letters according to the original structure	Not yet developed (Low): Participants were generally unable to reproduce the original letter structures.	Developing (Moderate): Participants began understanding the horizontal and vertical structural patterns.	Achieved (High): All participants reproduced the basic linear structures of the <i>ra</i> and <i>ha</i> letters based on the <i>Mbata Sarimbag</i> representation.
Learning independence	Not yet developed (Low): Participants depended heavily on facilitator guidance.	Developing (Moderate): Participants increasingly attempted writing activities independently.	Achieved (High): Participants completed most activities with substantially reduced facilitator assistance.

Table 1 showed that the categories were derived from qualitative observations across classroom observations, interview responses, students' writing products, and field

notes. "Not yet developed" indicates that most students required continuous guidance and had not yet demonstrated the expected skill independently. "Developing" indicates emerging performance demonstrated by several students with decreasing assistance. "Achieved" indicates that most or all students demonstrated the targeted performance with substantially greater independence. These categories represent aggregated qualitative judgments rather than numerical scores.

Table 1 indicates an overall developmental pattern observed across the three instructional sessions rather than numerical average scores. The categories represent aggregated qualitative judgments based on classroom observations, interview findings, students' writing products, and field notes. Overall, students demonstrated progressive development in engagement, stroke-sequence accuracy, letter construction, and learning independence, although individual differences in adaptation and learning pace remained evident throughout the implementation. These developmental patterns directly address the research questions by describing how students experienced the implementation of experiential learning and how learning behaviors changed across the three instructional sessions.

During the second instructional session, most indicators progressed to the developing category, reflecting students' increasing familiarity with both the learning activities and the accessible website. Four of the six participants were able to follow the segmented stroke sequences more systematically and began recalling the order of horizontal and vertical line segments with reduced facilitator support. In contrast, the remaining two participants still required repeated guidance, particularly when identifying the starting point and maintaining the correct movement sequence, although both demonstrated noticeable improvement compared with the first meeting. Greater independence also became evident, as several students attempted to complete the writing exercises before requesting additional assistance. These findings indicate that students progressed at different rates, with variations primarily related to adaptation to the website navigation and the stop-and-go audio instructions rather than differences in participation.

By the third meeting, all participants were able to reproduce the basic linear structures of the *ra* and *ha* letters following the segmented horizontal and vertical patterns of the *Mbata Sarimbag* representation. Accordingly, all learning indicators reached the achieved (high) category because all participants were able to reproduce the basic linear structures of both letters following the intended stroke sequence. Nevertheless, minor variations remained in movement precision, exploratory tactile movements, and the time required to complete the writing process. The linear structural patterns of the *ra* and *ha* letters used as learning references on the website are presented in Figures 1 and 2.



Figure 1. Linear Structural Pattern of the Letter *Ra* in *Mbata Sarimbag* Style

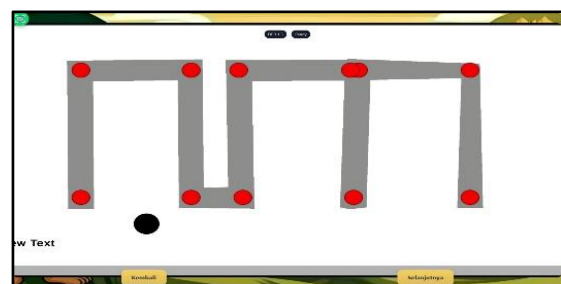


Figure 2. Linear Structural Pattern of the Letter *Ha* in *Mbata Sarimbag* Style

By the third instructional session, most participants were able to follow the stop-and-go audio instructions more systematically, although differences in adaptation time

and movement precision remained evident. Greater learning independence was also observed, as students increasingly attempted to complete writing activities with reduced facilitator assistance. Participants generally described the Bagong Smart website as accessible and engaging after an initial period of adjustment, particularly because they had not previously learned Javanese script through a website-based medium. Several students also reported that the segmented audio guidance helped them understand the original structures of Javanese letters, which they had previously known only through braille transliteration.

For example, one student (S1) stated, “It is more comfortable using this because there is audio, so I know where the sequence should go. Usually, I only use braille.” Another student (S2) expressed, “It is fun and different from usual. But at first, it was confusing because I had to listen first before moving.” Two other students (S3 and S4) also stated that the stop-and-go method helped them understand the parts of the letters gradually, although they often made mistakes in sequence during the first meeting. Meanwhile, other students (S5 and S6) stated that they needed time to adapt to the website navigation and to follow the audio instructions systematically. One student (S6) mentioned, “At first, it was rather difficult because I had never learned Javanese script using a laptop, but gradually I understood the patterns.” These interview excerpts illustrate variations in students’ learning experiences during the implementation. While several participants immediately appreciated the audio-guided interaction, others required additional time to adapt to the website navigation and the stop-and-go learning strategy. Overall, participants consistently reported that the segmented audio instructions supported their understanding of the writing sequence and the original structures of the Javanese letters, although they differed in the amount of time required to adapt to the website navigation and the stop-and-go learning procedures. Examples of students’ writing products produced during the third instructional session are presented in Figures 3 and 4 to illustrate how participants translated the segmented audio instructions into written letter forms.

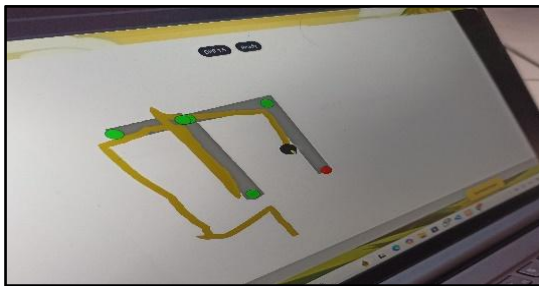


Figure 3. Student Writing Result of the Letter *Ra* in the Third Meeting



Figure 4. Student Writing Result of the Letter *Ha* in the Third Meeting

Figures 3 and 4 illustrate students' writing process while reproducing the *ra* and *ha* letters using the stop-and-go method with the *Mbata Sarimbag* representation. Several additional line markings can be observed before the main strokes begin. These markings should not be interpreted as writing errors or unsuccessful attempts to reproduce the letters. Instead, they represent intentional tactile orientation movements performed by the students to locate the appropriate starting point and establish movement direction before initiating the intended stroke sequence. Once the starting position had been identified, students continued constructing the letters by following the segmented horizontal and vertical patterns introduced during instruction. This exploratory behavior reflects an expected component of tactile learning among visually impaired learners as they translate auditory instructions into coordinated motor actions. Once the starting position had been established, participants generally continued reproducing the intended

horizontal and vertical stroke patterns as instructed. To further examine whether students had internalized the conceptual letter structures rather than merely copying guided patterns, they were subsequently asked to reproduce the letters independently on blank canvases without direct pattern guidance. The resulting independent writing samples are presented in Figures 5 and 6.



Figure 5. Students' Independent Writing Result of the Letter *Ra* on a Blank Canvas



Figure 6. Students' Independent Writing Result of the Letter *Ha* on a Blank Canvas

These independent reproductions demonstrated that participants attempted to reconstruct the learned letter patterns without relying on the previously provided visual templates or segmented guides.

Discussion

The findings of this study provide insight into how the implementation of the experiential learning approach through the accessible Bagong Smart website was associated with students' learning experiences while learning the Javanese script letters *ra* and *ha* represented in the *Mbata Sarimbag* style. Across the three instructional sessions, developmental patterns were observed in four interconnected aspects: students' engagement in following audio instructions, accuracy in reproducing stroke sequences, ability to construct the original letter structures, and learning independence. From the perspective of Kolb's experiential learning theory, these observed patterns suggest that learning was supported through the transformation of concrete experiences into increasingly organized conceptual understanding (Morris, 2019). In this study, concrete experience was not primarily derived from visual observation but from listening to segmented audio instructions, interacting with the accessible website through the NVDA screen reader, performing controlled tactile movements, and receiving immediate feedback during repeated writing activities. These multimodal learning experiences subsequently provided opportunities for reflection, conceptualization of letter structures, and repeated experimentation throughout the learning process (Cipto et al., 2022).

The first finding concerns the gradual development of students' engagement throughout the three instructional sessions. During the initial meeting, several participants required repeated audio instructions and additional time to become familiar with the website navigation and the stop-and-go learning procedures. As the sessions progressed, students became more actively involved in following the audio guidance and participating in the writing activities. From the perspective of Kolb's experiential learning cycle, this pattern may be interpreted as the result of repeated concrete experiences that enabled students to become increasingly familiar with the learning environment before engaging more confidently in subsequent stages of reflection, conceptualization, and experimentation (Morris, 2019; Dharlina et al., 2025). Rather than functioning solely as a content-delivery platform, the accessible Bagong Smart website provided opportunities for students to interact directly with segmented audio instructions, navigate learning materials independently using the NVDA screen reader, and immediately apply what

they had heard through writing activities. These repeated interactions appear to have encouraged greater participation over time. However, this observed increase in engagement should not be attributed exclusively to the experiential learning approach. It may also have been influenced by repeated practice, increasing familiarity with website navigation, facilitator feedback, and growing confidence in using the digital learning environment. Similar observations have been reported in previous studies of experiential learning and inclusive digital learning environments (Samudra et al., 2023; Pratiwi et al., 2025; B. Setiawan & Insani, 2025).

The second finding concerns the gradual improvement in students' accuracy in following the segmented stroke sequences of the *ra* and *ha* letters. Rather than occurring immediately, this development emerged progressively across the three instructional sessions as students repeatedly practiced the writing procedures and reflected on previous attempts. Within Kolb's experiential learning cycle, this pattern corresponds primarily to the stages of reflective observation and active experimentation (Morris, 2019). After completing each writing attempt, students reflected on the sequence they had followed, identified segments that required correction, and subsequently tested revised movement patterns during the next practice opportunity. The stop-and-go audio guidance provided by the Bagong Smart website appeared to support this iterative learning process by allowing students to pause, replay instructions, verify stroke sequences, and immediately apply the corrected movements. Consequently, improvements in stroke-sequence accuracy were observed gradually rather than instantaneously. Nevertheless, these observed developments should not be interpreted as resulting solely from the experiential learning approach. Repeated writing practice, facilitator feedback, increasing familiarity with the segmented audio instructions, and students' growing confidence in coordinating auditory information with motor actions may also have contributed to the observed learning progression. Similar learning processes have been discussed in previous studies of experiential learning, metacognitive regulation, and repeated practice in inclusive learning contexts (Laili & Nisak, 2022; Fadieny et al., 2023; T. Susanti et al., 2023).

The third finding shows that students gradually became able to construct the *ra* and *ha* letters according to their linear horizontal and vertical structures. This development is particularly meaningful because participants had previously learned Javanese script only through braille transliteration and therefore possessed symbolic knowledge without understanding the original graphemic structures of the letters. Rather than relying on visual perception, students gradually developed conceptual representations of the letter forms through listening to segmented audio instructions, performing controlled hand movements, interacting with the accessible website, and receiving immediate feedback during repeated writing activities. These experiences collectively constituted the concrete experience stage of Kolb's experiential learning cycle for visually impaired learners (Morris, 2019). As students repeatedly reflected on their writing attempts, identified incorrect stroke sequences, and reconstructed the horizontal and vertical patterns presented through the *Mbata Sarimbag* representation, they progressively developed abstract conceptualizations of the letter structures before applying this understanding during subsequent writing practice. These findings therefore illustrate how conceptual understanding emerged through the interaction of auditory, tactile, and kinesthetic experiences rather than through visual observation alone (Jannah & Shalihah, 2025). The present findings are consistent with previous studies showing that visually impaired students learn effectively through multisensory instruction, tactile literacy, audio-guided interfaces, and assistive technologies that transform visual information into accessible sensory experiences (Sofiana et al., 2025; Winarto et al., 2024; Prastika et al., 2025). Likewise, the linear characteristics of the *Mbata Sarimbag* representation enabled the complex structures of the *ra* and *ha* letters to be translated into

systematic verbal instructions that students could progressively internalize through repeated practice (Nagara et al., 2024). Rather than suggesting that the website alone produced these outcomes, the findings indicate that students' conceptual understanding was likely supported by the combined influence of accessible audio guidance, repeated tactile exploration, facilitator feedback, and their existing braille literacy.

The fourth finding concerns the gradual development of students' learning independence throughout the three instructional sessions. At the beginning of the implementation, participants still relied considerably on facilitator guidance to operate the accessible website, follow the segmented audio instructions, and complete the writing activities. As the learning cycle was repeated, students increasingly demonstrated confidence in navigating the website, interpreting the audio guidance, and completing writing tasks with substantially reduced assistance. From the perspective of Kolb's experiential learning theory, this development reflects the interaction between reflective observation and active experimentation, in which students evaluated previous attempts and applied improvements during subsequent writing practice (Morris, 2019). The observed increase in learning independence should not be interpreted as resulting solely from the experiential learning approach or the Bagong Smart website. Students' positive engagement with the learning activities may also have been influenced by the novelty of using an accessible website for Javanese script learning, as none of the participants had previously experienced website-based instruction. This novelty may have increased students' initial curiosity and motivation during the early stages of implementation before they gradually became more familiar with the learning environment. Rather, it was likely supported by several interacting factors, including repeated writing practice, immediate audio feedback, facilitator assistance, increasing familiarity with website navigation, and participants' prior braille literacy. Previous studies similarly suggest that accessible digital technologies can promote learner autonomy when combined with structured instructional guidance and assistive technologies (Cipto et al., 2022; Nur'aisah et al., 2022; Fasa & Purwanti, 2023; Simorangkir et al., 2023; Bela, 2024; Naim, 2025). Within this study, the Bagong Smart website functioned not only as a medium for delivering instructional content but also as an accessible learning environment that enabled students to practice independently while receiving continuous audio guidance and feedback.

Taken together, the four developmental patterns observed in this study suggest that the implementation of experiential learning provided a structured framework through which visually impaired students engaged simultaneously in cognitive, psychomotor, and affective learning processes. Rather than receiving information passively, students constructed understanding through listening to segmented audio instructions, performing controlled writing movements, interacting with the accessible website, reflecting on previous attempts, and applying immediate feedback during subsequent practice. These interconnected experiences illustrate how Kolb's experiential learning cycle operated as an integrated learning process rather than as four isolated instructional stages (Morris, 2019). Nevertheless, the developmental patterns identified in this study should be interpreted cautiously. Besides the experiential learning approach itself, students' progress was likely influenced by repeated practice, facilitator support, increasing familiarity with the accessible website, and prior braille literacy. Accordingly, the findings describe how these interacting instructional conditions supported learning within this particular case rather than demonstrating the independent effectiveness of the experiential learning approach.

An important finding of this study is that participants initially recognized Javanese script only through braille transliteration without understanding its original graphemic structures. This observation highlights a pedagogical gap in conventional

braille-based instruction, which primarily emphasizes symbolic equivalence rather than the structural organization of script forms (Hartiyani et al., 2023; Setiawan et al., 2023). The present findings suggest that conceptual understanding of Javanese script can be supported through accessible learning experiences combining segmented audio guidance, controlled tactile movement, and repeated interaction with accessible digital media (Dhuha & Astutik, 2025). From a theoretical perspective, these findings extend experiential learning theory within inclusive education by demonstrating that concrete experience for visually impaired learners does not necessarily depend on visual perception. Instead, meaningful learning experiences may emerge through listening, tactile exploration, controlled movement, digital interaction, and continuous feedback. Rather than replacing braille instruction, the Bagong Smart website functioned as a complementary learning medium that enabled students to connect symbolic braille knowledge with the structural characteristics of Javanese script (Laksana, 2024). Consequently, this study contributes to discussions on multisensory learning, assistive technology, accessible website design, and the preservation of regional scripts in inclusive educational settings (Hamidah et al., 2025).

This study has several limitations that should be considered. First, the number of participants was limited to six visually impaired students in one educational institution, so the findings cannot yet be generalized broadly. Second, the learning implementation was conducted in only three meetings, meaning that students' skill development was observed within a relatively short period and did not yet demonstrate long-term effects on retention or skill transfer. Moreover, because data collection concluded immediately after the third instructional session, this study could not determine whether the observed conceptual understanding and writing performance were retained over longer periods or transferred to other Javanese script characters. Third, this study employed a qualitative descriptive approach and therefore did not quantitatively measure skill improvement effectiveness through standardized measurement instruments. Fourth, this study may contain bias because the researcher acted as both facilitator and observer during the learning process, although reflective note-taking and confirmation of findings with the assisting teacher were conducted to minimize subjectivity. In addition, the learning design based on the *mbata sarimbag* style, which is linear and without curves, represents a pedagogical adaptation and may not fully represent the visual characteristics of conventional Javanese script. Furthermore, because the study focused on two linear Javanese script letters (*ra* and *ha*) represented using the *Mbata Sarimbag* style, the findings should not be generalized to more complex script forms or to long-term retention of writing skills. Therefore, future studies involving larger numbers of participants, quantitative experimental designs, and exploration of more complex script variations may provide more comprehensive insights and strengthen the validity of the findings.

CONCLUSION

This study described the implementation of the experiential learning approach through the accessible Bagong Smart website for learning the Javanese script letters *ra* and *ha* represented in the *Mbata Sarimbag* style among six visually impaired students at SLB Negeri Semarang. Across three instructional sessions, the learning process followed Kolb's experiential learning cycle consisting of concrete experience, reflective observation, abstract conceptualization, and active experimentation, which was implemented through segmented audio guidance, stop-and-go writing activities, reflection on writing attempts, and repeated independent practice.

The findings showed gradual developmental patterns across four interconnected aspects: students' engagement in following audio instructions, accuracy in reproducing stroke sequences, ability to construct the original letter structures, and learning

independence. Rather than demonstrating the effectiveness of the approach, these findings suggest that the integration of experiential learning with accessible digital media provided a supportive learning environment in which visually impaired students were able to develop a conceptual understanding of the linear structures of the *ra* and *ha* letters beyond their previous braille transliteration experience.

Because this qualitative case study involved only six participants and focused on two linear Javanese script letters within a short implementation period, the findings should not be interpreted as evidence of broad effectiveness or long-term retention. Nevertheless, the study illustrates the potential of combining experiential learning with accessible website-based instruction to support inclusive Javanese script learning. Future research involving larger participant groups, longer implementation periods, and more diverse script forms is needed to further examine the applicability of this instructional approach.

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DECLARATION OF USING AI TOOLS

During the preparation and revision of this manuscript, the author used ChatGPT (OpenAI) to assist with English translation, language editing, manuscript organization, and drafting responses to reviewers. All generated content was critically reviewed, revised, and verified by the author. The author accepts full responsibility for the final version of the manuscript.

RECOMMENDATION

Future studies are recommended to involve a broader range of visually impaired students and apply more varied research designs to obtain more comprehensive findings regarding the effectiveness of experiential learning through accessible digital media. Further research may also explore more complex forms of Javanese script beyond the *ra* and *ha* letters in the *Mbata Sarimbag* style. Several barriers were identified during the implementation process, including students' initial difficulty in adapting to website navigation and segmented audio instructions, differences in digital literacy skills, and the limited duration of the learning sessions. Therefore, future implementations should provide longer learning periods, more intensive practice, and improved accessibility features to better accommodate the diverse learning characteristics of visually impaired students.

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