

A Web-Based Historical Consciousness Assessment Framework Through North Sumatra Local History Writing for Students with Diverse Learning Needs

Wiene Surya Putra¹, Abdul Hamid², Sriadhi³

^{1, 2, 3}Faculty of Education, Universitas Negeri Medan, Indonesia

Email : wienesuryaputra@gmail.com, abdulhamidk@unimed.ac.id, sriadhi@unimed.ac.id

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ABSTRACT:

The development of historical consciousness is essential in fostering students' critical understanding of the past, present, and future relationships within society. However, conventional history assessments often fail to accommodate students with diverse learning needs, particularly in inclusive educational settings. This study aimed to develop a web-based historical consciousness assessment framework through North Sumatra local history writing activities designed to support accessible and inclusive learning. The study employed a Research and Development (R&D) approach involving needs analysis, framework design, expert validation, pilot testing, and revision stages. Participants included secondary school students with diverse learning needs, history teachers, special education experts, and educational technology specialists in North Sumatra. Data were collected through interviews, observation, questionnaires, validation sheets, and usability testing instruments. Quantitative data were analyzed using descriptive statistics, and qualitative data were analyzed using thematic analysis. The findings indicated that the developed framework was valid, accessible, and practical for assessing students' historical consciousness. The integration of local history writing activities enhanced student engagement, reflective thinking, and contextual understanding of historical events. Accessibility features such as adaptive navigation, multimodal content presentation, and flexible response formats supported inclusive participation among learners with varying abilities. The study concludes that the proposed web-based framework can serve as an effective assessment model for inclusive history education and advance digital assessment practices in special education contexts.

Keywords: Historical consciousness, web-based assessment, local history writing, inclusive education, special education.

1. Introduction

Contemporary history education increasingly emphasizes learners' capacity to relate past processes to present conditions and to frame

problems in a future-oriented way, rather than treating history as the reproduction of settled narratives. In this direction, history learning is commonly linked to the cultivation of historical

thinking skills, including connecting past events to the contemporary world and critically evaluating historical evidence, its credibility, and potential bias (Ofianto et al., 2024). Such an orientation implies that what is educationally valuable is not only students' retention of information but also their ability to interpret and justify historical accounts through reasoning with evidence in ways that are meaningful beyond the classroom (Ofianto et al., 2024). More broadly, this shift aligns with research in other domains arguing that higher-order competencies (e.g., critical thinking) are best assessed through authentic, performance-based tasks rather than through decontextualized item formats (ВЛАНОВА et al., 2022), particularly when competence is viewed as context-dependent and constructed in practice rather than as a fixed set of standardized behaviors (Anderson et al., 2024).

Despite these aims, assessment practices in many educational contexts remain dominated by formal, summative approaches that privilege subject-matter recall and standardized outputs. Evidence from teachers' reported practices indicates that as schooling moves into secondary levels, assessment tends to formalize and shift strongly toward summative assessment and goal-oriented measurement of subject knowledge, reducing the variety of evidence used to infer learning (Babinčáková et al., 2023). High-stakes standardized tests are also widely used for system monitoring and decision-making about progression and access, thereby increasing the stakes attached to test performance and shaping the meaning and consequences of assessment outcomes (Francis et al., 2024). In Indonesia specifically, national examinations have historically served as a national standard for evaluating primary and secondary education, reflecting the central role of standardized evaluation in quality assurance and educational control (Fitria & Baroroh, 2023). At the same time, there is a policy-relevant push toward assessments that incorporate higher-order thinking skills (HOTS), recognizing the limitations of purely factual or low-level testing in capturing intended learning outcomes (Fitria

& Baroroh, 2023). Together, these strands suggest a persistent gap between the intended aims of history education (interpretation, evidence use, and meaningful connection) and the dominant logics of conventional assessment (standardization, recall, and summative certification) (Babinčáková et al., 2023).

Inclusive education further intensifies this assessment challenge because equity cannot be reduced to "treating everyone the same" under a single assessment format. Conceptual work on equity in assessment distinguishes orientations of fairness (limiting bias), inclusion (ensuring all learners can participate meaningfully in assessment systems), and justice (interrogating how assessment structures reproduce advantage), arguing that inclusion requires assessment systems designed to include all learners rather than merely correcting partiality within unchanged structures (Anderson et al., 2024). This argument is particularly salient when competence is understood as context-dependent; under such a view, evidence of learning may need to be collected through multiple, situated opportunities that allow learners to demonstrate competence in diverse ways (Anderson et al., 2024). Moreover, where assessment carries high stakes, its consequences can extend beyond academic reporting. They can interact with learner experiences such as anxiety, which is known to be heightened in standardized and consequential testing environments (Francis et al., 2024). These perspectives collectively imply that assessment in history learning should be designed not only for psychometric comparability but also for broad accessibility, interpretive richness, and meaningful participation, especially for learners who may face barriers with a single dominant response mode (Anderson et al., 2024).

Digital technologies are frequently proposed as a pathway to more flexible assessment designs, including formats that can support performance evidence and iterative feedback. Empirical work in history education demonstrates that technology-mediated platforms (e.g., Padlet-based approaches) can be used to assess aspects

of historical thinking and to create more interactive environments for evidencing learning, reflecting how technology "revolutionized" interaction with information and opened possibilities for more dynamic assessment tasks in history classrooms (Ofianto et al., 2024). More generally, computer-based performance approaches have been developed to assess complex competencies (such as critical thinking) using authentic and realistic tasks, supporting the view that digital environments can host richer performance evidence than conventional paper-based tests (Vлахова et al., 2022). Studies of digital assessment media in school contexts also report positive motivational and engagement-related affordances; for instance, Wordwall is presented as a digital medium that can increase learner enthusiasm and interest when used for assessment activities (Muflikhah & Kamal, 2024). At the same time, research on competency assessment in other skill domains notes persistent limitations in the availability of widely accepted, validated assessment instruments, illustrated in computational thinking research, where there remains a recognized lack of broadly accepted tests and relatively fewer assessments for upper secondary students (Lavidas et al., 2023). This methodological caution is directly relevant to the assessment of historical consciousness and historical thinking: digital delivery alone does not solve the design problem, because validity, reliability, and interpretability still depend on coherent constructs and fit-for-purpose instruments (Lavidas et al., 2023).

Accordingly, the problem is not only technological but also conceptual and design-oriented: how to build an assessment framework that captures reflective, evidence-based historical interpretation while remaining accessible and inclusive for diverse learners. Recent work in secondary education shows that even when instruments exist to assess complex competencies (e.g., teamwork), their transfer across educational levels requires careful study of perceptions, appropriateness, and implementation conditions, underscoring that assessment instruments are rarely "plug-and-

play" across contexts (Vanhove et al., 2024)(Vanhove et al., 2024). In parallel, research on educator performance and assessment practice emphasizes that digitalization and changing societal demands are driving continuous transformation in what is assessed and how assessment systems are developed and validated across educational levels (Djidu et al., 2023). These arguments reinforce the need for principled assessment development, grounded in construct clarity, inclusive participation, and fit to the learning aims, rather than assuming that adopting a web platform automatically yields meaningful or equitable measurement (Anderson et al., 2024).

Within this landscape, a web-based assessment framework oriented toward historical consciousness can be motivated by two converging needs evidenced in the literature: (1) the need to assess historical learning as interpretive reasoning with evidence and connection to the present (as articulated in historical thinking skills research) (Ofianto et al., 2024), and (2) the need to expand equity in assessment beyond fairness toward inclusive systems that enable all learners to participate meaningfully (Anderson et al., 2024). Digital approaches provide a plausible infrastructure for performance-based tasks and flexible response formats, consistent with computer-based performance assessment logics (Vлахова et al., 2022) and technology-mediated assessment approaches already trialed in history education (Ofianto et al., 2024). However, the broader assessment literature cautions that robust instruments for complex constructs are often underdeveloped or unevenly validated, underscoring the importance of careful framework design and validation rather than relying on technology adoption alone (Lavidas et al., 2023). Therefore, there remains a clear research and development gap: designing and validating a web-based, inclusive assessment approach for historically oriented competencies that captures interpretive, reflective evidence of learning while supporting diverse learner participation, an area that is not resolved by existing work focusing either on digital tools for

assessment in isolation Muflikhah & Kamal (2024) or on historical thinking assessment without an explicit equity-and-inclusion assessment orientation (Ofianto et al., 2024; Anderson et al., 2024).

Therefore, this study seeks to develop a web-based historical consciousness assessment framework through North Sumatra local history writing activities for students with diverse learning needs. The framework is designed to provide accessible and inclusive assessment practices that support reflective historical learning. Specifically, this study aims to: (1) develop a web-based assessment framework for historical consciousness; (2) integrate North Sumatra local history writing into assessment activities; and (3) evaluate the accessibility and effectiveness of the framework for students with diverse learning needs. The findings of this study are expected to advance inclusive history education, digital assessment practices, and educational technology development in special education contexts.

2. Methodology

Research Design

The study used a Research and Development approach to create and validate a web-based, inclusive assessment framework, aligning with evidence that educational products and instruments are commonly developed through iterative criteria/design, expert review, pilot testing, and refinement processes (Hossen et al., 2023). Inclusivity requirements were operationalized using Universal Design for Learning (UDL) principles (multiple means of engagement/representation/action), which are frequently argued to reduce barriers by designing for learner variability rather than "fixing" students (Sims, 2024). Accessibility for students with diverse learning needs was additionally supported by literature emphasizing the role of assistive and information technologies in enabling access and participation for learners with disabilities (Ahmad et al., 2024).

Consistent with prior development studies that combine expert-panel content validation and

user-oriented evaluation (Montgomery & Walker, 2025), the framework was advanced through five stages: needs analysis, design, expert validation, pilot testing, and revision/finalization (Galof, 2025). Mixed quantitative–qualitative evidence was collected to judge validity and practical use (including usability/access considerations) (Rice et al., 2024).

Participants

Participants were recruited from inclusive secondary education settings and comprised students, teachers, and expert validators, a configuration consistent with educational product/instrument development studies that combine learner trials, practitioner input, and multi–subject-matter expert review to establish content relevance and usability (Erna et al., 2021). Expert involvement, in particular, reflects common validation practice in which frameworks/tools are reviewed by multiple specialists to assess content appropriateness before broader use (Fitria & Baroroh, 2023).

The pilot test involved 30 students with diverse learning needs in North Sumatra. The inclusion of learners with learning and attention/communication-related needs aligns with literature describing student groups such as those identified by teachers as having learning difficulties and those requiring communication supports (e.g., autism; hearing impairment) (Egbegi et al., 2021). Inclusion of students with mild physical/sensory access needs is consistent with research on mainstream/inclusive classrooms serving learners with visual or hearing impairments who may require assistive/IT supports (Mustafa et al., 2023).

Five history teachers contributed to needs analysis/implementation, consistent with development studies that incorporate teacher participants in evaluating educational materials ((Rizki et al., 2024). Six experts (history education, special education, and educational technology) conducted validation, reflecting multi-disciplinary expert panels used to assess content validity and practical adequacy (Steiss et

al., 2024). This research was conducted at three universities in North Sumatra, Indonesia. These universities were selected because they implement inclusive education policies and utilize digital learning technologies in classroom activities. The research environment provided an opportunity to test the implementation of accessible, web-based assessments in an authentic educational setting.

Instruments

The study employed multiple research instruments to collect both quantitative and qualitative data during the development and evaluation of the web-based historical

consciousness assessment framework. The instruments were designed to ensure comprehensive data collection regarding accessibility, usability, instructional quality, and student learning experiences in inclusive educational settings. Semi-structured interviews, observation sheets, validation questionnaires, student response questionnaires, and usability testing instruments were utilized throughout the needs analysis, validation, and pilot testing stages. These instruments enabled the researchers to obtain detailed information from teachers, experts, and students concerning the effectiveness and inclusivity of the developed framework (see Table 1).

Table 1. Research Instruments

No	Instrument	Respondents	Purpose	Indicators
1	Interview Guides	Teachers and Experts	To identify educational needs and assessment challenges	Current assessment challenges, inclusive learning practices, and expectations for digital assessment systems
2	Observation Sheets	Students and Teachers	To observe the pilot testing implementation	Student participation, accessibility barriers, student interaction with the platform, and teacher implementation practices
3	Validation Questionnaires	History experts, special education experts, and educational technology experts	To evaluate the validity and feasibility of the framework	Content relevance, accessibility, interface design, instructional quality, and practicality of implementation
4	Student Response Questionnaires	Students	To measure student perceptions of the platform	Learning motivation, ease of website use, accessibility perceptions, and satisfaction with learning activities
5	Usability Testing Instruments	Students and Teachers	To assess the technical usability of the web-based platform	Navigation efficiency, feature functionality, user interaction experiences, and technical accessibility

Development Procedure

The development of the web-based historical consciousness assessment framework was conducted systematically through several interconnected stages. The procedures were

designed to ensure that the framework addressed the educational needs of students with diverse learning needs while maintaining accessibility, instructional relevance, and technological usability. The development process included needs analysis, framework

design, expert validation, pilot testing, and revision and finalization. Each stage contributed to refining the framework and ensured

alignment with inclusive education principles and Universal Design for Learning (UDL) (see Figure 1).

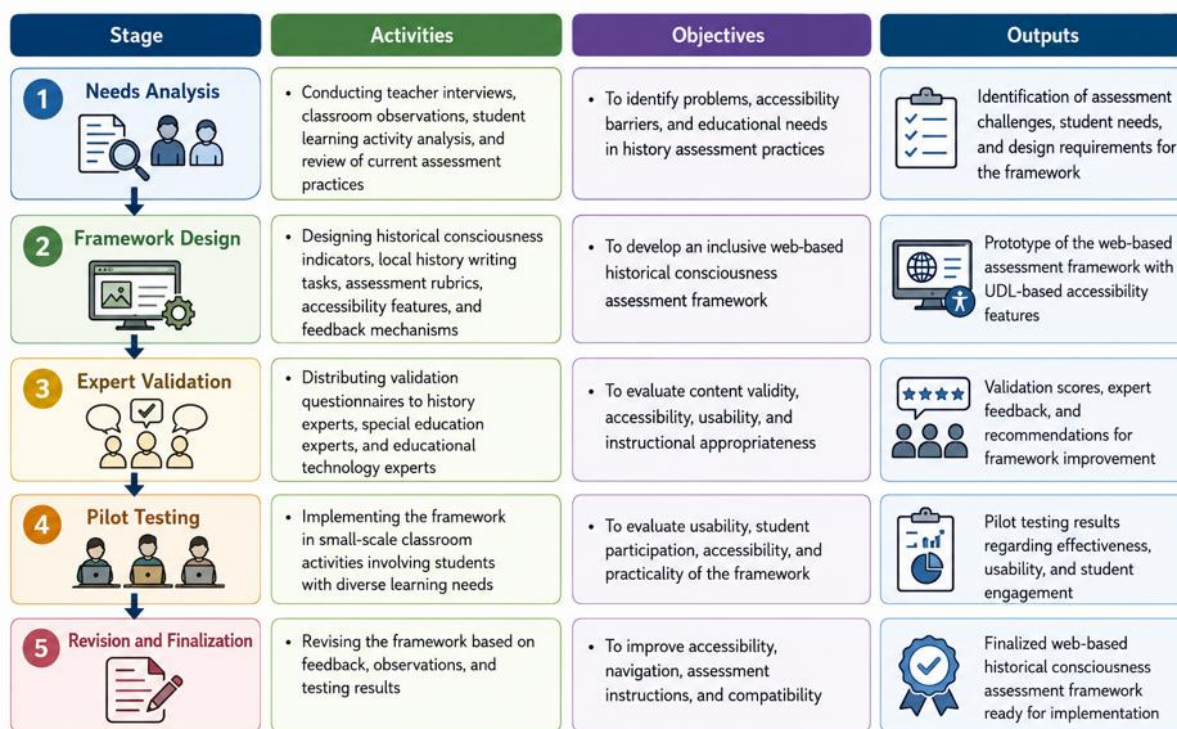


Figure 1. Development Procedures of the Framework

Data Analysis

Questionnaire and validation-sheet data were summarized using descriptive statistics (e.g., means and percentages) to provide an initial profile of responses and feasibility judgments, consistent with product-development studies that quantify validity/practicality/effectiveness indicators during R&D evaluation cycles (Zainil et al., 2023). Score interpretation was mapped into predetermined categories (e.g., low–medium–high or analogous validity levels), reflecting established practice of categorizing questionnaire-derived levels following statistical processing (e.g., SPSS-based categorization) (Subekti & Glory, 2022). Reliability evidence was computed as part of the instrument/framework evaluation, aligning with recommendations that pilot testing include reliability/psychometric evaluation and with examples of using quantitative indices to support content validity decisions (Griffith et al., 2023).

Interview, observation, and open-ended data were analyzed via thematic/content analysis, applying systematic stages of data reduction, organization/categorization, and interpretation, consistent with the Miles–Huberman-style qualitative workflow used in Indonesian R&D product trials and thematic content analysis approaches (Das et al., 2022; Ramdani et al., 2021). Themes emphasized accessibility and learner experience, consistent with mixed-method development studies that use qualitative feedback to refine interventions and strengthen validity (Montgomery & Walker, 2025; Zainil et al., 2023).

3. Results

Needs Analysis Findings

The needs analysis revealed several challenges in implementing history assessment practices in inclusive classrooms. Interviews with teachers indicated that conventional assessment methods focused primarily on factual memorization and written examinations, often failing to assess

students' reflective understanding and historical interpretation skills. Teachers also reported difficulties adapting assessment activities for students with diverse learning needs, due to limited instructional resources and limited assessment flexibility. Classroom observations showed that students varied in their levels of participation during history learning activities.

Some students demonstrated difficulties in reading lengthy historical texts, organizing written responses, and understanding abstract historical concepts. Students with attention and communication challenges required additional instructional support and alternative forms of assessment participation. The analysis further identified the need to see Figure 2.

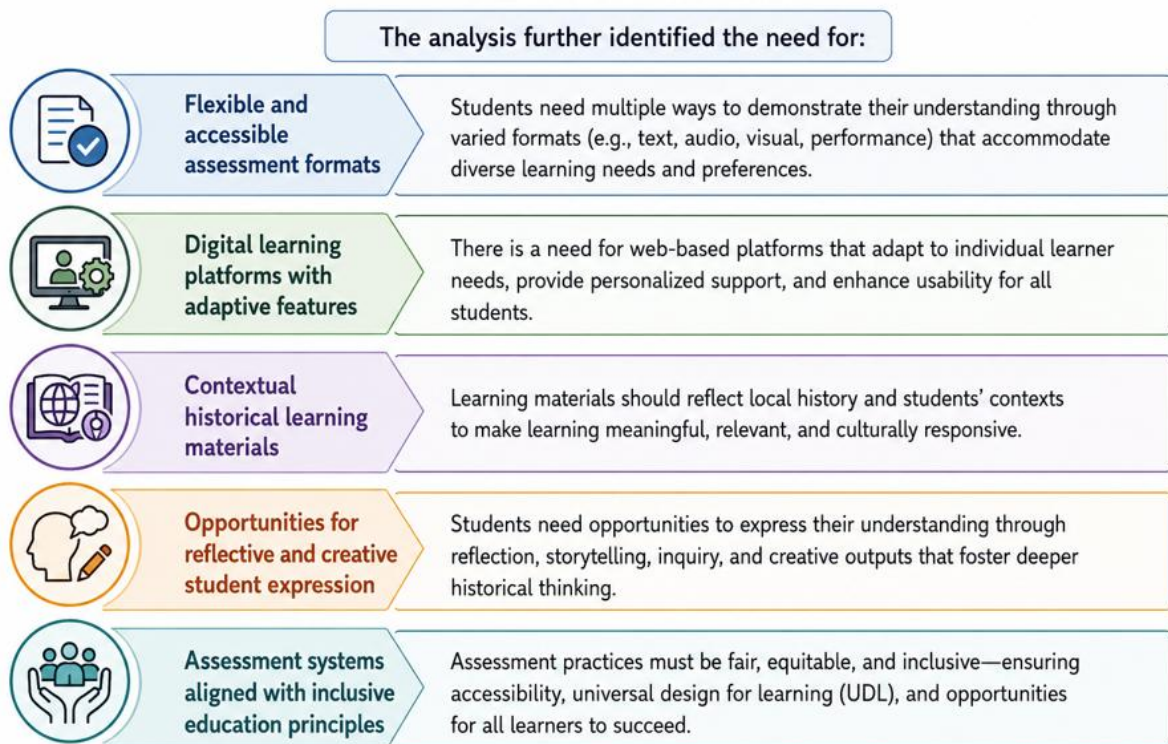


Figure 2. Identified Needs for an Inclusive Historical Consciousness Assessment Framework

Both teachers and students expressed positive attitudes toward integrating web-based learning technologies. Participants emphasized that local history materials related to North Sumatra were more engaging and meaningful because students could relate the historical narratives to their social and cultural environment.

Description of the Web-Based Framework

Based on the findings of the needs analysis, a web-based historical consciousness assessment framework was developed. The framework integrated local history writing activities with accessible digital assessment features designed for students with diverse learning needs. The framework consisted of several main components, as shown in Figure 3.

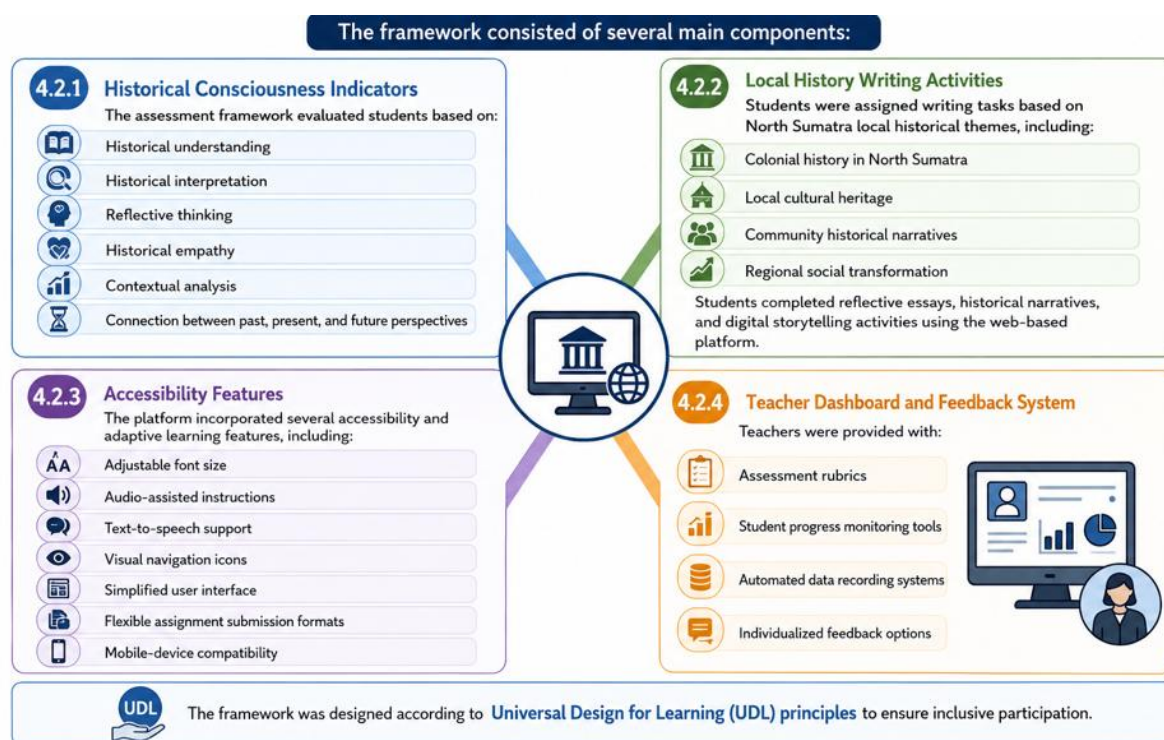


Figure 3. Main Components of The Web-Based Historical Consciousness Assessment Framework

The figure illustrates the main components of the web-based historical consciousness assessment framework developed for students with diverse learning needs. The framework integrates four interconnected components: historical consciousness indicators, local history writing activities, accessibility features, and teacher dashboard and feedback systems. Historical consciousness indicators focus on students' abilities in historical understanding, interpretation, reflective thinking, empathy, contextual analysis, and connecting past, present, and future perspectives.

The framework also incorporates local history writing activities in North Sumatra to encourage contextual and reflective learning experiences. Accessibility features such as adjustable text size, audio-assisted instructions, text-to-speech support, and flexible submission formats were designed to support inclusive participation for students with varying abilities. In addition, the teacher dashboard and feedback system facilitate

assessment management, student progress monitoring, automated data recording, and individualized feedback. Overall, the framework was developed based on Universal Design for Learning (UDL) principles to ensure accessibility, flexibility, and equitable learning opportunities in inclusive history education.

Validation Results

The developed web-based historical consciousness assessment framework was evaluated through an expert validation process involving history education, special education, and educational technology experts. The validation aimed to assess the framework's content relevance, accessibility, instructional appropriateness, usability, and technical functionality before pilot implementation. The expert evaluation process provided important feedback on the feasibility and inclusiveness of the framework for supporting students with diverse learning needs in history education contexts (see Table 2).

Table 2. Expert Validation Results of the Framework

Validation Aspect	Indicators Evaluated	Mean Score	Category	Suggestions
Content Validation	Relevance of historical consciousness indicators, appropriateness of local history materials, and reflective writing activities	4.72	Very Valid	Minor refinement of several historical writing instructions
Accessibility Validation	Inclusiveness of features, accessibility supports, flexible response options, and readability	4.65	Very Valid	Simplification of navigation and addition of visual supports
Technical Validation	Interface design, usability, navigation, system functionality, device compatibility	4.70	Very Valid	Improvement of loading efficiency on mobile devices
Instructional Quality	Clarity of instructions, learning engagement, and assessment practicality	4.68	Very Valid	Additional examples for student guidance
Overall Validation	Overall feasibility and implementation readiness	4.69	Very Valid	Suitable for pilot implementation after minor revisions

The validation results indicate that the developed framework achieved a "very valid" category across all evaluated aspects. History education experts confirmed that the framework appropriately represented the dimensions of historical consciousness and that the North Sumatra local history materials were contextually meaningful for reflective learning activities. Special education experts emphasized that the accessibility features effectively supported students with diverse learning needs, particularly through flexible response options and adaptive interface design. Meanwhile, educational technology experts found the platform user-friendly, functional across multiple devices, and supportive of learner engagement.

Although the framework was considered highly feasible for implementation, experts recommended several minor revisions, including simplifying navigation, adding more visual supports, and improving mobile device performance. Overall, the findings demonstrate

that the framework successfully integrates inclusive educational principles, contextualized historical learning, and accessible digital assessment features, making it suitable for pilot testing in inclusive secondary education settings.

Pilot Testing Results

The pilot testing phase was conducted to evaluate the practicality, accessibility, usability, and student engagement of the developed web-based historical consciousness assessment framework. The implementation involved 30 students with diverse learning needs and five history teachers from inclusive secondary schools in North Sumatra. During the pilot activities, students participated in local history writing tasks using the digital platform, while teachers and researchers observed classroom interactions and collected usability data. The pilot testing results provided important information on student participation, accessibility effectiveness, and teachers' perceptions of the framework. (see Table 3).

Table 3. Pilot Testing Results of the Framework

Aspect Evaluated	Findings	Percentage/Category	Interpretation
Student Participation	Students actively engaged in local history writing activities	88% (High)	The platform successfully encouraged active participation and learning engagement.
Student Motivation	Students showed enthusiasm toward local historical themes and digital activities	90% (Very High)	Contextual local history materials increased student interest and motivation.
Accessibility Features	Audio instructions, visual supports, and flexible submission tools supported participation	86% (High)	Accessibility features effectively accommodated diverse learning needs
Platform Usability	Students were able to navigate the system independently after orientation	84% (High)	The website interface was user-friendly and easy to operate
Teacher Assessment Management	Teachers found the framework practical for monitoring and evaluating students	89% (Very High)	The framework improved assessment efficiency and classroom management
Student Confidence in Expression	Students demonstrated greater confidence in expressing historical opinions	85% (High)	Flexible digital writing activities supported reflective expression
Technical Functionality	The platform functioned effectively across devices with minimal technical issues	87% (High)	The system demonstrated strong technical usability and compatibility

The pilot testing results demonstrate that the developed framework effectively supported inclusive history learning and assessment practices. Students showed increased participation and motivation during local history writing activities, particularly because the learning materials were closely aligned with their cultural and social environments. The integration of multimedia resources and flexible writing formats encouraged students to engage more actively in reflective historical learning. The accessibility features also played an important role in supporting students with

diverse learning needs. Audio instructions, visual learning supports, and flexible submission tools reduced barriers commonly experienced in conventional written assessments. Most students were able to operate the platform independently after brief orientation sessions, indicating that the interface design was accessible and user-friendly.

Teacher feedback further confirmed the practicality of the framework in inclusive classrooms. Teachers reported improved assessment management, easier monitoring of

student progress, and greater flexibility in implementing assessment activities. In addition, teachers observed that students became more confident in expressing their historical interpretations and in participating in contextual discussions about North Sumatra's local history. Although several students initially required assistance with login procedures and file uploads, these technical challenges gradually decreased through repeated use of the platform. Overall, the pilot testing findings indicate that the framework successfully integrated accessibility, contextual learning, and digital technology to create meaningful and inclusive history learning experiences.

Effectiveness of the Framework

The effectiveness of the web-based historical consciousness assessment framework was evaluated by comparing students' performance during initial and final assessment activities conducted throughout the pilot implementation phase. The evaluation focused on the development of students' historical consciousness competencies, including reflective understanding, historical interpretation, contextual analysis, and confidence in expressing historical perspectives. The findings demonstrated that integrating local history writing activities, accessibility-oriented digital features, and inclusive assessment principles positively influenced students' participation and learning outcomes in history education (see Table 4).

Table 4. Effectiveness of the Web-Based Historical Consciousness Assessment Framework

Historical Consciousness Competencies	Initial Score (%)	Final Score (%)	Improvement (%)	Category
Reflective Historical Understanding	68	86	18	High Improvement
Ability to Connect Past and Present Events	65	84	19	High Improvement
Historical Interpretation Skills	67	85	18	High Improvement
Confidence in Expressing Historical Perspectives	62	83	21	Very High Improvement
Engagement with Local Historical Issues	70	89	19	High Improvement
Awareness of Cultural and Community Identity	69	87	18	High Improvement
Participation of Students with Diverse Learning Needs	71	90	19	Very High Improvement
Overall Average	67.4	86.3	18.9	High Improvement

The results presented in Table 4 indicate that the developed framework effectively improved students' historical consciousness competencies across all assessed indicators. Significant improvements were observed in reflective

historical understanding, historical interpretation skills, and students' ability to connect historical events with contemporary social conditions. Students also demonstrated greater confidence in expressing historical opinions and

participating in reflective discussions during local history writing activities.

The findings further show that contextual local history themes increased student engagement and strengthened awareness of cultural and community identity. By relating historical learning materials to real-life experiences and local social environments, students became more actively involved in interpreting historical events and understanding their relevance to present-day society. The accessibility and flexibility of the web-based platform also contributed substantially to inclusive participation. Students with diverse learning needs were able to engage more equitably through adaptive features such as audio instructions, visual supports, and flexible response formats. The improved participation scores indicate that the framework successfully minimized learning barriers commonly encountered in conventional assessment systems.

Overall, the findings confirm that the web-based historical consciousness assessment framework was effective in supporting reflective, contextual, and inclusive history learning. The integration of digital technology, local history writing, and Universal Design for Learning (UDL) principles created meaningful educational experiences and supported equitable assessment practices in inclusive secondary education settings.

4. Discussion

The present study's finding, that reflective writing grounded in North Sumatra local history supported students' historical consciousness, can be interpreted through scholarship that positions writing not merely as the reproduction of information, but as a meaning-making activity embedded in social context and reflective cognition. Curriculum-level analyses of writing pedagogy in higher education indicate a shift from skill/genre-only conceptions toward holistic approaches that explicitly connect texts, writers' mental processes, and sociocultural-ideological context, implying that reflective

engagement is central to what writing instruction is for and does (Sukhera et al., 2024). Relatedly, research on feedback and writing pedagogy argues that writing development is strongly tied to meaning-making awareness (rather than form alone), reinforcing the plausibility that students' reflective written interpretation of local historical narratives can facilitate deeper understanding than memorization of facts (Kendall, 2023). Empirical and practice-oriented accounts of faculty pedagogies also document the deliberate use of reflective and free-writing practices as teaching strategies, supporting the instructional logic of using reflective writing tasks to elicit students' interpretation and self-positioning in relation to historical content (Zahoor & Khan, 2023). Taken together, these perspectives provide converging support for interpreting the study's results as consistent with the broader view that historically oriented understanding can be cultivated through interpretive, reflective writing processes situated in learners' contexts (Sukhera et al., 2024; Zahoor & Khan, 2023).

The study's observation that local historical themes increased students' interest and participation aligns with work in social studies education emphasizing the pedagogical importance, and sensitivity, of teaching local history in ways that are accurate, age-appropriate, and attentive to identity-linked concerns such as racism and community narratives. In reconsiderations of state/local history curricula (e.g., "Utah Studies"), educators explicitly report collaborative efforts to gather resources on local history while re-examining pedagogy in relation to anti-racist education, illustrating how local-history content can become an immediate site for engagement and critical discussion rather than distant factual recall (Yu et al., 2022). In parallel, research in Indigenous education highlights how building learning philosophies around local Indigenous knowledge systems (e.g., *mātauranga Māori*) supports students' day-to-day learning and success in ways that extend beyond traditional literacy/numeracy measures, underscoring the general principle that culturally proximate

content can strengthen learner connection and participation (Zhang, 2023). Additionally, evidence from Indonesian vocational schools indicates that when writing instruction is implemented through multimodal pedagogies, students tend to participate more actively and with greater motivation than in single-mode lessons, suggesting a complementary pathway by which locally meaningful content plus expressive flexibility can amplify engagement (Nazari et al., 2025). Collectively, these works support interpreting the present study's engagement outcomes as consistent with research linking locally grounded/culturally responsive themes and expressive pedagogies to increased participation and motivational investment (Yu et al., 2022; Zhang, 2023; Nazari et al., 2025).

The study's claim that writing activities supported students' historical thinking (e.g., organizing information, interpreting evidence, articulating reflective viewpoints) is consistent with research that conceptualizes writing as an integrated activity in which textual production, cognitive processes, and social context interact. The documented curricular movement toward holistic writing pedagogy explicitly frames writing as simultaneously involving the written product, mental processes, and the sociocultural-political context of the writing event, which coheres with the idea that writing tasks can prompt students to structure information and adopt stances while situating claims within contextual meaning (Sukhera et al., 2024). In applied linguistics research, meaning-making perspectives similarly emphasize that writing development depends on teachers' and learners' awareness of writing as the construction of meaning (not only correct language), reinforcing the pedagogical rationale for asking learners to interpret source material and communicate evaluative viewpoints (Kendall, 2023). Moreover, reflective/free-writing practices are described as part of teaching repertoires in higher education, lending additional support for the plausibility that writing tasks can be designed to foreground interpretation and reflection as central learning outcomes (Zahoor & Khan, 2023). While these

sources do not investigate "historical thinking" per se, they provide consistent cross-field evidence that writing pedagogy can be structured to elicit the organization, interpretation, and reflective articulation reported in the present study in a history-learning setting (Sukhera et al., 2024; Zahoor & Khan, 2023).

The study's finding that local history writing can be implemented flexibly in inclusive contexts, enabling varied writing styles and digital supports, accords with research on writing instruction under conditions requiring adaptation for disability, modality shifts, and technology-mediated learning. Studies of secondary educators' writing practices for students with disabilities show that teachers report using more adaptations and evidence-based writing practices in in-person contexts than during distance learning, and also highlight limited teacher preparedness for writing instruction across modalities, together implying the importance of flexible supports and accessible formats when writing is used for assessment and learning (Saori et al., 2023). Evidence on multimodal pedagogies in writing similarly suggests that integrating multiple modes can facilitate interaction, encourage creativity, and improve the learning environment, providing a concrete instructional basis for accommodating diverse learners' communication strengths (Nazari et al., 2025). At the institutional level, work on "digitalizing" higher education reports that senior academics generally do not dismiss technology-mediated pedagogy, consistent with the premise that digital tools can be integrated into teaching to support contemporary learning needs (Sun, 2022). Studies of faculty readiness to teach online further note that while instructors often possess traditional course design skills, they can experience challenges in creating interactive online activities and may lack time constraints that matter when designing inclusive digital writing supports that reduce barriers for diverse learners (Smith-Tran & Hang, 2021). Finally, meta-analytic evidence on online feedback in ESL/EFL writing indicates that modalities of

online feedback can affect writing outcomes, supporting the feasibility of digital feedback/support infrastructures as part of inclusive writing pedagogies (though the specific effectiveness depends on design and implementation) (Li et al., 2022). In combination, these sources substantiate the general claim that inclusive local-history writing benefits from multimodal and digital supports, while also highlighting practical constraints (teacher preparation, time, and online interactivity design) that may shape implementation quality (Nazari et al., 2025; Saori et al., 2023).

5. Conclusion

This study developed a web-based historical consciousness assessment framework through North Sumatra local history writing activities for students with diverse learning needs. The findings demonstrated that the developed framework was valid, accessible, practical, and effective for implementation in inclusive secondary education settings. The integration of local history writing activities encouraged students to develop reflective historical understanding, historical interpretation skills, and contextual awareness of social and cultural issues. The web-based platform provided flexible and accessible assessment opportunities through features such as adjustable displays, multimedia resources, audio-assisted instructions, and alternative response formats. These features supported equitable participation among students with varying abilities and learning characteristics. The findings also showed that students became more engaged and confident in expressing historical perspectives

when using contextual local history materials and accessible digital technologies.

Expert validation and pilot testing results confirmed that the framework aligned with inclusive education principles and Universal Design for Learning (UDL). Teachers responded positively to the framework because it facilitated assessment management, improved student engagement, and supported differentiated learning practices.

Several limitations should be acknowledged in this study. First, the pilot implementation involved a relatively small number of participants and schools in North Sumatra, which may limit the generalizability of the findings to broader educational contexts. Second, the study focused primarily on small-scale implementation and short-term assessment outcomes. The long-term impacts on students' development of historical consciousness were not extensively examined. Third, differences in technological infrastructure across schools may affect the effectiveness of web-based assessment implementation. Some students and teachers required additional technical support during the initial stages of using the platform. Finally, the study focused specifically on history education contexts and may require adaptation for implementation in other subject areas.

Future studies are recommended to conduct larger-scale implementations involving broader participant populations and diverse educational settings. Longitudinal research is also needed to examine the long-term impact of web-based historical consciousness assessment on students' reflective thinking and civic understanding.

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