



Masjid Tuha Indrapuri as an Open History Laboratory: A Qualitative Study of Heritage Site Utilization in Inquiry-Based Islamic History Education at the Higher Education Level

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ABSTRACT

Purpose – This study examines the utilization of Masjid Tuha Indrapuri as an open history laboratory in inquiry based Islamic history education at the higher education level in Aceh, Indonesia, with the aim of developing a replicable conceptual model for heritage site-based learning.

Methodology – A descriptive qualitative design with an embedded case study strategy was employed over eight months (March–October 2024). Data were collected through passive participant observation (10 sessions), in-depth interviews with six lecturers, 24 purposively selected students, two site managers, and one local historian, alongside document analysis. Trustworthiness was established through source triangulation, methodological triangulation, and member checking. Data saturation was confirmed at the point of theoretical redundancy across participant groups.

Findings – The site's tri-layered historical complexity generates authentic open questions that catalyse historical inquiry. A structured three-phase inquiry model qualitatively indicated enhanced critical thinking and historical reasoning among students. Key constraints include limited bilingual interpretive infrastructure, insufficient site-based pedagogical competency, logistical barriers, and the absence of formal academic visitation protocols. Identified benefits encompass strengthened historical consciousness, higher-order historical thinking, reinforced Islamic identity, and foundational research competencies.

Novelty – A four-component conceptual model integrating site potential, pedagogical design, facilitator competency, and institutional support is proposed as a replicable framework for Islamic heritage site-based learning with contemporary inquiry-based pedagogy and explicit institutional enabling conditions.

Significance – This study benefits history educators, heritage site managers, institutional policymakers, and curriculum developers seeking to integrate cultural heritage into higher education pedagogy across Indonesia and beyond.

Keywords: Heritage site learning; Higher education Indonesia; Historical thinking; Inquiry-based education; Islamic history education; Open history laboratory.

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I. Introduction

History education at the higher education level faces a fundamental challenge in bridging conceptual knowledge with meaningful empirical experience. The dominance of lecture-based and text-dependent learning frequently creates a gap between the historical narratives taught in the classroom and the deep contextual understanding that students require (Sayono, 2015; Sidik & Suswandari, 2022). Students who should be trained as critical thinkers often become trapped in chronological memorisation, unable to engage meaningfully with the dynamics of civilisation that underpin historical events. This condition compels educators to explore alternative learning strategies capable of bringing history alive in authentic and contextual ways.

One approach receiving growing attention both nationally and internationally is the utilisation of historical sites as open history laboratories. Unlike conventional laboratories confined to enclosed rooms, open history laboratories employ the physical environment of historical heritage as authentic primary learning resources (Pelealu, 2019; Widja, 1991). This approach aligns with constructivist learning theory, which asserts that knowledge is actively built by learners through direct interaction with real environments (Vygotsky in Creswell & Creswell, 2022; Kolb & Kolb, 2005). Multiple international studies have confirmed the effectiveness of this approach in cultivating higher-order historical thinking skills, historical consciousness, and civic identity (Chatterjee & Hannan, 2016; Goksu & Somen, 2019; Townley, Martinez, & Clark, 2024). However, a systematic examination of how heritage-based learning operates in the specific context of Islamic heritage sites within Indonesian higher education remains limited, representing a gap that this study addresses.

Aceh, as a region rich in Islamic civilisational heritage, contains numerous historically significant sites with substantial potential as learning laboratories. Among the most significant is Masjid Tuha Indrapuri in Aceh Besar Regency. This mosque is more than a place of worship; it is a 'living archive' recording layers of civilisation from the era of the Hindu Lamuri Kingdom (12th century CE) through the zenith of the Acehnese Sultanate under Sultan Iskandar Muda (1607–1636 CE), and continuing through its role as an emergency seat of government and the coronation site of Sultan Muhammad Daud Syah in 1878 as a symbol of anti-colonial resistance (Alfan, Beynon, & Marcello, 2016; Bahri, 2018). The site's architectural complexity including its distinctive three-tiered roof, 36 pillarless joinery columns, and ancient ablution pool makes it an extraordinarily rich pedagogical resource.

Previous studies on Masjid Tuha Indrapuri have focused primarily on its architectural and heritage value (Alfan et al., 2016; Yarda, Dewi, & Putra, 2023), without deeply exploring how the site can serve as a vehicle for active, inquiry-based learning in formal higher education contexts. This gap constitutes the specific contribution of this study to the literature on site-based history education at both national and international levels.

Based on this background, the study aims to: (1) describe the historical value and pedagogical potential of Masjid Tuha Indrapuri as an open history laboratory; (2) examine the implementation of site-based inquiry approaches in Islamic history education; (3) identify constraints encountered in the learning process and provide evidence-grounded recommendations; and (4) analyse the multidimensional benefits gained by students from site-based learning experiences. This study is expected to contribute theoretically to the development of site-based history learning models and practically to lecturers, site managers, and educational policymakers in designing more effective and sustainable programmes.

2. Theoretical Framework

2.3 Constructivist Learning Theory and Experiential Education

The theoretical foundation of this study rests on constructivist epistemology, which asserts that meaningful learning occurs when individuals actively construct knowledge through engagement with their social and physical environment (Vygotsky in Creswell & Creswell, 2022; Piaget, 2005). In the context of history education at the higher education level, this principle requires pedagogical designs that reposition students from passive recipients of narrative to active investigators engaged directly with primary historical evidence. Kolb & Kolb, (2005) experiential learning theory complements this framework by asserting that the most enduring learning occurs through a four-stage cycle of concrete experience, reflective observation, abstract conceptualisation, and active experimentation a cycle optimally activated through site-based inquiry.

Vygotsky's concept of the Zone of Proximal Development (ZPD) provides an additional theoretical lens of particular relevance. When designed through programmed inquiry with appropriate scaffolding, heritage site pedagogy can systematically move students from their actual developmental level basic recognition of historical facts toward their potential developmental level, encompassing independent historical analysis, interpretation of contradictory evidence, and synthesis of multiperspectival narratives (Vygotsky in Creswell & Creswell, 2022). In this model, the lecturer functions as an 'intellectual scaffold' who guides without dominating, rather than as a narrative authority who dictates meaning. Empirically, this ZPD activation was observed in the present study when, during the field phase, a third-year student initially described the mosque's tiered roof as 'just architectural decoration' but, after scaffolded questioning from the facilitating lecturer, revised this interpretation to articulate its symbolic encoding of Sufi spiritual stages (syari'at, tariqat, haqiqat, ma'rifat) demonstrating the transition from surface perception to contextualised historical reasoning that ZPD-based scaffolding is designed to enable.

2.3 The Open History Laboratory Concept

The concept of the 'open history laboratory' in the context of Indonesian history education was first systematically articulated by Widja (1989), who argued that local historical sites can function as 'primary source environments' that activate students' historical imagination and investigative instincts. While innovative for its time, Widja's framework is descriptive and focused on identifying types of sites with educational potential, without specifying the concrete pedagogical mechanisms required to optimise that potential consistently and sustainably.

This study extends and enriches Widja's framework in three significant dimensions. First, it specifies a structured, contextual three-phase inquiry model for Islamic heritage sites, internalising international best practices in heritage education (Chatterjee & Hannan, 2016; Goksu & Somen, 2019). Second, it foregrounds the enabling conditions required for open laboratory learning to function effectively: facilitator competency, institutional collaboration, and interpretive infrastructure. Third, it situates the Indonesian heritage-based learning tradition within a broader international academic conversation, demonstrating both its distinctiveness and the potential universality of its application. Crucially, no subsequent Indonesian study has operationalised Widja's framework through a systematically documented inquiry model that integrates institutional enabling conditions a gap that justifies both the continued relevance of Widja's framing and the specific contribution of the present work.

2.3 Inquiry-Based Learning and Historical Thinking

Inquiry-based learning (IBL) positions students as investigators who formulate questions, collect and evaluate evidence, and construct knowledge-based arguments reflecting the epistemic practices of professional historians (Harmin, Kirschenbaum, & Simon, 1976; Seixas & Peck, 2004). Applied to heritage sites, IBL enables students to interact directly with material evidence, practise source criticism, and develop historical empathy through spatial and sensory engagement with the past (Wineburg, 2001).

Wineburg's (2001) influential historical thinking framework identifies three core competencies particularly well-developed through site-based inquiry: (1) evidential reasoning, the ability to evaluate the reliability and significance of material and textual sources; (2) contextual understanding, involving the placement of historical actors and artefacts within their socio-political milieu; and (3) perspective-taking, defined as the ability to interpret historical events from multiple viewpoints without anachronistic projection of present-day values. The historiographical ambiguity of Masjid Tuha Indrapuri specifically the as-yet-unresolved scholarly debate regarding whether its foundations are remnants of a Hindu temple or a defensive fortification makes this site an extraordinarily productive case for developing all three competencies simultaneously.

3. Methods

3.1. Research Design

This study employed a descriptive qualitative approach with an embedded case study strategy (Creswell & Creswell, 2022; Sutopo, 2006). This design was selected because the study aims to understand in depth the phenomenon of site-based learning within a specific context Masjid Tuha Indrapuri with pre-determined case boundaries, while simultaneously attending to multiple units of analysis: individual student learning outcomes, the quality of instructional design, and the institutional conditions that enable or constrain effective site-based pedagogy. The qualitative paradigm is consistent with the study's interpretive epistemological position, which prioritises participants' meaning-making processes over quantifiable output measurement.

3.2. Researcher Positionality

The principal researcher is affiliated with the same institution as the participating lecturers, which creates the potential for relational bias. To mitigate this, several procedural safeguards were employed: (a) lecturer participants were not the direct supervisors or academic evaluators of the student participants; (b) data collection instruments were designed to elicit descriptive accounts of experience rather than evaluative judgements; (c) all interpretive claims were subjected to member checking with key informants from outside the research team; and (d) researcher reflective memos were maintained throughout data collection to monitor and document the researcher's interpretive positioning. These measures align with established reflexivity protocols in qualitative research (Creswell & Creswell, 2022).

3.3. Research Site and Participants

The study was conducted at Masjid Tuha Indrapuri, Indrapuri District, Aceh Besar Regency, Province of Aceh, over eight months (March–October 2026). Site selection was based on three criteria: (a) the site's status as a national cultural heritage site with extraordinary multi-layered historical value; (b) adequate accessibility for Banda Aceh-based students (approximately 25 km); and (c) its minimal prior formal academic utilisation, making it a theoretically productive case for examining the conditions of site-based learning optimisation.

Research participants were selected via purposive sampling to maximise informational richness. The participant composition comprised six lecturers teaching Islamic History and Local History

courses; 24 students from the History Education Department (drawn from two cohorts: 14 from the third year and 10 from the fourth year, none of whom had previously visited the site in a structured academic context); two site managers with comprehensive practical knowledge of the site; and one local historian serving as an expert informant. This purposive composition ensures representation of all key stakeholder groups whose perspectives are essential to a comprehensive understanding of site-based learning.

3.4. Data Saturation

Data saturation was determined through theoretical redundancy, following the iterative analytical protocol recommended by Miles, Huberman, & Saldana, (2014). After the seventh interview session with student participants, no substantively new themes or perspectives were emerging. Saturation across the lecturer group was confirmed after the fifth interview. The inclusion of the remaining participants served to validate emerging patterns rather than generate new categories. The 10 observation sessions similarly reached descriptive saturation after the seventh session, with the final three sessions confirming the stability of identified pedagogical patterns.

3.5. Data Collection Techniques

Data were collected through three complementary techniques. First, passive participant observation was conducted across 10 sessions seven structured learning visits organised by lecturers and three independent student visits during which the researcher systematically documented pedagogical interactions, student engagement behaviours, and site environmental conditions without active instructional involvement. Detailed field notes were recorded immediately after each observation session.

Second, in-depth interviews were conducted using open-ended question guides designed to elicit rich, detailed accounts of participants' experiences and perceptions. Individual interviews were conducted with lecturers and the expert informant; focus group discussions were employed for student participants to facilitate articulation of both shared and divergent experiences. All interviews were recorded with participants' informed consent and transcribed verbatim.

Third, document analysis encompassed review of Semester Learning Plans (RPS), students' field notes, visit reports, and historical documents about Masjid Tuha Indrapuri held at the Aceh Cultural Heritage Preservation Agency (BPCB Aceh). Triangulation of data from these three sources materially strengthens the evidential basis of the study's findings.

3.6. Ethical Considerations

This study was conducted in accordance with ethical research principles. Written informed consent was obtained from all participants prior to data collection, clearly explaining the study's purposes, the voluntary nature of participation, and the procedures for ensuring confidentiality. All participant identifiers have been anonymised in this report. The study was conducted under institutional research authorisation from the affiliated university. Site access was granted by the management of Masjid Tuha Indrapuri and BPCB Aceh, with explicit conditions that the research would not disrupt regular worship activities.

3.7. Data Analysis

Data analysis employed the interactive analysis model developed by Miles, Huberman, & Saldana, (2014), comprising three simultaneous components: (1) data condensation, the process of selecting, focusing, and transforming raw data into meaningful analytical summaries; (2) data display in the form of descriptive narratives, analytical matrices, and conceptual diagrams; and (3) conclusion drawing and verification through continuous interpretive reflection. Trustworthiness was ensured through source triangulation (comparing data from lecturers, students, and site managers), methodological

triangulation (comparing results from observation, interviews, and document analysis), and member checking with key participants to verify the accuracy of interpretive claims.

4. Results and Discussion

4.1. Historical Value and Pedagogical Potential of Masjid Tuha Indrapuri

Masjid Tuha Indrapuri represents one of the most pedagogically rich heritage sites in the Aceh region, owing to what can be described as a 'civilisational palimpsest' the physical superimposition of multiple historical eras within a single continuous space. The site, covering approximately 33,875 square metres on the bank of the Krueng Aceh River, contains at least three identifiable historical layers, each offering distinct pedagogical affordances.

The first layer comprises andesite stone foundation walls widely interpreted as the remnants of a temple from the Lamuri Kingdom (12th century CE), reflecting the era of Hindu-Buddhist civilisation in Aceh prior to Islamisation (Alfan & Marcello, 2016). The second layer is the 17th-century mosque built by Sultan Iskandar Muda (c. 1618 CE), displaying Acehnese vernacular architecture with a three-tiered pyramidal roof laden with Sufi symbolic content encoding the spiritual stages of *syari'at*, *tariqat*, *haqiqat*, and *ma'rifat* (Bahri, 2018). The third layer is the post-independence context, in which the mosque served as an emergency seat of government and the coronation site of Sultan Muhammad Daud Syah in 1878 CE as a symbol of resistance to Dutch colonialism.

From a pedagogical perspective, this multi-layered complexity presents what Widja (1991) termed 'speaking historical objects' physical artefacts that provoke authentic historical questions when encountered in situ. Every physical element of the site the 36 support pillars, the peg-and-mortise joinery system devoid of iron nails, the ancient ablution pool, the carved roof ornamentation represents a potential starting point for historical investigation. These findings are consistent with comparable studies at other Indonesian heritage sites: Nur Syamsu, Rahmawati, & Suyitno (2019) on Candi Muara Takus and Fardani, Atmaja (2017) on Candi Ngempon both confirm that architecturally rich historical sites substantially stimulate students' historical curiosity far beyond what text-based learning alone can achieve.

Critically, the site's historiographical ambiguity the unresolved scholarly debate on whether the lower foundations represent remnants of a Hindu temple or a defensive fortification generates productive epistemological tension. Students cannot simply accept an authoritative answer; they must engage with competing interpretations supported by divergent archaeological and textual evidence. It is this property that makes the site particularly well-suited to developing Wineburg (2010) historical thinking competencies, specifically evidential reasoning and multiperspectival interpretation.

4.2. Implementation of Site-Based Inquiry Learning

The learning process observed in this study followed a structured three-phase inquiry model, the details of which emerged from cross-analysis of lecturers' RPS documents, field observations, and participant interviews.

The pre-visit phase encompassed lecturers preparing 'guiding questions' designed to prompt students to formulate initial hypotheses about the site's historical aspects based on preliminary literature study. Students were asked to build a questioning framework covering the dimensions of 'what', 'why', 'how', 'when', and 'who' as the foundation for field investigation (Harmin et al., 1976; Seixas & Peck, 2004). This preparatory structure ensured that site visits constituted purposeful academic enquiry rather than passive excursion.

During the field visit phase, students engaged in diverse active inquiry activities: measuring physical dimensions of architectural elements, photographically documenting material details, interviewing site managers, comparing field findings with initial hypotheses, and conducting interpretive discussions in small groups. The lecturer's role was that of a scaffolding facilitator posing productive

follow-up questions to deepen analysis rather than providing ready-made information (Vygotsky in Creswell, 2014). This facilitative approach, which contrasted with the 'lecturing at the site' pattern identified among some instructors, represents the pedagogical disposition most consistent with the essence of inquiry-based learning.

The post-visit phase comprised reflection sessions and presentation of investigative findings. Students were required to produce analytical reports integrating field evidence, secondary literature, and original critical interpretation. Class discussion sessions displayed qualitatively meaningful enhancement in the sophistication of historical argumentation. As one fourth-year student reflected during the post-visit discussion: 'Before visiting the site, I understood Islamisation as a straightforward historical event. After examining the foundation layers directly, I began to understand it as a long negotiation between two civilisations not conquest, but a transformation that preserved what came before.' This kind of interpretive shift from event-based to process-based historical understanding represents precisely the higher-order historical thinking that site-based inquiry is designed to develop. These findings are consistent with Mbura, Yulifar, & Suwirta (2025), who found that contextual site-based learning significantly enhances students' historical consciousness and the quality of historical reasoning.

4.3. Constraints in Site-Based Learning

The study identified four major constraint categories, each with specific implications for the sustainability and scalability of the proposed model. These constraints, together with evidence-grounded solution recommendations derived from triangulation of field observations, participant accounts, and comparative international literature, are presented systematically in Table 1.

Table 1 - Constraints and Solution Recommendations in Site-Based Learning at Masjid Tuha Indrapuri

Constraint Category	Constraint Description	Solution Recommendation
Interpretive Infrastructure	No comprehensive bilingual curatorial guide available; on-site interpretive narration is very limited and not integrated with higher education academic needs.	Development of QR code-based bilingual (Indonesian-English) interpretive guides; collaboration between the university and BPCB Aceh for digital module production.
Lecturer Pedagogical Competency	Tendency toward 'lecturing at the site'; minimal specialised training in designing field-based inquiry learning.	Site-based learning pedagogy workshop programme; peer mentoring and classroom observation among colleagues.
Accessibility and Logistics	Distance of approximately 25 km from Banda Aceh; coordination of transportation, permits, and operational budget not always adequately available.	Structured institutional partnership scheme; integration of visit schedules into the official academic calendar of the study programme.
Site Visit Management	No formal academic visitation protocol; potential scheduling conflicts with worship activities and local religious community activities.	Preparation of a Memorandum of Understanding (MoU) between the university, BPCB, and the mosque management; establishment of standardised academic visit time slots.

The absence of bilingual interpretive guides is the constraint most immediately addressable, as its resolution requires inter-institutional collaboration more than large financial investment. International heritage education practice consistently demonstrates that well-designed interpretive infrastructure substantially reduces the cognitive load on facilitators and learners, enabling instructional

attention to be focused on higher-order inquiry tasks (Chatterjee & Hannan, 2016). The 'lecturing at the site' pattern identified among several lecturers is consistent with Sagala, Sultan Muda; Heriadi, M; Ababiel, Reno; Nasution, (2022) national findings that pedagogical competency in primary source-based learning remains a systemic challenge in Indonesian history education, underscoring the need for targeted and sustained professional development.

4.4. Multidimensional Benefits for Students

Notwithstanding the constraints identified, the study documented substantive, multidimensional learning benefits. Table 2 presents a systematic review of five principal benefit dimensions, together with the theoretical basis and observational foundation underlying each claim.

Table 2 - Dimensions of Learning Benefits from Site-Based Inquiry at Masjid Tuha Indrapuri

Benefit Dimension	Description of Achievement	Evidential Basis / Indicators
Strengthened Historical Consciousness	Students internalised concepts of continuity and change through direct interaction with authentic artefacts; Acehese Islamisation was understood as a long process of acculturation.	Post-visit student narrative reflections; qualitative comparison of understanding before and after visit.
Higher-Order Historical Thinking	Identification of material evidence, analysis of historical causality, and multiperspectival interpretation developed qualitatively (Seixas, Peter; Carla, 2004; Wineburg, 2010).	Quality of argumentation in student investigative reports; complexity of post-visit class discussions.
Reinforced Local Islamic Identity	Students developed pride and emotional connection to Acehese Islamic civilisational heritage; the affective dimension of history education, often neglected, was activated.	Verbal expressions and written student reflections; in-depth post-learning interviews.
Basic Historical Research Competency	Field data collection, artefact analysis, and production of historical investigative reports trained research skills not fully developable in conventional classroom settings.	Relevance to Merdeka Belajar project-based curriculum demands; quality of final reports.
Collaboration and Scholarly Communication	Small-group field discussions, presentation of findings, and peer review of historical interpretations built academic communication competency.	Enhanced quality of class discussions; group presentation assessments.

The affective dimension of learning particularly the reinforcement of students' Islamic civilisational identity and cultural pride merits special emphasis, as it is often marginalised in historically oriented learning outcome assessments focused on cognitive aspects. As expressed by a third-year student in a post-visit in-depth interview: 'I realised just how rich the civilisation of our ancestors was. This is not just an old mosque; it is living proof that Islam entered Aceh beautifully and peacefully through dialogue, not conquest.' This testimony illustrates the kind of emotional engagement and interpretive insight that Yusuf Perdana, Sumargono, & Rachmedita (2019) identify as an important but often overlooked dimension of history education in multicultural societies.

The professional competency dimension is also highly significant given the vocational orientation of the History Education Department. Site-based inquiry provides prospective history teachers with direct experiential training in primary source investigation, artefact analysis, and evidence-based argumentation skills increasingly demanded by the Merdeka Belajar curriculum framework but difficult

to develop fully in conventional classroom settings (Maman Suryaman, 2020). A senior student confirmed this: 'This was the first time I understood how a historian actually works you cannot just read about the past; you have to question what is in front of you, compare it with what you have read, and then form your own interpretation.'

4.5. International Comparative Perspective

To position findings within the broader international heritage education literature, Table 3 presents a comparative review of site-based history learning research across several national contexts. This comparative analysis reveals both the distinctiveness of the Indonesian Islamic heritage context and the generalisability of the core pedagogical principles underpinning the proposed model.

Table 3 - International Comparison of Heritage Site-Based History Learning

Country	Site/Context	Approach	Key Findings
Turkey	Ephesus sites & Topkapi Museum	Inquiry-based heritage tours in secondary and higher education	Increased motivation for history learning and understanding of multi-civilisational contexts (Goksu & Somen, 2019).
United Kingdom	National Museums & Galleries	Object-based learning in higher education	Strengthened critical thinking and visual literacy among students (Chatterjee & Hannan, 2016).
United States	Living history museums & outdoor campuses	Experiential & outdoor learning; systematic review 1996–2020	Enhanced transferable skills and civic engagement among students (Townley et al., 2024).
Indonesia (Present Study)	Masjid Tuha Indrapuri, Aceh Besar	Structured three-phase inquiry based on Islamic cultural heritage site	Qualitatively indicated enhancement in historical thinking, historical consciousness, and Islamic identity of higher education students

The comparative analysis confirms that despite substantial variation in institutional, cultural, and logistical contexts across national settings, three enabling conditions consistently predict the effectiveness of heritage site-based learning: the presence of a structured pedagogical framework (rather than unguided visits), facilitator competency in inquiry-based instruction, and institutional support infrastructure. These three conditions are precisely the components integrated into the four-element model proposed by this study, lending it cross-contextual validity extending beyond the Acehese setting.

4.6. The Four-Component Conceptual Model of the Open History Laboratory

Based on the totality of the study's findings, this study proposes a four-component conceptual model for the utilisation of Masjid Tuha Indrapuri and more broadly, comparable Islamic heritage sites as open history laboratories in higher education. The four model components are designed to function in dynamic synergy rather than as isolated variables; the absence or underdevelopment of any single component predictably weakens the overall quality of the learning experience.

Figure 1 presents the four-component conceptual model of the Open History Laboratory at Masjid Tuha Indrapuri. The model illustrates how the historical site can be interpreted as an integrated learning space through the interaction of physical heritage, historical inquiry, community participation, and educational transformation. Through this framework, Masjid Tuha Indrapuri is positioned not merely as an object of historical study, but as an active medium for developing historical awareness and meaningful learning experiences.

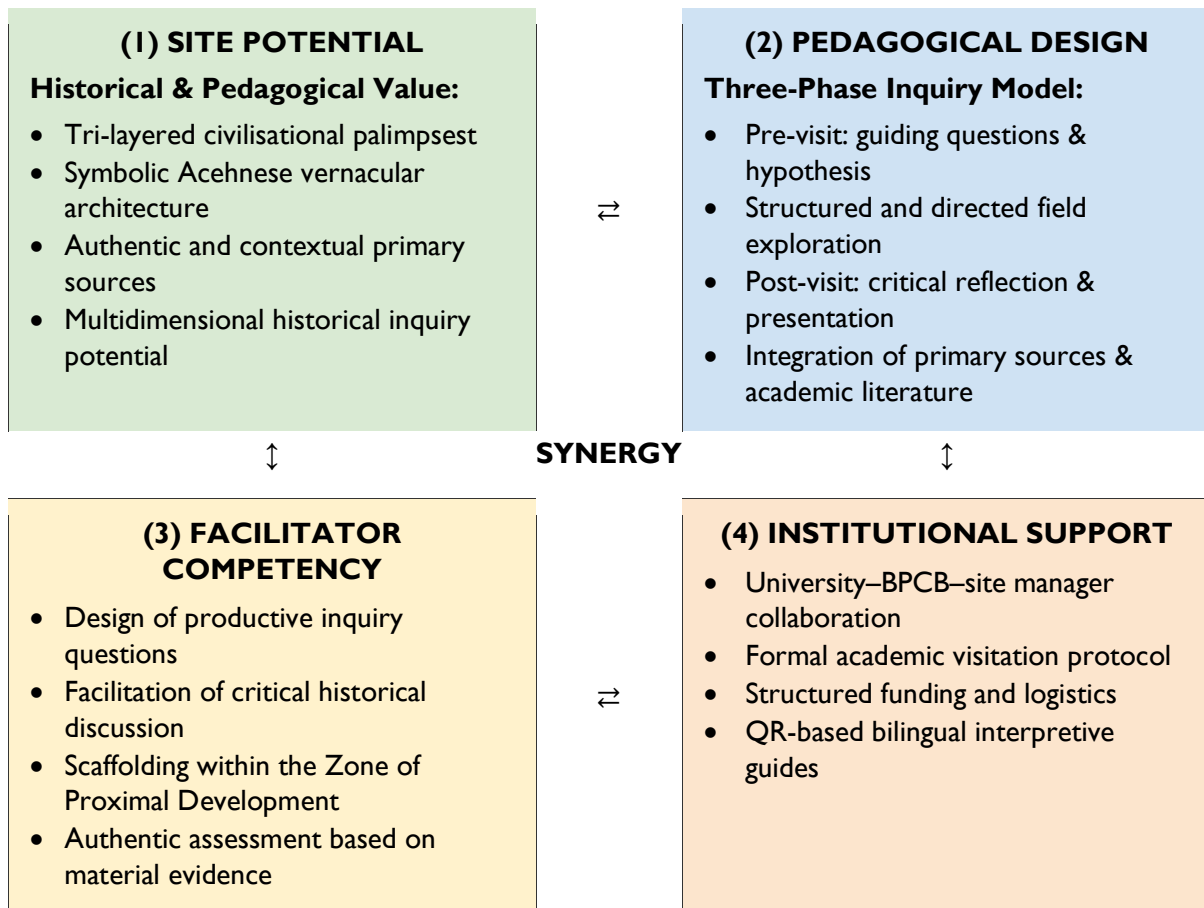


Figure 1. Four-Component Conceptual Model of the Open History Laboratory (Masjid Tuha Indrapuri)

The first component, Site Potential, encompasses the site's historical, architectural, and spiritual value as a repository of authentic primary historical evidence. The extraordinary density of pedagogically generative material at Masjid Tuha Indrapuri its three civilisational layers, its unresolved historiographical debates, and its continuing spiritual and community significance makes it one of the most pedagogically rich heritage sites in the Acehnese region.

The second component, Pedagogical Design, specifies the structured three-phase inquiry model (pre-visit, field exploration, post-visit reflection) as the organisational mechanism that translates site potential into achievable learning outcomes. The quality of pedagogical design is the single most determinative variable of learning effectiveness a finding consistent with the broader consensus in international heritage education research (Chatterjee & Hannan, 2016; Goksu & Somen, 2019). Regarding boundary conditions: this model is most applicable to sites that present genuine historiographical complexity or interpretive ambiguity. For sites with straightforward, well-documented histories and limited material evidence, the model's inquiry phases may need to be adapted to focus on contextualisation and empathy exercises rather than evidential debate.

The third component, Facilitator Competency, highlights the lecturer's capacity to design productive inquiry questions, scaffold interpretive discussions, and implement authentic assessment. The transition from the 'lecturing at the site' pattern toward genuine facilitative scaffolding requires sustained investment in professional development a finding consistent with Sagala, Sultan Muda; Heriadi, M; Ababel, Reno; Nasution (2022).

The fourth component, Institutional Support, encompasses the collaborative infrastructure required for sustainable site-based learning programmes: formal inter-institutional agreements

between the university, BPCB Aceh, and site managers; dedicated funding mechanisms; and development of bilingual interpretive materials. Without this supporting infrastructure, even the most pedagogically sophisticated instructional design will remain fragile and difficult to scale.

This model updates and substantially enriches Widja (1991) foundational framework by integrating contemporary inquiry-based learning principles and foregrounding the institutional conditions necessary for the sustained realisation of heritage-based educational potential. Compared with earlier Indonesian studies focused primarily on identifying site potential (Nababan, Agung, & Yamtina, 2019; Septiani, 2016), this study makes a more ambitious contribution by fully mapping the pedagogical mechanisms that enable that potential to be consistently actualised.

4.7. Sustainability and Scalability of the Model

The critical question for the model's practical application concerns its scalability and sustainability across diverse heritage sites and institutional contexts. Table 4 presents a phased implementation roadmap designed to guide institutions in progressively building the enabling conditions for a sustainable open history laboratory programme.

Table 4 - Phased Implementation Roadmap for the Open History Laboratory Programme

Phase	Primary Focus	Key Activities	Target Outcomes
Phase 1 (0–6 months)	Institutional Foundation	Signing of MoU between university, BPCB, and mosque management; formation of module development team; development of historical thinking assessment instrument (baseline pre-test).	Formal visit protocol; validated assessment instruments; student baseline data.
Phase 2 (6–12 months)	Resource Development	Production of site-based inquiry module; lecturer pedagogy training (two workshop cycles); development of QR code-based bilingual interpretive guides installed at the site.	Ready-to-use module; trained lecturers; interpretive guides installed at site.
Phase 3 (12–18 months)	Implementation and Evaluation	Full implementation with three student cohorts; quantitative post-test data collection on historical thinking index; module reflection and revision based on empirical data.	Quantitative impact data (pre–post); international journal article; validated model.
Phase 4 (18–24 months)	Scalability and Dissemination	Adaptation of model for three other Acehnese heritage sites; dissemination through international history education conferences; submission of national replication proposal.	Adoptable generic model; cross-institutional researcher network; policy recommendations.

The four-phase roadmap structure reflects the principle that sustainable educational innovation requires gradual consolidation of institutional foundations before expanding pedagogical ambition. The integration of quantitative baseline and post-intervention measurement in Phase 3 is particularly important: while this study builds a qualitative argument for the model's effectiveness, the field urgently requires rigorously designed quasi-experimental studies to produce a quantitative evidence base including pre-test and post-test comparisons of historical thinking indices and critical thinking

assessment scores that would fully consolidate the model's learning outcome claims and enable its incorporation into formal curriculum policy.

5. Conclusions

This study affirms that Masjid Tuha Indrapuri possesses extraordinary potential as an open history laboratory capable of delivering authentic, contextual, and transformative Islamic history learning experiences at the higher education level. Three principal conclusions emerge from the totality of the study's findings.

First, heritage sites characterised by multi-layered historical complexity such as the temple-to-mosque transformation at Masjid Tuha Indrapuri, which records the process of Acehese Islamisation in archaeologically readable form are qualitatively indicated to function more effectively as history laboratories than monofunctional sites, precisely because of their capacity to present authentic 'open questions' that stimulate multidimensional historical investigation.

Second, the effectiveness of site-based learning is determined far more substantially by the quality of pedagogical design than by the intrinsic nature of the physical site. A structured inquiry approach encompassing systematic conceptual preparation, directed field exploration, and critical post-visit reflective synthesis produces qualitatively superior learning outcomes in historical reasoning, evidential analysis, and historical consciousness.

Third, the realisation of a historical site's potential as a learning resource requires deliberately constructed systemic collaboration between higher education institutions, cultural preservation agencies, and site managers, accompanied by sustained investment in developing lecturers' site-based pedagogical competency. Without these institutional enabling conditions, even the richest heritage site will fail to realise its optimal learning potential.

The practical implications of these findings encompass three urgent actions: (1) development of a Site-Based Inquiry Learning Module specific to Masjid Tuha Indrapuri, incorporating bilingual interpretive materials and standardised academic visit protocols; (2) implementation of a structured pedagogical training programme for history lecturers in site-based inquiry facilitation; and (3) formalisation of an inter-institutional collaboration framework connecting the university, BPCB Aceh, and heritage site management bodies. Future research should measure learning impact through rigorously designed quasi-experimental studies, particularly employing validated historical thinking instruments such as those adapted from the Historical Thinking Project (Seixas & Peck, 2004), and develop and systematically validate this model at other significant historical sites across Aceh and the Indonesian archipelago.

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Conflict of Interest

The authors declare no conflicts of interest.

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