Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2, 141-149
2026
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v10i2.11989

Technodidactic model for local historical memory in students of a public secondary educational institution in Lambayeque, 2025

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Abstract: This study analyzed the contribution of a technodidactic model to strengthening local historical memory among students of a public secondary school in Lambayeque in 2025. The research is grounded in the conception of local historical memory as a fundamental social and cultural process for identity construction, sense of belonging, and citizenship education, which is frequently weakened by transmissive and decontextualized teaching practices. A basic quantitative approach was adopted, with a non-experimental, cross-sectional design and a descriptive–propositional scope. The population consisted of 3,500 students, from which a sample of 120 participants was selected through convenience sampling. Data were collected using the Local Historical Memory Questionnaire, comprising 20 items distributed across four dimensions, with high reliability (Cronbach's alpha = 0.89). Data analysis was conducted using descriptive statistics in SPSS version 28. The results showed a predominance of medium levels across all dimensions of local historical memory, indicating a partial appropriation of regional narratives, practices, and identities. Identified weaknesses included limited interpretation of built heritage, low critical awareness of media influence, and insufficient intergenerational transmission of memory.

Keywords: *Digital pedagogy, Local historical memory, Secondary education, Technodidactic model, Virtual heritage.*

1. Introduction

Protecting local cultural and historical legacy has become increasingly complex in contemporary education because memory is no longer formed only through family storytelling or community celebrations; it is also shaped by highly mediated digital environments that compete for students' attention. When school practices do not create structured opportunities for students to explore, discuss, and reinterpret local narratives, adolescents may experience a progressive weakening of identity ties to their territory, which in turn affects citizenship formation and the sense of collective responsibility for heritage [1, 2].

In Latin America, several studies show that local history and heritage learning can be displaced by curricular routines that privilege decontextualized information and external cultural references. As a result, students may develop instrumental knowledge (dates, names, isolated events) without building a meaningful narrative that connects their everyday life with the historical processes of their region. This gap is visible in rural and urban settings and is linked to broader inequalities in access to cultural resources and educational innovation [3, 4].

In the Peruvian context, this challenge is particularly relevant in regions with strong archaeological and cultural density, where heritage can be present in the landscape but absent from students' interpretive frameworks. When educational mediation is limited to textbook transmission, students tend to perceive heritage as an external object rather than as a living reference that informs identity and community belonging. Therefore, strengthening local historical memory requires pedagogical approaches that are experiential, reflective, and socially situated [1, 5].

History: Received: 23 November 2025; Revised: 13 January 2026; Accepted: 16 January 2026; Published: 3 February 2026
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Lambayeque is a strategic case because its heritage includes internationally recognized archaeological sites, museums, oral traditions, and community practices that are central to regional identity. However, school activities do not always translate these resources into learning experiences that allow students to reconstruct the past as part of their present. In such contexts, the erosion of local historical memory can generate disconnection from community narratives and reduce students' motivation to preserve or disseminate their heritage [6, 7].

Local historical memory in students can be understood as a multidimensional process that articulates the collective construction of narratives, the influence of social context on interpretation, the formation of group identity anchored in local history, and intergenerational transmission through family and community. This conceptualization aligns with research emphasizing that memory is built through shared narratives, place attachment, and communicative practices, rather than through individual recall alone [8, 9].

Evidence from heritage and memory studies suggests that memory can be strengthened when educational practices intentionally integrate community testimonies, material culture (monuments, museums), and meaningful participation. Heritage places can function as anchors of memory and identity, but they require pedagogical mediation for students to recognize their historical value, emotional significance, and social meaning [6, 10].

In parallel, the rapid expansion of digital media has transformed how young people access narratives about the past. Media ecosystems can amplify certain historical interpretations while silencing others, and students may consume content without developing tools to critically analyze sources, biases, and narrative strategies. For this reason, any attempt to strengthen local memory in schools should incorporate critical digital literacy as a core component rather than as an optional complement [2, 11].

Digital technologies can support this goal when they are integrated through coherent pedagogy. Research highlights that mobile learning and ICT-supported methodologies enhance student engagement and foster situated inquiry when instructional design emphasizes collaboration and meaningful tasks. However, technology alone does not transform learning; it must be aligned with clear objectives, scaffolding, and formative assessment [12, 13].

Immersive and spatial technologies, particularly 3D geovisualization, virtual reality (VR), and augmented reality (AR), have shown potential for making heritage and historical transformations visible. These tools allow learners to explore historical layers embedded in landscapes, compare past and present spatial configurations, and experience cultural sites through interactive representations. Such experiences can foster stronger place attachment and open opportunities for reflective dialogue about identity and community [14, 15].

Studies that use AR in social science education indicate that students' understanding of contextual processes can improve when they interact with digital overlays connecting physical spaces with historical narratives and explanatory resources. When paired with inquiry activities, AR can increase motivation and support deeper meaning-making in history learning. These findings are relevant for Lambayeque, where many heritage references are spatially accessible but pedagogically underused [12, 16].

Likewise, digital storytelling and transmedia narratives can strengthen local historical memory by enabling students to produce and share stories that combine oral testimony, archival images, maps, and audiovisual resources. Narrative transmedia approaches expand historical meaning across multiple platforms, encouraging students to see heritage as a living story that can be reinterpreted and communicated, rather than as an immutable set of facts [4, 9].

Despite these opportunities, local schools often face persistent barriers: limited teacher training in digital pedagogy, resource constraints, and institutional cultures that prioritize short-term coverage of content over long-term development of competencies. Such barriers can lead to superficial technology use that reproduces traditional instruction in digital form. Therefore, a technodidactic model must explicitly address pedagogical sequencing, teacher facilitation, usability, and cultural contextualization [17, 18].

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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DOI: 10.55214/2576-8484.v10i2.11989

In this context, the present study addressed the following research question: How would a technodidactic model strengthen local historical memory in students of a public secondary educational institution in Lambayeque, 2025? The general objective was to determine how a technodidactic model could strengthen local historical memory, and the specific objectives were: (i) to diagnose the levels of local historical memory by dimensions and indicators; and (ii) to define the pedagogical and technological characteristics that should compose the model according to the diagnosed needs [12, 19].

By providing a diagnostic baseline and translating findings into a validated model proposal, this research contributes to educational innovation in cultural heritage contexts. Theoretical contributions include the articulation of memory dimensions with digital pedagogy; methodological contributions include the use of structured measurement and content validation procedures; and practical contributions include a model designed for contextual implementation in Lambayeque secondary education [8, 20].

2. Method

Type of study and design. The research was basic and descriptive-propositive. It first produced a diagnostic description of local historical memory among students and then proposed a technodidactic model aligned with the diagnosed needs. The approach was quantitative, focusing on numerical measurement and descriptive analysis of response patterns. The design was non-experimental because variables were not manipulated; instead, they were observed as they occurred in the educational context during 2025 [19, 21].

Population and sample. The population consisted of 3,500 students enrolled in secondary education at a public institution in Lambayeque during 2025. A convenience sample of 120 students was selected due to accessibility conditions and the need to ensure timely data collection. Inclusion criteria included active enrollment in 2025, voluntary assent and informed consent, and participation in regular social science learning activities. Exclusion criteria included students with prolonged absence during the application period [19, 22].

Instrument. Data were collected using the Local Historical Memory Questionnaire (LHMQ), consisting of 20 Likert-type items with five response options (1=Never to 5=Always). Items were distributed across four dimensions: (D1) collective construction of memory, (D2) influence of social context on memory, (D3) group identity based on local history, and (D4) intergenerational transmission of memory. The instrument was aligned with recent conceptualizations emphasizing the social, narrative, and place-based nature of memory [8, 9].

Reliability was assessed through internal consistency, obtaining an overall Cronbach's alpha of 0.89, which indicates high reliability for the measurement scale. Additionally, the technodidactic model questionnaire maintained the same structure and scoring logic to assess students' perceptions regarding the relevance of proposed model components. For interpretation, each dimension was categorized into three levels: low (5-11), medium (12-18), and high (19-25), while the overall score was categorized as low (20-46), medium (47-73), and high (74-100) [19, 21].

Content validation of the model. The technodidactic model proposal was evaluated through expert judgment using a rubric that assessed relevance, clarity, coherence, contextualization, and feasibility. Experts provided qualitative feedback that was incorporated to improve the model's conceptual consistency and practical applicability. This validation strategy is widely recommended for educational model development because it strengthens content validity and reduces ambiguity in implementation [19, 22].

Data collection procedure. After obtaining authorization from the institution, the LHMQ was administered to the sample during 2025 under standardized conditions. Participants received instructions and completed the questionnaire in a supervised classroom setting to ensure comprehension and to minimize missing data. Responses were coded with anonymized identifiers and stored securely to maintain confidentiality [19, 21].

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Data analysis. Data were processed using SPSS (version 28). Descriptive statistics were calculated for each indicator and dimension. Binarization was performed using percentile-based tertiles to classify results into low, medium, and high levels, supporting diagnostic interpretation and the derivation of design requirements for the model. This analytic decision is consistent with quantitative descriptive approaches aimed at generating actionable pedagogical implications from survey data [21, 22].

Ethical considerations. Educational research on memory requires particular attention to respect, non-stigmatization, and cultural sensitivity. Participation was voluntary and based on informed consent; students were informed about the purpose of the study, confidentiality protections, and their right to withdraw at any time. The study avoided collecting personally identifying information and emphasized that there were no academic penalties related to participation. These practices align with ethical standards for educational research and support the responsible treatment of cultural and historical narratives [19, 22].

3. Results

This section presents diagnostic findings on local historical memory by dimensions and indicators, then summarizes the empirical requirements that guided the technodidactic model proposal for the Lambayeque context [8, 12].

Overall, results showed a predominance of the medium level in all dimensions, indicating partial appropriation of local historical memory. Students recognized local narratives and certain community practices, but there were persistent weaknesses in interpreting built heritage, critically evaluating media influences, and assuming responsibility for intergenerational transmission. This pattern suggests the need for a structured pedagogical intervention supported by coherent technology integration [1, 2].

Dimension 1 (Collective construction of memory) is mainly concentrated at the medium level across indicators, suggesting that students perceive community narratives as present but not consistently internalized. The indicator related to local legends showed the strongest high-level frequency, while the indicator related to monuments was comparatively weaker, pointing to limited recognition of built heritage as a collective memory device [6, 10].

Table 1.
Frequency of levels by indicators of Dimension 1: Collective construction of memory.

Indicator	High (n)	High (%)	Medium (n)	Medium (%)	Low (n)	Low (%)
Elders' stories reflect local history	5	4.2	14	11.7	9	7.5
Community events reflect history	4	3.3	13	10.8	10	8.3
Monuments reflect historical agreements	3	2.5	12	10.0	9	7.5
Local legends preserve history	6	5.0	11	9.2	8	6.7
Museums show collectively built history	5	4.2	15	12.5	7	5.8

Note: Percentages are calculated over n = 120 students [21].

Dimension 2 (Influence of social context on memory) revealed that students were more likely to acknowledge economic and urban transformation factors than political factors as influences on historical interpretation. A key concern was the relatively higher low-level frequency in the indicator related to media influence, indicating that many students do not habitually reflect on how digital and traditional media can frame, distort, or simplify local historical narratives [2, 11].

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Table 2.
Frequency of levels by indicators of Dimension 2: Influence of social context on memory.

Indicator	High (n)	High (%)	Medium (n)	Medium (%)	Low (n)	Low (%)
Social changes affect how we remember	4	3.3	13	10.8	8	6.7
Economic situation influences historical interpretation	6	5.0	12	10.0	7	5.8
Mass media influence the perception of history	3	2.5	11	9.2	10	8.3
Urban development has changed historical memories	5	4.2	14	11.7	6	5.0
Political events lead to the reinterpreting history	2	1.7	15	12.5	8	6.7

Note: Percentages are calculated over n = 120 students [2].

Dimension 3 (Group identity based on local history) showed that students more readily linked local history to personal identity than to social connection or territorial differentiation. The indicator related to connecting with others through historical knowledge exhibited the highest concentration at the low level within this dimension, suggesting that local history is not yet operating as a strong mechanism of peer cohesion and shared identity within the school community [5, 8].

Table 3.
Frequency of levels by indicators of Dimension 3: Group identity based on local history.

Indicator	High (n)	High (%)	Medium (n)	Medium (%)	Low (n)	Low (%)
Pride in belonging to a city with history	4	3.3	14	11.7	7	5.8
History influences my self-perception	5	4.2	13	10.8	8	6.7
Historical knowledge connects me with others	3	2.5	12	10.0	10	8.3
History is part of my current identity	6	5.0	11	9.2	9	7.5
History distinguishes my city from others	2	1.7	15	12.5	8	6.7

Note: Percentages are calculated over n = 120 students [5].

Dimension 4 (Intergenerational transmission) presented the most fragile profile. Although students reported learning traditions, they less frequently perceived active parental encouragement and personal responsibility to transmit history. This suggests that memory transmission channels are weakened and that school-based strategies should intentionally incorporate family and community participation, including testimony collection and shared heritage activities [7, 8].

Table 4.
Frequency of levels by indicators of Dimension 4: Intergenerational transmission of memory

Indicator	High (n)	High (%)	Medium (n)	Medium (%)	Low (n)	Low (%)
Grandparents transmit historical knowledge	5	4.2	13	10.8	7	5.8
In my family, it is common to tell stories	4	3.3	14	11.7	6	5.0
I have learned local historical traditions	6	5.0	12	10.0	8	6.7
Parents encourage me to preserve local history	3	2.5	11	9.2	10	8.3
I feel responsible for transmitting local history	2	1.7	15	12.5	9	7.5

Note: Percentages are calculated over n = 120 students [8].

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Table 5.
Overall frequency by levels for the variable 'Local historical memory in students', by dimensions.

Dimension	High (n)	High (%)	Medium (n)	Medium (%)	Low (n)	Low (%)
D1: Collective construction of memory	28	23.3	66	55.0	26	21.7
D2: Social context influence on memory	24	20.0	63	52.5	33	27.5
D3: Group identity based on local history	26	21.7	68	56.7	26	21.7
D4: Intergenerational transmission of memory	22	18.3	64	53.3	34	28.3

Note: Percentages are calculated over n = 120 students and may differ from preliminary drafts due to rounding corrections. [21].

The predominance of the medium level (between 52.5% and 56.7% across dimensions) indicates that students possess partial knowledge and intermittent practices related to local historical memory, but they still require didactic support to integrate narratives, interpret heritage artifacts, and engage in sustained transmission practices. Consequently, the diagnostic profile calls for a technodidactic model that integrates immersive heritage visualization, participatory storytelling, critical literacy, and community engagement [9, 12].

Design implications for the technodidactic model. Based on the diagnostic findings, the model was structured around five interrelated dimensions: (1) participatory-constructive pedagogical design, (2) integration of 3D geovisualization and VR/AR heritage resources, (3) intuitive usability-oriented interfaces, (4) cultural contextualization of content to Lambayeque heritage, and (5) formative evaluation and feedback cycles. This structure responds to the detected weaknesses by ensuring that technology use is guided by pedagogy, accessible to students, and anchored in culturally meaningful narratives [12, 14].

The participatory-constructive dimension prioritizes inquiry tasks where students work with oral testimonies, local legends, and museum resources to build collective narratives. The immersive technology dimension addresses weak monument recognition by enabling virtual tours and spatial reconstructions of heritage sites. The usability dimension ensures that interfaces do not become barriers to learning and that resources remain inclusive for diverse student digital skills. The cultural contextualization dimension guarantees that narratives and assets are relevant to Lambayeque, while formative evaluation incorporates rubrics, peer feedback, and reflection journals to monitor progress in memory construction and identity development [9, 18].

For implementation, the model proposes a sequence of learning units organized in cycles of: explore (heritage discovery), interpret (source analysis and narrative building), create (digital storytelling and transmedia production), and share (community dissemination and intergenerational dialogue). Each cycle can be carried out through classroom sessions and out-of-school activities, including guided museum visits, community interviews, and collaborative mapping. This cyclical design aims to strengthen sustained practice rather than isolated activities, addressing the observed deficits in continuity and responsibility for transmission [8, 17].

Finally, the model integrates teacher professional development as a transversal requirement. Teachers are expected to facilitate inquiry, guide ethical handling of testimonies, and orchestrate technology use within coherent learning goals. This responds to evidence that successful digital innovation depends on teachers' capacity to design, mediate, and assess learning experiences rather than merely operate tools [18, 19].

4. Discussion

The diagnostic predominance of medium levels across all dimensions suggests that local historical memory is present but weakly consolidated. This pattern resembles findings in other Latin American contexts where students recognize certain cultural elements but do not integrate them into a coherent

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identity narrative due to discontinuities in pedagogical mediation and limited opportunities for participatory meaning-making [2, 3].

Regarding Dimension 1, students' relative receptiveness to legends and oral narratives supports the argument that non-formal community storytelling remains a powerful entry point for memory strengthening. However, the weaker perception of monuments indicates that built heritage requires guided interpretation to become a meaningful memory device, consistent with studies showing that heritage attachment emerges when learners can connect places with narratives, emotions, and community practices [6, 10].

The deficits in Dimension 2, especially in media influence awareness, are highly relevant because historical interpretation increasingly circulates through digital ecosystems. Research on the role of the press and public perception indicates that media can legitimize certain interpretations while marginalizing others, shaping collective understandings of heritage. Therefore, integrating critical digital literacy into the technodidactic model is not optional; it is necessary to help students evaluate sources, recognize narrative strategies, and avoid uncritical reproduction of stereotypes about local history [2, 11].

Dimension 3 revealed that history is more frequently perceived as part of individual identity than as a mechanism for peer cohesion. This indicates that school practices may not yet be generating collective projects where students experience history as shared work and shared belonging. Collaborative digital storytelling and participatory mapping can address this gap by transforming historical knowledge into a collective product that requires coordination, dialogue, and negotiated meaning [9, 12].

The fragile profile in Dimension 4 highlights a broader social change: intergenerational transmission is weakening as families face time constraints, changing communication habits, and shifting cultural priorities. Memory research emphasizes that family storytelling is a key channel for sustaining continuity; when it weakens, schools can play a bridging role by facilitating intergenerational dialogue through testimonies, community interviews, and digital archives. This supports the inclusion of a 'share' phase in the model where students disseminate their productions to families and community actors [7, 8].

The model's emphasis on VR/AR and 3D geovisualization is supported by evidence that immersive visualization can intensify place attachment, improve understanding of spatial-historical change, and create new opportunities for interpreting heritage. In contexts where physical access to sites may be limited or where sites have changed, virtual representations can support continuity and enable learners to compare historical layers through interactive exploration [14, 15].

At the same time, the literature warns that technological innovation can fail if it replicates transmissive pedagogy. The effectiveness of AR and classroom platforms depends on instructional design, teacher mediation, and formative evaluation. The proposed model, therefore, includes usability and teacher professional development as essential conditions, aligned with research emphasizing that teacher competence in digital pedagogy determines the educational value of ICT integration [17, 18].

Overall, the findings and the derived model indicate that strengthening local historical memory in Lambayeque requires an articulated approach that integrates cultural contextualization, participatory narrative work, critical literacy, immersive heritage visualization, and intergenerational engagement. Such integration moves local history beyond memorization and positions it as a formative process that supports identity, citizenship, and sustainable heritage awareness in adolescents [1, 20].

5. Conclusions

The study diagnosed a predominance of medium levels of local historical memory among secondary students in Lambayeque, with weaknesses particularly evident in the interpretation of monuments, awareness of media influence on historical narratives, and intergenerational responsibility for memory transmission. These deficits indicate that local memory is present but not sufficiently consolidated through sustained educational and community practices [1, 2].

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Based on the diagnostic profile, a technodidactic model was structured in five dimensions: participatory-constructive pedagogical design, integration of 3D geovisualization and VR/AR resources, intuitive usability interfaces, cultural contextualization of heritage content, and formative evaluation cycles. This structure ensures that technology use is guided by pedagogy and aligned with culturally meaningful learning objectives [12, 14].

The model includes cyclical learning units (explore, interpret, create, share) that combine immersive experiences, digital storytelling, and community dissemination to strengthen identity and collective narrative construction. This design directly addresses the observed need to move from intermittent recognition of local history toward sustained practice that encourages students to become active producers and transmitters of local memory [8, 9].

Content validation through expert judgment supported the coherence, relevance, and feasibility of the proposed model for the Lambayeque public secondary context. The model can serve as a transferable reference for similar settings where historical memory is weakened and where technology integration must be pedagogically structured to generate meaningful learning and community impact [18, 19].

In summary, the research concludes that a context-sensitive technodidactic model has strong potential to strengthen local historical memory by transforming heritage resources into interactive, reflective, and community-connected learning experiences that support identity formation and culturally grounded citizenship among adolescents [6, 20].

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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