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A Crowdsourcing-Based Digital Storytelling Platform for Preserving Intangible Cultural Heritage: A Case Study of Southern Thai Textiles

Supaporn Chai-Arayalert *, Supattra Puttinaovarat and Wanida Saetang

Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Surat Thani 84000, Thailand; supattra.p@psu.ac.th (S.P.); wanida.sae@psu.ac.th (W.S.)
* Correspondence: supaporn.chai@psu.ac.th

Abstract

The preservation of tacit knowledge embedded in Southern Thai textiles remains a significant challenge because much of this knowledge is dispersed across private households and is inadequately supported by conventional object-centered documentation systems. This study developed a crowdsourcing-based digital storytelling platform that enabled communities to document, organize, and disseminate knowledge related to Southern Thai textile heritage. The platform integrated community participation, structured narrative authoring, and knowledge organization within a socio-technical system designed for cultural heritage documentation. To guide its development, the study proposed the Crowdsourced-Storytelling Intangible Cultural Heritage Framework (CS-ICH Framework) and operationalizes it through requirements analysis, iterative prototyping, and empirical user evaluation. The evaluation results indicated high levels of user satisfaction and positive user perceptions regarding knowledge accessibility, content organization, and the platform's support for heritage preservation. These findings suggested that participatory digital platforms can effectively facilitate the documentation and dissemination of locally embedded cultural knowledge that is difficult to capture through conventional institutional systems. This study contributed to digital heritage research by providing a potentially transferable framework and design principles for integrating crowdsourcing and digital storytelling within platforms designed to preserve and transmit intangible and community-held cultural heritage.

Keywords: crowdsourcing; digital storytelling; intangible cultural heritage; Southern Thai textiles

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1. Introduction

Southern Thai textiles are well-established as significant cultural heritage resources, valued not only for their aesthetic and technical qualities but also for their close connections to local knowledge, cultural identity, and community life. In many weaving communities, textiles function as more than utilitarian objects or craft products; they embody local histories, beliefs, social relations, and cultural practices transmitted across generations [1,2].

Despite this significance, the preservation and documentation of Southern Thai textiles face persistent structural challenges. Many textiles remain privately held within households and communities rather than formal institutional collections. This results in dispersed artifacts, fragmented documentation, and uneven access to reliable contextual information [2,3]. At the same time, much of the associated knowledge—encompassing

motif meanings, ritual uses, provenance, and community narratives—resides primarily as tacit knowledge embodied in the practices of artisans, custodians, and local communities. When such knowledge is not systematically recorded, it becomes vulnerable to loss as knowledge holders age, practices change, or transmission weakens [4,5].

These issues reflect broader concerns in digital cultural heritage research, where conventional systems often prioritize object-level description while providing limited support for contextual meaning and lived cultural experience. In response, recent research has increasingly emphasized participatory approaches and digital infrastructures capable of capturing distributed knowledge beyond institutional collections [6,7]. Two approaches are particularly relevant in this context. First, crowdsourcing expands documentation capacity by enabling distributed contributors—such as community members, artisans, and cultural practitioners—to provide knowledge and evidence that institutions alone may not be able to capture [8,9]. Complementing this, digital storytelling supports the communication of cultural meaning through narrative and multimedia, thereby connecting heritage objects to their social and cultural contexts [10,11]. Together, these approaches offer a complementary basis for overcoming the limitations of object-centered documentation.

However, while crowdsourcing and digital storytelling have each been widely studied, few digital platforms integrate participation, contextual narrative, and structured knowledge organization within a single socio-technical system. Existing initiatives often emphasize either large-scale contribution or narrative presentation, while devoting less attention to how contributed content can be systematically organized, linked, searched, and reused over time. This limitation is especially pronounced in the case of Southern Thai textiles, where heritage is dispersed, community-held, and deeply dependent on contextual interpretation [2,5,12].

To address this gap, this study implemented and evaluated a digital platform that integrates crowdsourcing and digital storytelling to support the systematic collection, organization, dissemination, and retrieval of culturally contextualized knowledge related to Southern Thai textile heritage.

This study contributes in four ways. First, it proposes the CS-ICH Framework, which articulates how community participation, contextual storytelling, and ICH knowledge organization can be integrated within a digital preservation environment. Second, it develops and evaluates a prototype platform that operationalizes these principles through role-based workflows, structured story creation, and a searchable knowledge repository. Third, it provides empirical evidence—drawn from usability testing, task performance data, and post-use perception measures—demonstrating that the integrated platform is both technically feasible and positively received by target user groups. Fourth, it derives design principles for participation workflows, narrative templates, and knowledge organization structures that collectively enable community-centered digital platforms to support the documentation and reuse of tacit cultural knowledge that is difficult to capture through conventional institutional systems.

Drawing on a post-digital museum perspective, this study treats digital participation not as a supplementary feature but as integral to the institutional mission, governance structures, and operational workflows of heritage organizations [13,14]. The platform is conceived as a participatory infrastructure that distributes content responsibilities from institutions to communities, while addressing practical obligations—such as moderation and governance—through its socio-technical design. Institutional readiness and long-term sustainability are acknowledged as important directions for future investigation.

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature; Section 3 describes the research methodology; Section 4 presents the platform

design and evaluation results; Section 5 discusses the findings and their implications for digital heritage practice.

2. Literature Review

2.1. Southern Thai Textiles as Intangible Cultural Heritage

Southern Thai textiles should be understood not only as material artifacts but also as carriers of intangible cultural heritage (ICH). Their significance extends beyond aesthetic or utilitarian qualities to include the knowledge, skills, cultural meanings, and social memories embedded in weaving practices. In weaving communities, textiles are closely connected to local identity, symbolic interpretation, and intergenerational knowledge transmission [2,15]. Southern Thailand has long been shaped by intercultural exchange among Malay, Chinese, Indian, and Thai traditions, and this historical interaction is reflected in the diversity of regional textile practices. Many weaving traditions develop within household and community-based production systems, where weaving functions not only as an economic activity but also as a culturally embedded practice through which skills, pattern knowledge, and aesthetic judgment are transmitted through observation and experiential learning [2,15]. Consequently, the heritage value of these textiles lies not only in the finished cloth but also in the processes of making, interpreting, and transmitting knowledge within communities. Contemporary heritage research increasingly emphasizes this broader socio-cultural perspective, highlighting that the preservation of textile heritage requires attention to living practices and knowledge systems rather than solely to the conservation of physical artifacts [16].

This perspective aligns closely with current work in digital cultural heritage. Recent reviews show that the field has moved beyond digitizing collections for storage and display toward more interactive, participatory, and interpretive models of engagement. Lian and Xie [16] identified participation, accessibility, and interdisciplinary digital innovation as major trajectories in digital cultural heritage research, while Zhang et al. [17] emphasized that digital heritage initiatives are increasingly assessed in terms of inclusion, engagement, and the capacity to support meaningful public contribution rather than passive access alone. Collectively, these developments indicate that heritage digitization is now expected to support not only preservation but also dialogue, co-creation, and knowledge circulation.

These shifts toward participation, co-creation, and meaningful public contribution carry particular significance for textile heritage, where weaving knowledge is often tacit, embodied, and contextual, and thus resistant to conventional forms of digital documentation [16,18]. This is especially relevant for the case of Southern Thai textiles, where knowledge is socially held, unevenly documented, and deeply tied to community practice.

The preservation challenges outlined above are concretely illustrated by the case of Namuensri textiles. This tradition, rooted in Namuensri Subdistrict, Na Yong District, Trang Province, is widely recognized not only for the quality of its woven cloth but also for the depth of cultural knowledge embedded in its production practices. Chai-Arayalert et al. [12] identify Namuensri as a well-known weaving community in Trang and describe the local cloth tradition as a longstanding element of community heritage; yet, as in many heritage craft contexts, continuity depends on whether this knowledge can still be transmitted, interpreted, and reused by future generations.

For this reason, textile preservation cannot rely on artifact conservation alone. A platform that merely stores images or technical descriptions would preserve only part of the heritage value. What is also needed is a way to document stories, meanings, memories, and contextual explanations from weavers, community members, and other knowledge holders. This is where the literature begins to connect directly to the present study. Recent

work on crowdsourcing applications in cultural heritage shows that participatory platforms can support broader contribution, contextual enrichment, and new forms of public engagement, especially when storytelling functions are integrated into the system design. Ziku et al. [18] demonstrate that storytelling-oriented crowdsourcing tools open new avenues for participatory heritage engagement, while Ginzarly and Teller [19] note that digitally mediated heritage practices increasingly combine crowdsourcing, community participation, and platform-based communication to make heritage more resilient and inclusive.

Likewise, digital storytelling research suggests that narrative-based interfaces are especially valuable when heritage interpretation depends on meaning, emotion, and community voice rather than object description alone. Kasemsarn and Nickpour [20] argue that digital storytelling can deepen cultural engagement by linking heritage content with narrative structures adapted to contemporary digital and social media environments. A related study further demonstrates that digital interaction tools can enhance engagement with textile-related heritage interpretation [21]. Collectively, these studies suggest that the preservation of Southern Thai textile heritage requires more than documentation; it requires a participatory narrative infrastructure through which communities can contribute, explain, and contextualize knowledge. This provides the conceptual bridge to the next section, where crowdsourcing and digital storytelling are discussed as complementary mechanisms for designing such a platform.

2.2. Structural Challenges in Digital Documentation of Textile Heritage

Recent studies in digital cultural heritage suggest that digital documentation should not be limited to digitization, online cataloging, or image storage. Rather, it should be understood as a knowledge-organization process that shapes how heritage is recorded, interpreted, accessed, and reused. This shift is especially important in textile heritage, where cultural value often exceeds what can be represented through object-level metadata alone. Although conventional systems can record materials, techniques, dimensions, and provenance, they often fail to capture tacit knowledge, narrative context, and socio-cultural meaning in forms that remain searchable and reusable over time [4,22].

This limitation has been widely discussed in relation to textile and dress collections. Digital platforms for historical textiles are increasingly expected to support not only preservation but also accessibility and research reuse, requiring documentation systems that balance technical description with interpretive value [4]. Similarly, studies on metadata design for traditional clothing and fashion heritage archives show that generic cataloging frameworks are often insufficient because they cannot adequately represent cultural significance, contextual meaning, and the relationships surrounding textile objects [23,24]. As a result, the challenge of digital textile documentation is not simply how to store records but how to organize knowledge in ways that make heritage understandable, meaningful, and reusable.

A central issue in this discussion is the semantic gap between technical description and cultural understanding. Object-centered records may preserve information about what an object is, yet fail to explain why it matters, how it relates to community life, or what meanings it carries in practice. This problem becomes even more pronounced when heritage is dispersed across households, communities, and privately held collections, where documentation is often fragmented and contextual information remains unevenly captured [25,26]. Consequently, recent research increasingly emphasizes the need for documentation models that can connect structured records with broader interpretive, relational, and community-held knowledge.

These challenges indicate that effective digital documentation for textile heritage requires more than a repository function. It requires systems capable of integrating struc-

tured object description with contextual interpretation, narrative explanation, and flexible knowledge linking. In this respect, the limitations of conventional documentation point directly to the need for participatory approaches that allow communities and knowledge holders to contribute meanings, memories, and contextual information alongside technical records. This is where crowdsourcing and digital storytelling become especially relevant. Crowdsourcing offers a mechanism for gathering distributed knowledge from weavers, community members, and other contributors. Digital storytelling, in turn, provides a means of organizing that knowledge into narrative forms that preserve cultural context and make heritage more accessible and meaningful to wider audiences.

2.3. Crowdsourcing in Cultural Heritage Contexts

Crowdsourcing has emerged as a significant paradigm in digital cultural heritage research, offering a mechanism through which documentation capacity extends beyond the institutional constraints of object-centered collection practices. By involving the public and communities in contributing information, images, experiences, and interpretations, crowdsourcing enables heritage systems to capture distributed knowledge that institutions alone cannot readily access [7,27]. Large-scale initiatives such as Wiki Loves Monuments demonstrate how crowdsourcing can mobilize widespread public participation to document built heritage at a scale beyond the capacity of any single institution [28]. In heritage contexts, however, the significance of crowdsourcing lies not merely in increasing data volume but in mobilizing situated knowledge from people with direct relationships to the heritage itself.

The literature broadly distinguishes between crowdsourcing for data expansion and crowdsourcing for knowledge co-creation. The former focuses on tasks such as tagging, transcription, or media contribution, whereas the latter involves richer contributions such as narratives, local explanations, and contextual interpretation. For heritage domains characterized by tacit and community-held knowledge, the second form is especially important because cultural meaning is often not recoverable through technical documentation alone [18,29]. Tricarico et al. [30] further illustrate this distinction in the context of intangible heritage, showing how crowdsourcing can serve as a mechanism for territorial knowledge co-creation when participation is structured around community practice rather than simple data input.

Effective crowdsourcing also depends on understanding what motivates contributors to participate and sustain engagement. Shiri et al. [31] find that perceived interactivity, relationship quality, and psychological ownership play significant roles in sustaining contributor engagement within online crowdsourcing communities. These factors are particularly relevant in heritage settings, where participation is often driven by cultural pride, identity, and a sense of stewardship rather than extrinsic incentives. At the same time, Zhang et al. [32] caution that volunteer engagement in cultural heritage crowdsourcing is frequently imbalanced across tasks and contributors, pointing to the importance of task design that distributes participation equitably and sustains long-term community involvement.

Beyond these motivational considerations, prior studies consistently stress that effective crowdsourcing also depends on structured participation design. Clear tasks, role differentiation, review processes, and quality-control mechanisms are essential if contributed content is to become credible, organized, and reusable. Pastor Pérez and Colomer [33] extend this argument by examining how authorized participation frameworks in cultural heritage shape what kinds of contributions are deemed legitimate, raising important questions about governance, inclusion, and community voice in participatory documentation systems. Crowdsourcing in cultural heritage should therefore be treated as a socio-technical

process rather than a simple input mechanism—one in which participation design, governance structures, and community relationships collectively determine the quality and sustainability of contributed knowledge.

2.4. Digital Storytelling in Cultural Heritage and Design Considerations

If crowdsourcing helps to gather distributed heritage knowledge, digital storytelling helps to make that knowledge culturally meaningful and interpretable. In digital heritage research, storytelling is increasingly understood not simply as a mode of presentation but as an interpretive mechanism that connects objects to people, places, memory, and lived experience. This is particularly important where meaning is contextual and experiential rather than fully captured by descriptive fields. Through narrative and multimedia, digital storytelling can reduce the semantic gap that often limits object-centered heritage documentation [34]. Studies on audience engagement further confirm that storytelling formats—particularly interactive and documentary forms—significantly enhance how users connect with and interpret heritage content [11].

The literature suggests that storytelling is especially valuable for communicating layered meaning. Text, images, audio, and video can represent personal memories, place-based contexts, and cultural practices that are difficult to convey through standard metadata alone. In textile heritage specifically, narrative layers are critical because the significance of a textile often depends on who made it, why it was used, and how it was remembered within community life. Hauser et al. [35] demonstrate this in the context of silk heritage, showing how multimodal narratives in museum settings enable richer interpretations of textile objects than object-level description alone. Similarly, Chai-Arayalert et al. [15] show that digital environments designed to support handicraft co-learning can strengthen intergenerational transmission of craft knowledge, reinforcing the value of narrative-centered approaches to textile heritage.

Studies also point to the importance of participatory storytelling, in which communities contribute not only content but also interpretation, thereby repositioning digital heritage platforms as environments for collaborative interpretation and co-production of cultural meaning, rather than as instruments of unidirectional dissemination [7,36]. Bala et al. [37] extend this argument by demonstrating how stories function as boundary objects that enable community members—including those from marginalized groups—to articulate heritage meanings that would otherwise remain invisible in institutional archives. Davidson and Reid [38] similarly illustrate how participatory digital storytelling, when anchored in local community practice, can produce online archives that reflect lived heritage rather than institutionally curated narratives.

Xiao et al. [39] further show that this relationship is bidirectional: digital storytelling can itself function as a persuasive mechanism that motivates creative crowdsourcing participation, suggesting that narrative design may strengthen community contribution, as well as interpretation. However, such potential depends on careful design. Story-authoring tools must reduce contribution burden, support multimedia integration, and provide enough structure to ensure consistency, while remaining sensitive to issues of disclosure, cultural rights, and community appropriateness [31]. The literature reviewed above indicates that digital storytelling is not merely a medium of presentation but a core mechanism through which heritage meaning is constructed, shared, and preserved in participatory digital environments.

2.5. Socio-Technical Perspective

A socio-technical perspective provides a useful integrative lens for understanding why crowdsourcing, storytelling, and knowledge organization must be designed as inter-

connected elements rather than standalone features. Information systems do not become effective through technology alone; they succeed only when technical components are aligned with user roles, participation norms, workflows, governance mechanisms, and actual usage contexts. In digital heritage settings, this alignment is especially important because preservation depends not only on storing information but also on enabling people and communities to contribute, review, interpret, and reuse knowledge in meaningful ways [12,40–42].

From this perspective, a digital heritage platform can be understood as a socio-technical infrastructure comprising three interdependent dimensions: technology and data structures, workflows and governance processes, and users and communities. The literature suggests that preservation-oriented platforms become credible and sustainable only when these dimensions work together coherently. Enabling content submission without review mechanisms may increase data volume while diminishing credibility; similarly, presenting narratives without structured knowledge organization may enhance user engagement without supporting long-term retrieval or reuse. For Southern Thai textiles, where knowledge is dispersed, contextual, and community-dependent, this perspective is particularly relevant. Synthesizing the literature reviewed in Sections 2.1–2.5, it becomes evident that effective digital preservation requires an integrated system combining participation, contextual storytelling, and structured knowledge organization within a coherent socio-technical design. Beyond technical integration, however, this perspective also raises questions about how such systems are governed, sustained, and positioned within broader institutional practice—questions that the post-digital museum discourse addresses directly.

This study is situated within the post-digital museum discourse, where digital participation is understood not as a technical add-on but as embedded within the mission, governance, and workflows of heritage institutions [13,14]. The platform developed here is therefore conceived as a participatory infrastructure that redistributes documentation and interpretive responsibilities from institutions to communities—enabling weavers, custodians, and community members to contribute, organize, and share heritage knowledge that conventional institutional systems cannot readily capture. This redistribution, however, introduces practical obligations: staff moderation, governance of contributor rights, and long-term maintenance of community-contributed knowledge. The present study addresses these through its socio-technical design—incorporating role-based moderation workflows, structured contribution processes, and a searchable knowledge repository—while acknowledging that institutional readiness and operational sustainability remain important directions for future investigation.

2.6. Conceptual Framework of the Study

Although crowdsourcing, digital storytelling, and intangible cultural heritage (ICH) knowledge organization have each been widely discussed in prior research, they are rarely integrated into a coherent socio-technical system for heritage preservation. The literature reviewed in Sections 2.1–2.5 points to three persistent gaps. First, participatory heritage platforms often prioritize contribution volume—such as image submission, tagging, or basic user-generated input—without adequately transforming these contributions into structured knowledge outputs that support long-term preservation and reuse [27]. Second, institutional documentation systems remain better suited to accessible and formally managed collections than to dispersed, community-held heritage, where knowledge is privately retained, tacit, and unevenly documented [6,26]. Third, digital documentation continues to face a semantic gap: object-centered records can capture materials, techniques, and other physical attributes, yet often fail to convey the contextual meanings, memories, and socio-cultural relationships that define the character of living heritage [4,43].

These gaps are especially salient in the case of Southern Thai textiles, where heritage is dispersed across households and communities, and where knowledge is embedded in practice, oral interpretation, and lived cultural contexts. This study therefore proposes the Crowdsourced-Storytelling ICH Framework (CS-ICH Framework), illustrated in Figure 1. This framework conceptualizes digital preservation as an emergent outcome of the interaction among three interdependent components: crowdsourcing, digital storytelling, and ICH-based knowledge organization. Rather than treating these as separate functional layers, the framework positions them as mutually reinforcing mechanisms within a single socio-technical system.

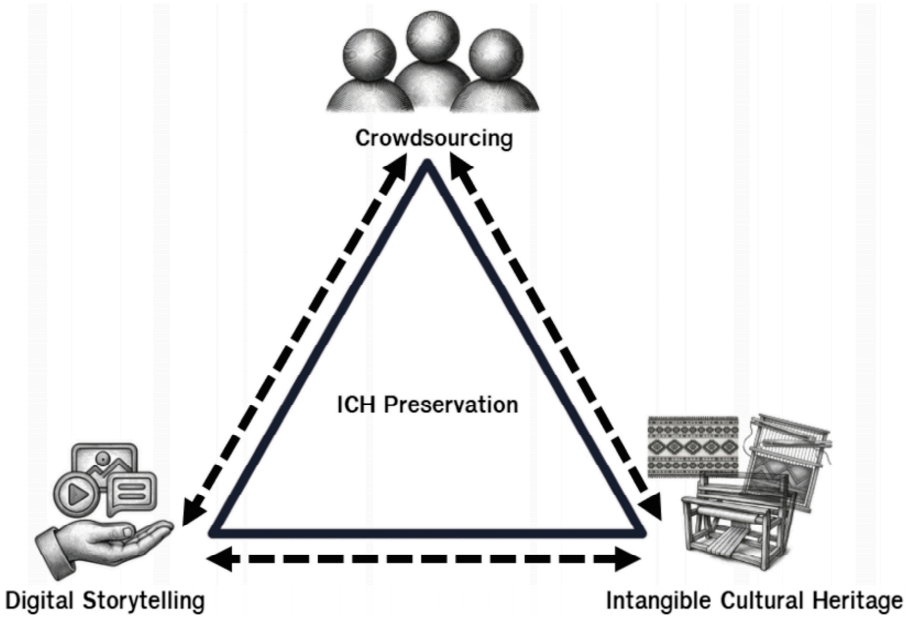

Figure 1. Conceptual framework for preserving intangible cultural heritage through the integration of crowdsourcing and digital storytelling. Solid lines represent the main structure of integration, while dashed lines indicate the interactive relationships among the three components in the preservation process.

In this framework, crowdsourcing functions as the participation mechanism through which weavers, custodians, and community members contribute distributed knowledge, narratives, and supporting evidence that would otherwise remain outside institutional archives. Digital storytelling functions as the meaning-making mechanism, transforming contributed data into contextual narratives that communicate relationships among textiles, people, places, and cultural practices through structured and multimedia forms. ICH knowledge organization functions as the organizing mechanism, ensuring that narratives and evidence do not remain isolated items but are linked, categorized, searchable, and reusable within a longer-term heritage knowledge repository.

Taken together, the framework proposes that preservation potential in digital environments depends not on any single feature but on the alignment of participation, interpretation, and knowledge structuring. From a socio-technical perspective, this alignment requires at least four operational components: role-based participation, submission and review workflows, story-authoring support, and an ICH-organized searchable repository. This framework provides the theoretical and design rationale for the platform developed in this study and guides the subsequent design, implementation, and evaluation phases.

3. Research Methodology

Design Science Research (DSR) is an established methodological paradigm in information systems research, concerned with designing and evaluating technological artifacts to address identifiable organizational or societal problems [44]. The methodology emphasizes iterative processes of problem identification, artifact development, and evaluation, operationalized in this study through three phases: requirements analysis, platform development, and platform evaluation (as illustrated in Figure 2).

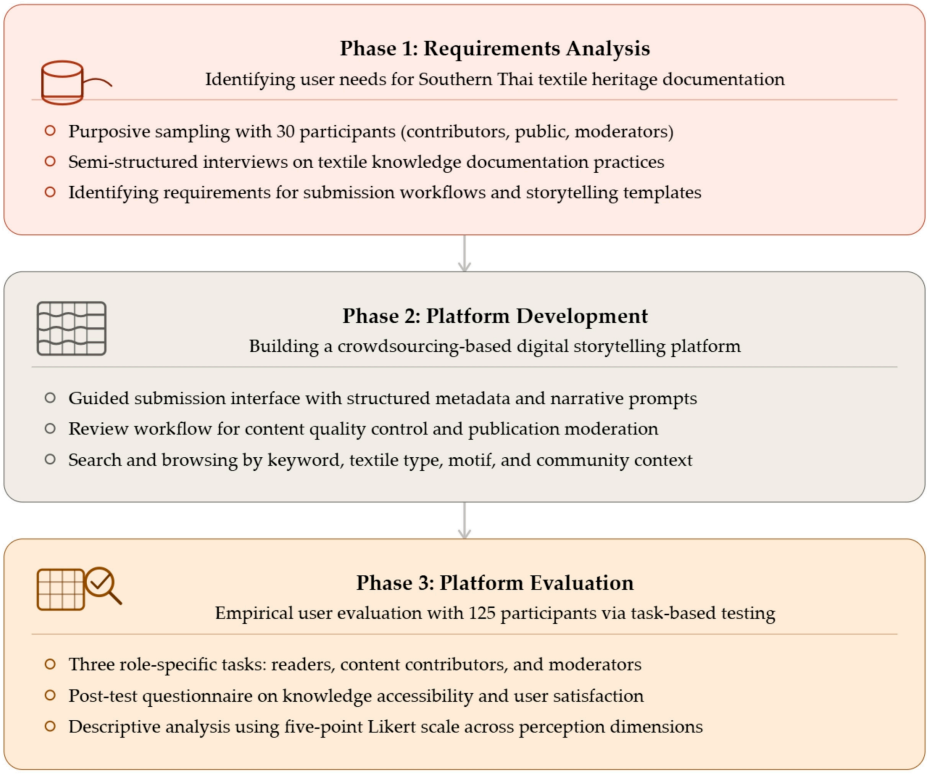

Figure 2. Stages of the research process.

3.1. Requirements Analysis

The requirements analysis phase aimed to identify user needs and expectations related to the documentation and sharing of Southern Thai textile heritage knowledge.

A total of 30 participants were selected using purposive sampling to represent key stakeholder groups relevant to the proposed platform. The first group comprised content contributors (n = 10) (10 participants), representing individuals who intended to submit textile-related information to the platform. These contributors included owners of handwoven textiles, individuals who possessed knowledge or documentation about local textiles, and community members who wished to share and disseminate textile knowledge through the digital platform. The second group consisted of members of the broader public (15 participants), representing potential platform users who might browse, learn from, or contribute to the system. The third group consisted of reviewers and moderators (5 participants), including community leaders, weaving group administrators, and traditional weavers, whose experiential knowledge of weaving processes, textile meanings, and cultural practices positioned them to validate and organize contributed information within the platform. This sample size was appropriate for qualitative requirement elicitation, where the goal is thematic insight rather than statistical generalization. Participants were selected based on their relevance to anticipated user roles and their ability to provide insight into documentation practices, preservation needs, and digital access expectations.

Semi-structured interviews were conducted to explore participants' experiences and perspectives regarding the documentation of textile heritage knowledge. The interviews covered three main areas. First, participants discussed current practices for documenting textile knowledge and cultural narratives, including what information was typically recorded and in what form. Second, they described challenges in preserving and sharing such knowledge, particularly when transmission occurred informally through observation, oral explanation, or community interaction rather than formal archival systems. Third, participants were asked about their expectations for a digital platform supporting community-based contribution, access, and reuse of textile heritage knowledge. The data were analyzed to identify key information types and system requirements, which informed the design of submission workflows, storytelling templates, review mechanisms, and search functions, each corresponding to a core component of the proposed platform.

3.2. Platform Development

The development phase translated the requirements analysis findings into a functional digital artifact—in DSR terms, the designed system instantiating the proposed framework. Based on the qualitative results, the platform was designed to support three functions: community contribution, structured storytelling, and organized access to published heritage records.

The design emphasized usability, low-barrier participation, and structured knowledge organization. Because heritage documentation often occurred in informal contexts and involved users with different levels of digital literacy, the platform adopted simplified interaction flows and clearly defined steps. Core features included a guided submission interface, structured metadata fields, support for image- and text-based entries, and narrative prompts to help users document both object-level details and contextual cultural meanings.

Beyond the contribution interface, governance mechanisms were embedded in the design. A review workflow was incorporated to support content quality and publication control, reflecting participants' concerns about reliability and consistency. Search and browsing functions were included to enable retrieval by keyword, category, textile type, motif, technique, and community context. The prototype was refined iteratively through internal review of interface logic and task flow, and the final version served as the basis for empirical evaluation, described in the following section.

3.3. Platform Evaluation

The platform evaluation involved 125 participants recruited through convenience sampling to represent general platform users. Participants were required to be at least 18 years old and able to use mobile or web-based applications. This group was intended to represent potential end users who might browse, learn from, or contribute to the platform.

Convenience sampling was appropriate at this stage because the purpose was to assess user perceptions after direct interaction with the platform rather than to estimate population parameters. The sample provided sufficient data for descriptive analysis of usability, knowledge access, and overall platform acceptance.

The sample was predominantly female (56.0%) and largely composed of young adults aged 20–29 (52.0%), followed by those aged 30–39 (25.6%) and 40 years or above (22.4%). Most respondents held a bachelor's degree (72.0%). In terms of familiarity with Thai textiles, half of the participants reported very low prior familiarity (50.0%), while 34.4% indicated low to moderate familiarity, and 15.2% reported high to very high familiarity. Experience with similar digital platforms varied, with most reporting occasional use (58.4%). Participants were permitted to indicate multiple access devices; the most commonly reported was mobile phones (70.0%), followed by tablets (30.0%) and computers (25.0%). This

sample size is consistent with comparable digital heritage usability studies, such as De Paolis et al. [45] and Szekely et al. [46], which report similarly sized evaluation cohorts for prototype-stage assessment of cultural heritage applications.

The system evaluation was conducted using task-based testing to simulate participants' interaction with the platform in a realistic usage scenario. Each session commenced with a standardized briefing in which participants were informed of the platform's purpose and provided with basic access instructions, with no additional training administered, in order to assess natural usability under conditions approximating real-world use.

Three role-specific task sequences were administered. First, readers and learners were asked to explore the platform by browsing and searching for textile-related stories or records using the search and category navigation functions. They then read a published story and reflected on the contextual knowledge conveyed and its perceived value for heritage understanding. Second, content contributors performed a simulated submission task using the structured contribution form. They were asked to attach supporting media such as photographs and descriptive text in order to evaluate the clarity of the submission process, the ease of completing the form, and the suitability of the storytelling template provided by the platform. Third, reviewers and moderators carried out tasks related to reviewing submitted content prior to publication. They examined the completeness, appropriateness, and credibility of the submitted information and decided whether to approve, request revision, or reject the content. This task was designed to assess the effectiveness of the review workflow and the platform's content quality control mechanisms.

Participants completed the assigned tasks at their own pace, with each session lasting approximately 9–12 min. Immediately after completing the tasks, participants were asked to complete a post-test questionnaire designed to capture their perceptions and experiences following interaction with the platform. The questionnaire consisted of three sections: participant demographics, perceived knowledge impact, and user satisfaction. The perception items assessed several aspects of the platform, including content accessibility, knowledge organization, clarity of presentation, usefulness for heritage documentation, and overall satisfaction with the system. All items were measured using a five-point Likert scale, ranging from strongly disagree to strongly agree. The collected data were analyzed using descriptive statistics, with mean and standard deviation calculated to summarize participants' perceptions across the measured dimensions.

3.4. Ethical Considerations

This study was approved by the Institutional Review Board of Prince of Songkla University (Approval No. PSU-HREC-2025-091-1-1). All participants were informed about the study objectives, the procedures followed, and their right to withdraw at any time without penalty. Written informed consent was obtained prior to data collection. All data were anonymized before analysis and treated as strictly confidential. No personally identifying information was disclosed in the reporting of results. These measures ensured full compliance with institutional ethical standards for research involving human participants.

4. Results

This section presents the findings from the development and evaluation of the crowdsourcing-based digital storytelling platform designed for documenting and disseminating knowledge related to Southern Thai textiles. The results are organized into three subsections. Section 4.1 reports findings from the contextual study and user requirements analysis that informed the system design. Section 4.2 presents the outcomes of platform design and development, and Section 4.3 reports the evaluation results.

4.1. User Context and Requirements

As described in Section 3.1, the requirements analysis identified a set of practical and functional requirements for a digital platform intended to support community-based documentation of Southern Thai textile heritage.

Participants consistently indicated that contribution procedures should be straightforward, intuitive, and low in cognitive burden, particularly because textile documentation often occurs in informal settings such as households or community spaces. Most contributors preferred taking photographs and providing brief descriptions rather than entering extensive text. This finding indicated that minimizing input burden is central to sustaining participation in community-based heritage documentation. In response, the platform adopted a step-based submission interface that streamlines data entry and simplifies the overall contribution process.

Readers and learners consistently highlighted the need to locate information quickly and navigate content efficiently. Participants expected both keyword search and thematic browsing, particularly across categories such as weaving techniques, motifs, communities, and usage contexts. These findings underscored the importance of retrieval design in supporting both discovery and learning. Accordingly, the platform integrated search and structured navigation features that enabled users to explore relationships among textiles, stories, and communities.

Participants reported that smartphones were the primary devices used when documenting textile objects in community environments. Because many artifacts were encountered outside formal institutional settings, contributors needed a system that supported immediate and convenient capture of information in the field. This highlighted the practical importance of accessibility in participatory heritage documentation. To address this need, a mobile-first design approach was adopted, enabling content capture and submission through portable devices in the field.

Reviewers and moderators emphasized the importance of quality control in a crowdsourced environment, particularly to ensure that submitted materials were accurate, relevant, and culturally appropriate before their release to the public. This finding indicated that participatory heritage systems required governance structures that maintain reliability without undermining openness. The platform therefore incorporated a review process through which moderators could assess submissions, provide feedback, and approve content prior to public release.

Participants indicated that contributors often need guidance when documenting textile-related narratives, especially to avoid omitting important contextual details such as origin, cultural significance, and usage. This suggested that narrative contribution was strengthened when open-ended input was supported by prompts. In response, a guided storytelling template was incorporated into the system, helping users organize contextual narratives while preserving flexibility for diverse forms of expression.

Participants showed a preference for visual documentation, particularly photographs, because these more effectively conveyed textile patterns, colors, and weaving details than text alone. Multimedia also enabled contributors to capture contextual elements that might be difficult to express verbally. This finding highlighted the value of multi-format documentation in heritage systems. Accordingly, the platform supported uploads of images and other media to enrich the representation of textile knowledge.

Participants recognized that contributors, reviewers, and readers perform different functions within the documentation process and therefore require distinct permissions and responsibilities. While this requirement was less strongly emphasized than usability and access issues, it remained important for maintaining procedural clarity. This informed

the design of a role-based workflow that differentiates contributor, reviewer, and reader functions within the broader participation structure.

Overall, the identified requirements highlighted that an effective platform for community-based textile documentation needed to balance usability, structured knowledge capture, and governance mechanisms. High-priority needs such as simplified submission, mobile accessibility, and efficient information retrieval emphasized the importance of reducing participation barriers, while features such as storytelling templates, multimedia support, and review workflows ensured that contributed knowledge remained structured, credible, and contextually rich. These requirements informed the subsequent system design, which translated the identified user needs into a platform architecture and workflow structure described in Section 4.2.

4.2. Platform Design and Development

Based on the requirements identified in Section 4.1, the platform was designed and developed as a modular digital environment integrating crowdsourcing and digital storytelling for cultural heritage documentation. Development followed an iterative prototyping approach, allowing continuous refinement of system functionality and interface design in response to user evaluation.

The proposed platform was designed as a three-layer architecture consisting of the presentation layer, application/service layer, and data layer, which together operated as an integrated heritage knowledge repository (Figure 3). The architecture was developed to support community contribution, narrative documentation, moderation, and knowledge retrieval within a unified digital environment. Rather than treating submission, storytelling, review, and access as independent functions, the platform integrated them into a coherent workflow that supported both participation and knowledge quality.

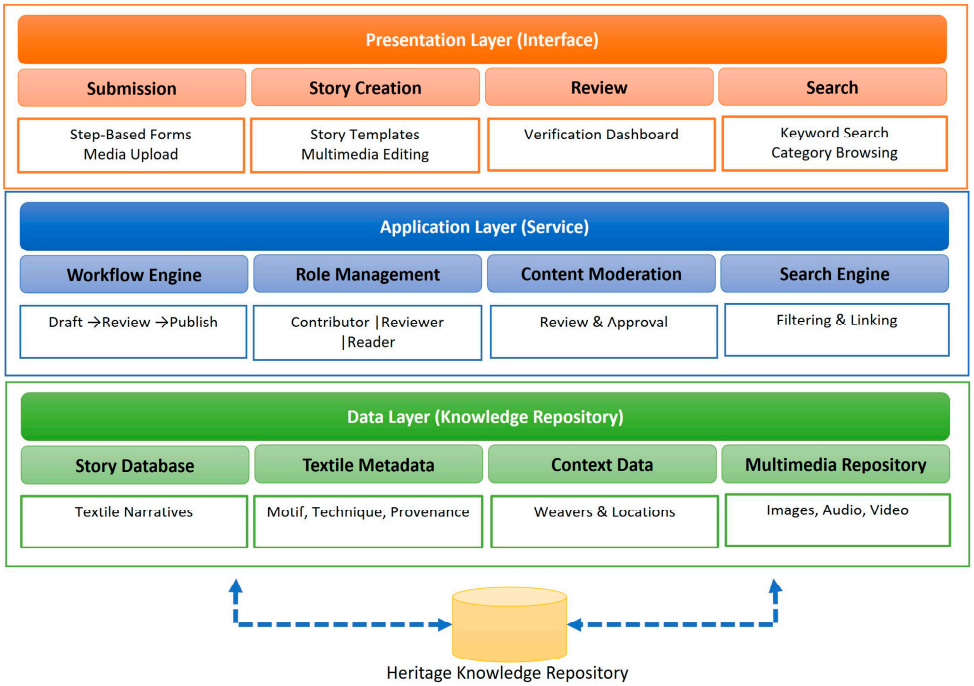

Figure 3. Three-layer platform architecture.

The architecture followed a socio-technical design perspective, recognizing that cultural heritage documentation involved not only technical systems but also human participation, cultural interpretation, and institutional governance. In the context of Southern Thai textile heritage, knowledge included not only textile attributes but also meanings,

memories, practices, and community contexts. The architecture therefore supported both structured metadata capture and narrative documentation while incorporating moderation and retrieval mechanisms to ensure credibility and long-term usability. In this sense, the platform functioned as a knowledge infrastructure that organized and connected community-generated cultural knowledge for preservation and reuse.

The presentation layer represented the user-facing environment through which contributors, reviewers, and readers interacted with the platform. It included four main components—the contribution interface, the story authoring interface, the review and moderation interface, and the search and navigation interface. The contribution interface supported structured data submission through step-based forms and media upload functions, enabling richer documentation of textile artifacts, weaving processes, and related cultural practices. The story authoring interface enabled contributors to create digital cultural narratives using story templates and multimedia editing tools, transforming fragmented experiential knowledge into structured cultural stories that could be preserved and shared. The review and moderation interface provided a verification dashboard and feedback functions for content assessment, allowing reviewers to examine submitted narratives, metadata, and attached media before publication and provide feedback when revisions were needed. The search and navigation interface supported access to published content through keyword search and category browsing, enabling users to discover stories, textile records, and related cultural information across themes, communities, and motifs. Figure 4 illustrates the user interfaces of (a) homepage, (b) storytelling, (c) gallery, and (d) contributor dashboard. The contributor submission interface is illustrated in Figure 5, which presents the four steps of the contributor workflow, including (a) entry of basic textile information, (b) creation of narrative story content, (c) media upload, and (d) submission review.

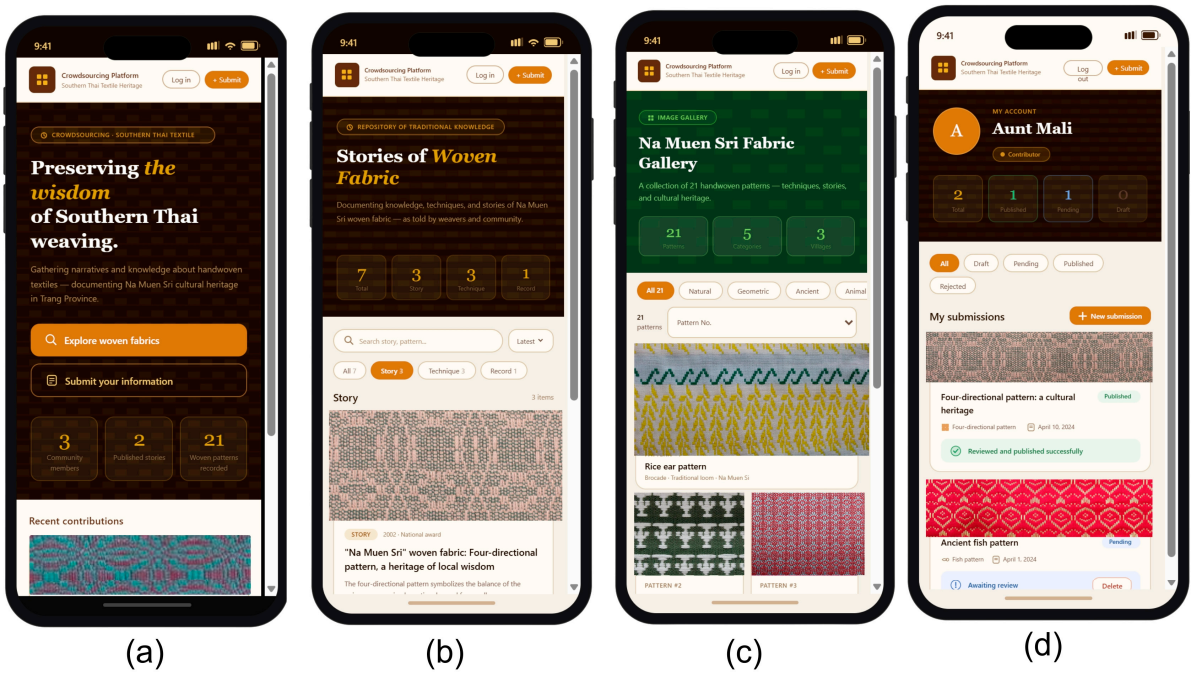

Figure 4. Examples of prototype user interfaces: (**a**) Homepage, (**b**) Storytelling Page, (**c**) Gallery, and (**d**) Contributor Dashboard.

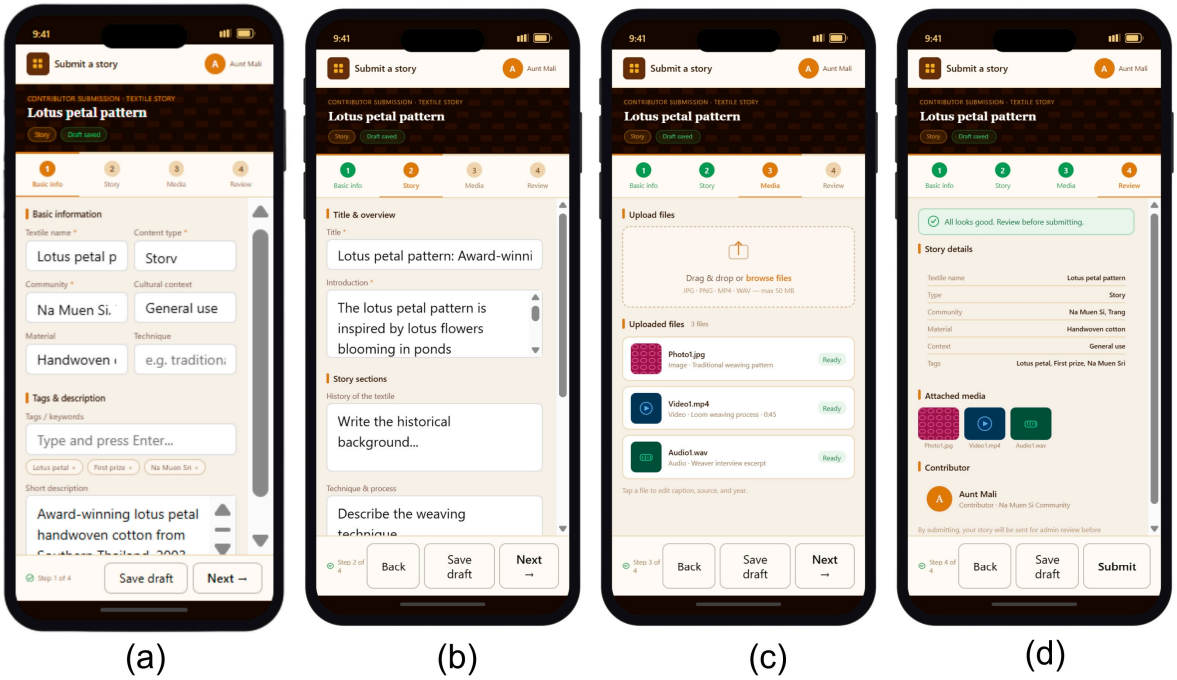

Figure 5. Contributor submission interface showing the four steps of the contributor workflow: (**a**) entry of basic textile information, (**b**) creation of narrative story content, (**c**) media upload, and (**d**) submission review.

The application/service layer managed the internal logic of the system and mediated interactions between the user interface and the repository. It included four core services—workflow management, role and permission management, the content moderation service, and the search and retrieval engine. The workflow management component organized the content lifecycle through a draft–review–publish sequence, ensuring that only verified content becomes publicly accessible. The role and permission management component regulated access according to user roles—contributor, reviewer, and reader—supporting accountability, editorial oversight, and appropriate governance of cultural knowledge. The content moderation service managed review and approval processes at the system level, recording content status, revision cycles, and moderation outcomes to help transform crowdsourced input into curated knowledge. The search and retrieval engine supported indexing, filtering, and linking across datasets, connecting stories, textile metadata, community information, and multimedia resources into searchable knowledge structures.

The data layer formed the persistent repository of the platform and was organized into four interconnected components—story repository, textile metadata records, community and contextual data, and multimedia repository. The story repository stored cultural narratives associated with textile objects, including historical background, symbolic meaning, and personal or community memories. The textile metadata records stored structured descriptive information such as motif, weaving technique, and provenance, providing the formal structure required for indexing, classification, and retrieval. The community and contextual data captured information about weavers, locations, and related cultural contexts. The multimedia repository stored images, audio, and video materials, enabling the preservation of visual, oral, and procedural knowledge that cannot be fully represented through textual description alone.

Although the architecture separated functions across layers, narratives, metadata, contextual information, and multimedia resources were linked into a connected knowledge structure rather than stored as isolated records. As a result, a textile entry could be explored not only as an object description but also as part of a broader network of stories,

communities, and cultural practices—enabling the platform to support the documentation, organization, retrieval, and reuse of community-generated cultural knowledge over the long term.

4.3. Evaluation

4.3.1. Knowledge-Related Outcomes

The prototype was evaluated to examine how users perceived the platform as an environment for organizing, accessing, and linking textile heritage knowledge. The evaluation involved 125 respondents who used the prototype system and subsequently completed a questionnaire measuring six dimensions of knowledge-related outcomes.

The results indicated that users perceived the platform positively in terms of its ability to structure and provide access to textile knowledge. The overall score across dimensions reached a mean value of 3.99 (*SD* = 0.83), indicating that respondents generally regarded the platform as an effective digital environment for documenting and accessing heritage knowledge (see Table 1).

Table 1. Knowledge-related Outcomes (125 participants).

Dimension	Mean	SD	Interpretation
Access and Retrieval (Question A1–A5)	4.16	0.78	High
Content Structure & Archiving (Question C1–C5)	4.08	0.80	High
Knowledge Linking (Question L1–L4)	4.02	0.86	High
Heritage Preservation Support (Question P1–P4)	3.96	0.79	High
Knowledge Infrastructure (Question K1–K5)	3.88	0.88	High
Knowledge Use (Question U1–U5)	3.84	0.88	High

Note: Responses were measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The interpretation of mean scores was based on a five-level scale: 1.00–1.80 indicating very low, 1.81–2.60 low, 2.61–3.40 moderate, 3.41–4.20 high, and 4.21–5.00 very high.

Access and Retrieval received the highest score (*M* = 4.16, *SD* = 0.78), indicating strong user recognition of the platform's ability to facilitate convenient discovery of textile-related information through search functions and structured browsing. This dimension examined ease of searching for needed information (question A1), exploration through category-based browsing (question A2), presentation of related content (question A3), accessibility of supporting media within stories (question A4), and users' understanding of information context (question A5). Participants reported that keyword search, category-based navigation, and embedded multimedia within stories supported efficient exploration of textile knowledge.

Content Structure and Archiving received the second-highest score (*M* = 4.08, *SD* = 0.80), indicating that users perceived the system as capable of organizing textile information systematically. This dimension examined the organization of textile knowledge (question C1), the integration of object-related and contextual information (question C2), the clarity of narrative explanations of textile meanings (question C3), the use of supporting media to enhance understanding (question C4), and the overall clarity of the information structure (question C5). The results suggested that the integration of storytelling templates with structured metadata supported the documentation of both object attributes and contextual narratives, enabling textile knowledge to include not only technical descriptions but also cultural meanings and social contexts.

Knowledge Linking evaluated whether users perceived relationships among different elements of textile heritage, including connections between textiles and communities (question L1), patterns and cultural meanings (question L2), links among content items supporting continued learning (question L3), and the ability to compare multiple stories or records (question L4). Although this dimension received a slightly lower score (M = 4.02, SD = 0.86) than Access and Retrieval, it remained within the high evaluation range. The findings suggested that the platform began to reveal relationships among knowledge elements, and these connections were expected to become more evident as the repository expanded and relational features continued to develop.

Heritage Preservation Support received a high score (M = 3.96, SD = 0.79), indicating positive user perceptions of the platform's role in safeguarding cultural knowledge. This dimension examined whether the platform helps document knowledge that might otherwise be lost (question P1), communicates community narratives to wider audiences (question P2), supports community participation in preservation (question P3), and contributes to the long-term preservation of cultural heritage (question P4). Participants generally agreed that the platform played a meaningful role in preserving textile knowledge and extending the reach of community narratives.

Knowledge Infrastructure (M = 3.88, SD = 0.88) captured users' broader perceptions of the platform as a digital environment for heritage knowledge management. This dimension assessed whether the platform systematically organizes textile knowledge (question K1), improves accessibility of knowledge (question K2), enables knowledge to be connected and extended (question K3), contributes to a digital textile knowledge repository (question K4), and functions overall as a knowledge infrastructure (question K5). Although the scores remained within the high evaluation range, their comparatively lower ranking suggests that users recognize the platform's potential while acknowledging that its long-term impact on knowledge preservation may become clearer as the repository expands beyond the prototype stage.

Reflecting a similar pattern, Knowledge Use received the lowest score among the six dimensions (M = 3.84, SD = 0.88), suggesting that users' perceptions of the platform's usefulness may strengthen as the repository expands and more content becomes available. Knowledge Use assessed the perceived applicability of the platform's content for educational, research, and cultural communication purposes. Specifically, it examined support for learning about handwoven textiles (question U1), use of information for educational or research purposes (question U2), communication of cultural knowledge (question U3), reduced time and location constraints through digital access (question U4), and convenient referencing of information (question U5).

The findings indicated that users recognized the platform as more than a simple data repository; rather, the system was perceived as a structured digital environment that effectively supports the organization, access, and dissemination of cultural heritage knowledge. This perception aligned with the platform's conceptual design, which was premised on knowledge organization and community participation functioning as mutually reinforcing dimensions of the platform experience.

4.3.2. User Satisfaction

In addition to knowledge-related outcomes, the study evaluated user satisfaction to examine how participants experienced the platform as an interactive environment for contributing and accessing textile heritage knowledge. User satisfaction was examined across multiple dimensions, including ease of interaction, interface quality, platform functional support, and content presentation, each of which may contribute differently to overall user acceptance and intention to continue use.

As seen in Table 2, the overall user satisfaction was high, with a mean score of 4.02 (*SD* = 0.84). This indicated that users generally perceived the platform as usable, coherent, and suitable for continued engagement.

Table 2. User Satisfaction (125 participants).

Dimension	Mean	SD	Interpretation
Ease of Interaction (Question ES1–ES4)	4.07	0.84	High
Interface & Visual Design (Question IS1–IS4)	4.04	0.81	High
Functional Adequacy (Question FS1–FS4)	4.02	0.84	High
Overall Satisfaction & Reuse Intention (Question OS1–OS4)	4.00	0.82	High
Content Presentation (Question CS1–CS4)	3.95	0.87	High

Note: Responses were measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The interpretation of mean scores was based on a five-level scale: 1.00–1.80 indicating very low, 1.81–2.60 low, 2.61–3.40 moderate, 3.41–4.20 high, and 4.21–5.00 very high.

Ease of Interaction received the highest score (*M* = 4.07, *SD* = 0.84). This dimension examined perceived ease of use (question ES1), speed with which users learned to use the platform (question ES2), clarity and smoothness of the workflow (question ES3), and overall satisfaction with the interaction experience (question ES4). Participants generally viewed the platform as easy to learn and operate. These findings suggested that the step-based interaction design reduced perceived complexity and supported a clear workflow, enabling users to complete contribution and exploration tasks with relatively little difficulty.

Interface and Visual Design also received a high evaluation score (*M* = 4.04, *SD* = 0.81). This dimension assessed whether the interface was well organized and visually appealing (question IS1), whether font size, colors, and visual elements were appropriate (question IS2), whether menu and button layout supported ease of use (question IS3), and overall satisfaction with the interface design (question IS4). The results indicated that the platform provided a visually coherent and readable interface, supporting intuitive navigation and contributing positively to the overall user experience.

Functional Adequacy assessed the extent to which the platform's functions sufficiently supported the tasks expected of contributors, reviewers, and readers (*M* = 4.02, *SD* = 0.84). This dimension examined whether the story submission function met user needs (question FS1), whether search and access functions were appropriate (question FS2), whether review and content management functions were usable (question FS3), and whether the platform's functions met overall expectations (question FS4). Respondents evaluated these functional components positively, suggesting that the platform's operational structure aligned well with the key processes required for documenting and managing textile heritage knowledge.

Overall Satisfaction and Reuse Intention (*M* = 4.00, *SD* = 0.82) suggested a positive disposition toward continued use and willingness to recommend the platform to others. This dimension evaluated overall satisfaction with the platform (question OS1), its suitability for preserving textile heritage (question OS2), intention to use it again in the future (question OS3), and willingness to recommend it to others (question OS4). The results indicated a positive disposition toward continued engagement, suggesting that the prototype was perceived not only as a test system but also as a potentially useful tool for ongoing heritage knowledge documentation and sharing.

Content Presentation Satisfaction received the lowest score among the satisfaction dimensions (*M* = 3.95, *SD* = 0.87). This dimension assessed whether story and textile infor-

mation presentation was engaging (question CS1), whether supporting media improved understanding (question CS2), whether the platform clarified cultural meanings (question CS3), and overall satisfaction with content presentation (question CS4). The findings suggested that users responded positively to the narrative and multimedia elements, while also indicating that further refinement in presentation design could improve engagement and interpretive clarity.

These findings indicated that user satisfaction was high across all evaluated dimensions. Strong ratings for interface design, ease of interaction, and platform functional support suggested that the system provided a usable and coherent environment for accessing and contributing textile heritage knowledge. Although content presentation received slightly lower ratings, it remained within the high range, indicating general approval while highlighting opportunities for further refinement.

5. Discussion

5.1. Platform Effectiveness and Design Implications

The findings indicated that the perceived effectiveness of the proposed platform was associated with the integration of participation design, narrative support, and knowledge organization within a single socio-technical environment. Across Sections 4.1–4.3, the results suggested that the platform performed better when contribution workflows, storytelling mechanisms, and retrieval structures were designed as mutually reinforcing components rather than as isolated features [41,42]. This finding contributes to discussions on intangible cultural heritage preservation by suggesting that preservation is not simply a matter of digitizing cultural materials but also of structuring community knowledge in ways that support contribution, interpretation, and reuse [4,5]. In this respect, the findings contribute to a growing body of evidence suggesting that crowdsourcing and digital storytelling may function as mutually reinforcing mechanisms for the documentation and organization of locally embedded cultural knowledge within accessible digital heritage resources [47].

One important finding concerned the central role of usability in enabling community participation. The requirements analysis revealed that contributors often documented textile knowledge in informal settings, such as households or community spaces, and relied primarily on mobile devices. This helped explain why dimensions related to ease of interaction and workflow clarity received the most favorable evaluations. In community-based heritage environments, contributors are rarely trained archivists; therefore, complex or highly formalized procedures could discourage participation [18,27]. The findings suggest that usability in this context should be understood not merely as interface convenience but as a prerequisite for inclusive participation. From a design perspective, this implies that heritage platforms should prioritize mobile responsiveness, simplified submission flows, and low-effort data entry to reduce barriers to contribution [46,48].

The findings also highlight the value of structured storytelling guidance in documenting contextual and culturally embedded knowledge. The use of prompts and templates helped contributors record not only basic textile descriptions but also meanings, origins, and use contexts that are essential for interpreting vernacular heritage [18,43]. This is particularly important because the cultural value of handwoven textiles often lies in the relationships among object, maker, memory, and community practice rather than in the physical artifact alone [2,16]. Content Structure and Archiving received the second-highest score among the knowledge-related dimensions, indicating that users perceived the storytelling template as effective in supporting systematic documentation. Future development should nonetheless examine whether the current level of template structure adequately accommodates diverse forms of community expression, or whether greater flexibility is

needed to capture locally meaningful narratives that may not conform to standardized prompts [31,33].

Another notable finding was that knowledge access and retrieval received the strongest evaluation among the assessed dimensions. This suggested that users responded positively to the ability to explore textile heritage through multiple entry points, including motifs, weaving techniques, communities, and cultural usage contexts [6,49]. These results are consistent with broader arguments in digital heritage research that effective retrieval design is integral to making documented knowledge practically usable over time [26,27]. However, the comparatively lower evaluation of knowledge linking indicated that relationships among stories, objects, and cultural contexts were not yet fully visible within the current prototype [25]. This suggests a direction for future development, including relational navigation, recommendation features, and visual knowledge maps that can make these interconnections more explicit [6,49].

5.2. Implications for Post-Digital Heritage Practice

Beyond platform design, the findings carry broader implications for post-digital museum and heritage practice. The platform should not be understood simply as a digital layer added to heritage work but as a mechanism that may reshape how institutions and communities share responsibility for documentation, interpretation, and access. By enabling contributions from weavers, community members, and other non-institutional knowledge holders, the platform redistributes interpretive participation beyond conventional collection management models. At the same time, it did not remove the need for institutional mediation; rather, it repositioned that role toward facilitation, moderation, quality assurance, and governance [30,33,41].

Viewed from a post-digital heritage perspective, the proposed platform is positioned not as a standalone technological novelty but as a participatory infrastructure through which community contribution, narrative interpretation, and knowledge organization are embedded within a broader cultural stewardship mission—one that is especially relevant where heritage knowledge is dispersed, socially held, and difficult to preserve through conventional object-centered documentation alone [13,14].

This shift creates both opportunities and obligations. Museums and cultural organizations may gain richer contextual knowledge, broader community participation, and more socially grounded forms of interpretation than would be possible through object-centered documentation alone. However, they may also face new demands related to content moderation, review continuity, rights management, and the long-term maintenance of community-contributed knowledge. In this sense, the post-digital challenge is not only technological adoption but organizational readiness to support digital participation as an ongoing practice rather than as a one-time digitization project [2,30,41].

Sustainability is particularly important in this regard. The platform architecture incorporated review workflows, moderation functions, and a knowledge infrastructure perspective, but the longer-term viability of such an environment depends on whether institutions or community partners can sustain moderation efforts, maintain content quality, and establish transparent rules governing stewardship, attribution, and the handling of culturally sensitive knowledge. These issues also raise practical questions concerning funding continuity, community ownership, and exit strategy if platform support declines over time. Such questions cannot yet be fully resolved from prototype-stage evidence, but they are central to assessing whether participatory digital heritage systems can remain credible and socially legitimate beyond initial implementation.

6. Conclusions

This study addressed the problem of knowledge loss in Southern Thai textile heritage by designing, developing, and evaluating a crowdsourcing-based digital storytelling platform. This platform integrated participatory contribution, narrative documentation, and structured knowledge organization within a unified socio-technical system. The findings indicated that this integration was both technically feasible and positively received by users. The results suggested that combining structured participation workflows with narrative storytelling tools effectively transformed community knowledge into organized digital resources. Users perceived the platform not merely as a repository but as a structured environment that actively facilitated participation, contextual documentation, and knowledge access.

Building on these results, the study contributed theoretically by proposing the CS-ICH Framework, which integrates crowdsourcing, digital storytelling, and ICH knowledge organization within a single conceptual and design framework. Practically, it offered design insights into how participatory workflows, storytelling templates, and metadata structures can be combined to support community-based heritage documentation.

These contributions, however, must be situated alongside important unresolved questions regarding governance structures, content moderation protocols, and the long-term sustainability of community participation, all of which require systematic investigation. Beyond the platform itself, the present study provides a design-oriented account of how community participation, storytelling, and knowledge organization may be integrated within a more sustainable and reflexive heritage environment.

Several limitations warrant acknowledgment. First, the study relied primarily on user perceptions and prototype-based evaluation and therefore cannot yet provide longitudinal evidence of preservation outcomes or sustained contribution behavior. Second, requirements analysis was confined to a single weaving community in Trang Province, and prototype evaluation participants were recruited through convenience sampling, which may limit generalizability to communities with differing documentation practices or heritage contexts. Third, the current repository contains a limited number of stories and textile records, which may have attenuated users' perceptions of relational knowledge linking and the platform's capacity to support networked knowledge retrieval. Fourth, in relation to the post-digital museum agenda, the study did not incorporate a dedicated sample of museum professionals or institutional cultural heritage staff in the prototype evaluation stage. Consequently, the study cannot yet provide direct evidence regarding staff acceptance, institutional workflow transformation, or organizational readiness for this form of participatory infrastructure.

Future research should prioritize of these directions. First, longitudinal deployment studies should examine how the platform performs over sustained community use, tracking contribution patterns, content quality, and preservation impact beyond the prototype stage. Second, the expansion of the knowledge repository through active community engagement would enable more meaningful evaluation of the platform's knowledge linking and relational navigation features. Third, the CS-ICH Framework and its associated design principles should be tested across additional weaving communities and broader heritage contexts to assess their potential transferability and identify the adaptations required for diverse socio-cultural settings.

As heritage knowledge faces mounting vulnerability to loss, platforms that integrate community participation, narrative documentation, and structured knowledge organization represent a substantive and transferable direction for preserving living cultural heritage in an increasingly digital world.

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