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Co-Designing Culture: Ethical Frameworks for Digital Representation of Batik Motifs

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ABSTRACT: The digital reinterpretation of Batik, a UNESCO-recognized Intangible Cultural Heritage, presents both opportunities and ethical challenges. This study explores the boundaries of cultural remixing through a mixed-methods approach combining user experience (UX) testing, qualitative interviews, and legal-normative analysis. Forty illustrators participated in a task-based UX experiment to assess perceptions of usability, aesthetic value, and ethical alignment when reimagining Batik motifs. Senior illustrators exhibited higher ethical sensitivity and design fidelity, as confirmed by ANOVA. Stakeholder interviews with artisans, curators, and designers revealed themes emphasizing respect for pakem (traditional rules), the importance of community participation, and risks of symbolic dilution. Legal analysis of Indonesian Copyright Law and UNESCO ICH guidelines highlighted gaps in enforcement and the need for soft-law instruments such as ethical toolkits and participatory protocols. Findings suggest that responsible innovation requires integrated frameworks combining legal, educational, technological, and participatory strategies. A Digital Ethics Toolkit is proposed to support designers in navigating cultural representation responsibly. This toolkit includes a pakem rubric, attribution checklist, AI output review system, and co-design templates. The study concludes that safeguarding heritage in digital contexts must involve collaborative stewardship, where ethical awareness and cultural dialogue shape innovation.

Keywords: Digital Heritage, Batik, Ethical Design, Cultural Remixing, Participatory Design, Pakem, Intangible Cultural Heritage.

INTRODUCTION

Recent developments in digital innovation have raised pressing questions about how cultural heritage, like Batik, is preserved and adapted in virtual spaces in how traditional cultural expressions are adapted and reinterpreted in the digital age. One prominent example is the digital reinterpretation of Indonesian Batik, an art form recognized by UNESCO in 2009 as part of the

Intangible Cultural Heritage (ICH) of Humanity. This status confers not only international recognition but also a responsibility to uphold the integrity of Batik while allowing it to evolve. As articulated in the UNESCO framework, cultural safeguarding should not lead to the freezing of traditions in static representations but should promote their dynamic continuity in contemporary life (Batchelor et al., 2021).

However, this evolution is not without ethical complexities. The digital reimagining of Batik motifs through tools such as AI design generators, vector graphics, and augmented reality raises fundamental questions about authenticity, cultural ownership, and ethical appropriation. Scholars have emphasized that while digital media provide avenues for innovation and broader cultural engagement, they simultaneously risk diluting original meanings and misrepresenting deeply rooted traditions (Ruszel, 2020; Yan et al., 2024). The potential for cultural motifs to be separated from their socio-historical context underscores the urgency of ethical guidance in digital design.

One central issue is the authority over cultural narratives. Who holds the right to interpret or transform traditional motifs? This question becomes more urgent in the case of Indigenous and regionally significant designs, where historical legacies of colonization and marginalization intersect with modern practices of remixing and reinterpretation. As Ruszel (2020) observes, the appropriation of Indigenous motifs in digital formats often reflects ongoing asymmetries in cultural power dynamics. The problem intensifies when such reinterpretations are commercialized or disseminated globally without adequate attribution or community involvement.

Audience reception also plays a key role. The meanings attributed to cultural motifs by creators may diverge significantly from how they are interpreted by diverse publics. This divergence introduces ethical risks, particularly when motifs are abstracted to suit aesthetic preferences at the expense of their cultural significance. Yan et al. (2024) argue that this misalignment can erode the value of the original expression and underscores the necessity of collaborative frameworks that integrate community voices in the design process. Respect and transparency thus emerge as foundational ethical principles in digital reinterpretation.

UNESCO's ICH principles offer a normative structure to approach this challenge. The idea of "safeguarding without freezing" encourages innovation that honors historical depth while embracing future relevance. It encourages designers to view traditional motifs as living elements that can evolve with changing contexts, provided such evolution remains anchored in cultural legitimacy. Batchelor et al. (2021) suggest that digital design, when aligned with these principles, can both preserve and revitalize endangered cultural expressions.

Technological tools are increasingly central to this revitalization. Graphic design platforms, 3D modeling tools, and interactive storytelling technologies enable designers to reinterpret Batik in forms that resonate with contemporary audiences, especially younger generations. According to Marttila & Botero (2021), these tools serve as creative conduits that bridge traditional artistry and digital fluency, making cultural motifs more accessible without necessarily sacrificing their complexity or symbolism. Moreover, digital media allow for multimodal engagement, enabling users to interact with motifs through touch, animation, and narrative layers that deepen cultural resonance.

Digital reinterpretation also supports cross-cultural dialogues. When done ethically, these reinterpretations promote mutual understanding and appreciation across cultural boundaries. Ruszel (2020) notes that this kind of cultural cross-fertilization encourages creativity without severing ties to origin communities, thereby fostering a sense of global interconnectedness rooted in mutual respect.

Yet, the boundaries between innovation and misrepresentation are frequently contested. Critics caution that remixing cultural heritage may trivialize its underlying meanings, especially when designs are reduced to decorative elements devoid of context. This critique is sharpened in commercial contexts, where motifs are monetized in ways that exclude or miscredit source communities. Marttila and Botero (2021) argue that designers must engage in critical reflection and dialogical practice to navigate these tensions responsibly.

Precedents from other cultural settings illustrate both the opportunities and pitfalls of digital transformation. For instance, Batchelor et al. (2021) describe how traditional embroidery motifs have been digitized and repurposed in global textile design, enabling new interpretations while raising similar ethical questions. These examples underscore the need for robust ethical frameworks that can guide design practices in diverse cultural contexts.

The concept of "cultural remixing" thus necessitates a more nuanced understanding of heritage. Rather than viewing traditional motifs as fixed artifacts, they should be understood as dynamic expressions shaped by ongoing dialogues among creators, communities, and audiences. This shift aligns with UNESCO's ICH approach and supports a more inclusive, participatory model of preservation. Yan et al. (2024) emphasize that such an approach not only safeguards traditions but also empowers communities to take part in shaping their cultural futures.

In conclusion, the digital reinterpretation of Batik and other cultural motifs represents both a challenge and an opportunity. Designers must tread carefully in balancing innovation with authenticity, ensuring that reinterpretations are grounded in ethical engagement, cultural awareness, and legal compliance. By adopting participatory practices and leveraging digital tools responsibly, cultural practitioners can contribute to a vibrant, living heritage that respects the past while engaging meaningfully with the present. The literature reviewed here affirms the value of dialogue, transparency, and respect in navigating this evolving cultural terrain.

METHOD

This chapter outlines the methodological framework adopted for this study, which investigates ethical boundaries in the digital reinterpretation of Batik. Given the interdisciplinary scope spanning user experience (UX), cultural preservation, and ethical-legal norms a mixed-methods designwas deemed most appropriate. This approach allows the integration of quantitative, qualitative, and normative data to form a holistic understanding of the research problem.

To align with the research questions regarding perception and responsibility, the study employs a sequential mixed-methods strategy combining UX evaluation, in-depth interviews, and document analysis. The combination of participatory action research (PAR) and design-based inquiry ensures both community involvement and empirical rigour. Following Cohen & Snyder (2024), reflexivity and stakeholder engagement were prioritized to support ethical rigor and cultural sensitivity throughout the research process.

Ethical Perception Framework

To assess ethical perception in design, the study draws on several established tools. The Ethical Decision-Making Framework (Newell et al., 2023) guided the development of Likert-scale items assessing designers' awareness of cultural ownership, representation, and authenticity. Complementarily, open-ended survey questions captured qualitative perceptions of design ethics, following by Cusack et al. (2018). Informed consent protocols and participant rights documentation were modeled on global research ethics standards, ensuring transparency.

UX Evaluation in Digital Heritage Design

To explore experience-based differences in perception, forty illustrators were recruited and categorized based on professional experience (junior: <3 years; senior: >5 years). Each participant was tasked with reinterpreting the Parang motif using digital illustration tools. Metrics included:

- NASA-TLX: To assess cognitive workload.
- SUS (System Usability Scale): Evaluated usability of the design environment.
- Aesthetic Rating & Ethical Fit: Measured on a 7-point Likert scale.

Analysis was conducted using ANOVA to detect differences in ethical and aesthetic evaluations based on experience level. The choice of UX metrics reflects best practices in heritage UX design, where usability, user satisfaction, and attention mapping play crucial roles (Benjamin-Thomas et al., 2024).

Qualitative Interviews and Thematic Analysis

Twelve stakeholders (artisans, curators, and heritage designers) were interviewed. Thematic analysis using NVivo was employed to identify recurring patterns concerning cultural authenticity, community involvement, and symbolic meaning. Themes were cross-referenced with UX results to highlight convergences and contradictions. Reflective journaling and memoing techniques were used by the research team to account for researcher positionality (Nagy, 2023).

Participatory Research Procedures

Following participatory research best practices, a community advisory board was established to review study protocols and provide feedback (Pyne et al., 2024). Community representatives co-developed interview questions and contributed to the co-analysis phase. Regular feedback loops ensured mutual learning and validated interpretations, reducing risks of tokenism.

Ethical engagement also involved arts-based methods, enabling participants to express their views through annotated visuals and design sketches, which elicited deeper emotional responses and richer insights (Davis & Ramírez-Andreotta, 2021). This creative dimension enhanced participant agency in shaping the research direction.

Legal and Normative Document Review

A document analysis of the Indonesian Copyright Law (UU No. 28/2014), UNESCO's ICH Convention, and WIPO Lex guidelines was conducted. These documents were coded thematically to identify concepts such as motif ownership, permissible remixing, and community consent. The findings informed both the construction of the ethical toolkit and the interpretative framework for evaluating remix scenarios.

In summary, this methodological approach integrates UX analytics, participatory inquiry, and legal review to build a robust foundation for examining ethical remix practices in digital Batik. The integration of reflexive and inclusive methods ensures that ethical fidelity is maintained across research phases.

RESULT AND DISCUSSION

This chapter presents the empirical findings of the study, divided into three subsections: quantitative UX metrics, qualitative themes from stakeholder interviews, and normative analysis of the legal-ethical landscape. Together, these results offer a comprehensive understanding of how ethical remixing of batik motifs is perceived, practiced, and regulated.

UX Metrics and Ethical Sensitivity

Quantitative analysis revealed clear differences between junior and senior illustrators in terms of usability perception, aesthetic judgment, and ethical awareness.

Table 1. UX and Ethical Fit Scores

Group	Task Time	NASA-TLX	SUS Score	Aesthetic Rating	Ethical Fit
Junior	24.1 min	67.3	84.5	6.1	4.2
Senior	31.4 min	58.6	79.2	6.7	5.9

As prior research in both design (Göktaş et al., 2022) and digital literacy (Yang et al., 2024) indicates, experience positively correlates with ethical sensitivity. This finding aligns with the present study: senior designers spent more time on the task and reported higher ethical fit scores, suggesting a more deliberate and reflective approach. Their designs also scored higher on aesthetic quality, suggesting that ethical consideration and visual appeal are not mutually exclusive.

SUS and NASA-TLX served as foundational metrics to benchmark user satisfaction and cognitive effort. SUS scores for both groups were above the industry benchmark of 68, reflecting positive usability. However, seniors reported lower workload and higher ethical deliberation, reinforcing the value of experience-based learning (Milliken, 2016; Palazoğlu & Koç, 2017).

Although limited, literature suggests that aesthetic preferences often clash with ethical reasoning in generative design. Kunz & Wirtz (2023) caution that pursuit of novelty may overshadow ethical concerns a tension observed here, especially in junior outputs. ANOVA results showed significant differences ($p < 0.05$) in Ethical Fit between groups.

Interview Themes

Three dominant themes emerged from stakeholder interviews:

Theme 1: Respect and Risk – Remixing Sacred Motifs

Artisans expressed concern about the dilution of symbolic meanings when sacred motifs are remixed without cultural knowledge (Basar & Çilingir, 2018). While some appreciated innovative approaches, the consensus emphasized a need for contextual understanding and respect (Zeynali et al., 2023).

Theme 2: Pakem as Creative Scaffold

Designers described pakem not as constraint but as a productive guide for cultural legitimacy. Adhering to pakem facilitated a meaningful bridge between tradition and innovation (Zeynali et al., 2023).

Theme 3: Participatory Legitimacy and Dialogue

Effective co-creation requires participatory legitimacy. Designers who involved community members reported stronger ethical confidence and cultural resonance. Collaborative projects like virtual museums and co-authored artworks exemplify ethical remixing (Ziyai et al., 2023).

Community participation legitimizes remixing and bridges disciplinary boundaries (Mert et al., 2021). Ethical perception improves when design decisions are informed by the originating community's cultural values.

Legal-Ethical Mapping

Table 2. Legal-Ethical Status of Remix Scenarios

Scenario	Legal Status	Cultural Sensitivity	Recommendation
Stylized Parang motif	Permitted (UU 28/2014)	Low	Attribution required
GAN-based Lasem motif generation	Risk-prone	High	Requires community consent
Mixed-motif fashion design	Ambiguous	Moderate	Recommend documentation & credit

Indonesia's copyright law (UU No. 28/2014) provides a framework for protecting traditional cultural expressions, yet enforcement is challenged by definitional ambiguity and procedural gaps (Büyük & BAYDIN, 2021). While the law allows communities to claim ownership, operationalizing protection requires proactive documentation and community consultation.

Distinctions between ethical and unethical remix hinge on consent and attribution (Zhang et al., 2021). Unethical remix often results in symbolic misappropriation, while ethical remix involves informed, credited participation (Mohammadi et al., 2021).

Internationally, frameworks such as the UNESCO ICH Convention emphasize inclusive and respectful integration of traditional knowledge in digital platforms (Göktaş et al., 2022) They call for AI practices grounded in community dialogues and ethical safeguards.

To operationalize community consent, clear protocols are needed. Yıldırım & Kocatepe (2022) propose community agreements detailing terms of use, attribution, and withdrawal rights. Educational resources can empower community members to participate actively and protect their rights.

The results of this study point to a fundamental convergence between ethical awareness, community engagement, and technological innovation in the digital reinterpretation of Batik. This discussion synthesizes those findings through the lens of ethical design frameworks, educational needs, verification mechanisms for pakem conformity, and the integration of soft-law tools to complement legal protections.

Ethical frameworks such as Value Sensitive Design (VSD) and Universal Design offer structured pathways for embedding ethical principles into digital heritage innovation. VSD encourages stakeholder engagement and the consideration of human values throughout the design process, ensuring that technological artifacts are developed in alignment with the rights and interests of originating communities (Umbrello & Yampolskiy, 2021). In tandem, Universal Design fosters accessibility and inclusivity, allowing diverse audiences, including those with disabilities, to engage with heritage content meaningfully. These frameworks promote not only technological performance but cultural sensitivity, making them essential for any designer seeking to ethically reimagine traditional motifs.

The participatory dimension of ethical design was evident in this study's interviews, where community inclusion enhanced both cultural legitimacy and design authenticity. Participatory design approaches allow communities to serve as co-creators of cultural reinterpretation, expanding ethical accountability beyond the designer to include the originating culture itself (Inie et al., 2023). This shift from unilateral authorship to collaborative authorship fosters trust, builds cultural legitimacy, and ensures that reinterpretations do not misrepresent or exploit traditional symbols.

The integration of AI technologies into cultural design further complicates ethical boundaries. As demonstrated in the literature, mechanisms such as internal audits, ethics committees, and stakeholder oversight help ensure that AI-generated outputs align with cultural narratives (Nguyen et al., 2024). Without such safeguards, generative systems risk prioritizing visual novelty over symbolic accuracy, thereby contributing to the dilution of meaning in traditional motifs.

These findings underscore the critical role of education in promoting ethical awareness in creative industries. Curricula that integrate ethics, cultural sensitivity, and interdisciplinary knowledge can prepare future designers to navigate these complexities. As Grassini (2023) notes, experiential learning methods that expose students to real-world ethical dilemmas enhance empathy and critical thinking. Including modules on Indigenous knowledge systems and cultural representation cultivates awareness of the ethical stakes involved in cultural design.

Technology-enhanced educational practices such as AI-driven ethical simulations and collaborative design platforms enable students to visualize the consequences of design choices in real time. Page et al. (2024) emphasize that these immersive environments support the internalization of ethical standards, equipping students with the tools to evaluate, anticipate, and mitigate cultural risks in their future work.

A key challenge in digital cultural design is verifying pakem conformity in AI-generated outputs. Automated evaluation frameworks, grounded in machine learning, can assess conformity by comparing outputs with standardized motif datasets. Yet, as with all algorithmic systems, cultural interpretation cannot be fully mechanized. Thus, expert committees comprising designers, anthropologists, and community representatives are needed to co-create pakem criteria and evaluate outputs in context. These human-in-the-loop systems ensure that AI aligns with tradition, not just technical patterning.

Furthermore, real-time feedback mechanisms and culturally anchored design prompts can guide iterative model development. Community consent processes should be embedded into this loop to authorize representations, reinforcing ownership and stewardship over cultural expressions. Such a co-governance model deepens respect and ensures AI is not a tool of cultural abstraction but of continuity.

Legal instruments like Indonesia's Copyright Law (UU No. 28/2014) provide formal protection, but soft-law tools ethical guidelines, UNESCO principles, and community charters offer vital complementary support. These instruments promote norms without invoking legal force, cultivating a sense of ethical responsibility among designers (Rajhi et al., 2024). They also fill gaps where formal law may not adequately cover the intricacies of cultural practice, especially in cases involving AI-generated remix.

The International Council of Museums (ICOM) and ICOMOS provide examples of such soft-law mechanisms. Their guidelines help align institutional and creative practices with ethical preservation goals. In addition, community dialogue platforms act as informal but powerful tools for dispute resolution and knowledge exchange, reinforcing social legitimacy.

In summary, the interplay of ethical design, educational advancement, AI verification protocols, and soft-law mechanisms constructs a multilayered framework for responsible digital reinterpretation. Ethical remixing requires designers not only to innovate but to do so with integrity, accountability, and cultural humility. Future research should continue developing adaptable toolkits and participatory systems that ensure tradition and technology coexist without conflict.

CONCLUSION

This study highlights the ethical complexities surrounding the digital reinterpretation of Batik as a form of intangible cultural heritage. Through a combination of UX evaluation, stakeholder interviews, and legal-normative analysis, we found that senior designers exhibit higher ethical sensitivity and aesthetic fidelity, underscoring the role of experience in navigating cultural responsibilities. Community engagement emerged as a key factor in legitimizing reinterpretation efforts, with pakem functioning not as a limitation, but as a generative guide for respectful innovation.

Legal protections such as Indonesia's Copyright Law offer a foundational safeguard, but they must be complemented by participatory co-design practices and soft-law instruments—such as ethical guidelines and educational toolkits—to ensure inclusive and culturally grounded digital design. The proposed Digital Ethics Toolkit offers a practical starting point for designers and institutions aiming to balance creative freedom with ethical accountability. Future research should expand this model across diverse cultural contexts to evaluate its adaptability and long-term impact.

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