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Realizing the Dream Kebaya: How Scratch Can Serve as an Innovative Design Tool

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Abstract: The contemporary fashion design paradigm, which is shifting towards digital innovation and sustainability, poses a challenge for traditional garments like the kebaya to remain relevant. Designers are often hindered by complex software and costly, time-consuming physical prototyping processes, which impede innovation. This research aims to bridge this gap by exploring the potential of a simple visual coding platform, Scratch, as an innovative and accessible design tool for the kebaya. Using a qualitative approach with the ADDIE framework, the study gathered data through in-depth interviews with fashion industry experts, practitioners, and academics. Data was analyzed using thematic analysis. The findings indicate that Scratch has the potential to democratize the design process by providing an intuitive platform for visual experimentation. Features such as sprites enable designers to manipulate design elements in a modular fashion and perform rapid iterations on silhouettes, colors, and motifs. The platform can also visually represent material textures and construction techniques, supporting the exploration of sustainable design. In conclusion, Scratch serves as an effective catalyst for creativity, lowering the barriers to experimentation and fostering the creation of original kebaya designs with high artistic value.

Keywords: Kebaya, scratch, design tool, design innovation, sustainability

1. Introduction

The paradigm of contemporary fashion design is dynamically transforming, moving from a traditional approach towards the exploration of digital innovation and sustainability (Casciani et al., 2022). Designers now not only focus on visual aesthetics but also consider aspects of functionality, material sustainability, and interactivity in their creative process (Han et al., 2021). This global trend encourages the adoption of digital technology to create more efficient design processes and more responsible fashion (Casciani & D'Itria et al., 2024). Amidst this change, the kebaya, as a rich Indonesian cultural heritage, faces the challenge of remaining relevant and adaptive to modern design trends without losing its original essence (Lestari et al., 2025). The preservation of intangible cultural heritage in the modern creative industry requires innovation strategies to ensure its value is maintained and relevant for new generations (Yan & Li, 2023). Nevertheless, there are significant challenges in the exploration of innovative kebaya design, particularly related to the accessibility of design tools and effective experimentation methods. Designers are often limited by complex professional design software or by physical prototyping methods that are time-consuming and costly (Sass & Oxman, 2006). The physical prototyping process not only slows down the innovation cycle but also generates textile waste, which contradicts the principles of a circular economy in fashion (Huynh, 2022). This condition hinders the emergence of fresh ideas and broader participation in the development of kebaya design, especially in response to the popularity of the latest kebaya models in Indonesia that emphasize modern adaptation and personalization (Tjahyadi et al., 2024).

The gap in the current scientific debate regarding innovative and sustainable design methods is still evident. Global discussions often center on the integration of advanced technologies such as artificial intelligence (AI) for trend

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forecasting and virtual reality (VR) for immersive retail experiences. However literature that discusses the utilization of simple visual coding platforms like Scratch as an innovative design aid for traditional garments such as the kebaya, particularly with a focus on sustainable production techniques, remains very limited (Viswanathan, 2024). Scratch, with its intuitive visual interface and drag-and-drop approach, offers great potential as a medium for a democratic initial design exploration. The use of visual programming languages has been proven effective in fostering computational thinking and creativity outside the field of computer science, including in arts education (Samaniego et al., 2024). By using visual code blocks, designers can easily manipulate elements of kebaya design, such as silhouettes, collar cuts, sleeves, and embellishments (Bariyanto & Rachmayanti, 2025). Scratch's ability to facilitate rapid design iteration and "what if" explorations allows designers to test various creative ideas (Fontes, 2024). This significantly reduces the time and cost associated with creating physical samples, accelerates the design cycle, and encourages bolder innovation within a participatory design framework.

This research aims to bridge this gap by exploring the potential of Scratch as a platform that can facilitate design exploration, including the integration of kebaya construction techniques, thereby enabling designers to develop visual prototypes intuitively and interactively.

2. Methodology

2.1 Analysis

The research focuses on needs analysis and problem identification with the objective of gaining an in-depth understanding of the kebaya design context, including existing challenges, the needs of designers, and the potential for technology utilization (Guo et al., 2026). To achieve this objective, the procedure begins by selecting relevant participants from three groups (fashion industry experts, practitioners, and academics) using the purposive sampling technique. Primary data is then collected through semi-structured interviews to explore their perceptions, experiences, and challenges, particularly concerning the prototyping process and the limitations of design tools. The qualitative data collected from these interviews is subsequently analyzed using thematic analysis to identify the core problems to be addressed in the research.

2.2 Design

Phase then focuses on solution design, with the objective of creating the concept and specifications for a visual prototype on the Scratch platform that can address the identified challenges (Canziba, 2018). This procedure includes structuring the prototype's framework with manipulable design elements (such as silhouettes, motifs, and colors), designing an intuitive and interactive user interaction flow, and preparing a follow-up interview guide for the subsequent Implementation and Evaluation phases.

a b

Figure 1. (a) cover catalog; (b) scratch coding

a b c d e

Figure 2. (a) E-catalog opening view; (b)E-catalog: Design 1 details; (c) E-catalog: Design 2 details; (d)E-catalog closing view; (e) coding blok for all stage

2.3 Development

Phase is the realization stage of the previously created design, with the objective of building an interactive visual prototype on the Scratch platform according to the specifications from the Design phase (Hartmann et al., 2006). The procedure involves carrying out the visual coding process in Scratch to create digital kebaya assets. During this process, features such as color manipulation, motif replacement, and silhouette changes are developed into a functional program. This practical solution, the prototype, is developed developed iteratively to ensure its functionality.

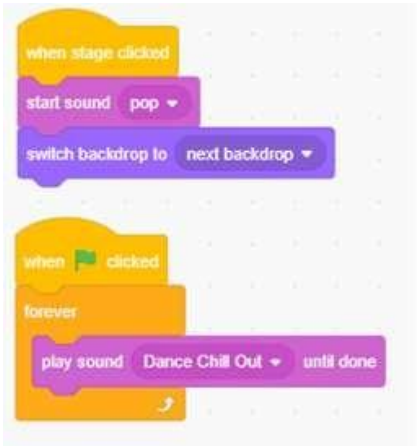

Figure 3. Coding blok for all stage

2.4 Implementation

Phase, the developed prototype is tested by users. The objective of this phase is to test the application of the Scratch prototype in a real-use scenario and to collect feedback from participants. The procedure begins with the completed prototype being introduced to the research participants. They are then asked to use the Scratch platform to explore and design kebaya virtually. Following this activity, the researcher collects data through observation and in-depth interviews regarding their experience, ease of use, and perceptions of this design aid.

2.5 Evaluation

Phase, the developed prototype is tested by users. The objective of this phase is to test the application of the Scratch prototype in a real-use scenario and to collect feedback from participants. The procedure begins with the completed prototype being introduced to the research participants. They are then asked to use the Scratch platform to explore and design kebaya virtually. Following this activity, the researcher collects data through observation and in-depth interviews regarding their experience, ease of use, and perceptions of this design aid.

Phase assesses the solution's effectiveness by analyzing data from the implementation sessions using a detailed, six-stage thematic analysis to identify key patterns and insights, with the results used to answer the research questions and potentially form the basis for future development cycles.

3. Results and Finding

Overall, this table systematically and comprehensively charts the qualitative research workflow, from the selection of credible participants to the generation of core findings. Each row is categorized by the Stage of the ADDIE framework, which indicates the data collection phase. The Respondent & Background column profiles the three participant archetypes interviewed: an industry practitioner (Designer A), an expert artisan (Practitioner B), and a senior academic (Academic C). Specific questions posed to them are listed in the Interview Question column, where their hypothetical answers are presented in the Example Participant Response column to reflect their unique perspectives for instance, the designer discussing market trends, the practitioner highlighting production difficulties, and the academic exploring the concept of 'design democratization'. These responses are then analyzed through Initial Codes, which are descriptive labels such as "Consumer awareness" or "Sample creation cost". Finally, these codes are synthesized in the Theme column to summarize the core research findings into conceptual phrases like "Sustainability as a Key Selling Point," "Obstacles of Physical Prototyping," and "Scratch as a Catalyst for Creative Experimentation."

Table 1. Integrated Thematic Analysis Table

Respondent & Background	Interview Question	Example Participant Response (Hypothesis)	Initial Codes	Theme
Designer A (Creative Director & Founder of a Contemporary Kebaya Brand, 12+ years of experience, focus on sustainable materials and modern design)	"How do you see the latest kebaya design trends in Indonesia, especially in the use of natural materials and traditional manufacturing techniques?"	"Nowadays, consumers are more 'aware'. They ask a lot about the origin of the fabric, whether it's environmentally friendly. So the trend is towards sustainable fashion. The use of materials like local tenun or natural dyes adds significant value."	- Consumer awareness - Interest in eco-friendly materials - Added value of local materials - Sustainable fashion trend	1. Sustainability as a Key Selling
Practitioner B (Owner of a Kebaya-Specialized Tailoring Business, 20+ years of experience, specialist in sequins & embroidery, often works on designer prototypes)	"What are the main challenges you face in the kebaya design exploration process, especially in the prototyping or initial concept visualization phase?"	"The hardest part is when designers want to try out many models, but we have to make a physical sample. Just one sample takes up a lot of time and fabric costs. So, the room for experimentation becomes limited."	- Sample creation cost - Prototype production time - Limited experimentation - Reliance on physical samples	2. Obstacles of Physical Prototyping
Academic C (Senior Lecturer in Fashion & Textile Design, 15+ years of experience, research focus on digital	"How relevant is the use of digital platforms, like Scratch, in assisting the fashion design process, especially for kebaya?"	"Very relevant, especially for the 'democratization of design'. Not everyone has access to expensive software. A tool like Scratch	- Democratization of design - Accessibility of digital tools - Reducing technical barriers - Idea visualization for beginners	3. Potential for Design Democratization through Simple Tools

technology and sustainable fashion)		can be a bridge, opening up opportunities for students or novice designers to visualize ideas without technical barriers."		
Designer A (Creative Director & Founder of a Contemporary Kebaya Brand, 12+ years of experience, focus on sustainable materials and modern design)	"In your opinion, what features of Scratch have the most potential to facilitate the visualization of kebaya silhouettes, colors, or motif details?"	"Its sprite feature. We can break down the kebaya design into several parts: the body, sleeves, collar. Then each part's color or motif can be easily changed. It's very helpful for quickly mixing and matching ideas."	- Use of sprites - Modular design (breakdown) - Ease of mix and match - Rapid iteration of colors and motifs	4. Modular Visualization and Rapid Iteration
Academic C (Senior Lecturer in Fashion & Textile Design, 15+ years of experience, research focus on digital technology and sustainable fashion)	"How can Scratch help integrate the concept of natural materials into the digital representation of kebaya designs?"	"Although it can't perform precise physical simulations, we can upload photos of actual fabric textures, for example, photos of brocade or tenun, and then apply them as a 'costume' to a sprite. This provides a fairly good initial visual representation of how the texture will look."	- Uploading texture images - Visual representation of textiles - Costumes on sprites - Initial visual simulation	5. Representation of Material Textures
Practitioner B (Owner of a Kebaya-Specialized Tailoring Business, 20+ years of experience, specialist in sequins & embroidery, often works on designer prototypes)	"How do you imagine the process of adapting traditional or innovative kebaya-making techniques into a visual representation in Scratch?"	"It could be made like a short animation or an interactive presentation. For example, showing the steps: Layer 1 is the bustier, Layer 2 is the kebaya, Layer 3 is the sash. So people can understand the wearing or making process step-by-step."	- Process animation - Step-by-step visualization - Layered representation - Narrative of the making process	6. Visual Simulation of Process and Technique
Designer A (Creative Director & Founder of a Contemporary Kebaya Brand, 12+ years of experience, focus on sustainable materials and modern design)	"What criteria do you use to assess the success of an innovative kebaya design, especially one that integrates natural materials?"	"Three main things: originality of the concept, is the idea fresh? Second, visual coherence, is it aesthetically harmonious? Third, the story behind it, especially if using natural materials, its sustainability narrative must be strong."	- Originality of concept - Aesthetic coherence - Strength of narrative/story - Sustainability value	7. Assessment Criteria for Innovative Design

Academic C (Senior Lecturer in Fashion & Textile Design, 15+ years of experience, research focus on digital technology and sustainable fashion)	"How much can Scratch contribute to the creation of original kebaya designs with high artistic value?"	"Its biggest contribution is as a 'playground'. Because it's cheap and fast, designers become brave enough to try 'wild' ideas that they might not attempt if they had to make a physical sample right away. Scratch liberates creativity in the initial stage."	- Platform for experimentation - Encouraging creative bravery - Reducing the risk of failure - Liberation of initial creativity	8. Scratch as a Catalyst for Creative Experimentation

4. Research Participants

Identified and selected participants using the purposive sampling technique to ensure the relevance and depth of the information. The participants comprised three main groups: fashion industry experts, such as prominent kebaya designers, creative directors of local fashion brands, or fashion consultants; practitioners, including kebaya artisans, professional tailors, or developers of natural materials directly involved in the production process; and academics, such as lecturers or researchers in the fields of fashion design, fine arts, or educational technology. We targeted a minimum of three participants from each category to achieve data saturation and the validity of the findings.

5. Data Analysis

Analyzed the interview data using thematic analysis. This process involved several stages: data familiarization by repeatedly reading the transcripts and listening to the recordings; generating initial codes by identifying relevant text segments and applying descriptive labels; searching for themes by grouping similar codes; reviewing themes to ensure consistency and coherence; defining and naming the themes clearly; and writing the report by integrating the themes into an analytical narrative supported by direct quotations from the participants. This thematic analysis allowed us to identify key patterns, concepts, and insights from the qualitative data, providing an in-depth understanding of how Scratch can serve as an innovative design aid for the kebaya.

6. Conclusion

This research concludes that simple visual coding platforms like Scratch have significant potential as an innovative design aid for the traditional garment of the kebaya. The key findings affirm that the primary challenge in current kebaya design is the costly and inefficient process of physical prototyping. Scratch offers a solution as an accessible pre-prototyping tool capable of democratizing the design process for a wider audience. Thematic analysis of interviews with experts reveals that through its visual and modular features, Scratch effectively facilitates rapid design iteration and boundless creative exploration. The platform enables the visualization of diverse kebaya elements, ranging from silhouettes to the representation of natural material textures. The greatest value of using Scratch lies in its role as a catalyst for bolder experimentation. By lowering the cost and time associated with creating physical samples, designers are encouraged to test original ideas, thereby potentially enhancing innovation and artistic value in modern kebaya design while respecting its cultural heritage.

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Conflict of Interest

The authors declare no conflicts of interest.

References

Bariyanto, A. G., & Rachmayanti, S. (2025, November). Reviving Traditional Fashion Through Digital Cultural Aesthetics: A Kidcore Approach to Kebaya Kutu Baru Design. In 2025 IEEE 11th International Conference on Computing, Engineering and Design (ICCED) (pp. 1-6). IEEE. https://doi.org/10.1109/ICCED68324.2025.11324849

Canziba, E. (2018). Hands-On UX Design for Developers: Design, prototype, and implement compelling user experiences from scratch. Packt Publishing Ltd.

Casciani, D., & D'Itria, E. (2024). Fostering Directions for Digital Technology Adoption in Sustainable and Circular Fashion: Toward the Circular Fashion-Tech Lab. Systems, 12(6), 190. https://doi.org/10.3390/systems12060190

Casciani, D., Chkanikova, O., & Pal, R. (2022). Exploring the nature of digital transformation in the fashion industry: opportunities for supply chains, business models, and sustainability-oriented innovations. Sustainability: Science, Practice and Policy, 18(1), 773-795. https://doi.org/10.1080/15487733.2022.2125640

Fontes, F. L. (2024). Failing through Play: Integrating Iterative Design Methods to Foster Creativity in Primary Education (Doctoral dissertation, Carleton University). https://doi.org/10.22215/etd/2024-15912

Guo, C., Yahaya, S. R., Liu, H., Lin, Y., Liu, M., & Wang, W. (2026). A Kansei engineering approach to optimizing traditional Nyonya Kebaya for young consumer preferences. Journal of Engineered Fibers and Fabrics, 21, 15589250251398450. https://doi.org/10.1177/15589250251398450

Han, J., Forbes, H., & Schaefer, D. (2021). An exploration of how creativity, functionality, and aesthetics are related in design. Research in Engineering Design, 32(3), 289-307. https://doi.org/10.1007/s00163-021-00366-9

Hartmann, B., Klemmer, S. R., Bernstein, M., Abdulla, L., Burr, B., Robinson-Mosher, A., & Gee, J. (2006, October). Reflective physical prototyping through integrated design, test, and analysis. In Proceedings of the 19th annual ACM symposium on User interface software and technology (pp. 299-308). https://doi.org/10.1145/1166253.1166300

Huynh, P. H. (2022). Enabling circular business models in the fashion industry: the role of digital innovation. International Journal of Productivity and Performance Management, 71(3), 870-895. https://doi.org/10.1108/IJPPM-12-2020-0683

Lestari, P., Rahmawati, A., Dwi, A. A. M., Febriani, P. I., & Ramli, M. F. (2025). Fashion transformation from tradition to modernity: The evolution of aesthetics in the clothing culture of Kudus, Central Java. ARTiES: International Journal of Arts and Technology in Elementary School, 3(1), 10-22. https://doi.org/10.24176/arties.v3i1.14320

Samaniego, M., Usca, N., Salguero, J., & Quevedo, W. (2024). Creative thinking in art and design education: A systematic review. Education Sciences, 14(2), 192. https://doi.org/10.3390/educsci14020192

Sass, L., & Oxman, R. (2006). Materializing design: the implications of rapid prototyping in digital design. Design studies, 27(3), 325-355. https://doi.org/10.1016/j.destud.2005.11.009

Tjahyadi, M., Mani, L., & Intan, A. (2024). Embracing the new, cherishing the old: A phenomenological study of Gen X Indonesian women's engagement with modern kebaya design. Clothing Cultures, 11(2), 165-181. https://doi.org/10.1386/cc_00092_1

Viswanathan, J. (2024). Artificial intelligence: Transforming the future of retail. International Journal of Science and Research (IJSR), 13(9), 174-178. https://dx.doi.org/10.21275/SR24901234506

Yan, W. J., & Li, K. R. (2023). Sustainable cultural innovation practice: heritage education in universities and creative inheritance of intangible cultural heritage craft. Sustainability, 15(2), 1194. https://doi.org/10.3390/su15021194