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Development of an Interactive Kebaya E-Catalog Based on Scratch as an Innovation in the Digital Transformation of Traditional Clothing

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Abstract: This research develops a Scratch-based interactive kebaya e-catalog as an innovation for the digital transformation of traditional clothing. Kebaya, as a symbol of cultural identity, faces dissemination challenges in the era of static catalogs. By utilizing Scratch as a visual programming platform, this study offers a digital-based interactive solution. The approach used is the ADDIE development model (analysis, design, development, implementation, and evaluation), beginning with a needs analysis through interviews with fashion industry experts, fashion design practitioners, and academics. Initial findings emphasize the importance of detailed visual representation and intuitive navigation. The developed prototype features an interactive visual selection, allowing users to choose a kebaya to access product information such as dominant colors and prices. This medium also facilitates visual comparison between designs through a sequential click mechanism, enabling users to explore their preferences independently. The e-catalog design successfully combines the aesthetic value of kebaya with a simple yet effective educational function. The use of Scratch demonstrates its potential as a conceptual prototyping medium in professional design. This solution offers a lightweight technology approach to support cultural preservation and innovation in the digital fashion education system.

Keywords: e-catalog, kebaya, scratch, digital transformation, respondents

1. Introduction

The paradigm of contemporary fashion design is observed to be continuously evolving, shifting from a conventional linear model to a more dynamic, inclusive, and adaptive approach towards technological advancements (Haryono et al., 2025). Currently, the focus is not only placed on the aesthetics of clothing but also on the aspects of interactivity, sustainability, and adaptability to digital platforms (Faras et al., 2025). This transformation requires designers to not only master conventional technical skills but also to possess digital literacy and the ability to utilize information technology as an effective medium for promotion and dissemination.

In Indonesia, the existence of kebaya as traditional clothing has long been a symbol of cultural identity and elegance (Endraswara & Dwiadmojo, 2026). However, amidst the expansion of global fashion trends and changing consumer preferences, the effort to preserve and simultaneously modernize kebaya has become a challenge. Recent observations indicate a growing interest in more modern and practical kebaya designs, including variations of kebaya dresses that blend contemporary silhouettes with traditional elements (Audita et al., 2023). This phenomenon creates an urgent need for a platform capable of displaying the diversity of kebaya designs in an engaging and easily accessible manner, surpassing the limitations of static physical catalogs. The representation of traditional clothing like kebaya in an interactive digital format is still not optimal, as existing platforms tend to provide a less immersive experience for users to explore (Rachmad et al., 2023).

The research gap lies in the limited exploration of simple visual programming platforms for developing e-catalogs for traditional clothing. One of the most promising platforms to fill this gap is Scratch. Developed by the MIT Media

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Lab, Scratch is a graphical block programming environment specifically designed to simplify the learning of computational concepts and the creation of interactive media (Hadi, 2021). Its intuitive nature, supported by a drag-and-drop interface, allows even users with non-informatics backgrounds to develop animations, interactive stories, and application prototypes. While digital fashion innovation in developed countries like France and the United States often involves high-level technologies such as Augmented Reality (AR) or Virtual Reality (VR), other countries like Turkey, Germany, and Russia also show interest in digitizing cultural heritage through more accessible platforms for education and promotion (Syahputra, 2025). This research positions itself within the scientific debate on the democratization of technology for cultural preservation, arguing that simple yet innovative solutions can be developed to achieve similar goals without depending on complex and expensive technological infrastructure (Setiawan et al., 2024). Thus, this study aims to fill this gap by demonstrating the potential of Scratch as an effective tool for developing an interactive kebaya e-catalog.

Based on the identified problems and research gap, this study aims to: (1) develop the creation process of a Scratch-based interactive kebaya e-catalog as an innovation in digital transformation, (2) identify the essential components and features required in the development of the e-catalog, and (3) analyze the results of the e-catalog's development from the perspective of its functionality and potential application.

2. Methodology

This research applies the ADDIE development model as a systematic framework (Yeh & Tseng, 2019). This approach was chosen because it is highly relevant for designing and building digital products that have interactive elements, such as the e-catalog developed in this study. As an instructional design methodology, ADDIE provides a framework that is both flexible and structured, with an iterative and adaptive nature that allows for continuous revision at each stage. This ensures that each development phase is based on the results of the previous phase, aiming to minimize potential errors and optimize a functional project outcome. The flow of the ADDIE process is presented in Figure 1.

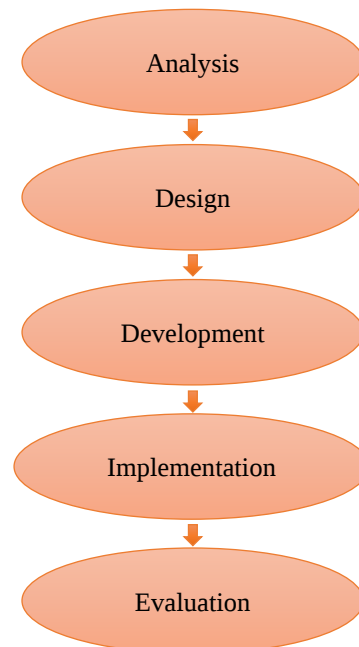


Figure 1: The flow of the ADDIE process

2.1 Analysis Stage

The analysis stage focuses on the identification of user needs and characteristics, as well as exploring the potential and limitations of using Scratch in the context of developing the kebaya e-catalog. To gather comprehensive perspectives from various stakeholders, in-depth interviews were used as the main instrument. The researcher interviewed three representatives from each participant category, namely fashion industry experts, fashion design practitioners, and academics from the field of fashion design. Structured interviews were conducted to collect data on kebaya fashion trends, digital promotion needs, and the relevance of simple technology like Scratch. The information gathered in this phase subsequently served as the foundation for defining the features that the e-catalog must include.

2.2 Design Stage

Based on the data collected in the analysis stage, the design stage involved conceptualizing the interactive kebaya e-catalog. This conceptual design process emphasized two main principles identified previously, namely detailed visual representation and intuitive navigation. These principles then served as a guide in determining the information architecture, navigation flow, and the overall user interface (UI) and user experience (UX) design. The primary interactive feature designed was an interactive visual selection, which allows users to choose a kebaya to access product information such as dominant colors and prices. In this phase, the researcher also established the technical specifications regarding the use of Scratch code blocks and graphic assets. The conceptual outcome of this design stage, which displays the main interface and the attire selection screen, is presented in Figure 2.



Figure 2: Prototype design

2.3 Development Stage

The development stage represents the realization phase of the conceptual designs previously created. At this stage, a functional prototype is actively built using the Scratch platform. The process begins with the creation and import of visual assets, such as sprites for each kebaya model and other interface elements, in accordance with the design specification document. Several interface displays of the developed prototype are presented in Figure 3.



Figure 3: (a) The thumbnail screen; (b) The main menu page; (c) The fitting page with kebaya selection options; (d) The selected kebaya fitted to the model's avatar; (e) The label displayed upon selection; (f) The display with background variations.

In this study, Scratch block-based programming logic is arranged to implement interactive mechanisms, including visual selection functions, product information displays, and screen transition controls. This phase emphasizes an iterative coding process, where each adjustment to the interaction flow requires modifications to the code blocks until the desired

functionality is achieved. These interaction features and control mechanisms are visualized in Figure 4. Initial internal testing, known as alpha testing, is also conducted to identify bugs or functional inconsistencies.

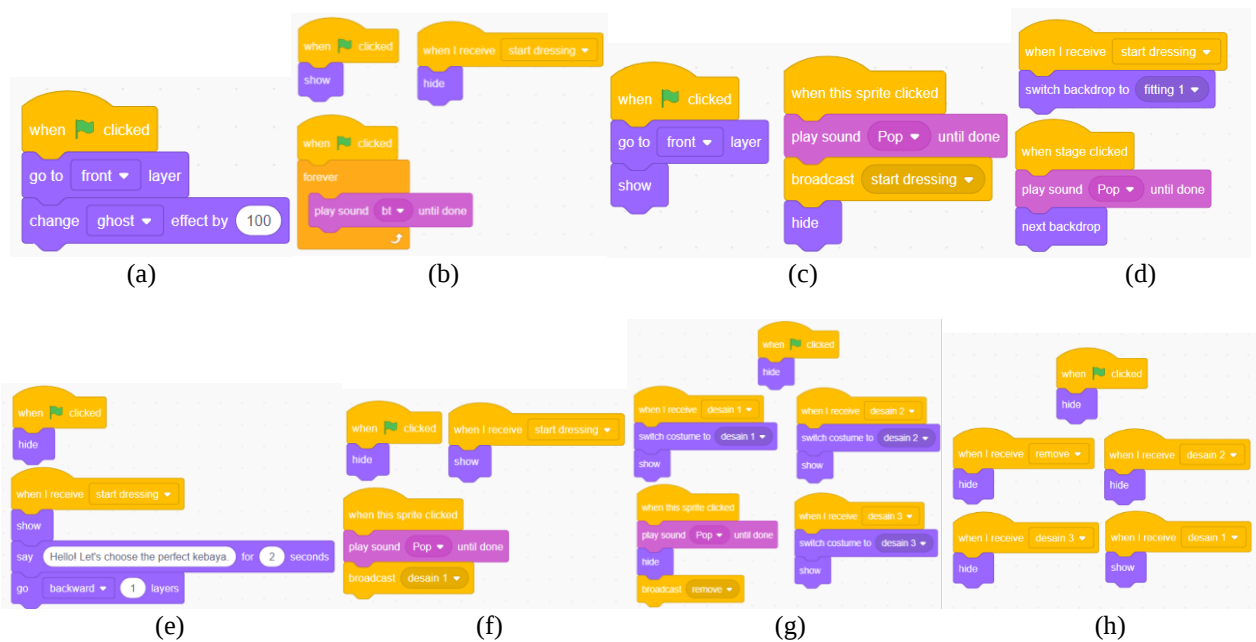


Figure 4: (a) Coding for the thumbnail; (b) Coding for the main menu page and background music; (c) Coding for the start button; (d) Coding for the fitting page and background switching; (e) Coding for the avatar model; (f) Coding for kebaya selection; (g) Coding for the kebaya worn by the model; (h) Coding for the kebaya label.

2.4 Implementation Stage

The implementation stage focuses on integrating the interactive e-catalog prototype into its designated digital environment. The functional media, developed using Scratch, is accessed via a browser-based interface to simulate actual user interaction. This browser-based approach was chosen to ensure broad accessibility for users without requiring additional software installation.

This phase ensures that key features such as navigation flow, object selection, and display transitions operate effectively during real-time use. The prototype was tested using desktop devices under stable internet conditions to reflect its practical usage scenario. Each screen transition, button response, and kebaya selection feature was monitored to confirm functionality and interface responsiveness. This monitoring specifically aimed to identify potential lags, interaction errors, or loading times that could diminish the quality of the user experience. This implementation served as the final validation step.

2.5 Evaluation Stage

The evaluation stage is a comprehensive assessment process of the effectiveness and functionality of the developed e-catalog. Data from the implementation stage, including usage observation and participant feedback, were collected and analyzed qualitatively. A thematic analysis method was applied to identify patterns, themes, and main categories from the interview data and user feedback. This analysis helps in interpreting the participants' views regarding the e-catalog's relevance, ease of use, innovation value, and its potential impact on the preservation and promotion of kebaya. The evaluation results serve as a basis for recommendations for further improvement and development, while also concluding the overall success of this interactive kebaya e-catalog development.

The completion of the evaluation stage marks the final phase of the product development process using the ADDIE model. The qualitative data collected from the in-depth interviews during the analysis stage and the feedback from the evaluation stage serve as the main foundation for the presentation of this research's findings. The following presentation aims to answer the research questions systematically and to present the experts' perspectives, which are both in-depth and relevant to the context of the current digital fashion industry.

3. Results and Findings

This section presents and discusses the key findings that emerged from in-depth interviews with three expert respondents. To ensure a comprehensive perspective, interviews were conducted with three respondents from different backgrounds, namely a fashion industry expert (R1), an independent fashion design practitioner (R2), and an academic from the field of fashion design education (R3). The data obtained from this analysis stage serves as the foundation for the design and

development of the e-catalog prototype. To provide a strong context for the findings that will be discussed, the complete profiles of the three respondents are presented first in Table 1.

Table 1: Respondent Background and Expertise

Respondent Code	Gender	Profession and Institution	Expertise and Experience (≥ 5 years)
R1	Female	Senior Brand Strategist at a fashion company, Surabaya	Over 10 years of experience in fashion marketing and brand consultancy. Specialized in consumer behavior, fashion business development, and product identity in the local market.
R2	Female	Independent Fashion Designer, Surabaya	More than 6 years designing ready-to-wear and custom outfits. Experienced in fabric handling, silhouette construction, and contemporary kebaya reinterpretation for younger audiences.
R3	Female	Lecturer in Fashion Design and Clothing Education, Surabaya	Over 8 years teaching and conducting research in fashion pedagogy, traditional garment innovation, and digital-based instructional media in vocational education.

The diverse expertise of the respondents served as the basis for formulating a series of structured questions. These questions were designed to elicit in-depth insights into several key aspects that contribute to the success of the project, including current market dynamics, challenges in digital representation, essential interactive features, and the educational potential of the developed e-catalogue. A synthesis of the respondents' answers, which forms the foundation for the thematic analysis in the following discussion, is presented in Table 2.

Table 2: Summary of Interview Results

No	Question	Summary of Expert Views
1	What is your view on the position of kebaya in today's local fashion market, especially among younger audiences?	Experts generally agreed that kebaya holds cultural and commercial value but needs modern presentation to appeal to younger users. R1 noted the need for refreshed branding; R2 saw a growing interest when kebaya is combined with casual styling; R3 emphasized repackaging kebaya with relevance to youth values.
2	What are the biggest opportunities and challenges in transforming kebaya into a digital platform such as an interactive e-catalogue?	All three respondents saw significant opportunities in expanding reach and promoting education. However, limitations in interactivity and maintaining exclusivity on a low-code platform were noted as key challenges.
3	How important is the feature allowing users to select a kebaya and visualize it on a digital model?	The feature was seen as essential for both product understanding and user engagement. R2 emphasized its practicality in client communication, while R3 highlighted its value for visual learning in fashion education.
4	Which navigation flow is considered most appropriate for this e-catalogue: a structured sequence or an exploratory interaction model?	All respondents preferred an exploratory interaction model. R1 recommended a hybrid structure combining exploration with structured sequencing, R2 supported interactive experimentation as a creative approach, and R3 suggested a gamified model to promote active engagement and self-directed learning.

3.1 The Position of Kebaya in the Digital Era and the Need for Rebranding

A strong consensus exists among the experts that kebaya has a solid foundation of cultural value but requires adaptation to remain relevant, especially for younger audiences. The Fashion Industry Expert's (R1) view on the need for fresh rebranding aligns with the Fashion Design Practitioner's (R2) opinion on the growing interest in casual styling, while the Academician (R3) suggests repackaging that aligns with youth values. Collectively, these views underscore the need for a perceptual shift from a mere heritage product to a living heritage brand, where the e-catalog serves as the primary narrative platform to communicate this new identity (Amir & Muhammad, 2024).

3.2 Opportunities and Challenges of the Interactive E-Catalog Platform

The transformation of kebaya to a digital platform opens significant opportunities in terms of market reach and education; however, the experts also highlighted significant challenges. The technical limitations of a simple platform can hinder the level of immersive interactivity, while maintaining a product's exclusive image when it is easily accessible to the

masses becomes a business challenge (Anggraeni et al., 2025). This finding highlights the classic dilemma in the digitalization of premium products, namely "accessibility versus exclusivity," meaning the primary design challenge is to create a premium user experience (UX) to maintain a high perception of value. Technically, this limitation arises because Scratch, as a 2D image-based platform, faces challenges in realistically simulating fabric textures and three-dimensional effects, which was a primary concern raised by the Designer (R2).

3.3 The Importance of the Visualization Feature as a Dual Function

The feature that allows users to select and visualize the kebaya on a model was deemed essential by all respondents, from both commercial (R1 and R2) and educational (R3) perspectives. This analysis identifies a "dual function" of a technical feature, making it a bridge between market needs and pedagogical needs (Bradecki et al., 2024). The implication is that the success of such a feature cannot be measured solely by sales metrics, but also by the learning outcomes achieved by the user (Farris et al, 2025).

3.4 Preference for an Exploratory Interaction Model

All experts rejected a rigid and linear navigation model, preferring an exploratory approach instead, such as a hybrid model (R1), creative experimentation (R2), or gamification (R3). This preference reflects the principles of 'active learning' and 'gamification' in modern digital experience design (Dinihari et al., 2025). This encourages a paradigm shift from a mere passive 'product catalog' to a 'creative playground' capable of fostering deeper user engagement.

3.5 Recommendations for Concise and Impactful Additional Features

To enhance the prototype's usability, the experts suggested additional features that are not technically complex yet have a significant impact, such as adding narrative context (R1), color variations (R2), and interactive tags (R3). These recommendations collectively emphasize the principle of design efficiency and the importance of impactful micro-interactions. This shows that innovation on simple platforms does not always lie in technological complexity, but rather in the ingenuity of understanding the psychological and informational needs of the user (Bonina et al., 2021).

4. Conclusion

This research successfully demonstrates the effectiveness of the Scratch visual programming platform in developing an interactive kebaya e-catalog, which innovatively bridges cultural heritage with digital transformation. Through the ADDIE model, the resulting prototype proved to have significant dual potential: as a visual learning medium that facilitates style experimentation for students without material constraints, and simultaneously as a fast and efficient conceptual prototyping medium for professional designers. Findings from the experts underscore the importance of rebranding strategies for younger audiences and the superiority of an exploratory interaction model for enhancing user engagement. Despite its limitations in realistically replicating fabric texture details, core functionalities such as visual customization showed high effectiveness. Ultimately, this research does not merely produce a digital product but also proposes a strategic model that shows how accessible technology can drive the democratization of innovation, support cultural preservation more inclusively, and advance creativity within the digital fashion ecosystem.

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Conflict of Interest

the authors declare no conflict of interest.

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