



Creative Fashion Learning: Introducing Ready-to-Wear Design Through Scratch Game Development

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Abstract: This study explores the development and implementation of a Scratch-based educational game as an innovative learning medium for introducing Ready-to-Wear (RTW) fashion design concepts to beginner learners. The growing integration of digital technology in education has encouraged educators to adopt interactive and student-centered learning approaches that can enhance engagement and learning effectiveness. In fashion education, particularly in introducing fundamental RTW concepts, students often encounter difficulties in understanding abstract topics such as design elements, design principles, consumer preferences, garment functionality, and market-oriented design thinking. Traditional instructional methods frequently rely on lectures and static visual materials, which may not sufficiently support active learning and practical application. Consequently, there is a growing need for technology-enhanced learning media capable of transforming theoretical concepts into meaningful and engaging educational experiences. Scratch, a visual block-based programming platform, offers an accessible environment for developing interactive educational games that combine creativity, visual communication, and learner participation. Using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model, this research investigates how gamification can support students' understanding of RTW characteristics while simultaneously fostering creativity, problem-solving abilities, and digital literacy skills. The educational game incorporates various interactive features, including design challenges, simulations, quizzes, reward systems, and immediate feedback mechanisms that encourage learners to actively engage with fashion concepts.

Keywords: Ready-to-Wear, Scratch, Educational Game, Fashion Education, Gamification

1. Introduction

Ready-to-Wear (RTW) fashion represents one of the most significant sectors within the contemporary fashion industry due to its ability to combine aesthetic value, functionality, and commercial viability (Kurniawan et al., 2026). Unlike haute couture, which is produced exclusively for individual clients, RTW garments are designed for mass production and distribution to a broader consumer market (Waddell, 2013). As a result, designers must consider not only creativity and aesthetic expression but also market trends, consumer preferences, production efficiency, and cost effectiveness. According to Laksana and Nursari (2021), Ready-to-Wear fashion emphasizes the balance between design innovation and industrial feasibility, making it an essential area of study for fashion students preparing to enter the professional fashion industry. Therefore, understanding RTW concepts is fundamental for developing competencies that align with contemporary fashion industry demands and consumer-oriented design practices.

The rapid advancement of digital technology has transformed the learning characteristics of contemporary students, particularly those belonging to Generation Z. This generation has grown up in an environment surrounded by digital devices, social media platforms, and interactive technologies, shaping their preferences for visual, engaging, and technology-supported learning experiences. Research by Saetang (2024) indicates that Generation Z learners tend to respond more positively to interactive and participatory learning environments than to traditional lecture-based instruction. Similarly, Princes et al. (2024) found that students demonstrate higher levels of engagement, motivation, and knowledge retention when learning activities incorporate digital tools and active participation. However, fashion

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education still frequently relies on conventional teaching approaches, which may limit opportunities for students to actively explore design concepts and apply theoretical knowledge in practical contexts.

One promising solution is the integration of game-based learning through Scratch, a visual programming platform that enables users to create interactive games, animations, and educational simulations. Scratch has been widely recognized as an effective educational tool for promoting creativity, problem-solving abilities, and computational thinking skills among learners (Zhang & Nouri, 2019). Through the incorporation of gamification elements such as challenges, rewards, scoring systems, and immediate feedback, educational games can transform abstract concepts into meaningful and engaging learning experiences. Kusumawati et al. (2025) reported that Scratch-based learning activities encourage active participation and improve students' understanding of complex concepts through experiential learning processes. In the context of fashion education, Scratch-based game development provides opportunities for learners to explore Ready-to-Wear design concepts through interactive decision-making, design challenges, and creative problem-solving activities. Consequently, the integration of Scratch into fashion education offers a valuable approach for enhancing learner engagement, fostering creativity, and supporting the development of both fashion knowledge and digital competencies required in the contemporary creative industry.

2. Methodology

This study employs the ADDIE model consisting of Analysis, Design, Development, Implementation, and Evaluation (Rusdi et al., 2022).

2.1 Analysis Stage

Learner needs, Ready-to-Wear (RTW) fashion concepts, and digital learning preferences were identified through a comprehensive analysis of relevant literature, curriculum requirements, and learner characteristics. The analysis revealed that beginner fashion students often face difficulties in understanding fundamental RTW concepts, including design elements, design principles, garment functionality, consumer-oriented design thinking, and market considerations. In addition, contemporary learners, particularly those from Generation Z, demonstrate strong preferences for interactive, visually engaging, and technology-supported learning environments that encourage active participation rather than passive knowledge acquisition. Previous studies have shown that digital learning media and game-based learning approaches can enhance learner engagement, motivation, and conceptual understanding by providing meaningful and interactive educational experiences (Saetang, 2024; Princes et al., 2024). Therefore, identifying these learner needs and preferences was essential to ensure that the developed Scratch-based educational game aligned with both educational objectives and the characteristics of the target users. The findings from this analysis served as the foundation for determining the learning content, game mechanics, instructional strategies, and interactive features incorporated into the educational game.

2.2 Design Stage

Researchers designed an educational game featuring fundamental Ready-to-Wear (RTW) fashion design concepts, including fashion elements, garment silhouettes, fabric selection, color combinations, design principles, and basic RTW production considerations (Salsa et al., 2026). The game was developed to provide an interactive learning environment in which students could explore and apply theoretical fashion knowledge through engaging activities, challenges, and simulations. Various game scenarios were created to encourage learners to make design decisions based on aesthetic principles, consumer preferences, functionality, and market-oriented requirements (Helfiyan & Russanti, 2026). In addition, visual representations such as digital garment illustrations, fabric textures, color palettes, and character-based interactions were incorporated to enhance learners' understanding of fashion concepts and maintain their engagement throughout the learning process (Yusa et al., 2024). The instructional content and game mechanics were carefully designed to align with learning objectives while promoting creativity, critical thinking, and active participation. According to Krouska et al. (2024), educational games that integrate visual interaction, meaningful challenges, and feedback mechanisms can improve learner motivation and knowledge acquisition. Therefore, the game design aimed not only to introduce RTW fashion concepts but also to create an enjoyable and effective learning experience that supports both fashion education and digital literacy development.

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To ensure meaningful learning, the game structure was organized into sequential learning stages that gradually increased in complexity. Learners first explored introductory concepts through interactive tutorials before progressing to

practice-based activities, problem-solving challenges, and decision-making tasks that simulated authentic RTW fashion design processes. Each activity provided immediate feedback, allowing students to recognize errors, revise their design choices, and strengthen conceptual understanding through repeated practice. This scaffolded learning approach supports knowledge retention while enabling learners to connect theoretical concepts with practical applications commonly encountered in the fashion industry. Furthermore, the incorporation of progressive challenges and continuous feedback encouraged self-directed learning and sustained learner engagement throughout the instructional process.

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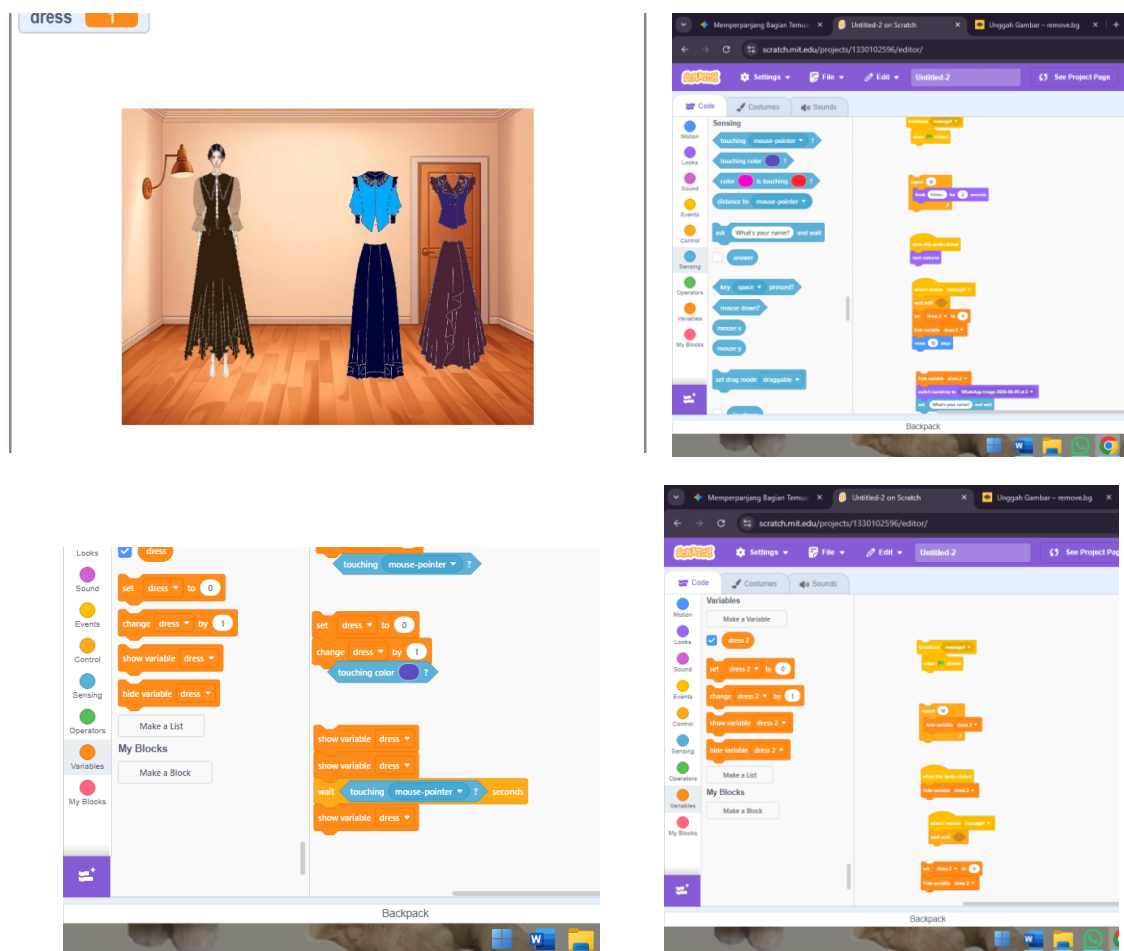


Figure 1: Prototype design

2.3 Development Stage

The prototype was developed in Scratch by integrating fashion illustrations, interactive coding blocks, animations, and game-based learning features to create an engaging educational experience (Ramadhani & Russanti, 2026). The game content was designed to introduce Ready-to-Wear (RTW) fashion concepts, including garment silhouettes, fabric types, color selection, design elements, and basic production processes. Through interactive coding blocks, learners were able to explore fashion-related challenges, receive immediate feedback, and actively participate in the learning process. The incorporation of visual fashion elements and gamified activities enhanced learner engagement, creativity, problem-solving skills, and digital literacy while facilitating a deeper understanding of RTW fashion design concepts.

2.4 Implementation

The game was tested with fashion education stakeholders, including fashion educators, instructional media experts, and prospective learners, to evaluate its functionality, usability, content relevance, and educational effectiveness. The testing process aimed to gather comprehensive feedback regarding the overall quality of the game and its potential as an instructional medium for introducing Ready-to-Wear (RTW) fashion design concepts. Participants were invited to

interact with the game by completing various learning activities, design challenges, and assessment tasks embedded within the Scratch-based platform.

During the testing phase, stakeholders evaluated several aspects of the game, including the clarity of learning objectives, the appropriateness of the instructional content, the visual design of the interface, the ease of navigation, and the effectiveness of the gamification elements in supporting learner engagement. Fashion educators assessed whether the educational content accurately represented fundamental RTW concepts, while media experts examined the technical performance, interactivity, and user experience of the game. Prospective learners provided feedback regarding their motivation, enjoyment, and understanding of the learning materials after using the game.

The testing results indicated that the Scratch-based educational game was generally well received by participants. Stakeholders reported that the interactive features, visual presentation, and challenge-based activities successfully increased learner engagement and facilitated a more enjoyable learning experience. In addition, participants noted that the game helped simplify complex fashion concepts by presenting them in a more accessible and practical manner. The feedback collected during this phase was used to identify areas for improvement and refinement, ensuring that the final version of the game aligned with both educational objectives and learner needs. Overall, the testing process demonstrated the potential of the Scratch-based game as an innovative learning tool capable of supporting the teaching and learning of Ready-to-Wear fashion design concepts in a digital learning environment.

2.5 Evaluation

Qualitative interviews were conducted with participants to gather in-depth insights regarding their learning experiences, perceptions, needs, and expectations related to the use of Scratch-based educational games in learning Ready-to-Wear (RTW) fashion design concepts. The interview data were then analyzed using thematic analysis to identify recurring patterns, key themes, and meaningful interpretations emerging from participants' responses. This analytical process enabled researchers to explore learners' perspectives on game usability, engagement, knowledge acquisition, digital literacy development, and overall learning effectiveness. The findings from the thematic analysis provided valuable information for evaluating the educational game prototype and identifying areas for improvement in future development.

3. Findings and Discussion

Results indicate that Scratch-based learning increases engagement, creativity, and understanding of RTW fashion concepts. Participants highlighted the value of visual learning and gamification.

Table 1: Participants Involved in the Testing Process

Participant Group	Number of Participants	Evaluation Purpose
Fashion Educators	3	Evaluated the relevance and accuracy of Ready-to-Wear learning content
Instructional Media Experts	2	Assessed technical functionality, usability, and interface design
Fashion Students	20	Tested the educational game and provided user experience feedback
Total	25	Participated in the evaluation process

Table 2: Evaluation Aspects of the Scratch-Based Educational Game

Evaluation Aspect	Indicators
Content Quality	Accuracy, relevance, and completeness of Ready-to-Wear concepts
Learning Design	Clarity of objectives, instructions, and learning activities
Interface Design	Visual appeal, layout organization, and readability
Usability	Ease of navigation, accessibility, and user friendliness
Interactivity	User engagement, responsiveness, and participation
Gamification Elements	Challenges, rewards, scoring system, and feedback
Overall Satisfaction	General user perception and acceptance of the game

Table 3: Data collection instruments

Instrument	Purpose	Respondents
Observation Sheet	Observe user interactions and learning behavior during gameplay	Fashion Students
Questionnaire	Measure perceptions regarding usability and learning effectiveness	All Participants
Semi-Structured Interview	Obtain detailed feedback and improvement suggestions	Fashion Educators and Media Experts
Documentation	Record testing activities and evaluation results	Researcher

The developed Scratch-based educational game was evaluated by involving fashion educators, instructional media experts, and fashion students, as presented in Table 1. The involvement of multiple stakeholders is essential in educational game development because it enables researchers to assess the product from pedagogical, technical, and user perspectives simultaneously. According to Fernandes et al. (2024), the evaluation of educational games should consider not only learning outcomes but also the quality of the learning process, user engagement, and the overall educational experience. Therefore, the participation of different stakeholder groups was expected to provide comprehensive feedback regarding the effectiveness of the game as a learning medium for introducing Ready-to-Wear fashion design concepts.

The evaluation focused on several aspects, including content quality, learning design, interface design, usability, interactivity, gamification elements, and overall user satisfaction, as shown in Table 2. These aspects were selected because they represent key indicators commonly used in assessing educational games and technology-enhanced learning media. Previous studies have shown that well-designed gamification elements, such as feedback systems, challenges, rewards, and progress indicators, can positively influence learner motivation, engagement, and learning achievement. Mazarakis and Bräuer (2022) emphasized that feedback mechanisms and progress visualization play a significant role in increasing learner motivation within gamified environments. Similarly, Zhang and Yu (2022) found that game-based learning environments contribute positively to both student motivation and academic performance when integrated appropriately into instructional activities.

To collect evaluation data, multiple research instruments were employed, including observation sheets, questionnaires, semi-structured interviews, and documentation, as presented in Table 3. The use of various instruments allowed the researcher to obtain both quantitative and qualitative data, thereby increasing the validity and comprehensiveness of the evaluation process. Khairunnisya et al. (2021) stated that educational game development research based on the ADDIE model commonly utilizes validation sheets, questionnaires, and user responses to measure the practicality and effectiveness of the developed product. Furthermore, combining observational and interview data provides deeper insights into user experiences and helps identify areas requiring improvement during the revision process.

The questionnaire employed a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5), as shown in Table 4. The use of a Likert scale is widely accepted in educational technology research because it allows researchers to quantify participants' perceptions, attitudes, and satisfaction levels regarding the developed learning media. Recent studies evaluating educational games and gamified learning environments have similarly adopted five-point Likert scales to measure usability, engagement, learning effectiveness, and user satisfaction (Krouska et al., 2024; Fernandes et al., 2024). Therefore, the instrument was considered appropriate for assessing participants' perceptions of the Scratch-based educational game.

The results obtained from this evaluation phase were used to identify strengths and weaknesses of the educational game before final implementation. Feedback provided by participants contributed to the refinement of instructional content, game mechanics, visual design, and user interaction features. This iterative evaluation process is consistent with the ADDIE development framework, which emphasizes continuous improvement through systematic testing and revision. Consequently, the evaluation findings served as an important basis for ensuring that the final version of the Scratch-based educational game effectively supports student engagement, creativity, and understanding of Ready-to-Wear fashion design concepts.

4. Conclusion

Scratch-based educational games can effectively introduce Ready-to-Wear (RTW) fashion design concepts while simultaneously integrating digital literacy, creativity, and interactive learning experiences. Through visual programming, animations, simulations, quizzes, and design challenges, Scratch enables learners to actively explore fundamental RTW concepts, including design elements, design principles, garment functionality, consumer preferences, and market-oriented design thinking. Unlike traditional instructional approaches that often position students as passive recipients of information, game-based learning encourages learners to participate actively in problem-solving, decision-making, and creative experimentation processes. This interactive environment allows students to apply theoretical knowledge in practical scenarios, thereby enhancing conceptual understanding and knowledge retention. Furthermore, Scratch supports the development of creativity and computational thinking by providing opportunities for learners to design, modify, and evaluate solutions within a digital environment (Zhang & Nouri, 2019). The integration of gamification elements such as

rewards, feedback, challenges, and progress tracking can also increase learner motivation, engagement, and learning satisfaction (Krouska et al., 2024). Consequently, Scratch-based educational games not only facilitate the learning of Ready-to-Wear fashion design concepts but also contribute to the development of essential twenty-first-century skills, including digital literacy, critical thinking, creativity, and technological competence, which are increasingly important in the evolving fashion industry and digital economy.

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Conflict of Interest

The authors declare no conflict of interest.

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