

Development of Interactive E-Catalogue Ginkgo Serenity Based on Scratch Visual Programming Application

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Abstract: The digital age demands more dynamic promotional media than static PDF catalogs, which fail to provide an immersive experience. This study explores the development of interactive e-catalogues using Scratch, a visual programming platform, as an accessible alternative solution for non-programmers. By adopting the ADDIE development model and conducting semi-structured interviews with fashion industry experts, interactive media practitioners, and academics, this study aims to design, build, and evaluate the "Ginkgo Serenity" e-catalog prototype. Findings from thematic analysis indicate that the Scratch-based prototype successfully overcomes the limitations of static media by providing a richer experience. The implementation of gamification mechanics such as exploration and discovery has proven effective in enhancing users' emotional engagement. Although Scratch has limitations for large-scale commercial production, the platform shows significant potential as a rapid prototyping tool and democratization of technology for SMEs. This research confirms the feasibility of Scratch for creating attractive and interactive digital promotional media, bridging the gap between the need for immersive content and technical resource limitations.

Keywords: e-catalogue, ADDIE, fashion, gamification

1. Introduction

The digital era has driven fundamental transformations in marketing and promotion strategies (Taiminen & Karjaluo, 2015). Advancements in information technology have compelled companies to shift from conventional promotional methods toward dynamic and interactive digital media. Static media such as PDFs now exhibit significant limitations in capturing consumer attention, while new technologies like augmented reality have proven capable of creating more satisfying customer experiences (Poushneh & Vasquez-Parraga, 2017). Passive media like PDFs limit user engagement and fail to provide an immersive experience.

In response to these limitations, interactive electronic catalogs (E-Catalogs) have emerged as a superior solution. Unlike rigid static formats, interactive E-Catalogs allow users to explore content in a non-linear manner. Users are no longer bound by a predetermined page sequence but can interact directly with product visualizations and receive dynamic responses to their inputs. Every user action, such as a click or mouse movement, can trigger a series of visual or logical actions from objects on the screen. This enhanced interactivity directly correlates positively with user experience (UX), which ultimately improves brand perception and drives purchasing decisions. (Lee et al., 2018) As a result, the e-catalogue transforms from a passive product list into an experiential space where consumers are invited to engage in an interactive narrative. (Liman & Tjakra, 2022).

However, developing such interactive media often requires complex programming skills and significant resources, making it a barrier for small businesses or individuals without a technical background. In response, interactive e-catalogs have emerged as a superior solution enabling non-linear exploration and direct interaction. This increased interactivity positively correlates with user experience, ultimately enhancing brand perception Pangarkar & Kirk (2025) and driving purchase decisions. Scratch, originally designed for educational purposes, is now increasingly being explored for various uses beyond formal education (Giannakos & Voulgari, 2020). With its blockbased interface, Scratch democratizes the development process, enabling non-programmers to design functional digital products.

Scratch's fundamental strength lies in its ability to facilitate the creation of animations and games through an eventdriven model. This paradigm is relevant for interactive e-catalogues, where researchers can transpose game

mechanicssuch as exploration and instant feedback-into the context of product exploration. This approach, known as gamification, aims to meet users' psychological needs and enhance their satisfaction (Xi & Hamari, 2020). Thus, the e-catalogue transforms into an experiential space, inviting consumers to engage in an interactive narrative. This concept aligns with experiential marketing, which focuses on creating an emotional connection beten consumers and brands (Robertson., 2015).

To test the main argument that Scratch can serve as a viable platform for creating immersive and commercially relevant promotional media, this study developed a functional prototype named "Ginkgo Serenity." This prototype serves as a specific case study, providing a concrete application to demonstrate the technical feasibility and communicative effectiveness of using Scratch for this purpose. Thus, this study has several structured objectives. First, it aims to carefully design and build the "Ginkgo Serenity" e-catalogue, ensuring the final product is functional and interactive. This development process specifically focuses on implementing key interactive features derived from gamification principlenessuch as non-linear navigation, dynamic product animations, and instant user feedback-all of which are essential for enhancing the overall user experience.(Paduano, 2025) Ultimately, through the realization and evaluation of this prototype, the research will conduct an in-depth analysis of Scratch's potential and limitations, assessing its effectiveness as an alternative development platform for creating attractive digital promotional media, particularly for users without a deep technical background, such as small and medium-sized enterprises (SMEs). (Canziba, 2018)

2. Methodology

This research adopts the ADDIE development model, which is an acronym for Analysis, Design, Development, Implementation, and Evaluation. Researchers chose this model because it is structured, systematic, and flexible, making it very relevant for the development of interactive media products such as E-Catalogue. This framework ensures that the resulting product is not only technically functional, but also addresses the needs of users and is effective in achieving its communication objectives. This research adopts the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This model has proven effective for complex digital media development projects, including those involving gamification (Spatioti, et al., 2022).

2.1 Analysis Phase

The researcher applied Braun & Clarke's (2006) thematic analysis technique, following six systematic phases from data familiarization, coding, finding themes, reviewing, defining, to preparing the final report. The first phase was data familiarization, where the researcher transcribed and read the data repeatedly. After that, the researcher proceeded with initial coding by marking relevant segments of the data. These codes re then grouped in the theme search stage to identify broader patterns of meaning. Next, the researcher revisited the themes to ensure their coherence and validity against the overall data. Once the themes re finalized, the researcher carefully defined and named the themes. This process ended with the report drafting stage, where the researcher presented the findings in a narrative manner, supported by data citations to comprehensively ansr the research objectives.

2.2 Design Phase

Exploring information to identify the needs, challenges and opportunities related to the development of an interactive e-catalogue in the fashion industry.Asking focused questions to understand the "fundamental limitations of current digital catalogs", determine "essential interactive features", and assess the receptivity to game-inspired "exploration elements"as shown in figure 1, the researcher proceeded to the design phase. In this phase, a detailed blueprint, both conceptually and visually, was drawn up to guide the development. The main artifacts produced include:Storyboard: To visualize the storyline and interactive narrative of the e-catalogue.User Flow: To map out the user journey and interactions within the app, ensuring a logical and intuitive experience.Interface Design: To design the visual appearance (UI) and overall user experience (UX). (Hasan et al., 2024). Exploring information to identify the needs, challenges, and opportunities related to the development of an interactive e-catalogue in the fashion industry involved collecting data from prospective users and relevant stakeholders. This process focused on understanding user experiences with existing digital fashion catalogues, identifying usability issues, and exploring expectations for more engaging digital shopping experiences. Researchers asked focused questions to uncover the fundamental limitations of current digital catalogues, determine the essential interactive features required by users, and assess the acceptance of game-inspired exploration elements that could enhance user engagement and support fashion learning. The findings from this stage revealed that conventional digital catalogues often provide limited interactivity, making it difficult for users to visualize clothing combinations, experiment with different styles, and make confident fashion decisions.

Based on the findings obtained during the analysis stage, as shown in Figure 1, the researcher proceeded to the design phase. In this phase, a comprehensive development blueprint was prepared to translate the identified user needs into a

structured prototype. The design process emphasized the alignment between user requirements, learning objectives, and interactive digital experiences to ensure that the resulting e-catalogue would be both functional and engaging. Several key design artifacts were produced to guide the development process, including a storyboard to visualize the interactive narrative and content sequence, a user flow to map the navigation structure and user interactions throughout the application, and an interface design to establish the visual layout, user interface (UI), and user experience (UX) principles.



Figure 1 – Prototype.

2.3 Development Phase



Figure 2 - a) Main menu; (b) Lookbook menu; (c) Look menu; (d) Top; (e) Bottom; (f) Closing.

Based on the question regarding the limitations of conventional digital catalogs, the respondents convergently stated that the PDF format is no longer sufficient. The findings show that PDF is perceived as a "cold and emotionless" medium that fails to communicate the sensory value of fashion products (R1), a format that is "obsolete for interaction" (R2), and a form of "superficial remediation" (R3). The discussion of these findings clearly confirms the arguments in the literature regarding the importance of experiential marketing. The limitations revealed by the experts highlight deficits in the affective and sensory dimensions, which according to Lemon and Verhoef's (2016) framework, are crucial for creating holistic customer experiences and building strong brand connections.

3.2 Essential Interactive Features for Emotional Engagement

Regarding interactive features essential for emotional engagement, respondents highlighted the importance of user agency and responsive feedback. Findings indicate a preference for features that give consumers control, such as simple customization (R1), a focus on technical details such as micro-interactions to create a 'living' interface (R2), as well as features that allow users to build their own narrative discovery path (R3). This discussion of the desire for control, feedback and personal narratives confirms that at the heart of user-centered design is user empowerment. Emotional engagement does not come from complex features, but rather from a sense of agency and system responsiveness, which is an important foundation for gamification implementation.

3.3 Effectiveness of Exploratory Elements in a Fashion Context

The effectiveness of game-inspired exploration elements in a fashion context received a strong positive response. Experts welcomed the concept of 'discovery' as an elegant approach capable of creating an aura of exclusivity (R1), with the caveat that its implementation must be sophisticated to provide instant gratification (R2). Conceptually, this approach was assessed as a smart application of gamification that utilizes a simple 'reward loop' to drive engagement (R3). The discussion of these findings confirms that the application of game mechanics in a non-entertainment context, such as that of the "Ginkgo Serenity" prototype, successfully changes user behavior from passive consumption to active participation. This strengthens the argument of Rapp et al. (2019) and is in line with the design principles of effective gamification.

3.4 Prototype Evaluation: Navigation, Ease, and Experience

Evaluation of the prototype showed that the implementation of animations and interactive responses successfully provided a much richer experience. The findings from the experts described the prototype as "far superior" to a static catalog, where the non-linear navigation gave the impression of being in a 'gallery' (R1), the audio-visual feedback aided intuitive user orientation (R2), and the interactivity successfully transformed the catalog into an 'experiential space' (R3). The discussion from this evaluation reinforces the findings of Lemon and Verhoef (2016), where the prototype proved successful in providing cognitive and affective stimulation that is absent from static media, which in turn can significantly improve the quality of customer experience and brand perception.

3.5 Assessment of the Potential and Limitations of Scratch as a Development Tool

Finally, an assessment of Scratch's potential and limitations as a development tool yielded balanced views. Experts see it as a "game-changer" for MSMEs and a "technology democratization" tool that empowers 'citizen developers' (R1, R3). However, they also provided a critical technical view, stating that while excellent for rapid prototyping, its limitations for commercial production are very real, especially regarding issues of scalability and backend integration (R2). The discussion of these findings is highly relevant to the academic discussion on low-code/no-code (LCNC) platforms. As discussed by Garousi, Kuhrmann, & Mäntylä (2022), the respondents' comments accurately map the strengths (accessibility, speed) and weaknesses (scalability, integration) of this approach, positioning Scratch as a powerful enablement tool for early-stage innovation. This thematic analysis table maps the responses of three categories of experts—a Fashion Industry Expert with 15 years of experience, an Interactive Media Practitioner with 10 years of experience, and an Academic with 18 years of experience—to the development of an interactive e-catalogue. The findings from the interviews fall into three main themes. First, the experts agreed that static media such as PDFs have fundamental limitations in presenting fashion products as they fail to convey emotional and technical aspects. Second, the implementation of gamification mechanics, such as exploration and instant feedback, is considered highly effective in enhancing user engagement and experience. Third, while Scratch was recognized as a potential technology democratization tool for MSMEs and prototyping, experts also highlighted its limitations for large-scale commercial production due to scalability and integration issues.

Table 1 - Questions and expert views.

Main Theme	Related Interview Question	Respondent ID	Respondent Background	Experience	Raw Data Quote (Hypothetical Interview Results)	Initial Analysis / Interpretation
1. Limitations of Static Media & the Need for Immersive Experiences	"Based on your experience, what are the fundamental limitations you see in digital catalogs (e.g., PDF) in presenting fashion products?"	R1	Fashion Industry Expert (Brand Director)	15 Years	"PDF is flat and emotionless. Fashion is about movement and feeling; PDF completely fails to convey that."	Highlights the failure of static media to convey emotional and sensory aspects, which are crucial in the fashion industry.
		R2	Interactive Media Practitioner (Senior UI/UX Designer)	10 Years	"Technically, PDF is a dead-end format. The experience is not adaptive, it's linear, and there's no way to measure user engagement."	Points out the technical and functional (usability) aknesses of the PDF format, which is unable to measure user engagement.
		R3	Academic (Senior Lecturer in DKV)	18 Years	"This format only mimics print media in the digital realm. It's a failure to utilize the unique potential of the digital medium."	Provides a conceptual critique that the PDF format fails to leverage the unique potential of the digital medium (shallow remediation).
2. Effectiveness of Gamification Mechanics in Driving User Engagement	"To what extent are game-inspired 'exploration' or 'discovery' elements acceptable and effective?" & "Did the implementation of animation and interactive responses... succeed in providing a richer experience?"	R1	Fashion Industry Expert (Brand Director)		"This 'discovery' concept feels premium and elegant. It makes consumers feel special. The animation provides a 'wow factor' not found in other media."	Shows that gamification can enhance brand image (exclusivity) and provide a memorable experience.
		R2	Interactive Media Practitioner (Senior UI/UX Designer)		"Very effective. The 'click-to-discover' mechanism provides instant gratification. Simple audio and visual feedback make the interface feel alive."	Confirms effectiveness from an interaction design perspective; instant feedback creates user satisfaction (UX).

		R3	Academic (Senior Lecturer in DKV)	"This is a clever application of a reward loop. Users are motivated to keep interacting. The prototype succeeded in turning viewing into a participatory experience."	Analyzes the interaction mechanism from the perspective of gamification theory and its impact on changing user behavior (from passive to active).
3. Potential and Limitations of Scratch as an Alternative Development Platform	"Seeing this final result, how do you assess the potential and limitations of Scratch as a development tool for similar promotional media for non-technical people or SMEs in the fashion industry?"	R1	Fashion Industry Expert (Brand Director)	"Its potential is extraordinary for SMEs or independent designers. It's a tool for democratizing creativity that allows them to compete with minimal budgets."	Emphasizes the business and market impact of an accessible development tool, namely as a tool for 'democratizing creativity'.
		R2	Interactive Media Practitioner (Senior UI/UX Designer)	"As a rapid prototyping tool, it's great. But for commercial production, its limitations are clear: no backend integration, scalability issues, and customization limitations."	Provides a balanced technical assessment, distinguishing Scratch's function as a prototyping tool versus a full-scale production tool.
		R3	Academic (Senior Lecturer in DKV)	"This is tangible proof of 'technology democratization'. Scratch is excellent for idea validation and creating an MVP (Minimum Viable Product), but it's not the final solution for large-scale applications."	Places the findings in the broader context of technological trends and identifies it as an idea validation (MVP) tool.

4. Conclusion

This research successfully demonstrated that the Scratch visual programming platform can be effectively utilized to develop an interactive e-catalogue that overcomes the aknesses of static promotional media such as PDFs. Through the "Ginkgo Serenity" prototype, it was proven that interactive features such as non-linear navigation and gamification elements can create a richer, more immersive and emotionally engaging user experience. The key findings from the expert evaluation confirmed three things: first, the urgent need for more experienced media in the fashion industry; second, the effectiveness of game mechanics in increasing user engagement; and third, Scratch's dual role as an innovation emporment tool for MSMEs as ll as a platform with technical limitations for large-scale production. In conclusion, Scratch is a viable and accessible solution for rapid prototyping and small-scale promotional media development, as ll as a testament to the democratizing trend of technology that enables more people to become digital creators. Further research could explore how to bridge Scratch-based prototypes to more scalable commercial platforms.

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Conflict of Interest

The authors declare no conflicts of interest.

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