ISSN 2723-6471

Exploring User Experience of an Interactive LMS for Green Entrepreneurship: An Empirical Study of the GEJUR Platform

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(Received: May 01, 2025; Revised: July 25, 2025; Accepted: October 21, 2025; Available online: October 22, 2025)

Abstract

This article aims to assess the design, development, and User Experience (UX) of GEJUR, a web-based interactive Learning Management System (LMS) designed to foster green entrepreneurship among youth in Nusa Tenggara Timur (NTT), Indonesia. This study defines green entrepreneurship as entrepreneurial activities that combine economic value creation with environmentally responsible practices that promote sustainability in business. This research enhances the domains of Human–Computer Interaction (HCI) and entrepreneurship education by illustrating how user-centered digital platforms may cultivate youth business competencies while promoting the Sustainable Development Goals (SDGs). GEJUR incorporates interactive learning modules, e-mentoring, and specific cultural features like weaved motifs (pola tenun), providing contextual relevance alongside essential LMS functions. A mixed-methods approach was employed, integrating surveys, Focus Group Discussions (FGDs), semi-structured interviews, and usability testing. Quantitative data were gathered via the System Usability Scale (SUS), whilst qualitative data documented user impressions of obstacles and anticipations. The usability evaluation, conducted with 33 individuals, resulted in a mean SUS score of 48.9, which corresponds to approximately 71.9% of the benchmark score of 68. This positions GEJUR beneath the established threshold, classified as having "poor" usability, although it remains functionally workable. Participants effectively accomplished critical tasks including authentication, course access, and quizzes, and offered favorable feedback regarding the system's cultural integration. The results highlighted critical areas for enhancement, such as interface uniformity, minimization of response times, and more explicit user feedback. The study finds that GEJUR offers a viable yet improvable foundation for digital entrepreneurship training platforms in underprivileged areas. Subsequent study ought to broaden testing to encompass bigger and more heterogeneous user populations and implement sophisticated UX evaluation criteria beyond the SUS. Through iterative refinement, GEJUR can develop into a scalable platform that facilitates youth empowerment, sustainable business practices, and extensive socio-economic advancement.

Keywords: Green Entrepreneurship, Human–Computer Interaction, Learning Management System, System Usability Scale, User Experience

1. Introduction

Entrepreneurship is widely recognized as an important driver of economic growth, innovation, and job creation. In Indonesia, however, the level of entrepreneurship remains relatively low, with only 3.1% of the population engaged in entrepreneurial activities [1], [2], [3]. This challenge is particularly visible among youth in Nusa Tenggara Timur (NTT), a province characterized by high unemployment, poverty, and limited access to entrepreneurial education. The region is abundant in agricultural commodities such as sorghum and coffee. Sorghum, notably, is drought-resistant and matches NTT's arid climate. Promoting sorghum supports food security and preserves local farming traditions. Despite these assets, many young people in NTT struggle to develop these resources into sustainable business ventures [4], [5], [6], [7].

At the same time, the rapid adoption of digital technologies provides opportunities to address these barriers through the development of interactive and user-centered platforms [8], [9], [10]. In this context, Green Entrepreneurship for Youth Resilience (GEJUR) was developed as a web-based Learning Management System (LMS) to strengthen youth entrepreneurial capacity. The system integrates interactive learning modules, e-mentoring features, and a digital catalog

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DOI: https://doi.org/10.47738/jads.v6i4.1041

to showcase youth products, enabling both skill development and broader market access [11], [12], [13]. The name of GEJUR is used based on the suggestion of the local traditional leader, which means work diligently, patience and persevering.

From a Human–Computer Interaction (HCI) perspective, it is essential to evaluate how users interact with such systems [14], how UX elements influence their engagement [15], and how digital applications can be designed to support both learning outcomes and sustainable economic participation [16], [17], [18], [19]. Previous research in UX emphasizes the importance of usability [20], [21], [22], [23], accessibility [24], [25], [26], and cultural relevance in ensuring long-term adoption of digital platforms [27]. Therefore, assessing the UX of GEJUR is necessary to understand its effectiveness in supporting green entrepreneurship among youth in disadvantaged regions.

In this study we evaluate the usability of the GEJUR web-based LMS using the System Usability Scale (SUS), investigate which user-experience factors shape adoption and engagement with the platform, and examine how GEJUR contributes to youth learning outcomes—particularly their understanding of and interest in green entrepreneurship. Accordingly, we ask about the overall usability level of GEJUR as measured by SUS and explore, from a UX perspective, the factors that influence users' willingness to adopt and remain engaged with the platform. We also consider how use of GEJUR supports learners' knowledge, interest, and self-efficacy related to green entrepreneurship.

To address these aims, we administer the 10-item SUS questionnaire on a 1–5 Likert scale and analyze results with descriptive statistics, including means, standard deviations, and benchmark comparisons. We complement this with task-based usability testing and direct observation of navigation paths, task completion times, and errors, alongside semi-structured interviews. Post-use questionnaires capture perceived learning outcomes and self-efficacy, and interview data are examined using thematic analysis to surface users' perceptions and experiences.

We expect to report a quantitative usability score for GEJUR and classify it against established benchmarks. The mixed-methods evidence is anticipated to reveal specific UX elements—such as navigation, content relevance, and interactivity—that strongly affect adoption and engagement. The findings will inform practical design recommendations and provide evidence of how GEJUR enhances knowledge and interest in green entrepreneurship, offering broader insights into the role of UX in supporting learning and sustainable practices.

2. Literature Review

2.1. User Experience and Usability Evaluation

Usability and User Experience (UX) are critical factors influencing technology adoption. The Technology Acceptance Model (TAM) posits that perceived ease of use and perceived utility influence consumers' propensity to adopt a technology [28]. Recent studies in e-learning environments confirm that usability is a crucial determinant of learners' adoption and ongoing utilization of online platforms [29]. A meta-analysis of information systems continuance indicates that if a digital platform, like as a Learning Management System (LMS), is unintuitive, users are significantly less likely to engage with it fully [30]. A prior study by [31] revealed that user-friendly interfaces featuring clear navigation and responsive design are associated with increased satisfaction and prolonged usage.

Contemporary UX design beyond mere functionality, incorporating aspects that enhance user enjoyment and motivation. UX is a key aspect of HCI research. It emphasizes how users perceive, interact with, and adopt a digital system [32]. Usability, as part of UX, is often measured in terms of effectiveness, efficiency, and user satisfaction [33], [34], [35]. Researchers frequently utilize standardized measures to assess and guarantee the quality of experience. The System Usability Scale (SUS) is a commonly utilized instrument that offers a rapid quantitative assessment of perceived usability. The SUS has been utilized across various domains, including e-learning systems and healthcare applications, demonstrating efficacy in identifying design problems that hinder adoption [36], [37].

In the context of learning applications, usability is not limited to system performance but also relates to user engagement and motivation. Poor usability often results in reduced learning outcomes, while systems with intuitive navigation, clear content, and interactive features are more likely to encourage long-term adoption [38], [39], [40]. Therefore, evaluating the UX of an LMS is critical to ensure that learning objectives are supported effectively.

2.2. Learning Management Systems (LMS) in Digital Education

LMS have become integral to contemporary education, facilitating more accessible and adaptable learning experiences, especially in the absence of robust physical infrastructure. In developing or resource-limited areas such as NTT, LMS platforms are regarded as a viable solution to address educational disparities [31], [41]. A studies conducted by [42] explained that LMS must conform to the local environment and underscores the significance of accessibility features (e.g., offline access, mobile compatibility) and localization (e.g., translation, culturally pertinent material) in the design of LMS. [31]observes that although the adoption of LMS is proliferating globally, its effectiveness is influenced by cultural and institutional factors. Localized content, language adaptation, and culturally appropriate design play a crucial role in adoption [43]. Technical and infrastructure limitations such as: unreliable internet connectivity, restricted access to gadgets, and inadequate digital literacy can impede LMS utilization in underdeveloped regions. The study of [44] found that students' adverse experiences with online learning frequently stemmed from inadequate connectivity and subpar LMS performance. In resource-constrained settings, even a well-meaning e-learning project may fail if the technology is not aligned with practical reality. The inclusion of end-users in the design process is required to ensure the LMS addresses local requirements [45], [46].

2.3. Digital Entrepreneurship and Green Business

Promoting youth entrepreneurship is broadly regarded as a tactic to stimulate economic growth and provide employment in developing areas. In recent years, this strategy has converged with the emergence of green entrepreneurship—business initiatives that seek economic objectives while promoting environmental sustainability. [47]. Involving youngsters in green entrepreneurship will alleviate unemployment by fostering enterprise development and encourage new solutions to environmental issues [48] found that entrepreneurs' dedication to social and environmental goals correlates with improved business performance, indicating that the pursuit of sustainability does not hinder success and may really augment it. Similarly, the research undertaken by [49] who demonstrated that entrepreneurship education centered on sustainability can enhance the entrepreneurial intentions of youngsters. Digital technology is progressively regarded as a facilitator in this domain. [50] observe that digital innovation is revolutionizing green entrepreneurship by broadening young entrepreneurs' access to information, networks, and clientele. This corresponds with the advice of other researchers that capacity-building via knowledge acquisition and application is beneficial for enhancing business abilities [47]. Effective support necessitates a combination of knowledge, practical involvement, and supportive infrastructure (financial, technological, and institutional). Well-designed digital platforms can effectively serve as a mechanism to deliver these supports at scale, which is the specific setting for the current study's emphasis on an interactive LMS for green entrepreneurship.

Entrepreneurship education is widely recognized as a strategy to reduce youth unemployment and foster innovation. Green entrepreneurship, which integrates business objectives with environmental responsibility, has gained growing attention in recent years. Studies indicate that youth participation in green entrepreneurship not only contributes to economic growth but also promotes sustainable practices in line with the Sustainable Development Goals (SDGs) [13]. However, young entrepreneurs in developing regions often encounter barriers such as limited access to training, mentorship, and markets [50], [51]. Digital platforms have been identified as potential solutions to these challenges by expanding participation and reducing entry barriers. Research further shows that such platforms are most effective when they combine capacity building, including training and knowledge transfer, with market access mechanisms such as digital catalogs and e-commerce tools [47], [48], [49].

2.4. Research Gap

While there is extensive literature on LMS usability and entrepreneurship education, limited studies have focused on the intersection of UX evaluation, digital learning systems, and green entrepreneurship in developing regions. Previous research in the HCI field indicates that for young individuals to effectively utilize an educational platform, particularly in resource-constrained settings, the platform must be user-friendly, captivating, and congruent with users' requirements. Simultaneously, studies on entrepreneurship education and green innovation underscore the necessity for content and support systems to align with the contextual needs of the target audience to engage in sustainable business. Previous literature indicates that technology-enabled interventions are most effective when they transcend

mere technological application; success is achieved when digital platforms such as a LMS are integrated with tangible real-world relevance and support [31], [52].

Furthermore, few studies have applied standardized usability metrics such as SUS to assess the effectiveness of LMS platforms designed for socio-economic empowerment. Studies exist on general LMS usability and on entrepreneurship education separately, but few have examined them together, particularly in developing regions. The need for such integrated insights is highlighted by recent critiques [53] which point out that the youth green entrepreneurship ecosystem is under-studied and that evidence on effective digital support strategies remains scarce. Addressing this gap, this study evaluates the UX of GEJUR, a web-based LMS tailored to youth in Nusa Tenggara Timur, with the aim of understanding its usability, identifying critical UX factors, and examining its role in supporting green entrepreneurship in the underprivileged area. The usage of GEJUR symbols are rich with the local content to give easier understanding.

3. Methodology

This study applied a mixed-methods approach combining social science research and applied system design in the field of information systems. Figure 1 presents the overall research methodology, covering the research design, participants and sampling, data collection procedures, and data analysis workflow [54], [55].

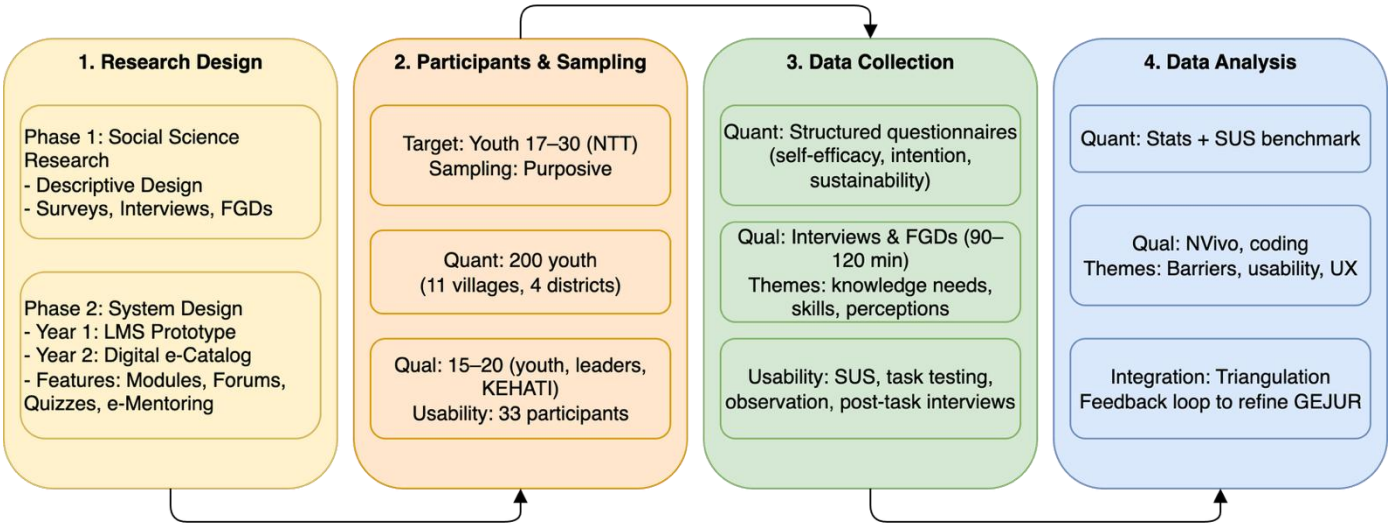

Figure 1. Research Methodology

3.1. Research Design

This study employed a mixed-methods strategy that combines social science research with practical system design within the domain of information systems [54], [55]. Data were gathered utilizing both quantitative and qualitative methodologies, encompassing surveys, interviews, and Focus Group Discussions (FGDs). The research was executed in two primary phases as a two-year longitudinal study, commencing at the beginning of 2025 and anticipated to conclude at the end of 2026. The initial year concentrated on empirical social science research employing a definitive descriptive design to ascertain factors affecting entrepreneurial intention, behavior, and sustainability among youth entrepreneurs in NTT, while also focusing on applied system development, culminating in the introduction and implementation of the GEJUR interactive LMS prototype. GEJUR employed a user-centered design methodology, integrating elements like interactive learning modules, discussion forums, adaptive quizzes, and e-mentoring. The second year of the study will concentrate on the creation of an e-catalogue for young entrepreneurial products. As the youth entrepreneurs enhance their skills through the use of LMS GEJUR, it is anticipated that the product will become more marketable.

3.2. Participants and Sampling

The subjects of this study were youth entrepreneurs aged 17 to 30 years from NTT, specifically in West Manggarai, which served as the research locus. A purposeful non-probability sampling technique was utilized to guarantee that respondents meet particular inclusion criteria, including a defined age range, business ownership, and prior experience with the Universitas Multimedia Nusantara LMS. There are 33 youth participants representing all villages, namely from Pantar, Golo Bilas, Wae Lolos, Liang Ndara, Compang Longgo, Gorontalo, Wae Kelambu, Labuan Bajo, Nggorang. The usability evaluation of GEJUR involved 33 youth entrepreneur participants, adhering to Nielsen's standards, which indicate that this sample size is sufficient to identify most usability difficulties. All participants can extrapolate the findings of the testing procedure [49]. All the participants are able to generalize the results of the testing process.

3.3. Data Collection

Data collection was conducted through three complementary approaches [56]. First, structured questionnaires were distributed to measure entrepreneurial self-efficacy, entrepreneurial intention, and sustainability orientation. Second, qualitative data were collected through semi-structured interviews and FGDs lasting between 90 and 120 minutes, designed to explore the knowledge needs, skill gaps, and perceptions of youth regarding green entrepreneurship. Third, usability data were gathered through testing sessions of the GEJUR LMS prototype. The SUS was administered to participants as the primary evaluation instrument, supported by task-based testing, direct observation of system interaction, and post-task interviews to capture perceptions and improvement suggestions [57], [58], [59], [60]. This multi-method data collection strategy allowed for a comprehensive evaluation of both social factors and system usability.

3.4. Data Analysis

Quantitative data obtained from the survey and SUS testing were analyzed using descriptive and inferential statistics. The SUS scores were calculated and benchmarked against standard usability thresholds to determine the acceptability and effectiveness of the GEJUR platform. Meanwhile, qualitative data from interviews and FGDs were transcribed and analyzed thematically using NVivo, with coding focused on themes such as barriers to entrepreneurship, system usability issues, and opportunities for enhancing user experience. The integration of findings was performed through triangulation of both quantitative and qualitative results, allowing for validation of results and a more comprehensive understanding of the phenomena studied. Iterative feedback from users was incorporated into the refinement of GEJUR, ensuring that system improvements aligned with the principles of user-centered design.

3.5. Expected Outcomes

The study is expected to produce several outcomes. First, it will generate empirical evidence regarding the usability of the GEJUR LMS, expressed through standardized SUS scores and supported by qualitative feedback. Second, it will identify key user experience factors—such as navigation, content relevance, and interactivity—that influence platform adoption and engagement among youth. Third, the integration of entrepreneurial training and market access through the LMS and e-catalog is expected to enhance the entrepreneurial self-efficacy and sustainability practices of young users. Finally, the findings are anticipated to contribute to the fields of HCI and applied data science by demonstrating how user-centered design of digital platforms can support youth empowerment and green entrepreneurship in developing regions.

4. Results and Discussion

The Results and Discussion present how GEJUR was designed, developed, and evaluated. Starting from requirement gathering through surveys and FGDs, a Figma prototype was created, integrating NTT cultural elements (avatars and woven motifs). After user acceptance, the system was built using React and TypeScript, providing core e-learning features.

4.1. Prototype Development and System Design

Before the actual system development, a prototype was created using Figma to visualize the user interface and gather early feedback. At this stage, several custom UI assets were designed to incorporate the cultural identity of NTT, such

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as locally inspired avatars/characters and woven-pattern motifs (*pola tenun*) that were embedded into the interface design. These elements were positively perceived by users during FGDs and reinforced the contextual relevance of GEJUR.

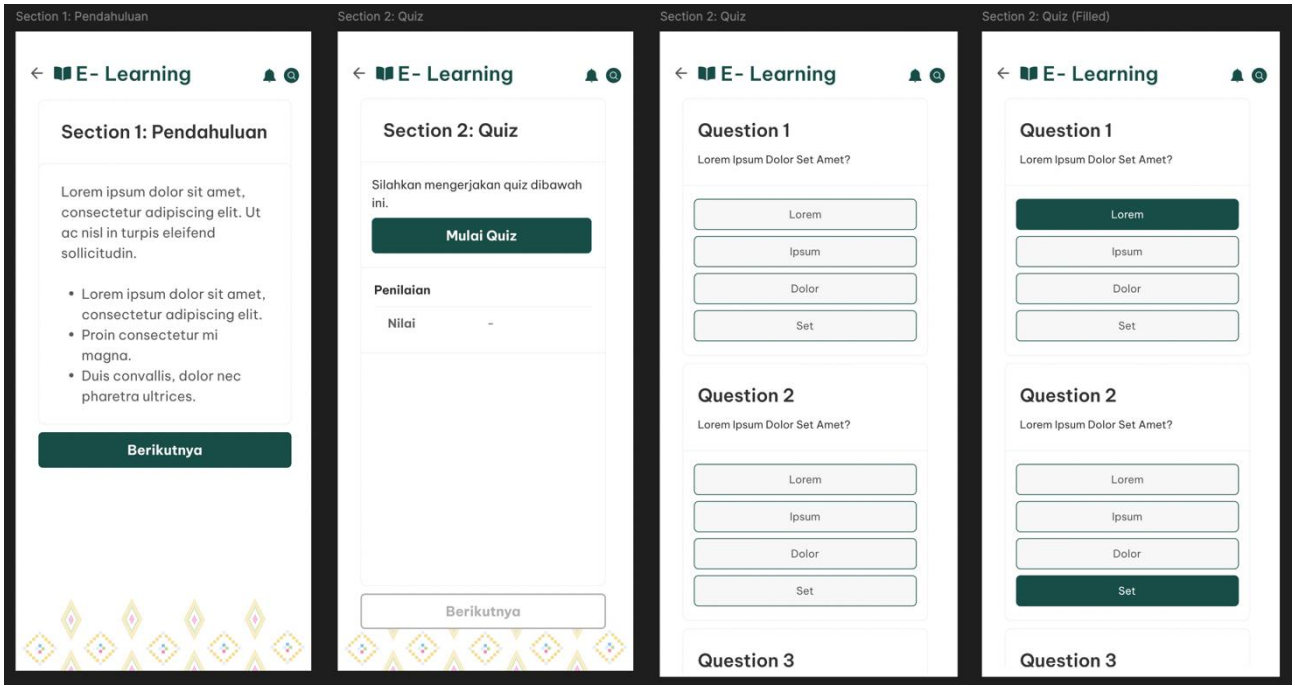

Figure 2. Web apps Prototype (develop by Figma) – 1

As illustrated in figure 2, the initial prototype of GEJUR was designed to provide a clear and user-friendly interface for learners. The mobile-first layout enables students to access course modules sequentially, beginning with an introductory section, followed by quizzes, and interactive learning tasks. The prototype emphasizes clarity and simplicity, ensuring that learners can navigate between sections, attempt quizzes, and review their performance with minimal friction. The design also incorporates cultural elements such as woven motifs at the bottom of the interface, strengthening the platform's local identity.

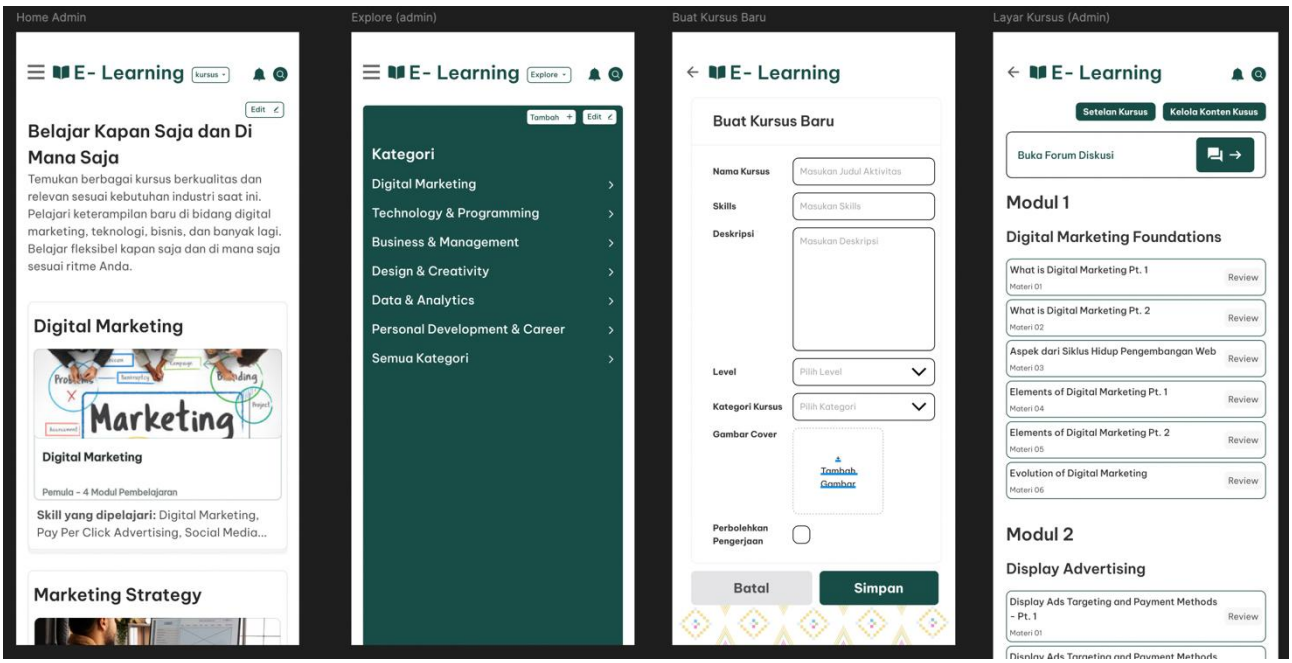

Figure 3. Web apps Prototype (develop by Figma) - 2

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Meanwhile, figure 3 presents the administrator interface, which facilitates the management and delivery of learning content. Administrators are able to create new courses, categorize them into relevant skill domains, and upload materials such as videos, readings, and quizzes. The explore feature provides structured browsing of courses, while the course management panel supports modular organization of content. This design not only streamlines content creation but also ensures scalability, as new modules can be easily added over time. After the prototype was accepted, the project progressed into system development using React and TypeScript, ensuring scalability and modularity in the implementation process.

4.2. Implementation of GEJUR Web Application

The resulting platform—accessible at digitalworks.id—integrates fundamental, learner-centered features that support study and interaction in a streamlined first release. Users authenticate through admin-registered accounts and can manage basic profiles, sign in and out, and update their passwords. Learning content is delivered through structured course modules that bundle materials, quizzes, and videos to guide progression. To foster engagement, the system provides notifications and an explore function for browsing available content, with forum discussions planned for the next development iteration. These capabilities reflect the initial requirements identified in the FGDs and surveys, ensuring that the platform's core needs are addressed from the outset. The implementation of GEJUR resulted in a fully functional web application accessible at digitalworks.id. As shown in figure 4, the platform has been designed to present courses in an engaging and structured manner.

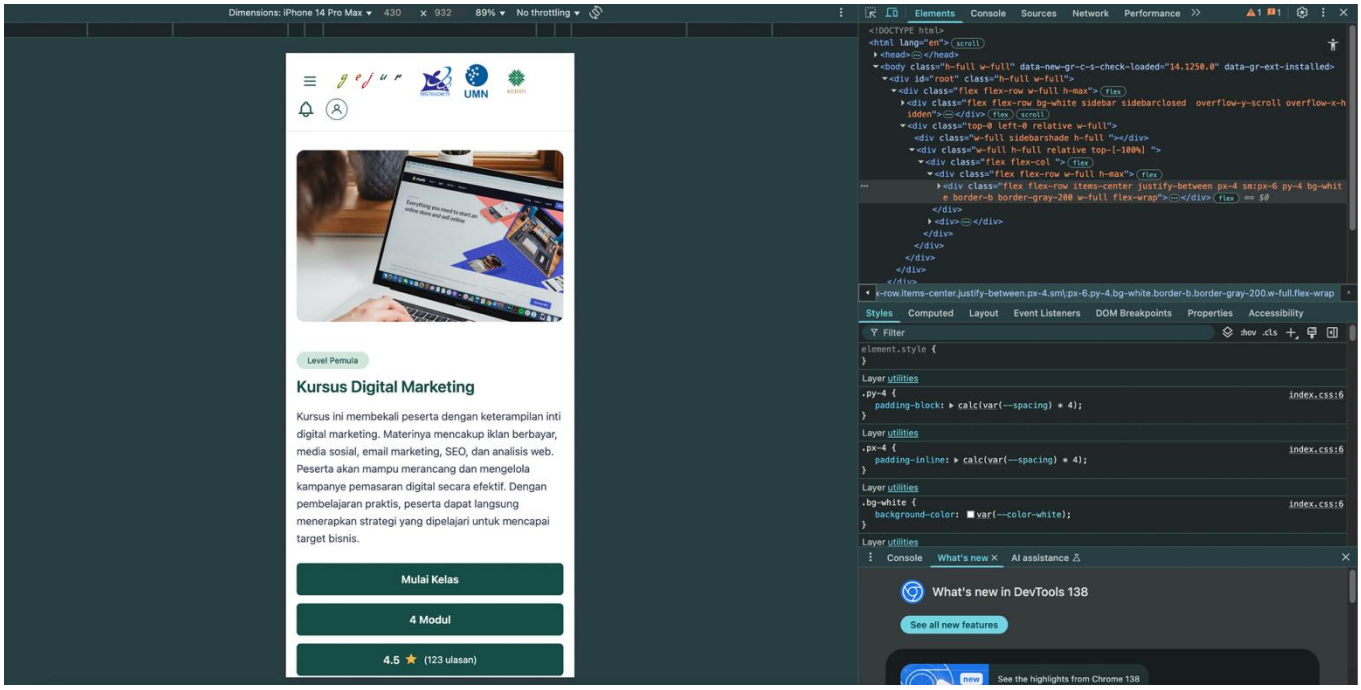

Figure 4. GEJUR Web Apps preview using Smartphone Ratio

For example, the Digital Marketing course page highlights the course description, number of modules, and a clear call-to-action button for learners to start classes. Additional details such as module counts, user ratings, and reviews provide learners with transparent information to support decision-making. The design emphasizes accessibility and a clean layout that is optimized for mobile use, reflecting the platform's aim of reaching diverse users in varying contexts. Meanwhile, figure 5 illustrates several key features that enhance both usability and functionality. The profile management page allows users to update their personal information and manage login credentials, including password changes.

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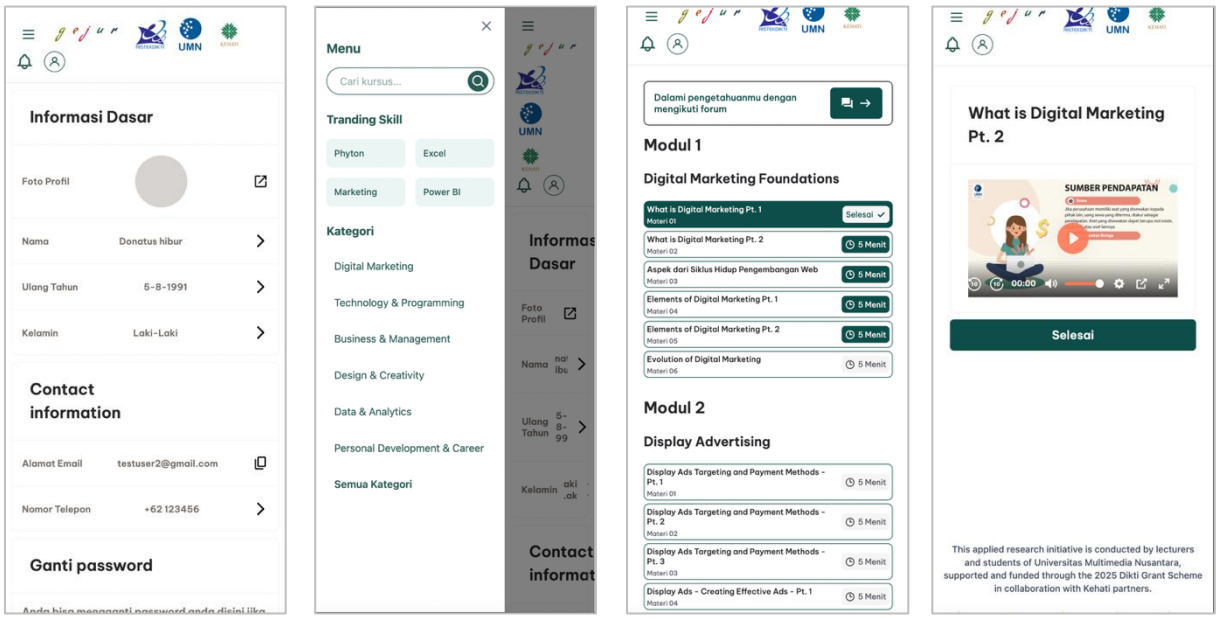

Figure 5. Preview of GEJUR Web Apps features

The navigation menu provides access to trending skills and course categories, enabling learners to easily explore content across multiple domains. The course module interface displays detailed learning pathways, with sequential modules and time allocations for each lesson. Furthermore, the video-based learning interface supports multimedia delivery, accompanied by culturally relevant visual assets and a structured completion workflow.

4.3. Usability Evaluation through SUS

The system's usability was evaluated using the SUS with 33 participants. Following user interaction with the platform, respondents completed the standardized 10-item SUS questionnaire. The results yielded an average score of 48.9, ranging from 35.0 to 57.5. The ten items listed in Table 1 represent the standardized SUS questionnaire, which was adapted to the context of the GEJUR web application.

Table 1. System Usability Scale (SUS) questionnaire

No.	Questions
1	I think that I would like to use the GEJUR web app frequently.
2	I found the GEJUR web app unnecessarily complex.
3	I thought the GEJUR web app was easy to use.
4	I think that I would need the support of a technical person or documentation to use GEJUR.
5	I found the various functions in the GEJUR web app were well integrated.
6	I thought there was too much inconsistency in the GEJUR web app.
7	I would imagine that most people would learn to use the GEJUR web app very quickly.
8	I found the GEJUR web app very cumbersome to use.
9	I felt very confident using the GEJUR web app.
10	I needed to learn a lot of things before I could get going with the GEJUR web app.

These questions are designed to capture users' perceptions across multiple dimensions of usability, including frequency of use, system complexity, ease of use, need for support, integration of functions, consistency, learnability, clarity, confidence, and required effort to learn. Each item alternates between positive and negative phrasing to minimize response bias and ensure balanced measurement. By applying this instrument, the study was able to generate a comprehensive assessment of GEJUR's usability from the users' perspective in the distributions of SUS Score in figure 6. The resulting scores provide not only a quantitative benchmark of the system's current performance but also valuable

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qualitative insights into areas where the application is already effective and where improvements are needed. The SUS evaluation as it described in table 2 reported a mean score of 48.9 but did not include confidence intervals or statistical tests comparing the results with the benchmark value of 68, which limits the interpretability of claims regarding "functional but improvable" usability.

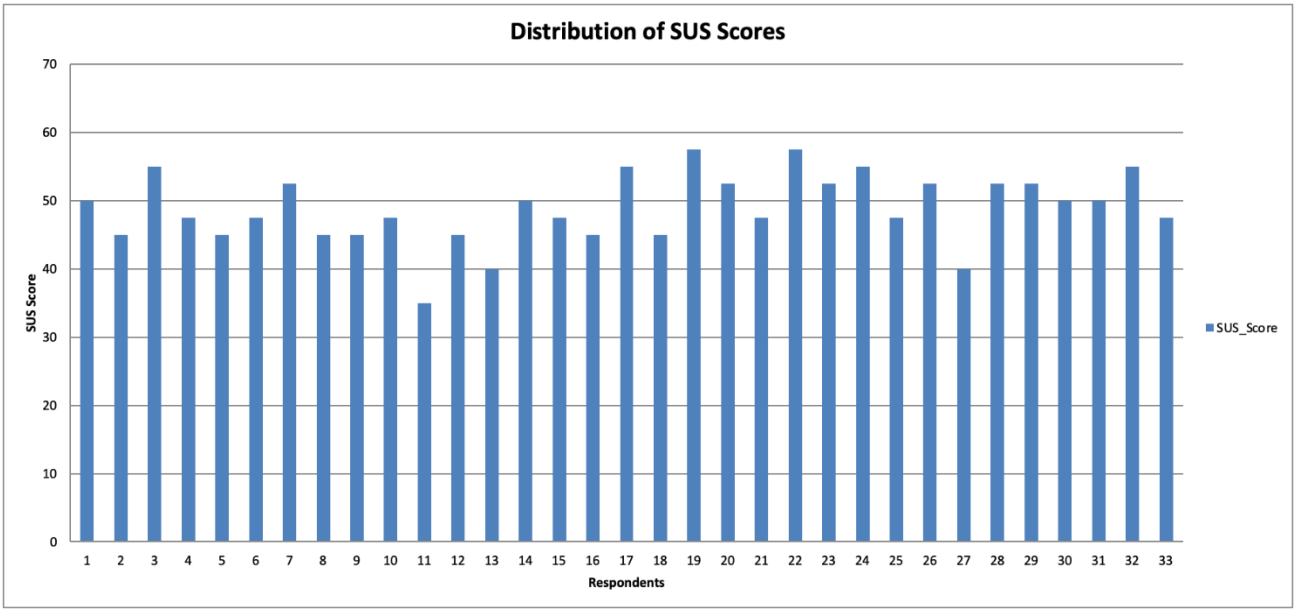

Figure 6. Distributions of SUS Score

Table 2. Summary of SUS Results

No	Metric	Value	Interpretation
1	Number of respondents (N)	33	Adequate sample for pilot usability test
2	Mean SUS Score	48.9	Below benchmark (68), indicates "Poor" usability but functional baseline
3	Median SUS Score	47.5	Consistent with mean, showing central tendency
4	Standard Deviation	5.2	Moderate variation across respondents
5	Minimum SUS Score	35.0	Lowest perceived usability
6	Maximum SUS Score	57.5	Highest perceived usability in sample
7	SUS Benchmark Reference	68	Threshold for "Acceptable" usability
8	GEJUR SUS Category	Poor (baseline)	Indicates functional but improvable usability

Although the score falls below the widely referenced threshold of 68, the findings indicate that GEJUR achieved a baseline level of functional usability, as participants were able to log in, navigate courses, and complete quizzes and materials without critical errors. The clustering of scores between 45 and 55 further suggests a consistent user experience across respondents, which, while insufficient to meet the standard for acceptable usability, provides a constructive foundation for iterative refinement at this stage of development.

$$\text{Effectiveness (\%)} = \frac{\text{Benchmark SUS Score}}{\text{Mean SUS Score}} * 100 = \frac{48.9}{68} * 100 = 71.9\% \quad (1)$$

The equation presents the statistical interpretation of the SUS results for GEJUR with a sample size of 33 participants. The mean SUS score was 48.9 (SD = 5.2), with scores ranging from 35.0 to 57.5. Most participants scored between 43.7 and 54.1 (Mean ± 1 SD). All scores fell below the benchmark threshold of 68, indicating that the system is significantly under the acceptable usability level. The calculated gap from the benchmark is 28.1%, suggesting that

while GEJUR demonstrates functional usability, it remains categorized as "poor" and requires further refinement. Effectiveness was estimated at approximately 71.9% of the benchmark standard. The results highlight the importance of iterative improvements in interface consistency, response time, and feedback mechanisms before broader deployment [37].

4.4. Findings and Discussions

The evaluation suggests several strengths of GEJUR in its current form. The successful integration of cultural UI elements distinguishes the platform as a context-sensitive learning application. Furthermore, the system already provides core e-learning functions (authentication, content access, assessment, and media delivery) that lay the groundwork for sustainable use and expansion.

The SUS results highlight opportunities for refinement, particularly in areas such as response time optimization, interface consistency, and clearer feedback during user interactions. These insights are typical of early-stage platforms and represent actionable items for the next design cycle. Importantly, the SUS evaluation should be interpreted as establishing a baseline benchmark. The current results validate the feasibility and operability of the platform, while also providing a roadmap for iterative improvement. With further refinement guided by structured feedback loops, GEJUR is expected to achieve higher usability standards and greater acceptance among its intended user base.

The integration of FGD and interview data provided nuanced insights into the user experience of the GEJUR platform. Beyond the quantitative SUS results, the qualitative findings highlighted the importance of cultural relevance, usability barriers, and motivational factors in shaping adoption. The coding tree illustrates the hierarchical structure of qualitative findings derived from FGDs. Three major themes were identified: Cultural Relevance, Usability Barriers, and Motivation & Engagement. Each theme is supported by sub-codes that emerged during the coding process, such as woven motif recognition, navigation issues, and the desire for gamification. This visual representation as it described in Figure 7 demonstrates how participant insights were systematically organized to validate and enrich the thematic findings, providing transparency and rigor in the qualitative analysis.

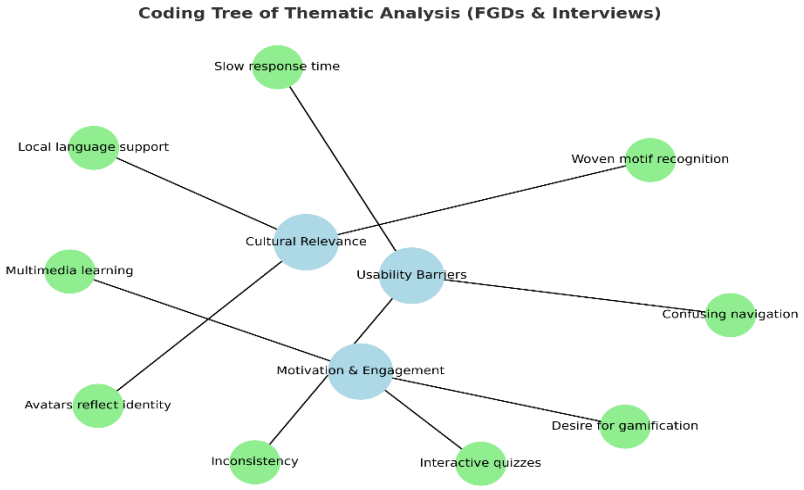

Figure 7. Coding Tree of Thematic Analysis

In Themes 1 (Cultural Relevance), participants consistently emphasized the value of localized design elements. The incorporation of woven motifs (pola tenun) and culturally inspired avatars was seen as affirming their identity: "I like that the platform uses local woven patterns — it makes me feel this system is really for us, not just something imported." (Female participant, age 22).

The finding aligns with [27], who showed that embedding cultural heritage into digital platforms fosters greater acceptance and trust. Meanwhile, in themes 2 (Usability Barriers), while cultural elements enhanced familiarity, usability challenges emerged as significant barriers, almost all the participants highlighted issues of response time and interface consistency): "Sometimes the videos load too slowly, and I lose interest before I can finish the lesson." (Male

participant, age 25) and "The menu feels confusing — I clicked on the wrong page several times before finding my course." (Female participant, age 19)

These concerns reflect broader findings in LMS research that poor performance and inconsistent design reduce engagement [44]. Furthermore, in themes 3 (Motivational Factor), Interactivity and gamification elements were described as key motivating factors: "The quiz made me want to learn more — I felt like I was competing with myself." (Male participant, age 21) and "If the app had levels or badges, I think it would be more fun and I'd keep coming back." (Female participant, age 23) This echoes recent evidence that gamified elements improve learner engagement and motivation [38]. The summary of coding tree of thematic analysis further explained in table 3 as follows:

Table 3. Summary of Coding Tree of Thematic Analysis

Theme	Codes	Illustrative Insights
Cultural Relevance	woven motif recognition, avatars reflect identity, local language support	"This system is really for us."
Usability Barriers	slow response time, confusing navigation, inconsistency	"Videos load too slowly"; "Menu feels confusing."
Motivation & Engagement	interactive quizzes, desire for gamification, multimedia learning	"The quiz made me want to learn more"; "Levels or badges would make it more fun."

Interestingly, while many valued cultural design, some participants were less concerned about it compared to performance issues: "Design is less important than speed — if it loads slowly, I won't use it." (Male participant, age 24), The finding contrast suggests that while cultural localization enhances acceptance, technical performance remains a non-negotiable factor in sustaining engagement. The finding also suggests several strengths of GEJUR in its current form. The successful integration of cultural UI elements distinguishes the platform as a context-sensitive learning application. The system already provides core e-learning functions (authentication, content access, assessment, and media delivery) that lay the groundwork for sustainable use and expansion. The SUS results highlight opportunities for refinement, particularly in areas such as response time optimization, interface consistency, and clearer feedback during user interactions. These insights are typical of early-stage platforms and represent actionable items for the next design cycle. However, one notable gap concerns accessibility and digital literacy, which emerged both in user feedback and in comparison to prior literature [25].

Several participants reported difficulties navigating menus or required additional explanation during testing. This suggests that while the platform is functionally usable, it is not yet fully inclusive for learners with limited digital experience or for users with potential disabilities. This aligns with [24] and [25], who argue that accessibility barriers—whether technical, visual, or cognitive—can significantly undermine long-term adoption in educational platforms. As one participant noted: "I asked a friend to help me log in the first time, because I didn't understand the steps." (Female participant, age 20), This highlights the importance of designing onboarding workflows, multimodal instructions (text, audio, video), and error-tolerant navigation that can support users with lower digital literacy. Similarly, while the current design incorporates cultural motifs, it does not yet include adaptive accessibility features such as screen reader compatibility, font adjustments, or alternative text for visuals. As [26] caution, accessibility compliance should be treated as a core design principle rather than an afterthought

The enriched qualitative findings validate the SUS results by showing that GEJUR is functionally usable but hindered by specific performance gaps. They also provide evidence that cultural contextualization enhances perceived relevance, while usability refinements and gamified features could boost adoption. These results echo broader literature on LMS in resource-constrained settings and digital entrepreneurship education, reinforcing the need for iterative, user-centered design improvements. The development and evaluation of GEJUR through digitalworks.id mark an important milestone in delivering a culturally responsive, functional, and scalable digital learning platform. The current usability score reflects a positive starting point, and the study provides a well-structured evidence base for ongoing enhancements. The integration of quantitative and qualitative data in this study ensures methodological robustness. While SUS provided quantifiable benchmarks, interviews and FGDs revealed user expectations and perceptions that

enrich the understanding of usability, accessibility, and inclusivity. This triangulation aligns with the overall research design and provides a clear framework for system refinement.

5. Conclusion

This study set out to examine the design, development, and UX of GEJUR, a web-based interactive LMS aimed at promoting green entrepreneurship among youth in NTT. Building on the challenges of youth unemployment, limited access to entrepreneurial training, and the need for sustainable business practices outlined in the introduction, GEJUR was conceptualized as both an educational tool and a digital platform to enhance market access. From the literature review, it was established that UX and usability play critical roles in ensuring the effectiveness of digital learning platforms, and that entrepreneurship education—particularly green entrepreneurship—requires solutions that integrate both capacity building and economic participation.

The methodology combined quantitative and qualitative approaches with applied system development to evaluate GEJUR in real-world settings. Through surveys, interviews, focus group discussions, and usability testing with the SUS, the study gathered both empirical and experiential evidence. This dual approach ensured a robust evaluation framework capable of capturing not only statistical usability benchmarks but also the contextual nuances of user expectations, barriers, and cultural relevance.

The results show that GEJUR delivered a functional and culturally responsive prototype, integrating localized design elements and providing essential LMS features such as content delivery, quizzes, and multimedia support. However, the mean SUS score of 48.9, which is below the widely accepted benchmark of 68, indicates that the system currently falls into the category of “poor” usability. This finding suggests that, while the platform is operational and provides a valid baseline for development, significant refinement is required before it can be considered acceptable for broader adoption. Key areas for improvement include response time optimization, interface consistency, and the provision of clearer user feedback. Addressing these limitations will be critical to achieving higher usability standards and improving user acceptance in subsequent iterations.

Despite these shortcomings, this research contributes to HCI and applied data science by demonstrating the application of user-centered design in developing digital platforms for youth empowerment and sustainable entrepreneurship. The integration of educational and market access features highlights the potential of GEJUR to provide both learning value and practical pathways for youth engagement in green business practices. Future work should expand evaluation to larger and more diverse user groups, apply advanced UX metrics beyond SUS, and assess the effectiveness of the e-catalog feature in enabling wider market participation. With continued refinement and iterative development, GEJUR can progress toward becoming a scalable platform that addresses socio-economic and environmental challenges while contributing to long-term sustainable development goals in Indonesia.

Provide a statement that what is expected, as stated in the "Introduction" chapter can ultimately result in "Results and Discussion" chapter, so there is compatibility. Moreover, it can also be added the prospect of the development of research results and application prospects of further studies into the next (based on result and discussion).

6. Declarations

6.1. Author Contributions

Conceptualization: F.K., J.W., E.D.L., A.A., A.S.E.N., M.F., Y.B.C.L., F.A.H., and A.Z.M.; Methodology: F.K.; Software: J.W.; Validation: F.K., J.W., and A.A.; Formal Analysis: F.K., J.W., and A.A.; Investigation: F.K.; Resources: F.K.; Data Curation: J.W.; Writing Original Draft Preparation: F.K., J.W., and A.A.; Writing Review and Editing: F.K., J.W., and A.A.; Visualization: F.K.; All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6.3. Funding

This study is conducted with the support funding from Kementerian Pendidikan Tinggi, Sains, dan Teknologi Republik Indonesia with the Contract No. 0993/LL3/AL.04/2025. This study is a collaboration reseach with Yayasan Kehati, under the Memorandum of Agreement No. 540/Rektor/VI/2025 (UMN) and No. 003/KHT/LGL/KP/KK/VI/2025 (Yayasan Kehati).

6.4. Institutional Review Board Statement

This study is conducted by the approval of Universitas Multimedia Nusantara Ethical Board Committee under the Letter No. 3296/RIS/VII/2025.

6.5. Informed Consent Statement

The data collected was approved with the permission from the chosen respondents assigned by Yayasan Kehati. The researcher team ensure the data confidentiality for research purpose only.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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