



Rule-Based Hybrid Filtering for Skill Event Recommendation in A Multi-Platform Application

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Abstract

Digital skill development events require effective mechanisms for personalized event discovery and efficient administrative management. This study developed and validated SkillFest, a multi platform event management application incorporating a rule based hybrid filtering recommendation model for skill development events. The research employed an applied software engineering approach using Agile Kanban to guide requirement analysis, system design, implementation, and iterative evaluation. The recommendation mechanism combined content matching, interaction history, and explicit decision rules based on user interests, skill levels, and location preferences to support transparent recommendation generation under limited behavioral data conditions. The prototype integrated a web administration platform, a mobile application, a REST API layer, and a relational database environment. Empirical validation was conducted through API testing, functional testing, scenario based User Acceptance Testing, and White Box Testing. The results demonstrated successful implementation of event management, participant registration, recommendation delivery, QR attendance recording, certificate management, discussion forums, and reporting functions. All evaluated testing scenarios achieved successful outcomes and confirmed the reliability of core application processes. The study contributes an explainable recommendation framework that supports practical event discovery while maintaining operational feasibility during early stage deployment and prototype validation.

Keywords : Rule Based Hybrid Filtering, Event Management, Recommender System, Multi Platform Application, User Acceptance Testing.



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INTRODUCTION

The rapid expansion of digital learning ecosystems has transformed the way individuals access professional development opportunities, creating an increasingly complex environment in which seminars, workshops, certifications, and competency enhancement programs are distributed across multiple digital platforms and organizational contexts. The convergence of mobile technologies, cloud based infrastructures, intelligent information systems, and data driven personalization has intensified the demand for recommendation mechanisms capable of connecting users with relevant learning opportunities while simultaneously reducing information overload. Recent developments in artificial intelligence, multimodal interaction environments, and large scale behavioral analytics indicate that personalized decision support is becoming a central component of modern digital services, particularly in domains where user preferences, contextual constraints, and dynamic content continuously evolve (Shen et al., 2026). The emergence of intelligent media consumption frameworks further demonstrates how personalized recommendation capabilities have become essential for navigating extensive digital content ecosystems and improving user engagement through adaptive information delivery (Sundar, 2023). At the same time, advances in memory aware intelligent agents and adaptive interface technologies reveal a broader movement toward systems that can interpret user contexts and provide increasingly relevant recommendations across heterogeneous digital environments (Zeng et al., 2026).

Research on recommender systems has consistently demonstrated that personalization mechanisms can substantially improve information discovery, user satisfaction, and decision quality when recommendation processes effectively integrate user characteristics with item attributes. Existing studies have explored collaborative filtering, content based filtering, neural recommendation models, knowledge driven approaches, and hybrid architectures that combine multiple sources of information

to improve recommendation outcomes. Comprehensive evaluations have shown that recommendation performance is influenced not only by algorithmic sophistication but also by the compatibility between recommendation logic, domain characteristics, and available data resources (Zangerle & Bauer, 2022). Within this evolving landscape, knowledge based recommendation approaches have attracted renewed attention because they provide interpretable reasoning mechanisms and can incorporate explicit domain knowledge into the recommendation process (Uta et al., 2024). Parallel developments in rule based intelligent systems have also highlighted the continued relevance of transparent decision structures, particularly in environments where explainability and operational control remain important requirements for system adoption and trustworthiness (Solomon & Tilahun, 2024).

Despite these advances, significant limitations remain evident within the existing literature. A substantial proportion of contemporary recommendation research prioritizes predictive accuracy obtained from large volumes of historical interaction data, often overlooking the practical constraints faced by newly deployed platforms that possess limited behavioral records. Such dependence creates persistent cold start challenges that reduce recommendation effectiveness for new users and newly introduced items. Furthermore, many recommendation models emphasize algorithmic optimization while providing limited transparency regarding the rationale behind generated recommendations, thereby reducing user trust and restricting organizational oversight. Although knowledge based recommender systems offer interpretability advantages, current implementations frequently focus on product selection, content recommendation, or decision support domains rather than skill development events characterized by diverse participant competencies, geographical considerations, and contextual participation requirements (Uta et al., 2024). Existing evaluation frameworks have also noted inconsistencies between technical performance metrics and real world utility, indicating a continuing gap between theoretical recommendation effectiveness and practical deployment outcomes (Zangerle & Bauer, 2022).

The challenge becomes more pronounced in multi platform event management environments where recommendation quality depends on the simultaneous consideration of topical relevance, user readiness, logistical feasibility, and contextual preferences. Skill development events differ from conventional recommendation domains because participation decisions are often constrained by competency levels, location accessibility, scheduling compatibility, and professional objectives. Recent advances in multi source information integration demonstrate that combining heterogeneous data sources can substantially improve decision making quality when contextual constraints are explicitly incorporated into system logic (Wang et al., 2026). Nevertheless, many existing event management platforms continue to rely on manual browsing processes, static categorization structures, or generic search functionalities that fail to provide personalized guidance for users attempting to identify relevant learning opportunities. This situation creates practical inefficiencies for participants while simultaneously limiting the visibility and accessibility of suitable events offered by organizers.

From a scientific perspective, the unresolved challenge concerns how recommendation systems can achieve a balance between personalization capability, transparency, operational simplicity, and effectiveness under conditions of limited behavioral data. From a practical perspective, educational institutions, professional organizations, and training providers increasingly require recommendation mechanisms that can be deployed during early system implementation stages without depending on extensive historical interaction datasets. The growing interest in explainable intelligent systems reinforces the need for recommendation architectures capable of providing traceable reasoning while maintaining sufficient personalization quality. Within this context, rule based hybrid filtering represents a promising yet insufficiently explored direction because it enables the integration of explicit domain rules, user profile characteristics, and available interaction histories into a unified recommendation framework. Such an approach has the potential to address cold start limitations while preserving interpretability and supporting decision making processes in skill event management applications.

This research positions itself at the intersection of recommender system engineering, knowledge based personalization, and multi platform event management by proposing a rule based hybrid filtering model specifically designed for skill event recommendation. Unlike approaches that primarily depend on extensive behavioral datasets, the proposed framework integrates user interests, skill levels, location preferences, and available interaction histories through transparent recommendation rules that can be directly interpreted and validated. The study aims to develop and evaluate a recommendation mechanism embedded within a multi platform event management application while simultaneously

contributing a methodological framework for explainable recommendation design under limited data conditions. The expected contribution extends both theoretically through the refinement of hybrid recommendation principles in skill development contexts and methodologically through the implementation and validation of a practical recommendation architecture suitable for early stage deployment and applied innovation environments.

RESEARCH METHODS

This study employed an empirical applied software engineering approach to develop and evaluate SkillFest, a multi platform event management application equipped with a rule based hybrid filtering recommendation mechanism for skill development events. The development process followed an iterative Agile Kanban framework consisting of problem identification, data collection, requirement analysis, system design, development, testing, and review. Requirement elicitation was conducted through direct observation of existing event management practices and an online survey involving potential participants, organizers, and event administrators to identify challenges related to event discovery and personalization. Based on these findings, a prototype architecture integrating a web administration platform, a mobile application, a REST API layer, and a relational database was designed and implemented using Laravel, Flutter, and MySQL. The recommendation module combined three complementary decision sources. Content based matching utilized user preferences and event metadata to identify thematic relevance. Interaction based signals incorporated available user event histories to refine personalization. A rule engine applied explicit constraints related to interest category, skill level suitability, and location preference. This integrated architecture was intentionally designed to support transparent recommendation generation under conditions of limited behavioral data while maintaining operational feasibility for early stage deployment and innovation oriented validation.

Methodological rigor was ensured through a multilayer validation strategy encompassing interface verification, functional assessment, user oriented evaluation, and structural code examination. API validation was performed using Postman to assess endpoint reliability, data exchange consistency, authentication processes, and database transactions across create, read, update, and delete operations. Functional evaluation was conducted through black box testing and scenario based user acceptance testing involving core system features, including event management, participant registration, recommendation delivery, QR based attendance recording, certificate management, discussion forums, and analytical reporting. Internal software reliability was further examined through white box testing to evaluate input validation procedures, conditional execution paths, recommendation rule processing, and data management logic. Evaluation metrics consisted of API response validity, successful execution of functional scenarios, correctness of recommendation outputs according to user interests, skill levels, and location preferences, as well as overall system integration performance across web and mobile environments. This comprehensive validation framework provided robust empirical evidence regarding the reliability, traceability, and practical applicability of the proposed recommendation model while demonstrating its capacity to generate explainable event recommendations without dependence on large scale historical interaction datasets

RESULTS AND DISCUSSION

System Architecture Design and Prototype Implementation

The development process resulted in the implementation of SkillFest as a multi platform event management application designed to support skill development activities through integrated event administration and participant services. Requirement elicitation involving prospective participants, organizers, and administrators revealed recurring challenges related to event discovery, fragmented information access, and the absence of personalized recommendation support. These findings indicate that event management platforms require not only administrative functionality but also mechanisms that facilitate efficient access to relevant opportunities. Similar observations have been reported in studies emphasizing the growing importance of integrated digital ecosystems for personalized information delivery (Ko et al., 2022; Roy & Dutta, 2022).

The resulting prototype was developed using a multi platform architecture consisting of a web administrator interface, a mobile application, REST based communication services, and a relational database environment. This architecture enables organizers and participants to interact through different interfaces while maintaining centralized data management. Such separation of concerns improves

maintainability and allows each subsystem to evolve independently without disrupting overall system functionality. Contemporary software engineering literature recognizes modular architecture as a critical factor influencing scalability and long term system sustainability (Michail & Ratnasari, 2026).

The implemented architecture establishes a continuous workflow that connects event creation, recommendation processing, participant interaction, and reporting activities within a unified environment. Event information entered through the administrative interface is stored within the database and subsequently accessed through service endpoints for processing and presentation. This workflow minimizes redundancy while supporting consistency across multiple access channels. Distributed service architectures have been widely adopted to improve interoperability and operational flexibility in information systems serving heterogeneous user groups (Putchakayala & Cherukuri, 2024).

The prototype was implemented using Laravel as the backend framework, Flutter as the cross platform development environment, MySQL for persistent data storage, and REST API services for system integration. The selection of these technologies was motivated by their compatibility with iterative development approaches and their ability to support rapid deployment across different operating environments. Functional separation between presentation, business logic, and data management components contributes to architectural clarity and simplifies future enhancement processes. Similar technology configurations have demonstrated effectiveness in supporting multi platform application development within resource constrained implementation contexts (Juliansyah & Ratnasari, 2026).

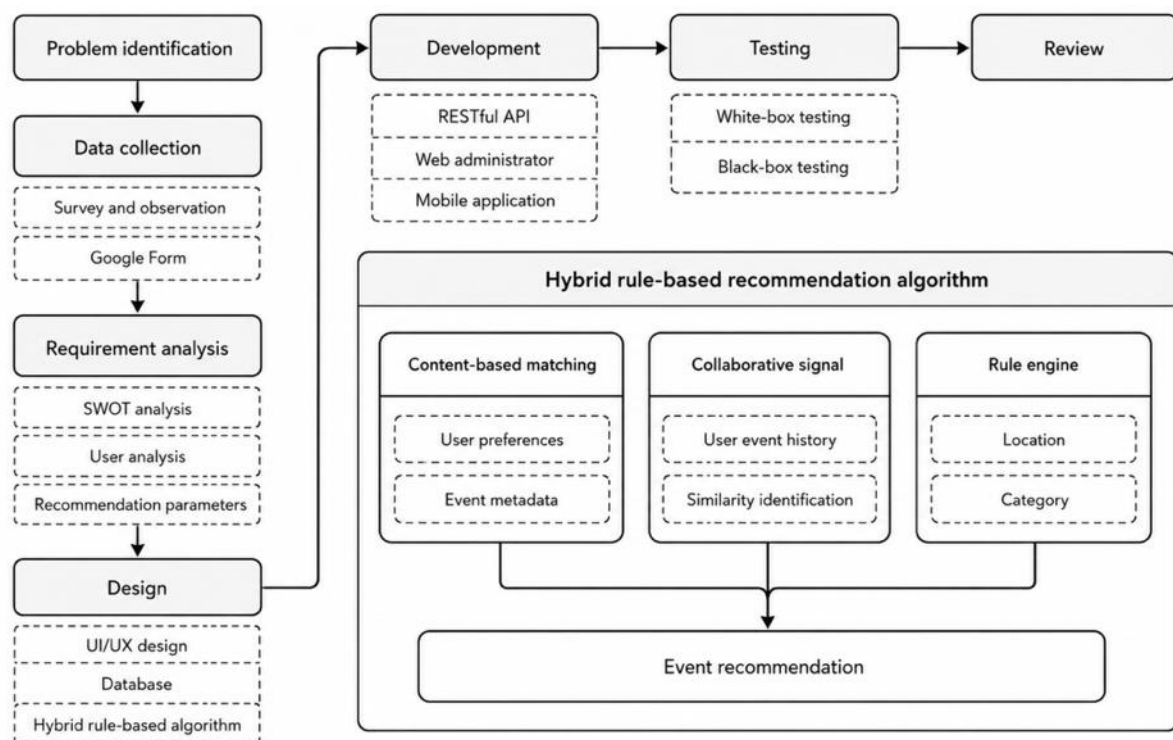


Figure 1. Research Framework For The SkillFest Rule-Based Hybrid Filtering System

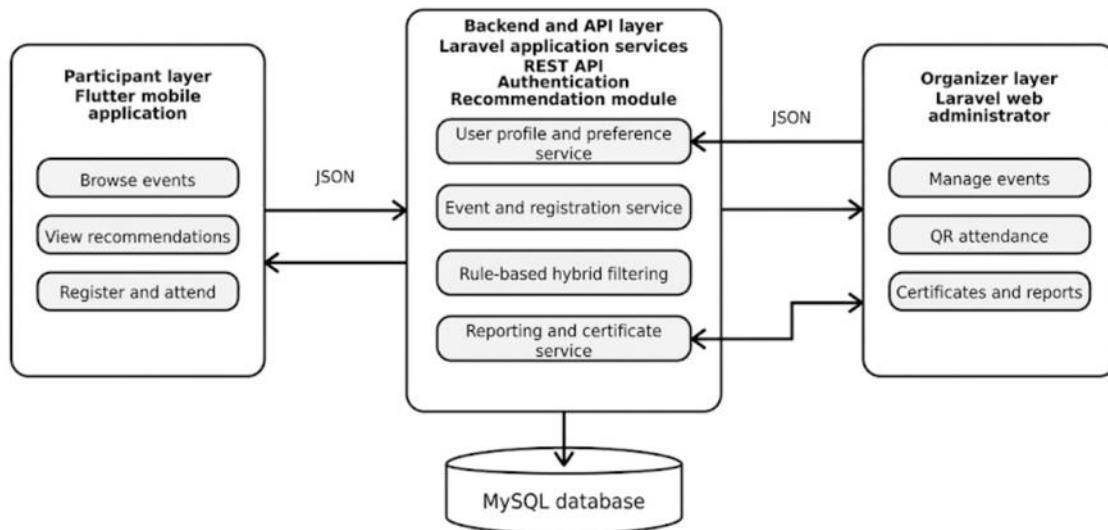


Figure 2. SkillFest Multi-Platform Architecture Using Laravel, REST API, Flutter, And MySQL

Figure 1 illustrates the overall research framework adopted during system development and validation. The framework establishes a systematic relationship between requirement analysis, architectural design, implementation, testing, and evaluation activities. This structure reflects the principles of iterative software engineering, where validation accompanies development rather than occurring exclusively after implementation is completed. Requirement driven development approaches have been shown to improve traceability and reduce inconsistencies between design objectives and implementation outcomes (Alalasdandra Ramakrishnaiah et al., 2026).

Figure 2 presents the operational architecture of the SkillFest platform and demonstrates the interaction among the web administrator environment, mobile interfaces, database services, and communication layers. The architecture supports end to end event management processes beginning with event creation and ending with recommendation delivery and participant engagement. The separation of operational responsibilities across interconnected modules allows the system to maintain functional cohesion while preserving implementation flexibility. Such architecture is aligned with current trends emphasizing service oriented integration within digital information systems (Li et al., 2024).

Table 1. Research Stages, Outputs, and Validation Focus

Main Activity	Output	Validation Focus
Requirement Analysis	User needs, problem list, and event discovery requirements	Consistency between needs and application scope
System and Rule Design	Architecture, database, user flow, and recommendation rules	Completeness of logic and traceability
Module Development	Web administrator, REST API, mobile application, and recommendation module	Feature readiness and integration
API and Functional Testing	Endpoint test results and functional validation	Response, CRUD, and error handling
User Evaluation	Scenario based UAT results and user feedback	Requirement suitability and usability
Review and Manuscript Writing	Final prototype evidence and article draft	Research findings and publication readiness

Source: Developed by the authors based on the Agile Kanban development and validation process implemented in this study (2026).

Table 1 demonstrates that each development phase generated observable outputs accompanied by explicit validation objectives. This structured progression ensured that architectural decisions, implementation activities, and testing procedures remained interconnected throughout the project lifecycle. The incorporation of validation checkpoints at multiple stages strengthened the empirical rigor of the development process. Software engineering studies frequently identify iterative verification as an important mechanism for improving development quality and reducing implementation risk (Michail & Ratnasari, 2026).

The implemented architecture provides a practical foundation for integrating recommendation functionality into routine event management operations. Conventional event systems often emphasize registration and reporting activities while providing limited support for personalized event discovery. The SkillFest prototype extends this functionality by embedding recommendation services directly into the operational workflow. This integration enhances the relevance of participant interactions and supports more effective information dissemination processes (Li et al., 2024).

Architectural transparency represents another important characteristic of the developed system. The clear separation between interface components, service layers, and data repositories facilitates monitoring, maintenance, and future system enhancement. Transparent architectures are particularly valuable in recommendation oriented applications because they simplify validation procedures and improve interpretability during deployment and evaluation stages. Research on intelligent information systems increasingly emphasizes transparency as a prerequisite for trustworthy digital services (Koli et al., 2025).

The implementation results confirm that the proposed architecture successfully supports integrated event administration and participant engagement within a unified multi platform environment. Interoperability among Laravel services, Flutter interfaces, REST communication mechanisms, and MySQL storage components was achieved throughout the development process. The resulting prototype establishes a robust technical foundation for the recommendation mechanism examined in the subsequent section. These findings demonstrate the feasibility of deploying a modular event management platform that combines operational efficiency with personalized service delivery capabilities (Ko et al., 2022; Li et al., 2024).

Rule Based Hybrid Filtering Recommendation Model

The core innovation of the SkillFest prototype lies in the development of a rule based hybrid filtering model designed to improve the relevance of skill development event recommendations. The recommendation mechanism was formulated based on empirical findings obtained during requirement analysis, which revealed that users experienced difficulties identifying events that matched their interests, competencies, and geographical preferences. Existing recommendation approaches frequently rely on either content similarity or behavioral interaction patterns, each of which presents limitations when applied independently (Ko et al., 2022; Roy & Dutta, 2022). The proposed model addresses these limitations by integrating multiple recommendation signals within a transparent decision framework that remains suitable for early stage deployment conditions.

The decision to adopt a hybrid recommendation strategy was motivated by the characteristics of the available data and the intended operational environment of the application. Pure content based filtering is effective for matching event attributes with user preferences but may generate repetitive recommendation patterns when contextual information is limited (Nurfalah et al., 2022). Collaborative filtering methods can improve personalization through collective behavioral patterns, yet they generally require extensive interaction histories before producing stable recommendation quality (Li et al., 2024). Hybrid recommendation architectures have been widely recognized for combining the strengths of multiple techniques while reducing the weaknesses associated with individual recommendation approaches (Afoudi et al., 2021).

The recommendation process combines content matching, interaction awareness, and explicit decision rules into a unified recommendation workflow. Content matching evaluates compatibility between user interests and event categories, while interaction information refines recommendations when historical activity data are available. Explicit rules serve as a filtering mechanism that verifies whether recommended events satisfy predefined suitability requirements. Similar integration strategies

have been shown to improve recommendation robustness in environments characterized by limited behavioral information and evolving user profiles (Roy & Dutta, 2022; Li et al., 2024).

The operational logic of the recommendation mechanism is illustrated in Figure 3. The recommendation flow begins with user profile evaluation, followed by category matching, skill suitability assessment, location verification, and interaction based refinement when historical data exist. Each stage contributes a distinct decision layer that narrows candidate events according to relevance and contextual suitability. This sequential filtering process supports transparent recommendation generation while maintaining logical consistency throughout the recommendation workflow (Hamzah et al., 2023).

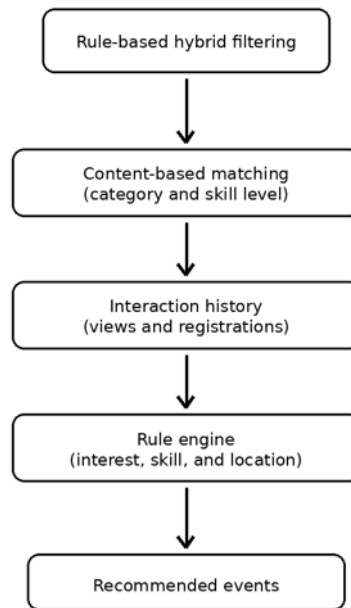


Figure 3. Rule-Based Hybrid Filtering Flow For SkillFest Event Recommendation

The recommendation workflow demonstrates that personalization is not exclusively dependent on behavioral learning mechanisms. Users with different interests, skill readiness levels, and location preferences may receive different recommendation outputs even when they possess limited interaction histories. This characteristic is particularly important in educational and skill development environments where participation decisions are strongly influenced by contextual factors. Context sensitive recommendation frameworks frequently emphasize the importance of incorporating user circumstances beyond behavioral observations alone (Kulkarni & Rodd, 2020).

Table 2. Recommendation Criteria and Implementation Logic

Criterion	Data Source	Rule Logic	Expected Effect
Interest	User interest and event category	Event is prioritized when its category matches the user interest	Improves thematic relevance
Skill Level	User skill level and event level	Event is prioritized when the required level matches user readiness	Reduces mismatch between participant ability and event difficulty
Location	User location preference and event location	Event is prioritized when location is inside	Improves practical accessibility

		the selected area or radius	
Interaction History	Views, registrations, and previous categories	History refines the result when available	Supports personalization after repeated use

Source: Developed by the authors based on the implemented recommendation model and system design specifications (2026).

Table 2 demonstrates that the recommendation model relies on four complementary decision criteria that collectively determine recommendation eligibility. Interest matching functions as the primary relevance indicator because thematic compatibility directly influences user participation intentions. Skill level suitability introduces an additional qualification layer that prevents users from receiving recommendations that exceed their preparedness. Rule based recommendation studies similarly report that explicit suitability constraints can significantly improve recommendation appropriateness within specialized domains (Pratami et al., 2024; Hamzah et al., 2023).

Location preference constitutes an important contextual variable within the proposed recommendation mechanism. Events that satisfy thematic requirements may still possess limited practical value if accessibility considerations are ignored. The inclusion of location constraints allows recommendations to reflect real world participation feasibility rather than relying exclusively on content similarity. Context aware recommendation literature consistently identifies geographical information as a critical factor affecting recommendation usefulness and user acceptance (Kulkarni & Rodd, 2020; Wang et al., 2026).

The integration of interaction history introduces adaptive behavior without creating complete dependence on historical datasets. When previous views, registrations, or category selections exist, these signals refine recommendation priorities according to demonstrated user preferences. When interaction records are unavailable, recommendation generation continues through profile based matching mechanisms. This design directly addresses the cold start challenge frequently encountered during the early stages of recommendation system deployment (Uta et al., 2024; Jiang et al., 2026).

Another important characteristic of the proposed model is explainability. Each recommendation can be traced to explicit decision criteria including category compatibility, skill readiness, location suitability, and interaction evidence. Users, administrators, and developers can identify the factors responsible for recommendation outcomes without relying on opaque computational processes. Explainable decision structures have become increasingly important in intelligent systems because transparency improves trust, accountability, and validation capability during operational use (Shehzadi et al., 2025; Uta et al., 2024).

The findings indicate that the proposed rule based hybrid filtering model provides a practical recommendation mechanism for skill development events under prototype validation conditions. The model combines thematic relevance, contextual suitability, behavioral refinement, and transparent rule execution within a single recommendation framework. Such characteristics distinguish the proposed approach from recommendation systems that depend primarily on large scale behavioral datasets and complex optimization procedures. Comparable rule driven intelligent systems have demonstrated that explicit reasoning structures remain valuable when interpretability and operational feasibility are prioritized alongside recommendation quality (Solomon & Tilahun, 2024; Afoudi et al., 2021).

System Validation and Functional Performance Evaluation

The evaluation stage was conducted to assess whether the developed application functioned according to its intended objectives and operational requirements. Validation activities focused on functional success, system reliability, traceability, and practical readiness under real usage scenarios. The assessment employed multiple validation layers consisting of feature verification, interface evaluation, user oriented testing, and internal logic examination. Similar evaluation approaches have been recommended for empirical software engineering studies to demonstrate implementation effectiveness and operational feasibility (Juliansyah & Ratnasari, 2026).

The validation results indicate that all major functionalities were successfully implemented and generated outputs consistent with the predefined specifications. Evidence from Table 3 shows that event

management, participant registration, recommendation delivery, attendance recording, certificate generation, discussion forums, and reporting modules achieved their expected operational outcomes. The achievement of complete functional coverage reflects effective implementation of integrated event management workflows and user services. Comparable findings have been reported in event oriented information systems where successful feature execution serves as a primary indicator of implementation quality (Putchakayala & Cherukuri, 2024).

Figure 4 presents the administrative dashboard developed to support monitoring and management activities across the platform. The interface consolidates operational information into a centralized environment that facilitates event administration, participant monitoring, and reporting activities. The dashboard structure enables administrators to access critical information efficiently while reducing operational complexity during event management processes. Such centralized monitoring environments are recognized as important components of scalable event management systems (Juliansyah & Ratnasari, 2026).

Figure 5 illustrates the mobile application interface used by participants to access platform services and event related information. The mobile environment supports user engagement through accessible navigation, event discovery, registration activities, and participation monitoring. Accessibility plays a significant role in increasing user adoption because interactions can be performed independently of device location and operational constraints. Previous studies emphasize that mobile centered environments contribute substantially to practical usability and service accessibility in digital platforms (Sundar, 2023).

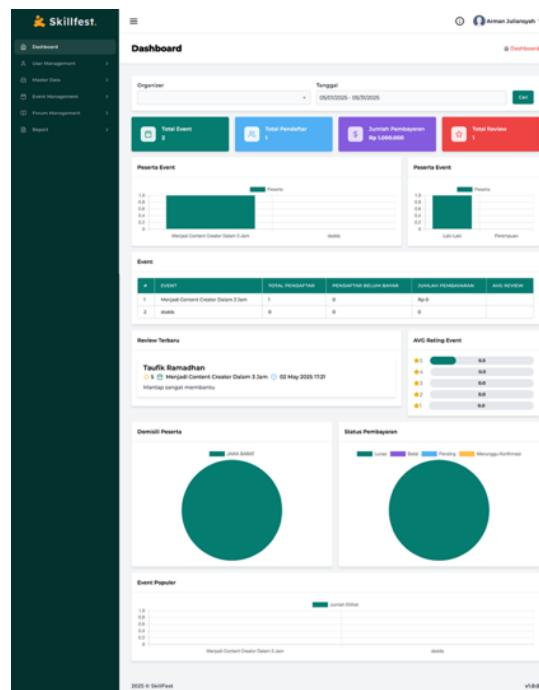


Figure 4. Web Administrator Dashboard For Event And Participant Monitoring

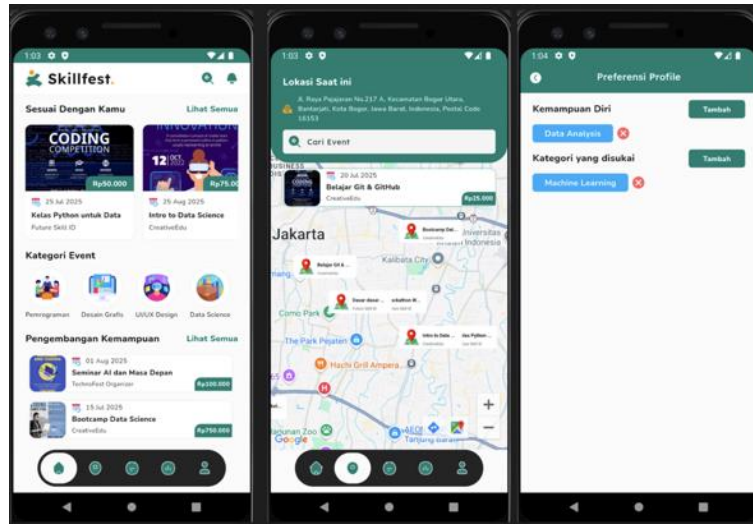


Figure 5. Mobile Application Interfaces For Event Discovery And Participant Access

Figure 6 demonstrates the implementation of the QR attendance mechanism used to automate attendance verification processes. The feature minimizes manual recording activities and improves attendance accuracy through direct digital validation procedures. Automated attendance recording reduces administrative workload while increasing the reliability of participant participation records. Similar attendance tracking approaches have been associated with improved operational efficiency in contemporary event management systems (Putchakayala & Cherukuri, 2024).

Figure 7 presents the API testing environment employed during validation activities. Testing results confirmed successful request handling, authentication processing, data exchange consistency, and response generation across all evaluated endpoints. Consistent API behavior is essential because communication reliability directly affects overall application performance and service continuity. API validation practices are widely recognized as fundamental mechanisms for ensuring dependable software operations and secure data transactions (Onyilo et al., 2026; Paidy, 2025).

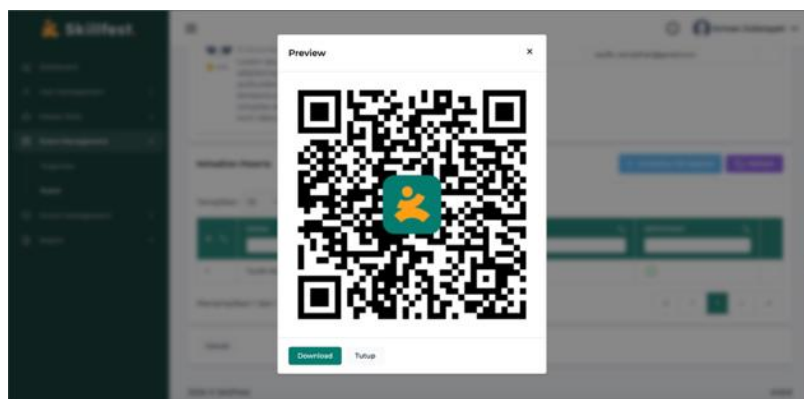


Figure 6. QR-Based Attendance Feature For Real-Time Event Participation Recording

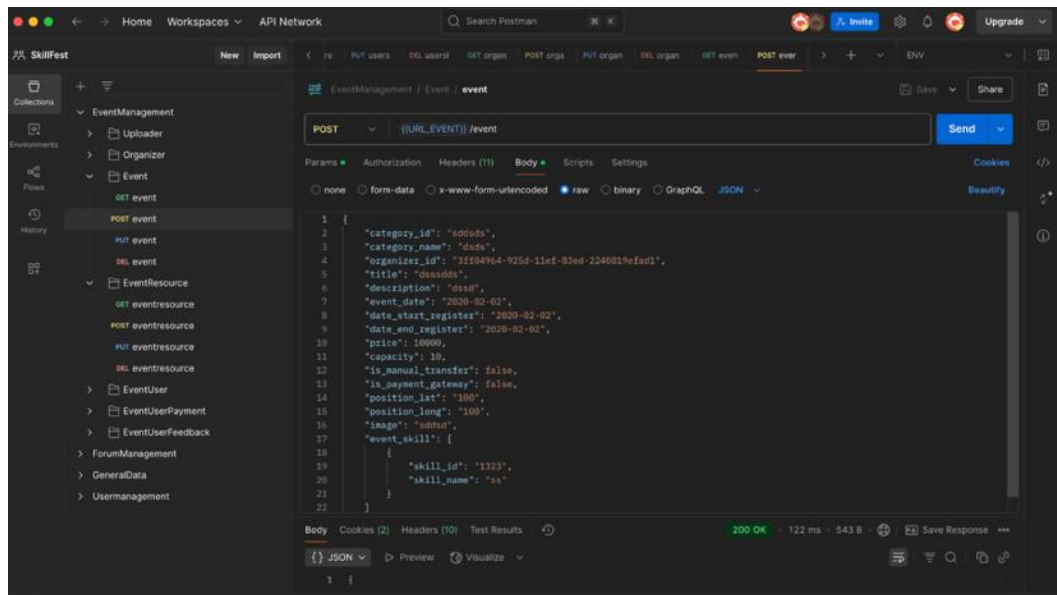


Figure 7. API Testing Example For The POST /event Endpoint Using Postman

User oriented evaluation was subsequently performed through scenario based User Acceptance Testing involving representative application functions. The assessment examined whether system behavior corresponded to user expectations during practical operation and routine usage activities. The testing framework covered authentication, event management, registration services, attendance recording, payment simulation, reporting, discussion forums, and recommendation access. The resulting outcomes are summarized in Table 4.

Table 4. User Acceptance Testing Results

Tested Feature	Result	Status
Login and account validation	Valid accounts can log in, and invalid accounts are rejected	Passed
Event creation and management	Event data are stored in the database and displayed in the application	Passed
Participant registration	Registration runs automatically and is recorded	Passed
QR attendance	Attendance is recorded in real time through scanning	Passed
Payment simulation	Transaction status is recorded according to user input	Passed
PDF/Excel report generation	Report files are generated and downloadable	Passed
Discussion forum	Posts and comments are displayed normally	Passed
Event recommendation	Events that match user preferences are displayed correctly	Passed

Source: Developed by the authors based on User Acceptance Testing conducted during system validation (2026).

The results presented in Table 4 indicate that all evaluated scenarios achieved a Passed status without functional failures. Successful execution was observed across authentication procedures, event

administration activities, registration workflows, attendance verification, transaction simulation, reporting functions, communication facilities, and recommendation delivery. The consistency of successful outcomes suggests that the application fulfilled the expected behavioral requirements defined during the development process. According to evaluation frameworks proposed by Zangerle and Bauer (2022), comprehensive scenario success provides strong evidence of system usability and operational effectiveness.

Additional reliability evidence was obtained through White Box Testing results summarized in Table 5. Internal validation confirmed that input validation procedures correctly rejected invalid entries, conditional execution paths operated according to design specifications, recommendation processing logic executed properly, and CRUD functionalities performed without errors. These findings indicate that the internal software structure maintained logical consistency and execution correctness during testing activities. Structural testing outcomes are frequently used to demonstrate software robustness and implementation quality in applied software development research (Michail & Ratnasari, 2026).

The overall validation results demonstrate that the developed platform achieved a satisfactory level of reliability, traceability, and deployment readiness. Evidence from Table 3 confirms that all implemented features generated outputs aligned with their intended functional objectives, while Table 4 and Table 5 provide complementary evidence regarding operational correctness and internal consistency. Traceability was strengthened through documented validation records, systematic testing procedures, and reproducible execution outcomes that supported transparent assessment of system behavior. Similar characteristics are considered essential indicators of practical software readiness and future scalability in intelligent digital platforms (Alalasandra Ramakrishnaiah et al., 2026; Shen et al., 2026; Zeng et al., 2026).

CONCLUSION

This study successfully developed and validated SkillFest as a multi platform event management application equipped with a rule based hybrid filtering recommendation mechanism for skill development events. The implemented system demonstrated effective integration of administrative services, participant management, recommendation delivery, attendance recording, certificate administration, communication facilities, and reporting functions within a unified operational environment. The recommendation model combined content attributes, user interaction history, and explicit decision rules to generate transparent and practically relevant recommendations under conditions of limited behavioral data. Empirical evaluation confirmed that the implemented features operated according to predefined functional requirements, while API testing, User Acceptance Testing, and White Box Testing verified system reliability, traceability, and operational consistency. The findings indicate that explainable rule based hybrid recommendation can support personalized event discovery without dependence on large scale interaction datasets. The study contributes both a validated software engineering artifact and a practical recommendation framework for digital skill development ecosystems. Future research may extend the model through larger deployment environments, longitudinal user behavior analysis, and recommendation quality evaluation using established ranking performance metrics.

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