Journal of Informatics and Vocational Education (JOIVE)
Vol.8, No.2, July 2025, pp. 22~34
ISSN: 2746-7813

Agile-Driven Digital Transformation in Traditional Educational Institutions: Integrating Scrum, Automated Testing, and TAM for Student Registration Systems

Anis Nur Choiriyah[1], Nurcahya Pradana Taufik Prakisya[2], Rosihan Ari Yuana*[3]
[1,2,3] Department of Informatics Education, Sebelas Maret University

Article Info

Article history:

Received Aug 16, 2024
Revised Sep 27, 2024
Accepted Jul 01, 2025

Corresponding Author:

Anis Nur Choiriyah,
Departement of Informatics Education,
Sebelas Maret University,
Jl Ahmad Yani, no 200,
Pabelan, Kartasura, Surakarta,
Jawa Tengah, 57169, Indonesia.
Email:
anisnishi9@student.uns.ac.id

ABSTRACT

Agile methodologies' integration with automated testing and user acceptance evaluation within traditional Islamic boarding school (pesantren) contexts remains understudied. This study develops 'SIAP AMWIN', a web-based student registration system integrating Scrum, Katalon Studio automated testing, and TAM. R&D design was employed across five Scrum cycles (Aug 2023–Feb 2024). A validated 16-item TAM questionnaire (4 Usefulness + 12 Ease of Use items, expert-validated by 2 validators) was administered to 25 new students following system use. Blackbox testing was conducted via Katalon Studio. The system achieved Usefulness 13.96 and Ease of Use 41.44 (overall 86.56%, Very Good), a significant improvement over the prior system score of 12.1 (Not Good). Scrum-driven, actor-centered development effectively enables digital transformation in resource-constrained traditional institutions, providing a replicable blueprint for similar pesantren contexts.

Keywords: Scrum methodology; Technology Acceptance Model; automated testing; pesantren; digital transformation.

1. INTRODUCTION

With over 26,000 Islamic boarding schools (*pesantren*) educating more than 4.2 million students across Indonesia, the urgency for scalable digital administrative solutions tailored to traditional educational contexts has never been greater(Jahar, 2025). Information systems are designed to collect, process, and distribute data efficiently, enabling organizations to work productively and make evidence-based decisions(Sarianja & Veri, 2025; Smina et al., 2025). In the digital era, this need extends increasingly to traditional institutions: *pesantren* are beginning to adopt technology to modernize student management processes(Adel Al-Maaitah et al., 2025). However, a critical precondition for successful adoption is that users are genuinely ready and willing to use the new system — a dimension that is frequently overlooked in technology deployment(Davis, 1989).

Al Muayyad Windan Islamic Boarding School presents a case that exemplifies this challenge. A baseline evaluation of the institution's existing web-based registration platform using the Technology Acceptance Model (TAM) revealed a critical deficiency: the Usefulness dimension scored only 12.1 out of a possible 20 — classified as "**Not Good**" — with particularly poor ratings on registration process facilitation (1.5/4.0) and workflow guidance (1.6/4.0). The registration process itself remains predominantly manual, relying on paper forms duplicated through Google Forms, with no centralized data platform. Challenges include frequent loss of student records, fragmented data storage, and limited system accessibility. These compounding deficiencies — empirically verified and operationally documented — constitute a clear mandate for a comprehensive, user-centered digital transformation. (Wandri et al., 2025) confirmed Scrum's effectiveness in university-level executive information systems; however, their study was limited to formal higher education contexts and lacked user acceptance validation. (Dhara et al., 2025)demonstrated Katalon Studio's accuracy in automated black-box testing, yet without integration into a full Research and Development (R&D) cycle or post-deployment user evaluation. Several studies that use TAM in the context of educational technology for

academic information systems and financial administration provide a valuable evaluation framework(Xue et al., 2026), but do not address the unique administrative and cultural characteristics of the Islamic boarding school environment. (Moreira et al., 2025) identified that TAM's predictive power is strongest when contextual factors specific to the institutional setting are considered — a dimension largely absent from existing *pesantren*-focused IS studies.

This body of literature reveals two complementary gaps. First, a **methodological gap**: no published study has integrated Scrum-based Agile development, Katalon Studio automated testing, and TAM user acceptance evaluation within a single unified R&D framework. Second, a **contextual gap**: *pesantren* — as institutions with distinct administrative structures, cultural norms, and digital literacy profiles — remain under-represented in the IS development and adoption literature, particularly within international Scopus-indexed research.

This study addresses both gaps through the development and evaluation of "SIAP AMWIN," a web-based student registration system for Al Muayyad Windan. Two research questions guide the inquiry: (RQ1) How can Scrum methodology be effectively implemented to develop a centralized, actor-centered student registration system within a *pesantren* context? (RQ2) What is the level of user acceptance of the resulting system as measured by the TAM Usefulness and Ease of Use constructs? The study makes three contributions: (1) an empirical Scrum implementation blueprint for resource-constrained traditional educational institutions; (2) TAM-validated evidence supported by a comparative baseline demonstrating measurable improvement from 12.1 (**Not Good**) to 86.56% (**Very Good**); and (3) a replicable integration model combining Scrum iterative development, Katalon Studio automated testing, and TAM user acceptance evaluation — applicable to analogous traditional institutional contexts.

2. RESEARCH METHOD

2.1. RESEARCH DESIGN

This research falls under Research and Development (R&D), focusing on developing a new product or advancing a previous research product continuously, aiming for ideal changes and developments as expected (Samsu, 2017).

2.2. POPULATION & SAMPLE

This study focuses on the population of new students at Al Muayyad Windan Islamic Boarding School using "SIAP AMWIN". A sample, as defined by (Creswell & Creswell, 2023), is a selected subset that represents the population. Data was collected through three triangulated methods: (1) semi-structured interviews with three key informants (school administrator, media staff, resident student) for requirements analysis; (2) a validated 16-item TAM questionnaire administered to all 25 new students after system use; and (3) a systematic literature review. The 25 respondents, representing the complete 2023/2024 new student cohort from various universities in Surakarta, justify saturated sampling. Where every member of the population is included in the sample(Creswell & Creswell, 2023).

2.3. DATA COLLECTION

The literature review was conducted to assess whether Islamic boarding schools can adopt new registration technologies. Following (Creswell & Creswell, 2023), this review prioritized primary sources and scholarly journals published within the last decade. According to Creswell and Creswell (2023), interviews are a data collection technique used to identify research problems and gain deeper insights from respondents. The interviews were conducted with the school caretaker, a media department official, and a resident student. The findings showed that: (1) Student registration remains manual using paper; (2) Data storage is decentralized and relies on Google Forms; (3) There is frequent loss of student data files; (4) The school's website provides only basic information; and (5) Both current students and prospective students have access to sufficient electronic devices and internet, as the boarding school permits the use of communication tools. According to Creswell & Creswell, (2023), a questionnaire is a data collection technique that involves written questions or statements presented to respondents. In this study, the questionnaire used the Technology Acceptance Model (TAM) to test system's feasibility. The TAM questionnaire comprised 16 items: 4 measuring Usefulness (Productivity, Job Performance, Task Importance, Overall Usefulness) and 12 measuring Ease of Use — all adapted from (Davis, 1989). Content validity was established through expert review by two validators (a practitioner and an academic supervisor), who rated all 16 items as appropriate. The TAM questionnaire comprised 16 items: 4 measuring Usefulness (Productivity, Job Performance, Task Importance, Overall Usefulness) and 12 measuring Ease of Use — all adapted from (Davis, 1989). Content validity was established through expert

review by two validators (a practitioner and an academic supervisor), who rated all 16 items as appropriate. These variables help us to see how users feel about the benefits and simplicity of the new system.

2.4. DATA ANALYSIS

The data in this study were analyzed by organizing and interpreting information from interviews and questionnaires to draw specific conclusions (John W. Creswell & Timothy C. Guetterman, 2018). The analysis was divided into two steps:

(1) Qualitative descriptive analysis: According to Ekawati et al (2021), Qualitative descriptive analysis involves presenting the final product design after implementation in the form of a finished product and testing the feasibility level of a product. During the Backlog and Sprint phases, data was analyzed to identify product requirements. Then, during Scrum Meetings, the system's progress was evaluated, including functional testing with Katalon Studio, to ensure the software met the users' needs.

(2) Quantitative descriptive analysis: According to Ekawati et al (2021), This method was used to measure the system's feasibility based on the TAM questionnaire. The study used a 4-point Likert scale (4, 3, 2, 1) instead of a 5-point scale. By removing the neutral option, the researcher ensured that respondents provided a clear and decisive evaluation of the system. There is no distinction between scores with or without a moderate category, as there is no difference in the measurement reliability and validity items. The only difference is the variance in scores (Widhiarso, 2010). Data was collected from 25 new students at Al Muayyad Windan Islamic Boarding School, and the final scores were interpreted using the quality criteria from Lukman & Ishartiwi (Lukman & Ishartiwi, 2014), The interpretation of quality based on the total score obtained can be summarized as follows:

Table 1 Quality Scale

Kategori	Skor	Kriteria
4	Mi + 1,5 SDi ≤ x ≤ Mi + 3 SDi	Very Good
3	Mi + 0 SDi ≤ x < Mi + 1,5 SDi	Good
2	Mi - 1,5 SDi ≤ x < Mi + 0 SDi	Not Good
1	x < Mi – 1,5 SDi	Very Not Good

Source: Lukman & Ishartiwi (Lukman & Ishartiwi, 2014)

Explanation:
Ideal Mean Score (Mi) = ½ (maximum ideal score + minimum ideal score)
Ideal Standard Deviation (SDi) = 1/6 (maximum ideal score - minimum ideal score)
Actual Score (x) = The score obtained from respondents

According to (Creswell & Creswell, 2023), conversion to percentages is done to facilitate the presentation of feasibility test results, with the following provisions:

Feasibility % $= \frac{Actual\ Score}{Expected\ Score} x\ 100\%$

Explanation:
Actual Score = Total score obtained from respondents
Expected Score = Total score from the instrument with the maximum value

2.5. SOFTWARE DEVELOPMENT PROCEDURES

This research follows the Research and Development (R&D) cycle, which involves conducting initial research to gather data used for developing a product based on those findings (Samsu, 2017). The software development process utilizes a series of activities based on the Scrum methodology, including Backlog, Sprints, Scrum Meeting, and Demo (El Hakim et al., 2023). Backlog, prioritizing detailed features to be developed, such as analyzing functional and non-functional requirements, hardware actors, and software components. Sprints, organizing activities to meet the established Backlog requirements, including designing cases, databases, and interfaces. Scrum Meeting, conducting meetings with the designated team to discuss the progress of system development activities. Demo involves showing the developed software features, launching the product to users, and conducting evaluations. The evaluation process includes testing the functional feasibility of the system using Blackbox Testing with Katalon

Studio Automated Testing Tools. Subsequently, feedback was collected from registered students using the Technology Acceptance Model (TAM) questionnaire, focusing on aspects of Usefulness and Ease of Use.

2.6. ETHICAL CONSIDERATIONS

This study received institutional approval from Al Muayyad Windan Islamic Boarding School. All 25 participants were informed of the study's purpose before system use and questionnaire completion; participation was voluntary, and responses were anonymized in all reporting. The study adhered to the research ethics guidelines of Universitas Sebelas Maret.

3. RESULT AND DISCUSSION

3.1. RESULT

Developing a system for a traditional school like a *pesantren* needs a flexible method. Scrum was chosen because it allows for changes during the development process to match the school's unique rules. Implementing Scrum proved to be highly effective in a *pesantren* (Islamic boarding school) environment for several reasons. First, the iterative nature of Sprints allowed the developer to show progress to the school's administrators regularly. This was crucial because traditional institutions often have specific administrative rules that may change during the process. Second, the Scrum Meetings helped bridge the communication gap between the technical developer and the non-technical school staff. By getting feedback early and often, the system was built to fit the school's actual culture rather than just following general software standards. This iterative approach was chosen to ensure that the final product directly addressed the administrative challenges at Al Muayyad Windan based on continuous feedback.

3.1.1. Backlog Phase

During the Backlog phase, the hardware and software requirements were analyzed to ensure the system's stability and were translated into Use Case Diagrams to define the specific interactions between the actors and the "SIAP AMWIN" system. The development used a laptop with an Intel® Core™ processor and a minimum of 4 GB RAM to maintain smooth performance. The system used MySQL and CodeIgniter for a stable database running on Windows 10.

The primary goal was to solve the problem of data loss. Therefore, functional requirements focused on centralized data entry and admin monitoring, while non-functional requirements focused on ease of use for the users. By allowing prospective students to independently manage their accounts and upload documents, the system directly eliminates the physical risks associated with manual paper forms. Providing staff with a dedicated verification and history interface ensures data centralization, which solves the primary challenge of tracking student records effectively. The identification of three distinct actors was a direct response to the decentralized data issues found in the initial interviews.

Table 2 Non-functional Requirements

No	Parameter	Non-functional Requirements
1	Usability	User interface design should be easy to use.
2	Compatibility	Should perform well, minimum compatibility with Windows 7.
3	Consistency	Website appearance should remain consistent across browsers.

Table 3 User Functional Requirements (Applicants)

No	Functional Requirement	Use case
1	System can process Authentication Login	Login
2	System can display student data search	Search
3	System can display applicant profile	Profile
4	System can perform registration	Registration
5	System can update registration data	Update
6	System can print registration data	Print
7	System can display institution information	Home
8	System can process Authentication Logout	Logout

Table 4 Operator Functional Requirements (Staff)

No	Functional Requirement	Use case
1	System can process Authentication Login	Login
2	System can display detailed student data search	Search
3	System can verify applicants	Verification
4	System can display verification history	History
5	System can process Authentication Logout	Logout

Table 5 Guest Functional Requirements (Public)

No	Functional Requirement	Use case
1	System can execute Login command	Login
2	System can execute Create Account command	Create Account
3	System can execute Search command	Search
4	System can display general information	Home

Table 6 Actor Identification

No	Actor	Description
1	Guest	Guest or public users who cannot Login, only view general information.
2	User	Users or applicants who can Login after creating a new account and perform registration.
3	Operator	Operators or staff who can Login and Logout to manage student data and perform verification.

3.1.2. Sprints Phase and Scrum Meetings

To ensure a structured development, a detailed timeline was followed, as shown in Table 7. Sprint and Scrum Meetings Timeline. The decision to conduct five iterations was crucial. This Agile approach allowed the researcher to identify technical findings in early stages and resolve them in subsequent cycles. This flexibility is essential in a *pesantren* environment.

Table 7 Sprint and Scrum Meetings Timeline

Iteration & Date	Progress Detail (Sprint & Meeting)	Findings & Improvements
Iteration 1 Oct, 1-3, 2023	**Sprint:** Analysis and initial design. **Meeting:** Present survey results and requirements analysis, progress was in the early stage.	**Finding:** Need for file upload tables and a new verification structure. **Improvement:** Updated the database and refined Use Case designs.
Iteration 2 Nov, 4-10, 2023	**Sprint:** UI design and development. **Meeting:** Presented Use Case and UI designs; progress reached 25%.	**Finding:** Public interface needed to be more attractive to users. **Improvement:** Focused on enhancing the UI's visual appeal.
Iteration 3 Desc, 5-7, 2023	**Sprint:** UI implementation and data grouping. **Meeting:** Progress reached 50%; designs for public and users were nearly done.	**Finding:** Feedback focused on grouping applicant data fields. **Improvement:** Reorganized data categories and fixed initial bugs.
Iteration 4 Jan, 7-12, 2024	**Sprint:** System integration and testing.	**Finding:** No new design feedback; focus shifted to technical stability.

	Meeting: Progress reached 75% for public and user interfaces..	**Improvement:** Conducted intensive testing to find and fix remaining errors.
Iteration 5 Feb, 17-20, 2024	**Sprint:** Final completion and Use Case validation. **Meeting:** Progress reached 100% (Public, User, and Officer interfaces).	**Finding:** All functionalities aligned with Use Case requirements. **Improvement:** Final bug fixing to ensure a stable, production-ready system.

During the Sprints phase, activities are organized to fulfill both functional and non-functional requirements listed in the Backlog. Each Sprint aims to achieve the objectives or targets outlined in the Backlog. The requirements were turned into visual designs and code. This stage included creating Use Case Diagrams, Database schemas, and User Interfaces. The Sprint and Scrum Meetings process was effective because it allowed for small, manageable goals. Regular meetings were held to monitor progress. These meetings were crucial to bridge the gap between traditional administrative habits and digital efficiency. The architecture is strategically divided into three distinct roles to ensure data security and task-specific clarity.

(1) Guest: This layer focuses on accessibility. By simplifying the initial page and account creation process, the design minimizes technical hurdles for prospective students during their first interaction with the system.

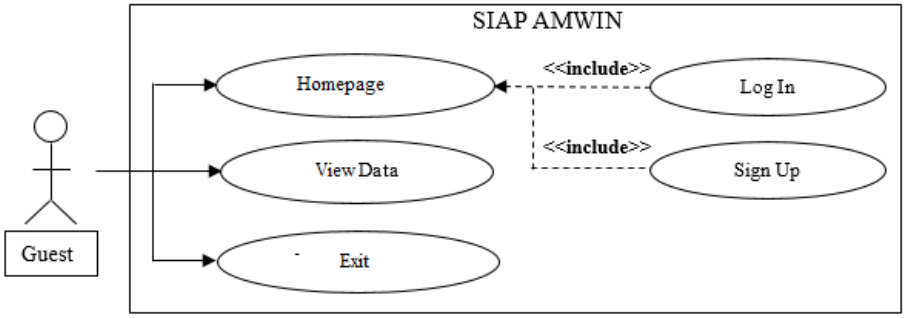

Figure 1 Guest Usecase Diagram

Figure 2 Implementation of the Guest interface

(2) User: Designed as the primary data-entry hub, this interface guides students through a structured registration. During the Sprints, the layout was optimized to handle multi-stage data ensuring data completeness while reducing the risk of manual submission errors.

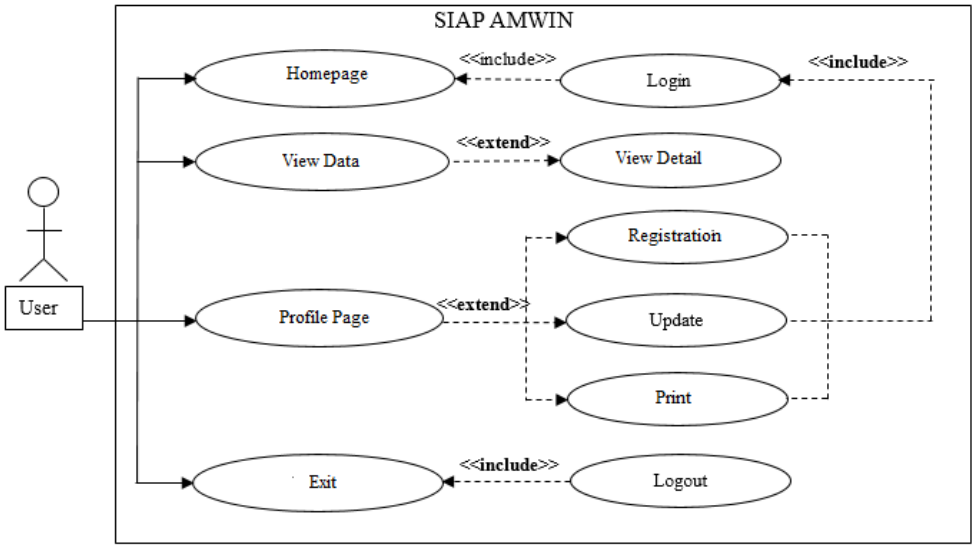

Figure 3 User Use case Diagram

Figure 4 Implementation of the Users interface

(3) Operator: This specialized dashboard centralizes administrative oversight. It was developed to provide school staff with verification tools and historical tracking. This separation of roles ensures that the boarding school's management can verify large volumes of data efficiently, fulfilling the core project goal of centralized administration.

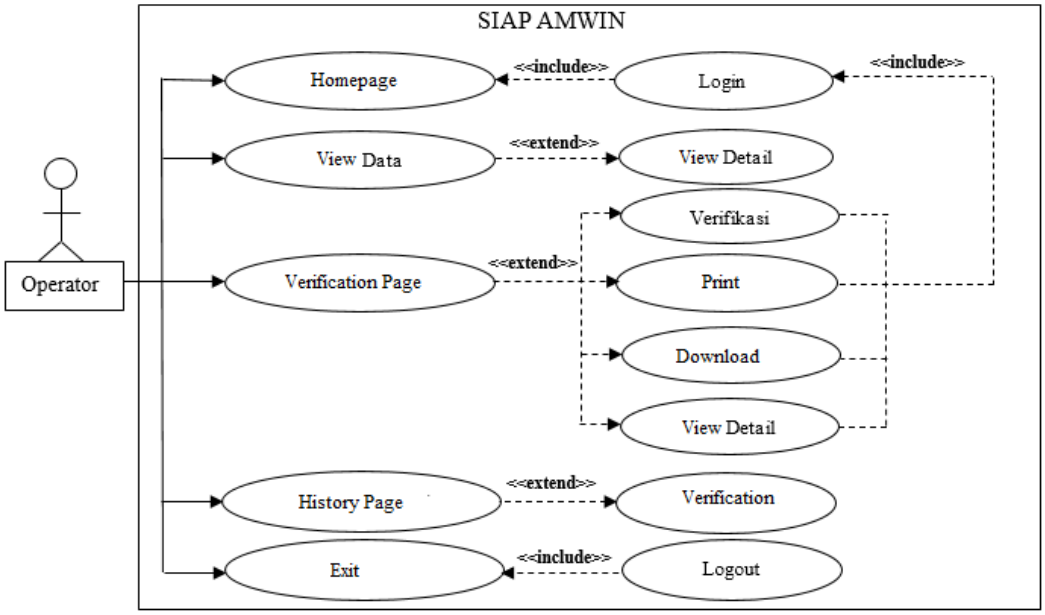

Figure 5 Operator Use case Diagram

Figure 6 Implementation of the Operator interface

(4) Database: The system utilizes a relational database consisting of four core tables. This structure was optimized during the first sprint to facilitate seamless data retrieval. By separating education and filing data into distinct entities, the system maintains high data integrity, allowing the Operator to verify documents without compromising the student's primary biodata.

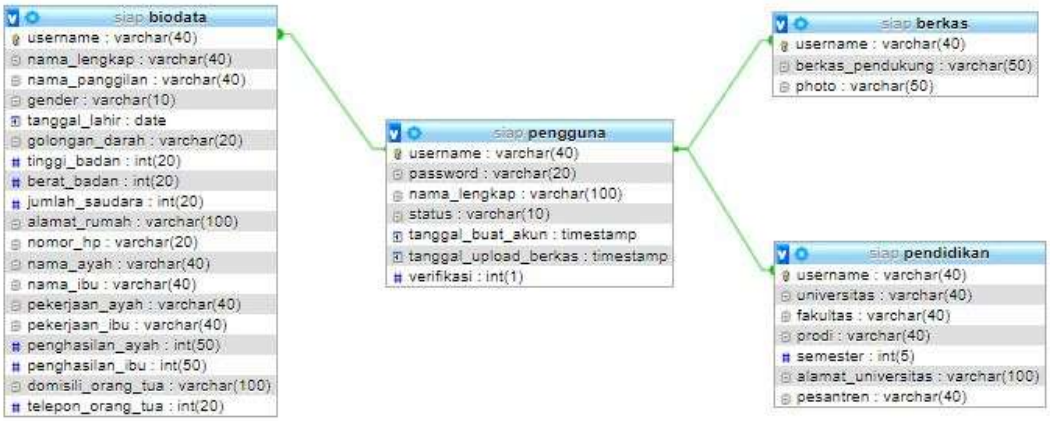

Figure 7 Database design

3.1.3. Demos and Testing

The Demos stage starts with Blackbox testing using Katalon Studio to ensure the system's technical integrity before deployment. Unlike manual testing, this automated approach provides a rigorous and repeatable verification of the system's viability relied on executing test cases derived from the outcomes of web recording tools. The successful execution of test cases via web recording tools confirms that the "SIAP AMWIN" system is operationally stable.

The automated nature of Katalon Studio ensured that all critical paths were verified with high precision. During testing, an issue was identified where date inputs, photo uploads, and file uploads were not readable by the automated tool. Although the automated tool flagged these as errors, manual verification confirmed they operated normally. This finding highlights the nuance of automated testing in web environments, while the code was functional for humans, the "readability" for automated scripts required further refinement. All other system processes ran without issues, confirming the system's readiness for live use.

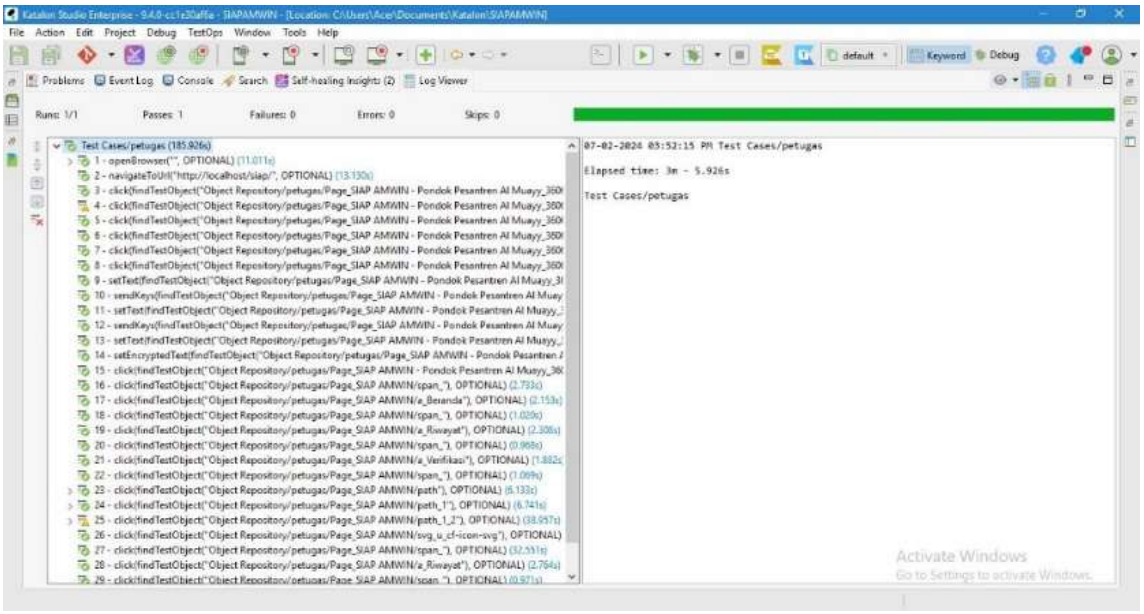

Figure 8 Blackbox testing process with Katalon

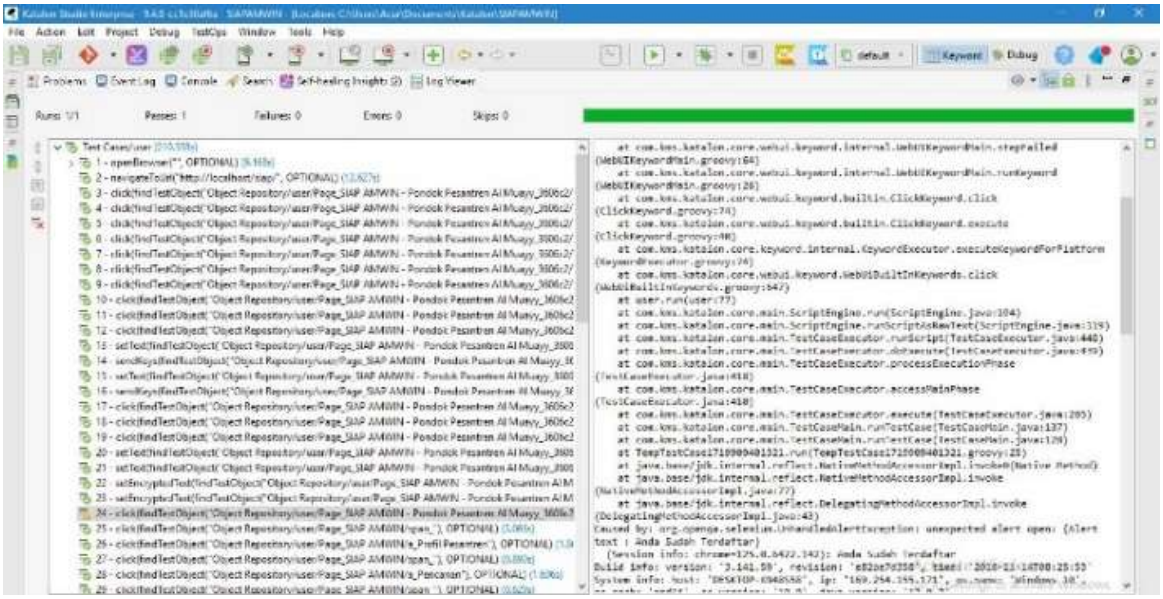

Figure 9 Error in Blackbox testing process

3.1.4. User Acceptance Analysis

Following the technical validation via Katalon Studio, the system's acceptance was evaluated through the Technology Acceptance Model (TAM) with 25 respondents. This stage measures the transition from technical viability to actual user adoption within the *pesantren* environment. Below is a summary table of the evaluation process for the aspects of Usefulness, Ease of Use, and Overall, based on the Technology Acceptance Model (TAM) questionnaire in Table 7 below:

Table 8 TAM Calculation Table

No	Aspect	Indicator	Max	Min	Mean	Sdi	Nilai	Prosentase	Category
1	Usefulness	4	16	4	10	2	13,96	87,25%	Very Good
2	Ease of Use	12	48	12	30	6	41,44	86,33%	Very Good
3	Overall	16	64	16	40	8	55,4	86,56%	Very Good

Source: Processed primary data.

The system achieved an average score of 3.46, resulting in an overall percentage of 86.56%, which classifies the system as "Very Good" and "Suitable for Use." A comparative analysis reveals a substantial improvement over the legacy system: the prior platform scored only 12.1 on TAM Usefulness (Not Good), with particularly poor ratings on registration process facilitation (1.5/4.0) and workflow guidance (1.6/4.0). The new 'SIAP AMWIN' system achieved an overall score of 86.56% (Very Good) across both Usefulness and Ease of Use — representing a measurable, empirically validated impact of the Scrum-driven development approach. The Usefulness score (13.96) confirms that the system effectively addresses its core purpose, streamlining the student registration process. Most users perceive the digital platform as a significant improvement over manual documentation. Furthermore, the Ease-of-Use score (41.44) highlights the success of the iterative refinements made during the third and fourth Scrum Meetings. By focusing on interface flexibility and language clarity, the system successfully lowered the technical barrier for users, ensuring that the interface is not perceived as difficult or complex.

3.2. DISCUSSION

3.2.1. Effectiveness of the Scrum Framework in a *Pesantren*

The implementation of the Scrum methodology in developing the "SIAP AMWIN" system proved highly effective for the Al Muayyad Windan environment. In this study, the analysis confirms

that conducting five Scrum Meeting sessions was the key to bridging the gap between technical design and the institutional needs of the school.

The effectiveness is evident in how the process evolved as an iterative Research and Development (R&D) cycle. The first meeting established critical hardware, software, and functional requirements, while the subsequent meetings allowed for development results to be reviewed. By the fifth meeting, the researchers were able to address specific errors encountered during development. This iterative Sprint Review process ensured that the database and the multi-actor interface (Guest, User, and Operator) were not just built but refined based on continuous feedback. This adaptability is crucial in a *pesantren* setting where administrative requirements must be precisely aligned with the actors' specific access rights to ensure data integrity and organizational trust.

3.2.2. Implications for Similar Educational Institutions

The transition from a manual to a digital registration system at Al Muayyad Windan offers significant implications for other traditional or resource-constrained educational institutions. According to (Creswell & Creswell, 2023), research should ideally provide practical contributions to the field by solving existing problems through systematic methods. In this study, the successful implementation of "SIAP AMWIN" demonstrates that digital transformation does not require a big change but can be achieved through incremental, actor-centered development. Categorizing system requirements based on user roles (Guest, User, and Operator) ensures that data is managed securely and centrally, solving the common problem of scattered records. Testing with Katalon Studio proved that while automation is efficient, human oversight remains necessary to verify specific items like date inputs and file uploads that automated tools may misread. For institutions with limited IT staff, long-term success depends on balancing technology with clear user training and a user-friendly design (UI/UX) to ensure the system is easily accepted and maintained (Samsu, 2017).

3.2.3. Theoretical Reflection on TAM Findings

The evaluation results using the Technology Acceptance Model (TAM) provide empirical evidence that the system is well-suited for its environment, achieving an overall score of 55.4 (86.56%), categorized as "Very Good." This success can be attributed to the strong performance of its primary variables.

Perceived Usefulness (13.96): This rating reflects that the system effectively addresses the institution's core objective: centralized and digitalized data management. Users perceive the platform as a significant improvement over manual documentation, providing a clear "relative advantage" in administrative speed and data accuracy.

Perceived Ease of Use (41.44): This score is particularly high, encompassing interface design, flexibility, and language clarity. It validates the iterative refinements made during the third and fourth Scrum Meetings. Consistent with the theory proposed by Davis (1989) and supported by Saputra et al. (Saputra et al., 2020) In similar system evaluations, Ease of Use is a primary driver of Perceived Usefulness. This improvement — from 12.1 (Not Good) on the legacy system to 86.56% (Very Good) on SIAP AMWIN — provides empirical evidence that iterative, user-centered Scrum development directly addresses the adoption barriers identified in the baseline evaluation, particularly in registration facilitation and workflow guidance, where the prior system scored lowest. When users find a system intuitive and flexible, their resistance to new technology diminishes. To maintain and further improve this 86.56% acceptance rate, the study recommends integrating a continuous feedback loop. Responding promptly to user feedback and conducting regular evaluations ensures that the system remains an evolving solution that aligns with the growth of the *pesantren* community.

4. CONCLUSION

The development of the "SIAP AMWIN" registration system demonstrates a successful model for digital transformation within traditional educational environments like Islamic boarding schools (*pesantren*). This study contributes a methodological blueprint showing that the integration of the Scrum framework is highly effective for institutions with evolving administrative needs. The iterative nature of Scrum, executed through five cycles, allowed for a flexible development process that synchronized technical stability with the school's cultural readiness. Practically, the research proves that an actor-centered approach (Guest, User, and Operator) ensures secure and organized data management,

effectively solving the issue of fragmented manual records. The functional validation via Katalon Studio Automated Testing Tools facilitated faster and more detailed processing compared to manual testing, despite encountering some errors. And the high user acceptance score of 86.56% (Very Good) indicates that the system not only meets technical standards but also significantly lowers the technical barrier for users. Future enhancements may focus on addressing identified issues to further optimize system performance and user satisfaction

4.1. Limitations and Future Research

Additional limitations include single-researcher design, where the system developer also served as the primary evaluator — a potential source of researcher bias. The system's CSS layout also exhibited minor rendering issues in mobile view, and the web-based-only platform limits users preferring mobile-native applications. Future research should: (1) replicate this blueprint across multiple pesantren to establish external validity; (2) conduct longitudinal studies to assess sustained acceptance beyond initial deployment; (3) explore an extended TAM model incorporating pesantren-specific constructs such as institutional trust and religious compatibility as potential moderating variables; and (4) develop a mobile-native version with OCR integration to further streamline administrative workflows.

REFERENCES

Adel Al-Maaitah, T., Ali Alduneibat, K., Mowafaq Alshdaifat, S., Alsarayreh, R., Bani Ahmad, A. Y. A., & Faeik Hijazin, A. (2025). AI adoption, technological readiness, and AI usability in sustainability accounting education: The moderating role of academic integrity. *Heritage and Sustainable Development*, *7*(1), 611–628. https://doi.org/10.37868/hsd.v7i1.1176

Creswell, J. W. ., & Creswell, J. David. (2023). *Research design : qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Inc. https://books.google.com/books/about/Research_Design.html?hl=id&id=Rkh4EAAAQBAJ

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, *13*(3), 319–339. https://doi.org/10.2307/249008

Dhara, F., Arsya, A., Cahyo Wibowo, N., & Wahyuni, E. D. (2025). Implementasi Black Box Testing Menggunakan Tools Katalon Studio Pada Fungsionalitas Website Rekrutmen Fast Print Indonesia. *ILTEK : Jurnal Teknologi*, *20*(02), 182–189. https://doi.org/10.47398/ILTEK.V20I02.235

Ekawati, R., Permata, E., Fatkhurrohman, M., Irwanto, & Afridah, S. (2021). Pengembangan Media Pembelajaran Trainer Kit Teknik Digital berbasis Cooperative Learning Approach. *Lectura: Jurnal Pendidikan*, *12*(2), 180–193.

El Hakim, F. A., Prayudi, A., Hanifati, K., Fariza, A., & Rante, H. (2023). Scrum Framework Implementation for Building an Application of Monitoring and Booking E-Bus Based on QRCode. *Jurnal Teknik Informatika*, *16*(1), 100–111. https://doi.org/10.15408/jti.v16i1.29409

John W. Creswell, & Timothy C. Guetterman. (2018). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (Sixth edition). Pearson Education, Inc.

Lukman, L., & Ishartiwi, I. (2014). Pengembangan Bahan Ajar Dengan Model Mind Map Untuk Pembelajaran Ilmu Pengetahuan Sosial Smp. In *Jurnal Inovasi Teknologi Pendidikan* (Vol. 1, Number 2, pp. 109–122).

Moreira, F., Marian, A.-L., Apostolache, R., & Ceobanu, C. M. (2025). Toward Sustainable Technology Use in Education: Psychological Pathways and Professional Status Effects in the TAM Framework. *Sustainability*, *17*. https://doi.org/10.3390/su17157025

Jahar, A. S. (2025, October 22). *Pesantren as the New Education Trend | Syarif Hidayatullah State Islamic University Jakarta Official Website*. https://www.uinjkt.ac.id/index.php/en/pesantren-as-the-new-education-trend

Samsu. (2017). *METODE PENELITIAN : (Teori dan Aplikasi Penelitian Kualitatif, Kuantitatif, Mixed Methods, serta Research & Development)* (M. Pd. I. Dr. Rusmini, S.Ag., Ed.). Pusat Studi Agama dan Kemasyarakatan (PUSAKA).

Saputra, R., Santoso, B., & Syawaludin, M. (2020). Evaluasi Penerimaan Sistem Otomasi Perpustakaan Senayan Library Management System (SLiMS) dengan Pendekatan Technology Acceptance Model (TAM) di UPT Perpustakaan Politeknik Negeri Sriwijaya. *Tadwin : Jurnal Ilmu Perpustakaan Dan Informasi*, *1*(1), 50–57.

Sarianja, S. S., & Veri, J. (2025). The Impact of Management Information Systems and Technological Innovation on Organizational Productivity: A Literature Review. *UPI YPTK Journal of Business and Economics*, *10*(2), 1–7. https://doi.org/10.35134/JBE.V10I2.302

Smina, N., Gahi, Y., & Gharib, J. (2025). Data Management in Smart Manufacturing Supply Chains: A Systematic Review of Practices and Applications (2020–2025). *Information 2026, Vol. 17, Page 19*, *17*(1), 19. https://doi.org/10.3390/INFO17010019

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D.* Alfabeta.

Wandri, R., Rizki Fadhilah, M., Rachmat Setiawan, P., Fadhilla, M., Studi Teknik Informatika, P., Teknik, F., Islam Riau, U., Kaharuddin Nst No, J., & Pekanbaru, K. (2025). *Sistemasi: Jurnal Sistem Informasi Agile Scrum as a Development Approach: A Case Study of Web-based School Information System Design*. *14*(4), 2540–9719. http://sistemasi.ftik.unisi.ac.id

Widhiarso, W. (2010). *Pengembangan Skala Psikologi : Lima Kategori Respons ataukah Empat Kategori Respons ?* 1–5.

Xue, L., Mahat, J., & Ghazali, N. (2026). Technology Acceptance Model in Artificial Intelligence in Education: A Meta-Analysis. *SAGE Open*, *16*(1). https://doi.org/10.1177/21582440251409441/ASSET/C1CF00AD-DB37-4543-83F7-1887AF4726E6/ASSETS/IMAGES/LARGE/10.1177_21582440251409441-FIG8.JPG