



## DIGITAL ENGAGEMENT IN CHILD ISLAMIC BOARDING SCHOOLS: CORRELATION BETWEEN APPLICATION USAGE AND GUARDIANS' SATISFACTION

Taufikin<sup>1</sup>(✉), Ahmad Hariyadi<sup>2</sup>, Muhammad Ihsan Dacholfany<sup>3</sup>, Dwinarko<sup>4</sup>,  
Tri Cicik Wijayanti<sup>5</sup>, Gulnaz Fatma<sup>6</sup>

<sup>1</sup>Universitas Islam Negeri Sunan Kudus, Central Java, Indonesia

<sup>2</sup>Universitas Muria Kudus, Central Java, Indonesia

<sup>3</sup>Universitas Muhammadiyah Metro Lampung, Indonesia

<sup>4</sup>Universitas Bina Sarana Informatika, Jakarta, Indonesia

<sup>5</sup>Universitas Gajayana Malang, East Java, Indonesia

<sup>6</sup>Jazan University, Saudi Arabia

---

### Article History:

Received: January 2026

Accepted: March 2026

Published: April 2026

---

### Keywords:

Pesantren Application Use,  
Guardians' Satisfaction, Learning  
Technology

---

(✉)Correspondence to:  
taufikin@uinsuku.ac.id

**Abstract:** This study aimed the association between intensity of *PPATQ-RF* application usage and guardians' satisfaction, providing an evidence base for more effective technology-enabled services. A quantitative design was employed using a structured questionnaire administered to 60 guardians from diverse regions and age groups. Data were analyzed using descriptive statistics, item validity tests, reliability analysis, Pearson's correlation, and simple linear regression. The instrument demonstrated high internal consistency (Cronbach's alpha = 0.838) and all items met validity criteria. A moderate, statistically significant positive correlation emerged between application usage and satisfaction ( $r = 0.573$ ;  $p < 0.05$ ). The regression model  $Y = 11.948 + 0.699X$  accounted for 32.9% of the variance in satisfaction. These findings indicated that optimizing application use can enhance guardians' satisfaction, while recognizing that other determinants outside the application continue to exert substantial influence. These findings suggested that optimizing the app's use can increase the satisfaction of students' guardians, while acknowledging that other factors beyond the app still have a significant influence. This study offers concrete managerial implications by identifying priority areas for improvement, particularly regarding system accessibility, information completeness, and feature optimization, thereby enabling boarding school administrators to design digital service strategies that are more responsive, integrated, and user-oriented.

---

### Please cite this article in APA style as:

Taufikin, T., Hariyadi, A., Dacholfany, M. I., Dwinarko, D., Wijayanti, T. C., & Fatma, G. (2026). Digital Engagement in Child Islamic Boarding Schools: Correlation Between Application Usage and Guardians' Satisfaction. *Edureligia: Jurnal Pendidikan Agama Islam*, 10(1), 176-192.

## INTRODUCTION

The rapid advancement of digital transformation has fundamentally reshaped educational service systems, including those in Islamic boarding schools (Saepurohman et al., 2025; Tantowi et al., 2025; Taufikin et al., 2025). Digital platforms are now widely used to facilitate communication, monitor student progress, and deliver institutional services to parents (Asad et al., 2026 and Mateu-Luján et al., 2026). In this context, student guardian satisfaction serves as a critical dependent variable, reflecting the extent to which digital services meet user expectations for accessibility, reliability, and utility (Belmokhtar et al., 2025; Ding et al., 2025; Y. Lu & Khan, 2024). Satisfaction is best understood as a comprehensive evaluation of user interaction with digital platforms, encompassing both cognitive and affective dimensions of the user experience, rather than merely an outcome of system usage. In educational settings involving children, guardian satisfaction is closely linked to trust, transparency, and perceptions of institutional communication quality (Li & Chen, 2025 and Rulinawaty et al., 2024).

Despite the increasing adoption of mobile applications in Islamic boarding schools, a significant gap persists between the implementation of technology and the systematic measurement of guardian satisfaction (Estriegana et al., 2024; Mumcu & Çebi, 2025). While many institutions have integrated digital applications as part of service modernization, these efforts are frequently not supported by empirical evaluations to determine whether the technology genuinely improves user experience and satisfaction (Jiang et al., 2025 and G. Lu et al., 2025). This lack of assessment leads to uncertainty about the true impact of app usage, as high adoption rates do not necessarily indicate meaningful engagement or user satisfaction (Rulinawaty et al., 2024; Ashoumi et al., 2025; and Sapuadi et al., 2024)). In children's boarding schools, this challenge is further complicated by concerns about information sensitivity, the need for real-time data updates, and expectations for ongoing communication between institutions and guardians (Liang et al., 2024; Pandita & Kiran, 2023; Raghuwanshi & Dwivedi, 2025).

Findings from the field indicated that parents' use of the boarding school app does not yet fully reflect an optimal service experience. While some parents used the app regularly, they still face challenges with ease of navigation, loading speed, and limited information. On the other hand, there was a disparity between usage intensity and satisfaction levels, where a perception of satisfactory service does not always accompany high access frequency. This situation indicated that the app has not yet fully bridged the needs for communication, information transparency, and parents' expectations regarding the boarding school's digital services. Therefore, a data-driven approach is needed to systematically examine how dimensions of app usage, such as ease of access, information quality, system performance, and feature utility, correlate with satisfaction levels, enabling management of digital services to move from mere assumptions toward more measurable, context-specific decision-making.

Extant research offered a robust theoretical foundation for understanding technology use and user satisfaction. The Information Systems Success model identifies system quality, information quality, and service quality as primary predictors of user satisfaction and continued system use (Al-Kofahi et al., 2025 and Nasution et al., 2025). The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2) emphasized perceived usefulness, ease of use, and social influence as determinants of user behavior and satisfaction. The Expectation-Confirmation Theory (ECT) further posits that satisfaction results from the confirmation of users' initial expectations after system use. However, the application of these frameworks has largely focused on students and teachers, with the perspectives of student guardians, as key stakeholders in the digital education ecosystem, remaining underexplored (Dulloo et al., 2025 and Nguyen & Nguyen, 2024).

Conversely, prior research on digital applications in education has often emphasized system adoption rates and effectiveness without sufficiently considering contextual and cultural factors, particularly within religious-based educational institutions such as pesantren (Rulinawaty et al., 2024; Grané et al., 2023; and Bhattacharya et al., 2026). The distinctive characteristics of pesantren, including structured religious routines, hierarchical authority, and ethical considerations in information dissemination, necessitate a more contextually grounded understanding of how parents perceive and evaluate digital services. Consequently, empirical research is required that not only tests theoretical models but also adapts them to the socio-cultural realities of the pesantren environment.

The urgency of this research stems from the growing demand for accountable, transparent, and responsive digital educational services, particularly within institutions responsible for children's development and well-being. This study has novelty by specifically focusing on guardian satisfaction in the context of children's pesantren and quantitatively testing the relationship between app usage and satisfaction levels using validated and reliable instruments. Additionally, this study integrates multiple theoretical perspectives, the IS Success Model, TAM/UTAUT, and ECT into a unified analytical framework tailored to the boarding school context. Accordingly, the objectives of this study are to test the validity and reliability of measurement instruments for app usage and parent satisfaction, analyze parents' perceptions of the PPATQ-RF app, and determine the extent to which app usage is related to and influences parent satisfaction.

## RESEARCH METHOD

This study employed a quantitative, survey-based approach to analyze the relationship between app usage and students' guardians' satisfaction. This approach was chosen because it allows for the objective measurement of variables and the statistical testing of relationships between variables. Data were collected via a structured questionnaire developed based on constructs from the Information Systems Success model, the Technology Acceptance Model

(TAM/UTAUT), and the Expectation-Confirmation Theory (ECT). The primary data source was the guardians of students at the PPATQ-RF children’s boarding school who actively used the boarding school application. The sampling technique used was purposive sampling, with a total sample of 60 guardians, with the following criteria: (1) guardians who have active access to the application, (2) have used the application for at least three months, and (3) are involved in monitoring student progress through the digital platform. This technique was chosen because it allows researchers to obtain relevant respondents with direct experience of the research subject.

Data analysis was conducted using descriptive and inferential statistics. Validity and reliability tests ensured the quality of the instruments, while regression analysis assessed the influence of app usage on guardian satisfaction. The analysis aimed to identify the strength of relationships between variables and determine the contribution of each dimension of app usage to satisfaction levels. Additionally, classical assumption tests were performed to confirm the suitability of the analytical model. Data validation included construct validity and internal consistency reliability, utilizing factor loading values, Cronbach’s alpha, and composite reliability (Malapane & Ndlovu, 2024; Pilcher & Cortazzi, 2024 and Ragin, 2024)). This approach ensured that research results are accurate, consistent, and reliable, providing a foundation for data-driven decision-making within the pesantren environment.

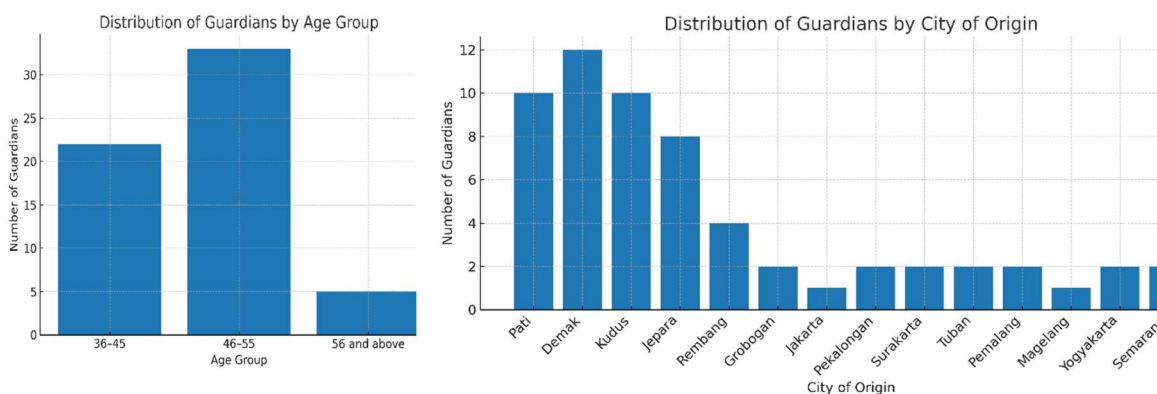


Figure 1. Distribution of Respondents

Figure 1 showed that the distribution of 60 respondents who are guardians of boarding school students is dominated by the 46–55 age group, followed by the 36–45 age group, while those aged 56 and older are relatively few in number, indicating that the majority of app users are in their productive years and likely bear significant responsibility for their children’s education. In terms of region of origin, respondents are spread across various cities in Central Java, with the largest concentrations in Demak, Pati, and Kudus, followed by Jepara and several other areas in smaller numbers, including Rembang, Grobogan, and cities outside the core region. This pattern shows that the app’s user base has a fairly broad geographic reach. However, it remains centered on areas around Islamic boarding schools, reflecting a user community that is

regionally focused yet diverse.

## RESULT AND DISCUSSION

### Mobile Application PPAATQ-RF ku Development Process

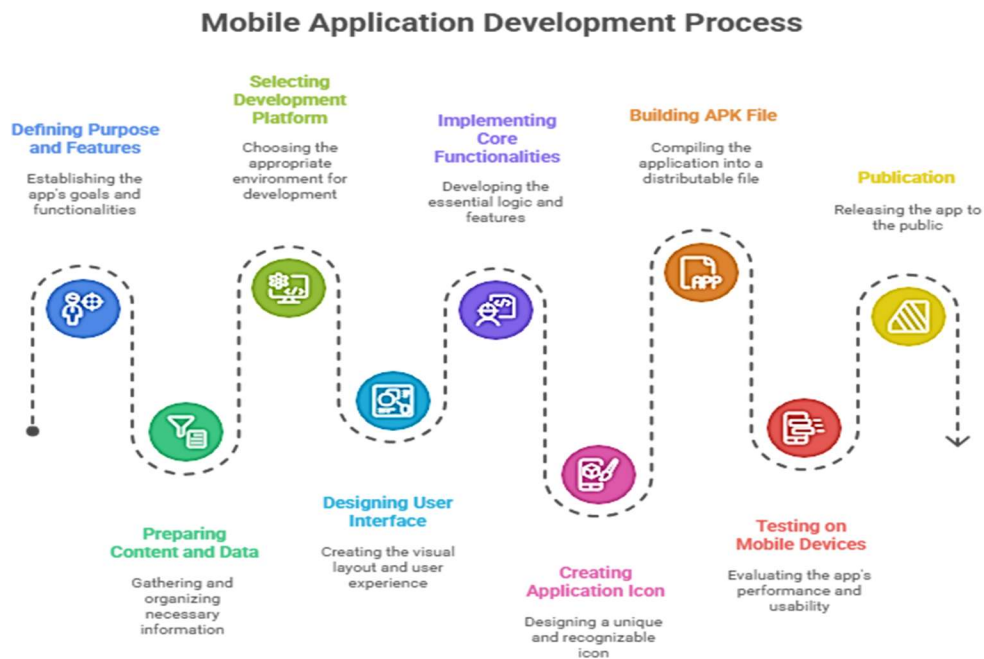


Figure 2. Mobile Application PPAATQ-RF ku Development Process

Figure 2 illustrated the systematic and phased development process of the PPAATQ-RF mobile application, beginning with the formulation of objectives and initial planning focused on user needs—particularly those of student guardians through to the stage of releasing the application to end users. This process includes conceptual data processing as the foundation for development, selecting a development platform suitable for the system’s needs, and designing a user interface that emphasizes usability and user experience. Subsequently, the implementation phase involves integrating key features relevant to boarding school services, followed by the creation of the application file (APK) as a distribution-ready product. Before publication, the application is tested on mobile devices to ensure system performance, stability, and usability. Overall, this workflow demonstrates that application development is not solely focused on technical aspects but also prioritizes the quality of the resulting digital service to optimally meet the needs for communication, information transparency, and the satisfaction of student guardians.

Table 1. Short Description for the Development of PPAATQ-RF ku

Stage	Objective	Core Components	Implementation Steps
Defining the Purpose and Features	Identify institutional needs and determine the	Institutional profile, study/class schedule, student/teacher data, form, WhatsApp/Call link, gallery.	(a) List desired features. (b) Create initial sketches or wireframes of the

	application's functional scope.		interface.
<b>Preparing Content and Data</b>	Provide all textual and media content prior to development.	Institutional profile text, schedules, contact details, images/logos, links, PDF files, database structure.	(a) Compile and verify textual content. (b) Prepare media assets in appropriate formats.
<b>Selecting the Development Platform</b>	Choose the most suitable programming or no-code environment.	With coding: Android Studio (Java/Kotlin), Flutter (Dart), React Native (JavaScript).	Evaluate development skills, device compatibility, and scalability requirements.
<b>Designing the User Interface (UI)</b>	Ensure a visually coherent and user-friendly design reflecting institutional identity.	Institutional color palette, official logo, structured menu layout.	(a) Design main pages: Home, Profile, Schedule, Gallery, Registration Form.
<b>Implementing Core Functionalities (Logic)</b>	Enable navigation, data display, and interactive features.	Page navigation, static/dynamic data retrieval, form submission (email/Google Form), WhatsApp/Call integration.	Code and test each function iteratively for reliability.
<b>Creating the Application Icon</b>	Develop a recognizable and branded app icon.	PNG format, 512×512 px, labeled with application name.	(a) Design icon in Canva/Photoshop. (b) Integrate icon into project settings.
<b>Building the APK File</b>	Generate an installable Android package.	Export/Build APK function (AppSheet/Kodular/Thunkable) or flutter build apk command.	Produce APK file ready for testing and distribution.
<b>Testing on Mobile Devices</b>	Verify stability, performance, and usability on real hardware.	Installed APK on target devices.	(a) Transfer APK to smartphone. (b) Test all features systematically.
<b>Publication (Optional)</b>	Distribute the application to intended users.	Google Play Store, Google Drive, direct WhatsApp link.	(a) Upload to online platforms. (b) Share download links with target audience.

Table 1 presented a concise description of the PPAQ-RF application's development stages, as part of the findings of this study. This table does not merely describe the technical process; it also reflects how institutional needs were systematically translated into the design and implementation of the application. Each stage illustrated the relationship among development objectives, the key components built, and the implementation steps taken, thereby providing a comprehensive overview of the application's development logic tailored to the needs of boarding school guardians. Thus, this table serves

as an operational framework explaining how the application was constructed to support structured, user-oriented digital services for boarding schools.

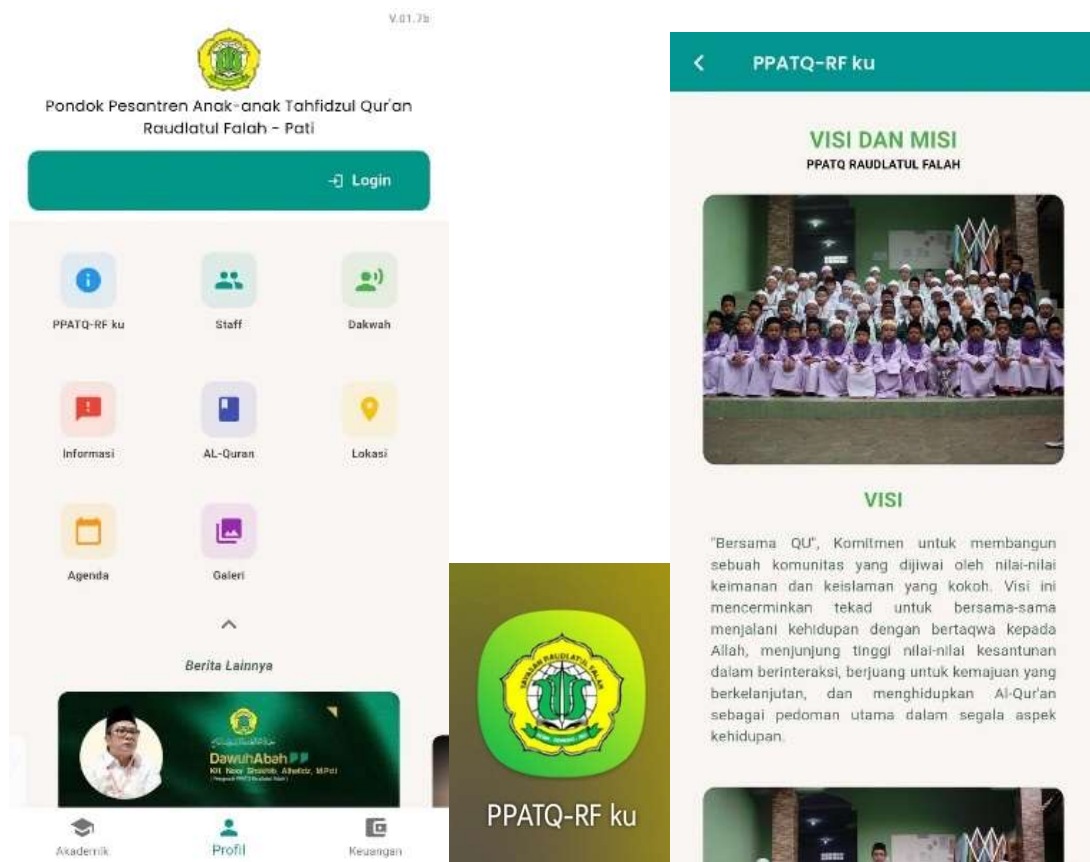


Figure 3. PPATQ-RF ku Application

Figure 3 showed the main interface of the PPATQ-RF app, a digital platform designed to support information and communication services between Islamic boarding schools and students' guardians. The app has been used by 530 students' guardians registered as primary users, supported by 123 teachers and 2 administrative staff members who manage and update the system. In this study, 60 parents of students served as respondents, representing active users of the app. In practice, the application is used routinely by parents to monitor their children's activities, access boarding school information, and receive regular updates. The application interface is designed to be simple and intuitive, with key features such as boarding school information, teacher profiles, da'wah activities, Quran access, location, calendar, and gallery organized as icons to facilitate navigation. The inclusion of a login feature indicated the presence of an authentication system that enables personalized access for each user, making interactions more targeted and secure. Additionally, the clean visual design and soft color palette reflect the developers' efforts to enhance user comfort and experience. Overall, this app serves as an integrative platform that not only provides information but also strengthens transparency, connectivity, and trust between the boarding school and parents within the digital education service ecosystem.

### Descriptive Statistics of Variables

Application usage (X) and guardians' satisfaction (Y) were measured through 14 Likert-scale items (1 = strongly disagree to 5 = strongly agree). The mean values for all items fell within the high range ( $\geq 3.68$ ), indicating respondents' positive attitudes toward the pesantren's application and its digital services. Table 2 presented the means (M) and standard deviations (SD) for each item.

**Table 2. Means and Standard Deviations per Item**

Item	M	SD	Item	M	SD
X1	4.67	0.48	Y1	4.82	0.39
X2	3.68	0.54	Y2	4.67	0.48
X3	4.03	0.69	Y3	4.57	0.53
X4	4.17	0.62	Y4	4.55	0.50
X5	3.87	0.57	Y5	4.42	0.56
X6	4.35	0.52	Y6	4.62	0.49
X7	4.55	0.50	Y7	4.80	0.40

Table 2 showed that all items fall into the high category, indicating that guardians' perceptions of the app's use and their level of satisfaction are generally positive. However, these findings are not merely descriptive; they provide initial indications of the patterns of influence among the dimensions. The high mean scores on X6 (speed/stability) and X7 (feature usefulness) indicate that technical performance and feature relevance are dominant factors contributing to the user experience. Conversely, the relatively lower scores on X2 (ease of access) and X5 (completeness of information) suggest potential weaknesses that could hinder the optimization of satisfaction. Regarding the satisfaction construct, high scores on Y1 (satisfaction with information) and Y7 (willingness to recommend) indicate that information quality directly influences both satisfaction and user loyalty. Thus, these results confirm that, while the app is generally well-received, variations across usage dimensions have distinct implications for satisfaction. Conceptually, these findings suggest that improvements in accessibility and information completeness could strengthen the association between app usage and overall satisfaction. This claim will be further confirmed through correlation and regression analyses.

### Instrument Quality: Validity and Reliability

Item validity was assessed using corrected item-total correlations, with  $r \geq 0.30$  adopted as the practical threshold for item adequacy. Results showed that 13 of the 14 items exceeded this threshold; one item (X2) was slightly below ( $r = 0.275$ ) but remained informative in representing ease of access.

**Table 3. Corrected Item–Total Correlations (Validity)**

Item	r	Item	r	Item	r
X1	0.480	X5	0.309	Y3	0.776
X2	0.275	X6	0.587	Y4	0.725
X3	0.565	X7	0.522	Y5	0.764
X4	0.513	Y1	0.587	Y6	0.675
		Y2	0.797	Y7	0.485

Internal reliability was estimated using Cronbach’s alpha. The combined 14-item scale demonstrated high reliability ( $\alpha = 0.838$ ), exceeding the conventional 0.70–0.80 threshold for applied research. These findings indicate strong internal consistency, supporting the instrument’s suitability in the pesantren context.

**Relationship Between Application Usage and Satisfaction**

Pearson’s correlation between the composite application usage score (X\_total) and the composite satisfaction score (Y\_total) indicated a positive, moderate, and statistically significant association ( $r = 0.573$ ;  $p < 0.001$ ; two-tailed). Substantively, guardians reporting higher frequency and ease of use, better system quality, and more useful features also tended to report higher satisfaction levels with the pesantren’s digital services. This finding aligns with information systems success literature, which identifies system quality, information quality, and service quality as key determinants of user satisfaction.

**Table 4. Pearson Correlation Between Application Usage and Guardians’ Satisfaction**

Variables	Application Usage (X)	Guardians’ Satisfaction (Y)
Application Usage (X)	1.000	0.573***
Guardians’ Satisfaction (Y)	0.573***	1.000
N	60	60
p-value	–	< 0.001

Note. \* $p < 0.001$  (two-tailed). Pearson’s  $r = 0.573$  indicates a moderate positive correlation.

Table 4 presented the results of the Pearson correlation test examining the relationship between app usage and student guardians' satisfaction. This analysis was conducted after the data were deemed valid and reliable to test whether the intensity and quality of app usage are significantly related to users’ perceptions of satisfaction. The results showed a correlation coefficient of  $r = 0.573$  ( $p < 0.001$ ), indicating a positive, moderate-strength relationship that is statistically significant. This meant that higher levels of app use tend to be associated with greater parental satisfaction. Nevertheless, the moderate strength of the relationship suggests that app usage is not the sole determinant of satisfaction; other factors outside the model also influence it. This correlation serves as a key step before regression analysis, providing an initial overview of the direction and strength of the relationship between variables and simultaneously strengthening the empirical foundation for testing the effects in subsequent stages.

### Simple Linear Regression Analysis

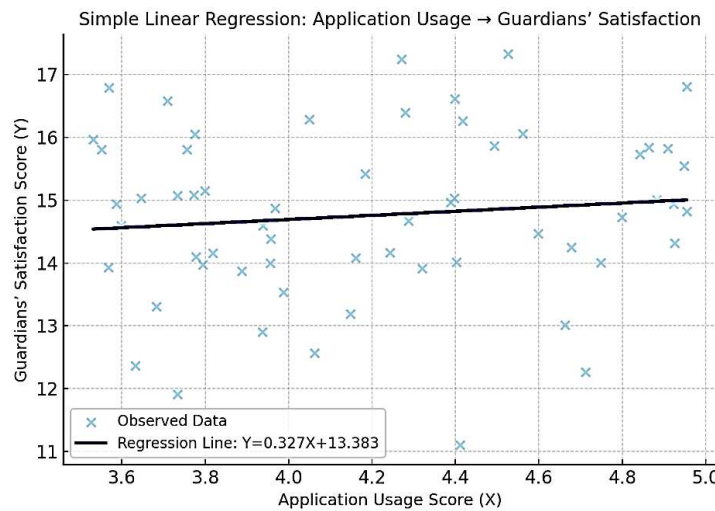
The effect of application usage on guardians' satisfaction was estimated through a simple linear regression model. The resulting equation was:

**Table 5. Simple Linear Regression of Application Usage on Guardians' Satisfaction**

Predictor	B	Std. Error	Beta	t	Sig. (p)
(Constant)	11.948	2.317	—	5.156	< .001
Application Usage (X)	0.699	0.132	0.573	5.295	< .001

**Model Summary:** R = 0.573, R<sup>2</sup> = 0.329, Adjusted R<sup>2</sup> = 0.317, F(1, 58) = 28.04, p < .001

**Regression Equation:** Y=11.948+0.699X



**Figure 4. Path of Regression**

The model explained 32.9% of the variance in satisfaction (R<sup>2</sup> = 0.329), with a positive and statistically significant slope coefficient (b = 0.699; p < 0.001). This indicated that a one-unit increase in the application usage score is associated with an approximate 0.699-point increase in the satisfaction score. The moderate R<sup>2</sup> value suggests that, in addition to application usage, other factors contribute to satisfaction such as the quality of face-to-face interactions, responsiveness of non-digital services, and guardians' overall experience which were not modeled in this analysis. Assumption checks indicated residual patterns approximating linearity and homoscedasticity, with no substantive violations.

### Additional Analysis: Feature Distribution and Improvement Points

Examination of mean scores revealed two consistent areas for improvement: item X2 (ease of access) and item X5 (information completeness). First, the lower score for X2 may indicate login difficulties, network speed limitations, or less intuitive navigation flows on certain devices. Potential interventions include optimizing application size, caching key content, and simplifying the login process without compromising security. Second, the X5 score highlights the need for more comprehensive and structured content

curation (e.g., integrated scheduling, preference-based push notifications, and a concise knowledge base for frequently asked questions). The upward trends in Y1 (information satisfaction) and Y7 (recommendation) reinforce that when information quality is clear and timely, the likelihood of recommending the application increases.

**Synthesis of Findings in Relation to the Research Questions**

RQ1 (Instrument validity and reliability): Results indicated that the instrument met the criteria for item validity (13/14 items with  $r \geq 0.30$ ) and demonstrated high internal reliability ( $\alpha = 0.838$ ). Thus, the instrument is suitable for measuring application usage and guardians’ satisfaction in the pesantren context.

RQ2 (Profile of application usage perceptions): All usage dimensions received positive ratings, with particular emphasis on stability/speed (X6) and feature usefulness (X7). Areas for potential enhancement include ease of access (X2) and information completeness (X5). These findings contribute to a nuanced understanding of usability and system quality aspects relevant to guardians.

RQ3 (Relationship and contribution of usage to satisfaction): A significant moderate positive correlation was observed ( $r = 0.573$ ). Regression analysis confirmed a meaningful contribution of usage to satisfaction ( $R^2 = 0.329$ ) while also indicating the influence of external determinants beyond the application itself. This pattern aligns with the Information Systems Success Model and Expectation-Confirmation Theory, which link perceived digital service performance with satisfaction and continuance intentions.

Overall, guardians positively assessed the PPATQ RF application’s performance and reported high satisfaction levels. The instrument used was valid and reliable, and correlational and regression analyses confirmed the contribution of application usage to satisfaction. Nevertheless, the identified gaps in ease of access and information completeness outline clear development priorities: streamlining access flows, enhancing cross-device stability, improving content curation, and implementing more adaptive notifications. These findings provide an empirical foundation for pesantren administrators to design more responsive digital service strategies and open avenues for future research to test potential mediating or moderating variables—such as service quality, trust, or guardians’ digital literacy to explain the variance in satisfaction not captured by the current model.

**Table 6. Summary of Research Novelty and Contribution**

Aspect	Recent Literature	This Study
Target Population	University students/teachers; parents in public schools	Guardians in child pesantren; strong religious-cultural context
Theoretical Framework	IS Success, UTAUT2, ECM; evidence in LMS/ed apps	Integration of usage constructs (quality & feature usefulness) → satisfaction in pesantren app
Quantitative	Positive effects on	$r = 0.573$ ; $R^2 = 0.329$ ; $\alpha = 0.838$ ; majority

<b>Evidence</b>	satisfaction/intention	valid items
<b>Implications</b>	Improve UX and system/information quality	Concrete recommendations: low-friction onboarding, content curation, adaptive notifications

The cross-sectional design limits causal inference; longitudinal or experimental studies are recommended. The moderate sample size and single-site setting call for multi-site replication for broader generalizability. Non-digital variables: face-to-face service quality, institutional trust, and digital literacy should be considered as mediators or moderators in an expanded model. A mixed-methods approach incorporating usability testing and in-depth interviews could enrich understanding of access friction and information needs.

For *pesantren* (boarding schools) administrators, establishing information quality standards (accuracy, timeliness, communicative tone), adaptive notification governance, and mobile-first design accommodating cross-age usability will enhance guardian experience and satisfaction. Integrating user feedback into the development cycle supported by usage analytics is recommended to maintain consistent digital service quality.

### Discussion

The research findings demonstrate that app usage is positively associated with parents' satisfaction, aligning with theoretical frameworks such as the Information Systems Success Model and UTAUT/UTAUT2, which emphasize system quality, perceived usefulness, and user experience as key determinants of satisfaction (Al Naqbi, 2024 and Y. Wang et al., 2023). This alignment suggests that, despite the strong religious and cultural characteristics of Islamic boarding schools, the fundamental mechanisms of satisfaction with digital technology are consistent with global technology adoption theory (Alsulami et al., 2024; Atabik et al., 2024; Rulinawaty et al., 2024). This relationship can be attributed to the role of digital platforms in reducing information asymmetry between the institution and parents, thereby enhancing transparency and trust. When parents perceive a stable system and relevant features, their cognitive evaluation of system performance leads to affective satisfaction, as described in the Expectation-Confirmation Theory (Bukhori, 2025 and Rulinawaty et al., 2024).

Moderately, the app usage to satisfaction suggests that parents' satisfaction is shaped not only by digital factors but also by broader institutional variables, such as service culture, interpersonal communication, and trust in the institution (Al Naqbi, 2024; Chang et al., 2024; Chuktu et al., 2024; Guo et al., 2023). These findings align with previous research that positions digital systems as complementary rather than sole determinants of user satisfaction. This can be explained by the interaction between digital and non-digital experiences, where the application enhances efficiency and accessibility (Hambali & Mardiya, 2023; Rijal, 2023). At the same time, perceptions of institutional care, responsiveness, and credibility are primarily formed through direct or hybrid interactions. Consequently, improvements in digital services should be aligned with

institutional values and existing service practices (Ab Alim et al., 2025; Belkhir, 2024; Habes et al., 2023; Hambali et al., 2023).

This primarily focused on students or teachers in formal education contexts, this study broadens the scope by positioning parents as the primary subjects within the context of children's pesantren, thereby addressing a significant gap in the literature. While earlier research has established a positive relationship between system quality and satisfaction, it often overlooks the socio-cultural dimensions of communication within religious institutions. This study demonstrates that, although the direction of the relationship remains consistent, the determinants of satisfaction are substantially influenced by expectations regarding transparency, moral responsibility, and continuity of communication. This is particularly relevant given parents' heightened sensitivity to their children's development, which increases the demand for accurate, timely, and easily accessible information. Thus, the contribution of this study is twofold: it provides quantitative empirical evidence in an under-researched context. It integrates multiple theoretical frameworks into a contextual analysis model tailored to the pesantren environment.

This study also offers practical contributions by proposing implementation strategies such as a simple and low-barrier onboarding system, structured information architecture management, adaptive notification mechanisms, and the sustainable use of usage analytics. These recommendations are consistent with recent literature that emphasizes the integration of system quality and user experience as prerequisites for the sustainability of digital services. These strategies directly address the identified weaknesses in access and information delivery, thereby strengthening the relationship between app usage and satisfaction. Overall, this study enriches theoretical development and provides practical guidance for transforming digital service management in Islamic boarding schools. The primary contribution of these findings is the confirmation that modern information systems theory remains applicable in religious-based education, while also highlighting the importance of trust-based digital interactions within the pesantren environment.

## CONCLUSION

The findings of this study suggest that the use of digital applications in Islamic boarding schools is not merely a technical issue but reflects a conceptual shift toward data-driven, user-oriented educational services, while simultaneously strengthening the trust relationship between the institution and students' guardians. Theoretically, this study confirms that the quality of the user experience particularly in terms of ease of access, system reliability, and information relevance serves as a key determinant in shaping satisfaction levels, especially within the context of education grounded in religious values. From a practical perspective, the findings indicate that boarding school administrators should prioritize intuitive interface design, seamless cross-device access, and the timely presentation of well-curated information as part of a sustainable digital governance strategy. Furthermore, digital platforms also have the potential to

serve as strategic instruments in strengthening collaboration between Islamic boarding schools and families, provided they are managed according to principles of ethical communication and in alignment with institutional values. However, this study also has limitations in its cross-sectional design, single-location scope, and the exclusion of external variables such as digital literacy, interpersonal trust, and the quality of in-person services, which may also influence satisfaction. Therefore, future research is recommended to adopt a longitudinal or experimental design, expand the sample to include diverse institutional contexts, and integrate mediating and moderating variables to develop a more comprehensive and generalizable model of digital engagement in Islamic education.

### ACKNOWLEDGMENT

The author would like to express sincere gratitude to the leadership, teachers, and administrative staff of PPATQ Raudlatul Falah for their invaluable support and cooperation during the research process. Special thanks are extended to the parents and guardians who participated in this study for their openness and willingness to share their experiences. The author also appreciates the constructive feedback provided by academic colleagues, which contributed to the refinement of this manuscript.

### REFERENCES

- Ab Alim, N. N. A., Wahid, K., Abd Zamani, S. N. H., & Adenan, F. (2025). Artificial Intelligence As A Support Tool for Quran Memorization: An Exploratory Study on The Potential Use of AI Applications Among Non-Islamic Studies Students. *Quranica*, 17(2), 157–186. <https://doi.org/10.22452/quranica.vol17no2.7>
- Al Naqbi, S. H. (2024). A Mixed-Method Approach to Post-Implementation Success of Technology Performance in UAE Universities: Assessing DeLone and McLean IS Success Model. *Sage Open*, 14(2), 21582440241240827. <https://doi.org/10.1177/21582440241240827>
- Al-Kofahi, M., Hassan, H., & Mohamad, R. (2025). DeLone and McLean Information Systems Success Model: A Literature Review. *International Journal of Business Information Systems*, 48(4), 452–481. <https://doi.org/10.1504/IJBIS.2025.145551>
- Alsulami, S. G., Albeladi, A. A., Kouchay, S. A., Altammam, A. A., Afifi, M. Y., & Al-Qahtani, R. T. M. (2024). Integration of TAM and ISSM into Student Satisfaction with AI Learning Intervention: Empirical Evidence from Islamic Studies. *Pakistan Journal of Life and Social Sciences*, 22(2), 6356–6366. <https://doi.org/10.57239/PJLSS-2024-22.2.00479>
- Asad, M. M., Chachar, S., & Almusharraf, N. M. (2026). Impact of K-12 School Administration and Parents' Digital Communication on Students' Engagement and Academic Self-Efficacy: Insights from the Global Perspective. *Journal of Professional Capital and Community*, 1–29. <https://doi.org/10.1108/JPCC-11-2024-0187>

- Ashoumi, H., Aprina, S. C. A., Hidayatulloh, M. K. Y., Munifah, & Tsani, I. (2025). Development of a Multiple-Choice Item Analysis Application to Enhance Learning Assessment Instruments. *Edureligia: Jurnal Pendidikan Agama Islam*, 09(02), 223–239. <http://dx.doi.org/10.33650/edureligia.v9i2.10366>
- Atabik, Nurfuadi, Hidayat, I., Masruri, & Nur, S. (2024). Digitalization of Educational Quality Management in Higher Education. *Revista de Gestao Social e Ambiental*, 18(7). <https://doi.org/10.24857/rgsa.v18n7-133>
- Belkhir, F. Z. (2024). Challenges and Opportunities of AI-Assisted Learning: A Systematic Literature Review on the Impact of ChatGPT Usage in Higher Education. *IJLTER*, 22(7), 25–39. <https://doi.org/https://www.nature.com/articles/s41586-023-06221-2>
- Belmokhtar, Y., Rhizlane, B., & Abdeslam, C. (2025). Impact of the Quality of Digital Services on Student Satisfaction in Higher Education Institutions in Morocco. *Adv. Sci. Tech. Inno.*, 11–16. [https://doi.org/10.1007/978-3-031-74470-9\\_2](https://doi.org/10.1007/978-3-031-74470-9_2)
- Bhattacharya, S., Agarwal, N., & Poudel, D. (2026). The Persuasive Power of Visual Elements in Strategic Communication. *Lect. Notes Comput. Sci.*, 16324 LNCS, 79–94. [https://doi.org/10.1007/978-3-032-14107-1\\_7](https://doi.org/10.1007/978-3-032-14107-1_7)
- Bukhori, I. (2025). Beyond Normative Instruction: the Internalization of Satlogi Santri in an Indonesian Islamic Boarding School. *Edureligia: Jurnal Pendidikan Agama Islam*, 9(3), 376–390. <https://doi.org/10.33650/edureligia.v9i3.11610>
- Chang, I.-H., Hsu, P.-C., & Chen, R.-S. (2024). The Effects of Trust on User Satisfaction with Parenting Apps for Taiwanese Parents: the Mediating Roles of Social Ties and Perceived Value. *Education and Information Technologies*, 29(12), 15113–15131. <https://doi.org/10.1007/s10639-024-12471-y>
- Chuktu, O., Owan, V. J., Abang, K. B., Idika, D. O., Ekpo, E. E., Ekon, E. E., Dan, F. A.-O., Ojini, R. A., Sunday, M. O., Robert, A. I., & Aduma, P. O. (2024). Institutional Attributes and Parents' Contentment with the Quality of Teaching, Care, and Safety of Pupils In Public primary schools. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2023.2295167>
- Ding, Y., Xiao, Y., Jiang, Y., & Zhou, A. (2025). The Mediatization of Religion: How Digital-Age Film and Television Reshape Interfaith Experiences. *Religions*, 16(9). 201-218 <https://doi.org/10.3390/rel16091172>
- Dulloo, R., Das, A., & Bolesnikov, M. (2025). The Influence of AR and Digital Twin Technologies on Customer Engagement: An Integrated TAMUTAUT Framework with Customer Experience as Mediator. *International Conference on Artificial Intelligence and Emerging Technologies, ICAIET 2025*, 2(1). 34-45. <https://doi.org/10.1109/ICAIET65052.2025.11211406>
- Estriegana, R., Teixeira, A. M., Robina-Ramirez, R., Medina-Merodio, J.-A., & Otón, S. (2024). Impact of Communication and Relationships on Student Satisfaction and Acceptance of Self- and Peer-Assessment. *Education and*

- Information Technologies*, 29(12), 14715–14731.  
<https://doi.org/10.1007/s10639-023-12276-5>
- Grané, M., Suárez, R., & Sabando, D. (2023). It Depends on You. Family Beliefs of Digital Technologies as a Regulator of Children’s Screen Use. *Digital Education Review*, 43(43), 151–171.  
<https://doi.org/10.1344/der.2023.43.151-171>
- Habes, M., Alghizzawi, M., Ahmad, A. K., & Almuhausen, O. (2023). The Impact of Digital Media Learning Apps on Students’ Behaviors in Distance Learning During COVID-19 at the University of Jordan. *Studies in Media and Communication*, 11(3), 47–55.  
<https://doi.org/10.11114/smc.v11i3.5982>
- Hambali, Harmonis, M., Rozi, F., & Milla, M. (2023). The Usage of Magic Box-Based APE as an Effort to Improve Cognitive Aspects. *WISDOM: Jurnal Pendidikan Anak Usia Dini*, 4(2), 243–263.  
<https://doi.org/10.21154/wisdom.v4i2.7462>
- Hambali, & Mardiyah. (2023). Technology in Education; Tpack as an Approach to Becoming a Revolutionary Teacher in the Digital Age. *Academy of Education Journal*, 14(2), 171–185.  
<https://doi.org/10.47200/aoej.v14i2.1646>
- Guo, Z., Li, M., Cai, J., Gong, W., Liu, Y., & Liu, Z. (2023). Effect of High-Intensity Interval Training vs. Moderate-Intensity Continuous Training on Fat Loss and Cardiorespiratory Fitness in the Young and Middle-Aged a Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, 20(6), 4741.  
<https://doi.org/10.3390/ijerph20064741>
- Jiang, S., Li, H., & Gan, D. (2025). Technology Acceptance Model for Online Education: Identifying Interdisciplinary Topics and Their Evolution Based on BERTopic Model. *Social Sciences & Humanities Open*, 12, 101831.  
<https://doi.org/10.1016/j.ssaho.2025.101831>
- Li, J., & Chen, X. (2025). Modeling Student Satisfaction in Online Learning Using Random Forest. *Scientific Reports*, 15(1), 312–322.  
<https://doi.org/10.1038/s41598-025-06686-3>
- Liang, Dr. Y. (Danni), Chen, Dr. S., Abeysekera, Dr. R., O’Sullivan, Dr. H., Bray, D. J., & Keevill-Savage, I. (2024). Examining the Adoption of Technology-Enhanced Learning in Universities and Its Effects on Student Performance, Satisfaction, and Motivation. *Computers and Education Open*, 7, 100223. <https://doi.org/10.1016/j.caeo.2024.100223>
- Lu, G., Qu, S., & Chen, Y. (2025). Understanding User Experience for Mobile Applications: A Systematic Literature Review. *Discover Applied Sciences*, 7(6), 587. <https://doi.org/10.1007/s42452-025-07170-3>
- Lu, Y., & Khan, M. S. (2024). Influence of Higher Education E-Service Quality on E-Learning Student Satisfaction; As Moderated by Digital Literacy: A Mixed Method Research Approach. *Revista de Gestao Social e Ambiental*, 18(1), 1-12. <https://doi.org/10.24857/rgsa.v18n1-112>

- Malapane, T. A., & Ndlovu, N. K. (2024). Assessing the Reliability of Likert Scale Statements in an E-Commerce Quantitative Study: A Cronbach Alpha Analysis Using SPSS Statistics. *Syst. Inf. Eng. Des. Symp., SIEDS*, 6(1), 90–95. <https://doi.org/10.1109/SIEDS61124.2024.10534753>
- Mateu-Luján, B., Suárez-Guerrero, C., & Catala, C. L. (2026). Pedagogical Perspective on Platformization in Primary Education: Teachers' Discourses and Emerging Issues in the Valencian Community. *Digital Education Review*, 48(1), 94–111. <https://doi.org/10.1344/der.2026.48.94-111>
- Mumcu, B. B., & Çebi, A. (2025). You Have a Notification: the Role of Push Notifications in Shaping Students' Engagement, Self-Regulation and Academic Procrastination. *International Journal of Educational Technology in Higher Education*, 22(1), 36-45. <https://doi.org/10.1186/s41239-025-00537-x>
- Nasution, A. P., Erlina, Sirojuzilam, & Muda, I. (2025). Delone McLean Model Application for RGIS User Satisfaction Assessment in Regional Government. *International Journal of Accounting and Economics Studies*, 12(5), 739–746. <https://doi.org/10.14419/2vca8212>
- Nguyen, H.-H., & Nguyen, V. A. (2024). An Application of Model Unified Theory of Acceptance and Use of Technology (UTAUT): A Use Case for a System of Personalized Learning Based on Learning Styles. *International Journal of Information and Education Technology*, 14(11), 1574–1582. <https://doi.org/10.18178/ijiet.2024.14.11.2188>
- Pandita, A., & Kiran, R. (2023). The Technology Interface and Student Engagement Are Significant Stimuli in Sustainable Student Satisfaction. *Sustainability*, 15(10), 450-463. <https://doi.org/10.3390/su15107923>
- Raghuvanshi, C., & Dwivedi, P. (2025). Transforming Government Schools Through E-Government: Opportunities and Challenges. In D. Mishra, R. Kumar, & A. B. B. Abdul Hamid (Eds.), *Startup-Driven E-Government: Digital Innovation for Sustainable Ecosystems* (pp. 133–145). IGI Global. <https://doi.org/10.4018/979-8-3373-0817-3.ch006>
- Ragin, C. C. (2024). *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*. Univ of California Press.
- Rijal, S. (2023). Management of Online-Based Learning Media Through The Google Classroom Application in Increasing Student Learning Interest. *AL-FAHIM: Jurnal Manajemen Pendidikan Islam*, 5(1), 188–206. <https://doi.org/10.54396/alfahim.v5i1.564>
- Rulinawaty, Kasmad, Samboteng, L., Purwanto, A. J., Kuncoro, S., Jasrial, Tahilili, M. H., Efendi, Y., & Karyana, A. (2024). Investigating the Influence of the Updated Delone and Mclean Information System Success Model on the Effectiveness of Learning Management System Implementation. *Cogent Education*, 11(1), 2365611. <https://doi.org/10.1080/2331186X.2024.2365611>
- Saepurohman, A., Badrudin, Erihadiana, M., Sri Lestari, A., & Alai, A. (2025). Strategic Management of Digital Literacy Initiatives in Islamic Boarding

- Schools of Tasikmalaya. *Munaddhomah*, 6(2), 238–250. <https://doi.org/10.31538/munaddhomah.v6i2.1711>
- Sapuadi, Sulistyowati, Syahmid, Rizal, S. U., Hikmah, N., & Mualimin. (2024). Thematic Curriculum Analysis Using Context, Input, Process and Product Evaluation Models. *Edureligia : Jurnal Pendidikan Agama Islam*, 08(01), 115–128. <https://doi.org/10.33650/edureligia.v8i1.8735>
- Pilcher, N., & Cortazzi, M. (2024). “Qualitative” and “Quantitative” Methods and Approaches Across Subject Fields: Implications for Research Values, Assumptions, and Practices. In *Quality and Quantity* (Vol. 58, Issue 3). Springer Netherlands. <https://doi.org/10.1007/s11135-023-01734-4>
- Tantowi, A., Gunawan, M. A., & Ibrahim, A. (2025). Optimizing Islamic Boarding School Management in the Digital Era: Analysis of Technology Effectiveness in Administration and Operations. *Munaddhomah*, 6(2), 295–309. <https://doi.org/10.31538/munaddhomah.v6i2.1738>
- Taufikin, T., Nurhayati, S., Badawi, H., Falah, A., & Sholihuddin, M. (2025). Integrating Creative Digital Content in Pesantren: Improving Santri’s Digital Literacy And Islamic Learning. *Edukasia Islamika*, 10(1), 35–54. <https://doi.org/10.28918/jei.v10i1.10326>
- Wang, Y., Cong, X., Zi, L., & Xiang, Q. (2023). Blockchain for Credibility in Educational Development: Key Technology, Application Potential, and Performance Evaluation. *Security and Communication Networks*, 2023(1), 5614241. <https://doi.org/10.1155/2023/5614241>