DEVELOPMENT MANAGEMENT SYSTEM OF STUDENT RELIGIOUS ACTIVITY THROUGH USER CENTERED DESIGN APPROACH AND UTAUT

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Abstract - Project-Based Learning (PBL) is increasingly adopted in educational settings, including Mata Kuliah Wajib Kurikulum (MKWK), to foster active engagement and practical skill development. However, managing student religious activities within this framework presents challenges, particularly with manual attendance tracking and inaccurate point calculations. This research aimed to develop a system religious activity for students and mentors, utilizing the User Centered Design (UCD) approach. By employing the Unified Theory of Acceptance and Use of Technology (UTAUT) model, data was collected from 240 respondents through questionnaires. The findings revealed a 99% positive perception of the system regarding its effectiveness, ease of use, peer support, and resource availability. Key features, such as real-time attendance submission and point updates, significantly enhance operational efficiency and accuracy. The study concludes that this UTAUT-based evaluation system effectively meets user needs and boosts engagement in religious studies, marking a shift from traditional manual evaluation methods that often lack real-time feedback and comprehensive metrics.

Keywords - MKWK, Project-Based Learning, Religious Activities, User Centered Design, UTAUT.

I. INTRODUCTION

Indonesia, with over 260 million people, is the fourth most populous country and third-largest democracy, facing challenges in improving access, quality, infrastructure, and teacher standards, especially in remote areas [1]. Education, as per law, aims to transform attitudes and behaviors through teaching [2]. The government, following the 1945 Constitution, promotes intellectual growth, and Law No. 12/2012 mandates higher education institutions to offer Mata Kuliah Wajib Kurikulum (MKWK) courses like Religion, Pancasila, Citizenship, and Indonesian Language to build students' moral values [3]. The MKWK learning process is regulated by PERMENDIKTI No.84/E/KTP/2020, while Permendikbud No. 3/2020 introduces new standards for research and Project-Based Learning (PBL), requiring 50% of the grade to come from discussions [4]. PBL, used in subjects like religion, to promotes critical thinking and problem-solving, aligning with national goals [5].

Mentoring is an effective PBL method in religious education. It facilitates group learning to enhance students' knowledge, skills, and attitudes [6]. In religious activities, mentoring helps students apply religious values while incorporating science, technology, and the arts [7]. The aim is to foster community, moral guidance, spiritual growth, and self-reflection [8]. Mentoring promotes character development [9] and takes various forms, such as guiding groups of 7–15 students in weekly worship and discussions [10], or, in Islamic mentoring, providing Qur'an reading guidance and group discussions [11].

A common issue in religious activities is student laziness, leading to cheating and difficulties in managing attendance, which is crucial for tracking progress. Previous studies using Google Forms and Sheets are time-consuming, inefficient, and allow cheating [12]. Other manual methods, like stamping books or calling names, are prone to human error and inefficiency, especially with large groups [13] [14]. These issues negatively impact learning outcomes, as students who cheat or skip attendance miss critical discussions and moral lessons. Poor attendance management also makes it difficult to accurately assess student engagement and progress, reducing the effectiveness of mentoring programs. This ultimately hinders students' character development and spiritual growth, which are key goals of religious education.

Educational management systems have advanced by integrating technologies like biometric systems and mobile apps with geolocation for real-time attendance monitoring, reducing fraud and improving student engagement. PBL also benefits from these technologies, engaging students in meaningful projects. This research aims to show how a User Centered Design (UCD) based mentoring system effectively meets the unique needs of religious activities while enhancing usability. Previous studies using UCD in various fields, such as E-Traffic [15], E-Rapport [16], E-Learning [17], Internship Monitoring [18], and wedding organizers [19], have proven its effectiveness. However, no research has applied UCD to religious activities. Adopting UCD for managing student religious activities ensures functional usability and user satisfaction, as it prioritizes user needs throughout the development process [20].

This research focuses on building a UCD based mentoring system to address gaps in attendance management and prevent cheating in religious activities [21]. The system will automate attendance recaps, weekly worship summaries, and replace manual methods like pen and paper or Google Spreadsheets. The web application is designed to meet user needs and improve management efficiency. The evaluation will use the Unified Theory of Acceptance and Use of Technology (UTAUT) model [22], followed by usability testing to gather user feedback and experiences. Additionally, the proposed technology aligns with Indonesia's national education goals by promoting active student engagement, improving learning outcomes, and fostering moral values in line with the country's educational policies. By applying UCD principles, the system ensures that the needs and preferences of students are prioritized, enhancing usability and effectiveness. This approach not only contributes to individual learning experiences but also supports national objectives for quality education and character development. This research contributes to the literature by applying UTAUT in this context, highlighting its relevance to broader educational policies, and demonstrating how UCD can benefit other educational systems and PBL initiatives.

II. SIGNIFICANCE OF STUDY

This research is significant for advancing the understanding and implementation of technology in managing student religious activities. By using a UCD approach and the UTAUT model, the study provides insights into user needs and expectations, bridging theoretical frameworks with practical applications in education. The UTAUT framework enables a thorough analysis of user acceptance, while the UCD method enhances system usability for students and mentors. This research aims to develop more effective systems for managing religious activities, improving user satisfaction, and streamlining administrative processes in educational institutions.

A. Research Methods

This section explained step by step methods that would be used in the development system of the student religious activity and used by the mentor and students. The methods that used in

this research employed a multi-method approach consisting of applied research and quantitative research.

1. Applied Research

The development of the system using a applied method called User Centered Design (UCD) approach for knowing the needs, goals and input of users when creating a system. This method consists of several stages, as shown in Figure 1.

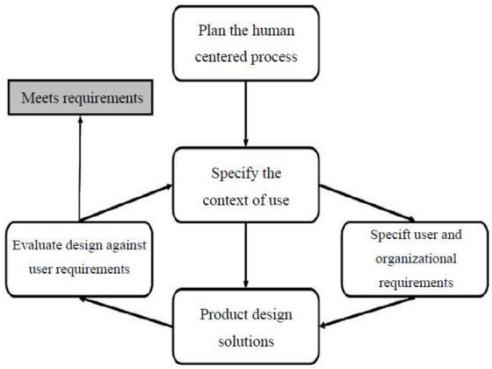


Figure 1. User Centered Design

a. Plan the Human Centered Design Process: The researcher collected data through observations and interviews, including brainstorming sessions with mentors and students.
b. Understand and Specify the Context of Use: This stage identified system objectives, user characteristics, and the usage environment, focusing on simplifying attendance management for students and mentors in religious activities. Students used the system to record attendance and earn activity points, while mentors validated attendance.
c. Specify the User Requirements: This stage analyzed system requirements and user goals based on data from the first two stages.
d. Produce Design Solutions to Meet User Requirements: The researcher created a design prototype, including an Entity Relationship (ER) diagram and a system interface prototype to define user interactions and visualize functionalities.
e. Evaluate Designs Against Requirements: Usability testing was conducted to assess whether the design met user needs, gathering initial feedback from mentors and users.
f. Designed Solution Meets User Requirements: At the final stage, the researcher confirmed that the system design met the user's needs.

2. Quantitave Research

Data collection for this research utilized a quantitative approach through questionnaires distributed via Google Forms. The target population consisted of 580 students enrolled in the MKWK curriculum. A sampling frame was constructed using the university's enrollment list, ensuring all eligible students were accounted for. Participants were selected using a simple random sampling technique, allowing each student an equal chance of being chosen. The analysis of acceptance factors for the developed system for religious activities was guided by the UTAUT model, as illustrated in Figure 2 [23].

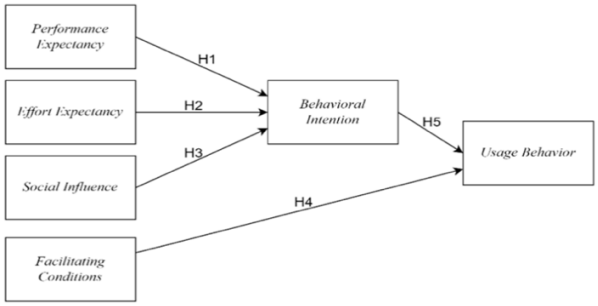


Figure 2. Research Model UTAUT

The research model includes two types of variables:

1. Independent Variable, these influence the dependent variables without being affected by others. They are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC).
2. Dependent Variable, these are influenced by the independent variables, consisting of Behavioral Intention (BI) and Usage Behavior (UB).

Using UTAUT and variables from the research model, the researcher compiled a list of questions based on references from [24] and listed in the Table I.

TABLE I
DEFINITION OPERATIONAL OF VARIABLES AND QUESTIONS

Variables	Indicator
Performance Expectancy (PE)	1. Do you believe that this system will help increase the efficiency of students' religious activities ? 2. Do you feel that using this system will increase your productivity in managing student religious activities ?
Effort Expectancy (EE)	1. Do you find this system easy to use ? 2. Do you find interacting with this system easy to learn?
Social Influence (SI)	1. Do you feel that your friends believe that you should use this system ? 2. Do you feel that people important to you (for example like friends, family or colleagues) support you using this system ?
Facilitating Conditions (FC)	1. Do you have sufficient resources (for example like computer equipment, internet access) to use this system ? 2. Do you feel that this system is compatible with other devices you use ?
Behavioural Intention (BI)	1. Do you plan to use this system in future student religious activities ? 2. Do you interested using this system regularly ?
Usage Behaviour (UB)	1. Do you frequently use this system for managing student religious activities ? 2. Do you feel comfortable using this system for all aspects of student religious activities ?

The data analysis technique utilized the Likert Scale method to assess UTAUT variables through questionnaires, using a scale from 1 to 5: 1 = "Strongly Disagree" to 5 = "Strongly Agree" [25]. Descriptive statistical analysis followed these steps:

a) Determining the Criterion Score: The ideal score ranges from 100 (lowest, 1) to 500 (highest, 5).
b) Determine the total score from the data collection results, symbolized by ∑SH.
c) Calculate the percentage (P) of respondents' answers is derived from the criteria and total scores, allowing for comparison of results.

III. RESULTS AND DISCUSSION

The student religious activity system was successfully developed using the UCD approach. This section presents the development outcomes and analyzes user feedback gathered through the UTAUT model.

1. User Centered Design (UCD)

a. Plan the Human Centered Design Process: The first outcome was secondary data collection on UCD-based applications, showing a gap in systems for managing religious activities. The second involved brainstorming with stakeholders, including the student organization head, mentors, and students.

b. Understand and Specify the Context of Use: This stage identified four key topics: enhancing manual attendance tracking through streamlined submission, validation, and approval processes; categorizing users into college students and mentors; and ensuring the system is responsive across devices, including mobile and desktop.

c. Specify the User Requirements: User requirements for managing religious activities were identified from interview results in Table II.

TABLE II
IDENTITY USER REQUIREMENTS

Stakeholder	Question	Response	Identified Needs
Mentor	1. What difficulties do you face when managing student for religious activities ?	"Manually verifying attendance is time-consuming, tracking history is unclear, and point calculations often have errors."	An efficient system for attendance verification and automatic point calculation.
	2. How do you currently approve student participation and point in religious activities ?	"I check attendance and calculate points manually, leading to errors and delays."	A system for quick attendance approval and accurate point calculations.
	3. What features would help you better manage student for religious activity ?	"Automated attendance validation and point reports would save time."	Need for automatic validation of attendance and report of calculated point generation tools.
Student	1. How do you currently submit your attendance for religious activities?	"We manually fill out a book or form, which can lead to confusion."	A clearer, simpler attendance submission method.
	2. What challenges do you face in participating in religious activities under the current system?	"It's hard to confirm if my attendance is recorded correctly, and there's no real-time feedback."	Real-time confirmation of attendance submissions.
	3. How would you prefer to submit your attendance for religious activities?	"An online system that confirms attendance immediately and shows my score would be ideal."	A user-friendly online system for immediate attendance and score feedback.

d. Produce Design Solutions to Meet User Requirements*:* This stage involved creating a solution using an ER-Diagram and a system interface design. The ER diagram, shown in Figure 3, illustrates database connections, organizing data for functionality and user alignment.

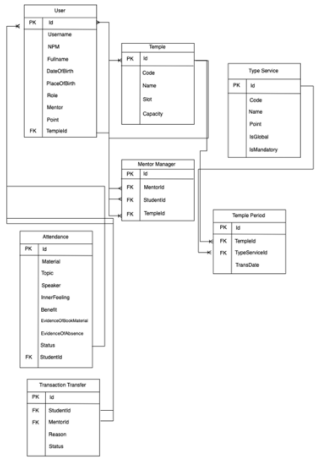


Figure 3. Entity Relationship Diagram (ERD)

The next stage involved developing the system interface with ReactJS for the frontend and ASP.NET with C# for the backend. Figure 4 shows the login page, where users enter their username and password. Access is based on roles student, admin, or mentor redirecting users to a role's specific dashboard after login.

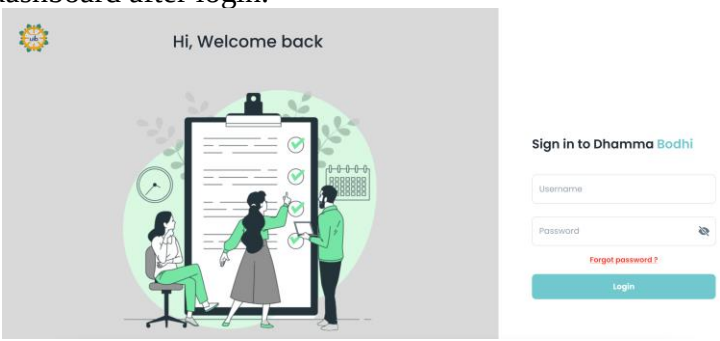
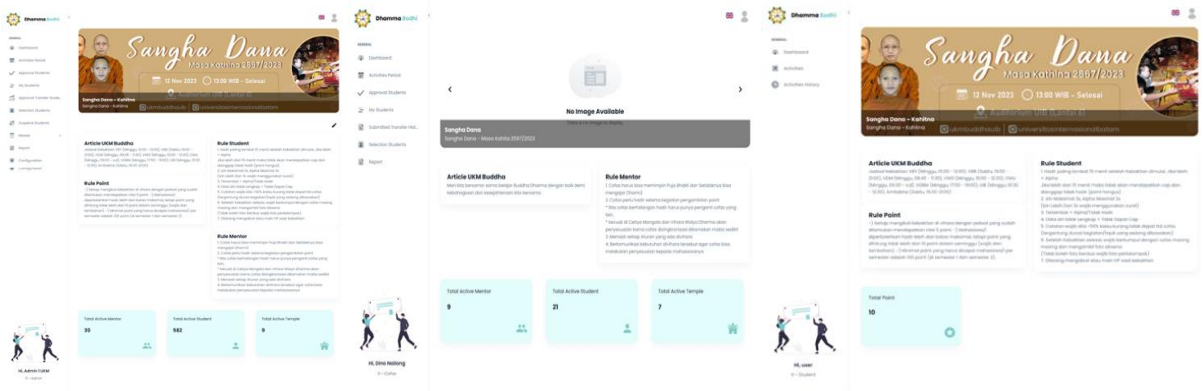


Figure 4. Login Page

Upon login, users access the dashboard: students see upcoming events, activity rules, and their points, while admins and mentors view additional data, like total registered activities and participants. Figures 5a, 5b, and 5c display the dashboards for admins, mentors, and students, respectively.



(a) (b) (c)

Figure 5. (a) Dashboard Admin (b) Dashboard Mentor (c) Dashboard Student

Figure 6 shows how students submit participation in religious activities. They click "Activities" in the sidebar, fill out the form, and upload evidence before submitting. Submission history is accessible in the "Activities History" section, and mentors can approve submissions on the "Approval Students" page.

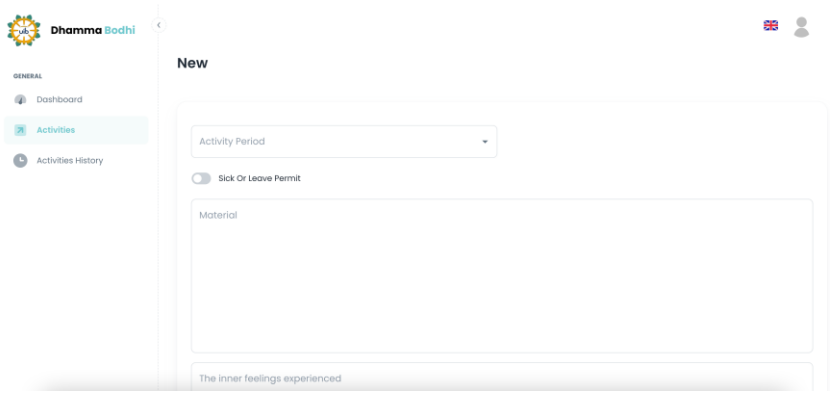


Figure 6. Activities Page

e. Evaluate Design Against Requirements: This stage assessed the system's effectiveness by distributing a Google Form questionnaire to students and analyzing the data using the Likert Scale method.
f. Designed Solution Meets User Requirements: The system was validated to meet user needs, with feedback confirming its effectiveness in improving efficiency and accuracy in attendance tracking and validation processes.

2. UTAUT

In this research, a quantitative approach was employed to collect data through a questionnaire distributed via Google Forms, based on the UTAUT model to assess factors influencing technology acceptance.

a. Target Population and Sampling

The target population consisted of 580 students. The sample size was determined using the formula:

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where:
n = sample size
N = population size
e = error margin (5% or 0.05)
For this research:
N = 580 students
e = 0.05

Using this formula:

$$n = \frac{580}{1+580(0.05)^2} = \frac{580}{1+580(0.0025)} = \frac{580}{2.45} \approx 237 \quad (2)$$

The calculated sample size was rounded up to 240 to ensure comprehensive data collection and maintain the study's reliability.

b. Distribution of Questionnaire

The questionnaire, based on UTAUT variables (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions), was randomly distributed to students and mentors. It featured Likert scale questions ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Data from 240 respondents were analyzed using descriptive statistics to summarize averages and percentages. Gender analysis showed 150 respondents (62.5%) were male and 90 (37.5%) were female, indicating a male-dominated response, as shown in Table III.

TABLE III
RESPONDENT BY GENDER

Gender	Frequency	Percentage
Male	150	62.5%
Female	90	37.5%
Total	240	100%

Respondent feedback was categorized using a Likert scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree") based on Table IV. The analysis determined the percentage of agreement for each question, offering insights into the system's acceptance for managing student religious activities.

TABLE IV
RESPONDENT ANSWER CATEGORIES

Description	Score Range	Agreement Level
0%-20%	1	Strongly Agree (SA)
21%-40%	2	Disagree (D)
41%-60%	3	Neutral (N)
61%-80%	4	Agree (A)
81%-100%	5	Strongly Agree (SA)

Table V shows that the performance expectancy variable includes two questions. Figure 7 indicates that 99% of respondents agreed that the system enhances the efficiency of students' religious activities, while 1% disagreed, indicating strong support for its productivity.

TABLE V
SCORE RANGE PERFORMANCE EXPECTANCY

No	Performance Expectancy	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you believe that this system will help increase the efficiency of student's religious activities?	0	1	1	89	149
2	Do you feel that using this system will increase your productivity in managing student religious activities?	0	0	2	107	131

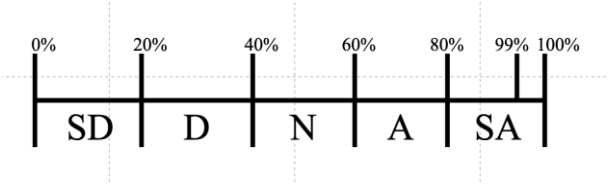


Figure 7. Variable Performance Expectancy

Table VI shows that the effort expectancy variable includes two questions. Figure 8 indicates that 97% of respondents found the system user-friendly, while 3% disagreed, reflecting a strong consensus on its ease of use and learning.

TABLE VI
SCORE RANGE EFFORT EXPECTANCY

No	Effort Expectancy	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you find this system easy to use?	0	0	5	96	139
2	Do you find interacting with this system easy to learn?	0	0	5	115	120

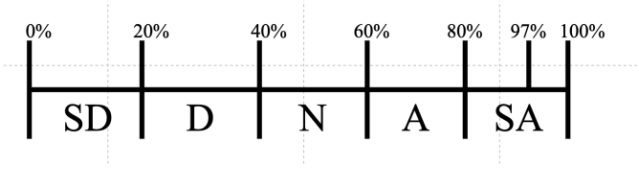


Figure 8. Variable Effort Expectancy

Table VII shows that the social influence variable includes two questions. Figure 9 indicates that 97% of respondents viewed social influence positively, while 3% did not, suggesting strong peer and authority support for using the system.

TABLE VII
SCORE RANGE SOCIAL INFLUENCE

No	Social Influence	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you feel that your friends believe that you should use this system?	0	3	3	81	153
2	Do you feel that people important to you (for example like friends, family or colleagues) support you using this system?	0	0	3	144	123

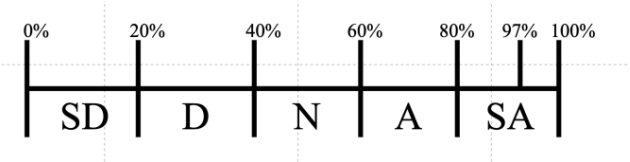


Figure 9. Variable Social Influence

Table VIII outlines the facilitating conditions variable, which includes two questions. Figure 10 shows that 97% of respondents felt they had adequate resources and device compatibility to use the system, while 3% disagreed.

TABLE VIII
SCORE RANGE FACILITATING CONDITIONS

No	Facilitating Conditions	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you have sufficient resources (for example like computer equipment, internet access) to use this system?	0	0	6	110	124

2	Do you feel that this system is compatible with other devices you use?	0	0	5	94	141

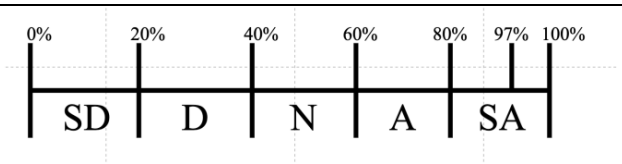


Figure 10. Variable Facilitating Conditions

Table IX presents the behavior intention variable, comprising two questions. Figure 11 shows that 97% of respondents intend to use the system for future student religious activities, while 3% do not.

TABLE IX
SCORE RANGE BEHAVIOUR INTENTION

No	Behavior Intention	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you plan to use this system in future student religious activities?	0	0	3	90	147
2	Do you interested using this system regularly?	1	1	6	115	117

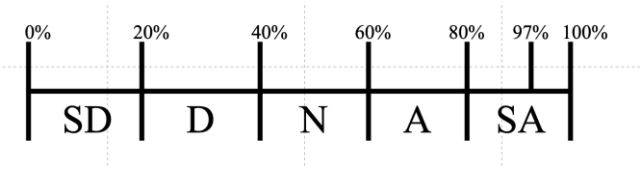


Figure 11. Variable Behavior Intention

Table X shows the usage behavior variable, comprising two questions. Figure 12 reveals that 98% of respondents feel comfortable using all system features for managing religious activities, while 2% do not.

TABLE X
SCORE RANGE USAGE BEHAVIOR

No	Usage Behavior	SD (1)	D (2)	N (3)	A (4)	SA (5)
1	Do you use all the features available in this system?	0	1	6	102	131
2	Do you feel comfortable using this system for all aspects of student religious activities?	0	0	2	109	129

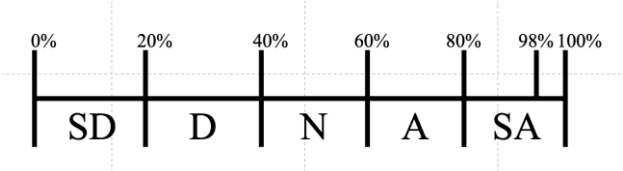


Figure 12. Variable Usage Behavior

Data analysis from 240 respondents shows a highly positive perception of the student religious activity management system. Among the respondents, 62.5% were male, with 99% agreeing

the system enhances efficiency and productivity. Additionally, 97% found it easy to use, felt peer support, and confirmed access to necessary resources. Behavior Intention results indicated that 97% plan to continue using the system, and 98% are comfortable with its features. These findings underscore the effectiveness of the UTAUT-based evaluation system in PBL for religious activities at MKWK, aligning with prior studies [26] [27] that highlighted the limitations of manual evaluations in providing real-time feedback. This research illustrates how the UTAUT model enhances system efficiency and user engagement, suggesting that future digital implementations in education can benefit from the UCD approach to improve attendance tracking and overall student engagement.

IV. CONCLUSION

The student religious activity management system was developed using the UCD approach to effectively meet the needs of students and mentors. It addressed challenges like manual attendance tracking and point errors with features such as attendance submission, real-time point updates, and mentor approvals, enhancing efficiency and accuracy. Feedback from 240 respondents analyzed through the UTAUT model showed strong support for the system's performance and ease of use, with 99% confirming its positive impact on managing religious activities and intent to continue using it. Overall, this research underscores the importance of UCD in educational systems and aligns with Indonesia's national education goals, demonstrating the effectiveness of the UTAUT model in fostering improved user satisfaction and engagement in PBL.

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