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Innovation of Technology-Based Learning Models to Increase Student Involvement in Distance Learning in Islamic Higher Education

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ABSTRACT

Distance learning in various educational institutions poses significant challenges in creating effective interaction between lecturers and students. This study aims to analyze the implementation of technology-based learning model innovations to enhance student engagement in the Islamic Religious Education (PAI) Study Program at STAI Al-Falah Cicalengka, Bandung. A mixed-method descriptive approach was employed, combining quantitative and qualitative data obtained through interviews, observations, documentation, and questionnaires. The findings reveal that the integration of Learning Management System (LMS) platforms, instructional videos, and communication applications such as Google Meet and Zoom significantly increased student participation in class discussions, collaborative activities (84%), task accuracy (90%), and technology utilization (82%). Statistical analysis showed a correlation coefficient of 0.85, indicating a strong positive relationship between student engagement and the use of technology in learning. These results suggest that technology-based learning model innovations can optimize the learning experience and improve the quality of education in Islamic higher education.

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1. INTRODUCTION

With the development of information and communication technology (ICT), many aspects of human life have transformed, including education. ICT-based learning primarily aims to support teaching and learning processes (Zen, W. L., Zukdi, I., Zulfahmi, Z., & Trinova, 2022). It provides broad, fast, and accurate access to information, while simplifying the learning process (Budiharto, Triyono, 2019). From its early use in tools such as projectors and computers, technology has evolved to reshape how we interact, access information, and share knowledge in educational contexts (Azizah, C. P. N., & Subiyantoro, 2023).

Research developments at the Indonesia University of Education (UPI) in 2024 show that the use of technology in learning has a real impact on improving the quality of the learning process. A study by (Rahmi, 2019) found that the implementation of blended learning successfully created high learning interactivity, so that prospective educators and educational staff had a more meaningful learning experience through the use of ICT, as long as students were given ample opportunity to actively participate in the process. In addition, research by (Fajrin, 2024) shows that the use of ICT-based learning media significantly increases student motivation to learn, even compared to conventional graphic media. Although the increase in learning motivation was not much different between the experimental and control classes, this still confirms that ICT-based media has the potential to effectively stimulate students' interest in learning.

One of the most significant transformations in education is the rise of distance learning systems (PJJ), now widely adopted worldwide, including in Indonesia. In online learning, ICT can serve as a medium, a mode, a tool, or even as learning content it self (Nasution, 2019) and (Akbar, K., Hamdi, H., Kamarudin, L., & Fahruddin, 2021). The shift from classroom-based to online formats has reshaped teaching strategies (Setiono, P., Handayani, E., & Selvia, 2020) and fostered more meaningful learning experiences (Kurniati, E., Nur Alfaeni, D. K., & Andriani, 2020). Although distance learning is not a new concept (Aljawarneh, 2020) and (Nikulina, N. A., Mordvintseva, V. S., & Galaktionova, 2020), it became essential during global challenges such as the COVID-19 pandemic, which accelerated the transition to online education. By allowing students to access materials from anywhere without being physically present (Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, 2020) and (Pregowska, A., Masztalerz, K., Garlińska, M., & Osial, 2021), it offers flexibility in teaching and learning, overcoming limitations of time and space (Sadikin, A., & Hamidah, 2020).

The development of technology-based distance learning has not only become a temporary solution during the COVID-19 pandemic, but has also evolved into a permanent necessity in higher education, including in Islamic universities. This is due to the increasing demands of the digital age, which emphasizes the importance of technological literacy, flexibility, and student independence in learning. Recent studies indicate that technology-based learning designs have proven effective in significantly enhancing student engagement (Muhammad Hafizh, Amril Huda M, Dafrizal, 2024). Islamic higher education, which has been known for its conventional face-to-face approach (Maarif, M. A., Rofiq, M. H., & Sirojuddin, 2022), is now challenged to deliver learning innovations that can integrate Islamic values with digital technology (Makruf, I., Rifa'i, A. A., & Triana, 2022) and (Hoerudin, C. W., Syafruddin, S., Mayasari, A., Arifudin, O., & Lestari, 2023). Thus, the application of technology-based learning models is not only seen as an effort at modernization, but also as a strategy to expand access to education and respond to the competency needs of the 21st century.

The implementation of technology-based learning is not without various obstacles that need to be overcome, both in terms of infrastructure, lecturer competence, and student readiness. New research on the use of interactive multimedia in LMS for reading instruction shows that although it has been proven to increase interaction and academic outcomes, there are still challenges such as unequal access to technology and disparities in digital literacy among students (Hidayati, D., & Slamet, 2025). Additionally, other challenges arise in maintaining interactivity, motivation, and active student engagement to ensure the learning process is not merely passive and one-sided. Therefore, innovative technology-based learning models are needed that not only emphasize the delivery of material but also build collaborative, participatory, and contextual learning experiences as the main strategy in improving the effectiveness and quality of distance learning in Islamic higher education institutions.

However, distance learning also presents challenges (Hartono, S. D. T., Mansyur, M. H., 2022), in maintaining student engagement, particularly in Islamic Religious Education (PAI). This field demands not only the delivery of theoretical knowledge but also the cultivation of character and values

traditionally nurtured through close interpersonal interaction between lecturers and students. While integrating technology via Learning Management Systems (LMS), video conferencing, and collaborative platforms can improve engagement (Camilleri, M. A., & Camilleri, 2022), most studies either focus on general education or adopt a one-size-fits-all approach that overlooks the unique pedagogical needs of Islamic higher education. Consequently, there is limited literature on how technology can be adapted to serve cognitive and spiritual learning objectives in a holistic way.

Islamic higher education institutions, such as STAI (Islamic Religious Colleges), face the dual challenge of optimizing technology use while safeguarding religious and character education. For example, Community of Inquiry model emphasizes social and cognitive presence in online learning but does not explicitly address integrating spiritual and moral values in virtual settings (Garrison, D. R., & Anderson, 2003). Although blended learning and flipped classrooms have been applied successfully in secular higher education (Chowdhury, 2020), frameworks that incorporate Islamic pedagogical principles remain scarce. This gap highlights the need for context-specific innovations that merge technology with pedagogical strategies tailored to Islamic education adaptations that reinterpret global best practices in ways that align with the values and objectives of Islamic higher education.

As technology advances, the application of e-learning in Islamic higher education has shown strong results in supporting the religious learning process. For example, research at UIN Raden Fatah Palembang found that the use of PAI e-learning media was effective in improving the quality of learning, with the average score of the experimental class higher than that of the control class, indicating an improvement in the quality of teaching and student motivation in understanding religious material. In addition, another study conducted during the COVID-19 pandemic noted that online Islamic Religious Education learning was not only considered effective, but also had a positive impact on students' religiosity including their understanding of religious material and an increase in the frequency of independent worship, despite still facing challenges such as limited interaction and access to technology (Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, 2020). These findings reinforce the need to develop an online learning model that not only conveys theoretical knowledge but also strengthens religious and spiritual values.

On the other hand, the development of digital-based interactive media is also very promising as a form of innovation that integrates cognitive and affective learning experiences. For example, studies on the use of interactive media in PAI learning strategies show a significant increase in student learning motivation when the material is delivered through attractive and interactive media (Purnomo, D., Marta, M. A., & Gusmaneli, 2025). In addition, research on the creation of interactive web-based learning media for PAI subjects at the MI (Madrasah Ibtidaiyah) level shows that interactive web-based platforms can enrich the methods of delivering material and attract students' interest in learning (Dewi, S. S., Jannah, U. M., Darajat, P. P., & Septarina, 2024). Furthermore, the importance of digital literacy is also a key concern: a study on the digital literacy of students at Islamic religious universities found that there is a gap that must be bridged so that students can access and utilize technology optimally in the learning process (Yudhiantara, R. A., & Martitia, 2023). All these findings emphasize that technological innovation in Islamic education must be contextual, interactive, and grounded in spiritual values, supported by strong digital literacy among faculty and students.

This study addresses that gap by examining technology-based learning model innovations in the PAI Study Program at STAI Al-Falah Cicalengka, Bandung. Unlike previous studies that focus mainly on adoption, this research takes a dual approach: (1) investigating how targeted integration of LMS, instructional videos, and collaborative tools can enhance cognitive, social, and spiritual engagement in a religious higher education setting, and (2) using mixed-method analysis to correlate technology use with measurable indicators of student participation and engagement. By grounding the study in a

specific institutional and religious context, it contributes to a largely underrepresented area in empirical discussions of educational technology.

Therefore, the primary aim of this study is to comprehensively analyze the implementation of innovative technology-based learning models at STAI Al-Falah Cicalengka, Bandung, and to evaluate their impact on student engagement in distance learning within the Islamic Religious Education (PAI) study program. In addition, this study seeks to identify the supporting and inhibiting factors that influence the effectiveness of such innovations, as well as to provide practical recommendations for improving the quality of technology integration in higher education, particularly in the context of Islamic education.

2. METHODS

The research method should be included in the introduction. The method contains an explanation of the research approach, subjects of the study, the conduct of the research procedure, the use of materials and instruments, data collection, and analysis techniques. This study uses a quantitative and qualitative descriptive approach to the Islamic Religious Education Study Program (PAI) STAI Al-Falah Cicalengka Bandung. This method was chosen to describe in depth the application of technology-based learning model innovations in distance learning, as well as its influence on student engagement. The data collected consisted of primary and secondary data, using data collection techniques such as interviews, observations, questionnaires, and document analysis.

Research Design

The design of this study aims to explore the implementation of technology-based learning models applied in the PAI (Islamic Religious Education) study program, the level of student engagement in distance learning, as well as factors that can hinder and support the use of technology in the learning process. Furthermore, this study also seeks to examine how digital platforms facilitate interaction between lecturers and students, particularly in the context of delivering religious values that require dialogical and reflective approaches. In addition, the research intends to identify pedagogical innovations that emerge from the integration of technology, such as collaborative assignments, interactive discussions, and digital assessment tools that can strengthen student participation.

Beyond that, the study also aims to map the challenges faced by lecturers and students in adapting to digital-based learning, including issues related to digital literacy, accessibility of devices and internet networks, and the consistency of motivation in online learning environments. At the same time, it highlights various supporting factors, such as institutional policies, availability of learning management systems (LMS), and the role of lecturers in designing engaging and contextually relevant learning content. By comprehensively analyzing these dimensions, the research is expected to provide valuable insights for the development of more effective and sustainable technology-based learning models in the PAI study program.

Population and Sample

The research uses students of the PAI STAI Al-Falah Cicalengka Bandung study program who participated in distance learning in the even semester of the 2024/2025 academic year as the research population. The sample was taken using the purposive sampling technique, namely students who actively participated in online lectures and lecturers who were involved in the application of technology in learning.

Table 1. Research Population and Sample

Group	Number Of Respondents
Students	50
Lecturers	5

Data Collection Techniques

Interviews were conducted in a semi-structured manner with lecturers and students to gain an in-depth view of the application of technology in learning. A questionnaire was distributed to students to measure their level of involvement in distance learning. This questionnaire uses the Likert scale (1 = strongly disagree, 5 = strongly agree). Observations were made on the implementation of online learning to identify interactions between students and lecturers through a learning platform. Document analysis was carried out on lecture materials, attendance records, and student learning evaluation results.

Data Analysis

Existing data were analyzed using a combination of quantitative and qualitative descriptive approaches to ensure a comprehensive understanding of the research findings. The quantitative data obtained from questionnaires were processed using simple statistical techniques such as percentages, frequency distributions, and mean scores to describe trends, patterns, and general tendencies among respondents. This statistical analysis was intended not only to provide numerical descriptions but also to identify dominant categories, levels of agreement, and variations in responses across different aspects of the study.

Meanwhile, the qualitative data gathered from interviews and observations were analyzed through a structured process that included data reduction, data display, and conclusion drawing/verification in accordance with the framework suggested by Miles and Huberman. Data reduction was carried out by selecting, simplifying, and organizing raw data into meaningful units. The data display stage involved presenting the information in narrative form, supported by quotations from participants, so that the findings became clearer and more easily interpreted. Finally, the process of drawing conclusions and verification was conducted by comparing the findings with existing theories, as well as cross-checking consistency between quantitative and qualitative results.

The integration of both approaches allowed the research to capture not only the measurable aspects of the phenomenon but also the deeper contextual meanings. Thus, the mixed-method descriptive analysis strengthened the validity and reliability of the findings while at the same time providing a more holistic picture of the problem under study.

Data Presentation

The results of the analysis are made in the form of tables and graphs to provide a clearer picture.

Table 2. Student Engagement Levels in Distance Learning

Engagement Indicators	Average Score	Percentage (%)
Participation in online discussions	4,2	84%
On-time task completion	4,0	80%
Virtual classroom attendance	4,5	90%
Interaction with lecturers	3,8	76%
Utilization of technology features (chat, forums, etc.)	4,1	82%

Data Validity and Reliability

Data Triangulation. Data validity is guaranteed by triangulation methods (questionnaires, interviews, observations) to strengthen the research results.

Simple Statistical Test. The reliability of the questionnaire was tested using Cronbach's Alpha method, which resulted in a score above 0.7, indicating high reliability.

3. FINDINGS AND DISCUSSION

Student Engagement Levels in Distance Learning

Student engagement in distance learning is measured based on five key indicators: attendance, participation in discussions, task work, technology utilization, and interaction with lecturers. The results of the questionnaire showed:

Table 3. Student Engagement Levels in Distance Learning

Engagement Indicators	Average Score	Percentage (%)
Virtual classroom attendance	4,5	90%
Participation in online discussions	4,2	84%
On-time assignment Attendance in virtual classes	4,0	90%
Utilization of technology features	4,1	82%
Interaction with lecturers	3,8	76%

From the table above, it can be concluded that attendance in virtual classes is the highest indicator of engagement (90%), which shows the students' commitment to consistently attending online lectures. Meanwhile, interaction with lecturers received the lowest score (76%), which indicates the need for improved communication between students and lecturers. In addition, other indicators such as participation in online discussions (82%) and timely completion of assignments (85%) also show fairly high achievements. This shows that students are not only committed to attending, but also actively strive to fulfill their academic obligations. However, the gap between attendance rates and interaction with lecturers shows that student engagement still tends to be passive, more oriented towards fulfilling administrative obligations than the dialogical process. Therefore, innovative strategies are needed to encourage two-way communication so that student engagement is more comprehensive and meaningful, rather than just a formality of attendance(Mustapa, M. A. S., Ibrahim, M., & Yusuf, 2015). These findings confirm that the success of distance learning is not only determined by the level of quantitative participation, but also by the quality of academic interaction between lecturers and students.

Effectiveness of the Learning Platform

The platforms used include Google Meet, SIAKAD LMS, and WhatsApp Group. Each platform has different effectiveness in supporting distance learning:

Table 4. Effectiveness of the Learning Platform

Platform	Average Score	Effectiveness
Google Meet	4,4	88%
LMS Siakad	4,1	82%
WhatsApp Groups	3,9	78%

From the table above, it can be seen that Google Meet is the most effective platform (Pedroso, J. E. P., Tubola, L. F. A., Mamon, E. J. M., & Sencida, 2021) and (Pham, 2022), especially in facilitating direct communication and interaction through virtual classes. Meanwhile, the SIAKAD LMS plays an important role in managing academic activities (Gunawan, I., Hui, L. K., Ma'sum, M. A., & Sukawati, 2020), particularly in assigning tasks, distributing learning materials, and monitoring student progress in a more structured manner. WhatsApp Groups are more commonly used as a supplementary tool for informal discussions and quick information sharing (Khan, A., Usmani, A., & Khaliq, 2020), but they are less optimal when used to encourage deeper academic engagement or comprehensive learning processes. Therefore, these three platforms should be used in an integrated manner, where Google Meet is used for virtual face-to-face interactions, the SIAKAD LMS as a learning management center, and WhatsApp as an additional communication medium. The proper integration of these three media will increase the effectiveness of distance learning while strengthening student engagement, both formally and informally.

Challenges and Barriers in Distance Learning

The challenges faced by students and lecturers during distance learning are identified through interviews and observations presented in the form of tables:

Table 5. Challenges and Barriers to Distance Learning

Challenges/Obstacles	Percentage Of Students Who Experience (%)
Unstable internet connection	60%
Limitations of technological devices	40%
Lack of motivation to learn online	35%
Difficulty understanding the material without direct interaction	45%

From the table above, it can be seen that internet connection problems are the biggest obstacle faced by students, especially those who live in rural areas with limited and unstable network access. This condition often causes delays in attending virtual lectures, disruptions during the learning process, and even reduces motivation to study because students find it difficult to focus. In addition, the unavailability of learning devices such as laptops and mobile phones is also a significant problem. Not all students have adequate facilities to support online learning (Yusuf, B. N., & Ahmad, 2020), so some have to share devices with other family members or rely on low-spec mobile phones. These limitations have implications for students' ability to access learning materials, complete assignments, and interact with lecturers optimally. Therefore, more equitable infrastructure support and responsive campus policies are needed, such as providing internet quota assistance, device lending facilities, and utilizing alternative learning media that are more accessible to students in areas with technological limitations.

Benefits of Using Technology

Despite facing various challenges, students and lecturers remain aware of the tangible benefits of utilizing technology in distance learning (Yudhiantara, R. A., & Martitia, 2023). One of the main benefits is time flexibility, where students can access lecture materials at any time according to their individual schedules and learning rhythms. This flexibility provides opportunities for students to balance academic activities with personal activities and work. In addition, technology also provides easy access to various learning resources, such as e-books, instructional videos, electronic journals, and interactive materials that support deeper understanding. This enriches the learning experience for students

because they do not only rely on lecturers' explanations, but can also explore materials from various digital references.

Another benefit is increased academic administration efficiency, particularly in terms of assignment collection, grade management, and lecture information distribution. Through a technology-based system, processes that previously required a lot of time and energy can now be carried out more quickly, transparently, and in an organized manner. This situation not only lightens the burden on students, but also helps lecturers monitor student academic progress more systematically. Thus, the use of technology in distance learning not only provides a practical solution to the limitations of space and time, but also opens up opportunities for a more modern, effective learning process that is in line with the demands of the digital age.

Implications for Islamic Religious Education

Technological innovations have greatly helped the Islamic Education Study Program (PAI) at STAI Al-Falah in overcoming geographical barriers that previously limited students' access to learning. Through the use of online platforms, students from various regions can now attend lectures without having to be physically present on campus. This certainly opens up wider opportunities for prospective religious educators to obtain knowledge and academic guidance more evenly. However, there is still an urgent need to develop interactive learning strategies that are more suited to the characteristics of religious-based courses. PAI courses, especially those related to aqidah, akhlak, tafsir, and fiqh, require in-depth discussion, a dialogical approach, and a holistic process of internalizing values.

Thus, the use of technology in this context is not enough to simply provide access, but must also be directed towards creating innovative learning models that are able to maintain depth of understanding while building the spiritual experience of students. For example, through the integration of interactive discussion forums, personalized virtual mentoring, and the use of digital media that can bring a reflective and contextual nuance to every discussion. This step will ensure that technology-based learning in the Islamic Education Study Program not only emphasizes cognitive aspects but also includes the affective and spiritual dimensions that are at the core of Islamic religious education.

Quantitative Analysis of Student Engagement

Student involvement in distance learning (PJJ) is measured using five main indicators: attendance, participation, task completion, interaction with lecturers, and the use of technology. The data obtained were analyzed using a descriptive statistical approach with a simple formula, mean, percentage, and correlation.

Table 6. Results Per Indicator

Indicators	Actual Score	Max Score	Percentage (%)
Presence	450	500	90%
Discussion Participation	420	500	84%
Task Completion	400	500	80%
Utilization of Technology	410	500	82%
Lecturer Interaction	380	500	76%

Distance learning in the Islamic Education Study Program at STAI Al-Falah Cicalengka shows a fairly high level of student engagement, with an average of 82.4%. The highest engagement indicator

is Student Attendance, at 90%, which illustrates that digital platforms significantly facilitate students' consistent access to virtual classes. This high attendance rate is not only supported by the flexibility of time and place offered by technology, but also due to interactive learning designs that support active engagement. These findings are in line with the results of a study by (Fitriyani, Y., Fauzi, I., & Sari, 2020), which states that digital learning media provide greater opportunities for students to participate without geographical barriers.

Furthermore, recent research also reinforces the positive role of technology in online education. A study by (Hanifa, A., AUlia, C. N., Wisesa, N. S., Faturrohman, R., & Hadiansyah, 2023) shows that technology-based tutorials, particularly in the Islamic Education (PAI) program at UPI, received positive responses from students. Respondents stated that these tutorial media improved the clarity of the material and strengthened their understanding during online learning. Additionally, research in Edutech: Journal of Educational Technology (2023) reveals that platforms such as Google Meet, Google Classroom, and Moodle LMS significantly support student learning satisfaction and strengthen their engagement during online lectures. This effectiveness is greatly influenced by internet network stability and adequate data quotas, as well as proactive teaching strategies that facilitate two-way interaction (Permana, R. H., Junaedi, W., & Hermayanti, 2023).

However, the lowest indicator is Student-lecturer interaction (76%). This shows that there are challenges in creating effective communication between students and lecturers in the digital space. Low lecturer interaction in online learning can be explained using the Community of Inquiry (CoI) framework (Xin, 2012), which highlights the importance of teaching presence in sustaining engagement. A low teaching presence may reduce students' sense of connection, leading to passive participation and lower motivation (Stone, C., & Springer, 2019). In Islamic Religious Education, this is critical because value formation and moral reasoning require active dialogue and feedback. Therefore, improving lecturer interaction should focus not only on frequency but also on the quality of exchanges through structured feedback, small-group mentoring, and reflective discussions. The lack of student learning activity can be caused by various factors, such as the lack of lecturer skills in utilizing interactive features or obstacles for students to express their opinions in virtual spaces. (Iskandar, 2020) Suggest that faculty training in the use of interactive technology, such as breakout room features in Zoom or group discussions in LMS, can improve this interaction.

Student involvement in distance learning is highly dependent on interaction, both synchronous (virtual face-to-face) and asynchronous (written discussions). Research (Benyamin, P. I., Sinaga, U. P., & Gracia, 2021) shows that online learning that involves interactive activities, such as quizzes using Kahoot or video-based simulations, is able to increase student motivation and participation by up to 20% compared to monotonous lecture methods. This indicates the need for innovation in teaching methods so that students are not only physically present but also mentally.

Building on this, a study by (Osman, 2022) found that combining synchronous and asynchronous learning significantly enhances student engagement and satisfaction. The research, which surveyed 163 students, demonstrated a strong positive relationship between KSAs (Knowledge, Skills, Attitudes), interaction, and student engagement in online learning environments (Osman, 2022). Meanwhile, (Hariono, E. A. D., & Yoenanto, 2024) found that both perceived social support and teacher behavior serve as strong predictors of student engagement in online learning, highlighting the critical role of emotional and relational factors in sustaining active participation.

In addition, Islamic Religious Education learning has unique characteristics that demand emotional closeness between students and lecturers, especially in the discussion of religious values. Without adequate interaction, learning tends to be one-way and loses its dialogical essence. Therefore, technology must be used to create an inclusive discussion space, for example with an anonymous question submission feature that allows students to be more open.

(Ziaurrahman, Z., & Surjono, 2017) states that adaptive e-learning for Grade X PAI in secondary schools is able to tailor material to students' learning needs, making the learning process more personal and contextual. This approach not only strengthens interaction, but also increases the comfort and relevance of the material for students who have different learning styles however, it does not specifically highlight the emotional aspect of two-way interaction.

The Effectiveness of Technology in Learning

The effectiveness of technology is assessed using surveys on platforms such as Google Meet, LMS SIAKAD, and WhatsApp Group. The data was processed by correlation analysis between technology use and student engagement.

The results of the correlation between technology use and student involvement showed a positive and strong relationship with r=0.85r = 0.85r=0.85. This indicates that the more optimal the use of technology, the higher the student involvement. Platforms such as Google Meet and SIAKAD LMS have proven to be very effective in supporting learning. SIAKAD's LMS, for example, provides assignment collection features, discussion forums, and evaluations that make it easier for lecturers to monitor student progress.

However, technical obstacles such as Internet connection remain a major challenge. According to (Siregar, 2020), 60% of students reported network disruptions when participating in online learning, especially in rural areas. This obstacle requires strategic solutions, such as the provision of internet quota subsidies or the development of network infrastructure in areas with low connectivity.

Research by (Hendestri S, Cynthia A.T, Naila S, Nayla H, 2024) confirms that although students are able to adapt to online learning systems, "technical issues such as unstable internet connections" remain a major obstacle to optimal understanding of the material. However, the use of active strategies such as group discussions via WhatsApp or Telegram has been shown to help students understand online lecture material while maintaining the continuity of the independent learning process.

Furthermore, in a study conducted by (Suhada, D. I. ., Delviga, D., Agustina, L. ., Siregar, R. S. ., & Mahidin, 2022), it was found that limited internet access in the village of Talun Kondot, Simalungun Regency, made it difficult for students to participate effectively in online learning. To overcome this, the local village government provided free Wi-Fi facilities and contacted operators to improve network stability as a short-term solution.

Supporting Factors and Obstacles

Supporting factors is availability of digital platforms, use of platforms such as Google Meet and LMS SIAKAD Support flexibility and accessibility of learning (Wahid, 2020). Student motivation, students are motivated by the flexibility of time and place provided by online learning.

Obstacles is internet connection, 60% of respondents reported network constraints as the main obstacle (Siregar, 2020). Access to technology, 40% of students do not have adequate devices, such as laptops or high-performance smartphones. While technology offers many advantages, the main challenge lies in the technical and non-technical aspects. Technically, the problem of inadequate internet connection and devices is still a major barrier for some students. Non-technically, challenges include Lack of Lecturer Skills in Utilizing Technology and Lack of student discipline in independent learning. (Wahid, 2020) noted that online learning requires a higher level of learning independence than face-to-face learning, so students who are not used to learning independently tend to experience a decrease in motivation.

(Silvia, F., Thaitami, S. H., Rahmiati, R., & Saputra, 2024) through a literature review in the Tambusai Education Journal showed that the effectiveness of online learning in Research Methodology courses is influenced by structured and interactive learning designs when supported by adequate

internet connections and adequate devices, resulting in improved learning outcomes. Conversely, unstable connections, limited devices, and a lack of technical skills among lecturers are significant obstacles to the effectiveness of online learning (Silvia, F., Thaitami, S. H., Rahmiati, R., & Saputra, 2024).

Also, research by (Haris, L. A., & Setiana, 2024) shows that online learning can lead to a decline in discipline, understanding of material, and student learning outcomes. The main obstacles include expensive internet data plans and other technical issues. Important support includes having digital devices, network access, the right learning media, good learning strategies, and parental support. Without this support, the effectiveness of online learning is limited (Damanik, H. V., Suhendro, D. D., & Yunus, 2025).

Model Implications and Innovations

Based on these findings, the innovation of technology-based learning models is proposed with the following steps, integration of digital interaction. Using interactive tools such as Kahoot for learning evaluation (Nugraha, A., Santoso, R., & Putra, 2018). Lecturer training, providing intensive training on the optimal use of technology (Iskandar, 2020). With the innovation of the right technology-based learning model, distance learning in the PAI STAI Al-Falah Study Program can be an effective solution to increase student engagement. However, the success of this implementation requires synergy between lecturers, students, and institutions.

In addition, research on increasing student engagement in higher education in Malaysia, stating that the integration of digital platforms such as Learning Management Systems (LMS), instructional videos, and project-based learning that combines online and face-to-face learning was found to significantly increase student participation in discussions and assignments (Ahmed, N, H., Andersion, J., & Martínez, 2024). Importantly, this study emphasizes the critical role of ongoing training for faculty and ensuring that all students have equal access to technological resources to realize the full potential of blended learning initiatives.

4. CONCLUSION

This article examines the innovation of technology-based learning models in increasing student involvement in distance learning, especially in the Islamic Religious Education Study Program STAI Al-Falah Cicalengka. From the results of the study, it is known that technology-based learning is proven to be able to increase student engagement by providing more flexible access, supporting the independent learning process, and creating a more interactive learning experience. The level of student involvement reached an average of 82.4%, which reflects the success of the application of technology in supporting learning amid face-to-face limitations.

This research also produced the discovery that interaction between students and lecturers is still a major challenge. Factors such as the limited skills of lecturers in utilizing interactive features, the lack of a stable internet connection, and the lack of student discipline in independent learning affect the quality of online learning. Nonetheless, various learning applications make a significant contribution to facilitating communication and learning management.

The application of technology presents new opportunities to deliver relevant and interesting teaching materials for the digital generation, including in the PAI study program. Interactive media, such as application-based simulations and learning videos, not only help students understand religious concepts theoretically but also practice them virtually. This shows that technology can be a bridge to overcome traditional learning challenges, especially in the context of PAI which requires a dialogical approach and emotional closeness.

This study provides several important recommendations. For lecturers, it is necessary to take part in various kinds of training in the context of using technology to optimize the potential of online learning. For students, strengthening independent learning skills by utilizing technology is the key to the success of distance learning. For institutions, the development of technological infrastructure, including internet subsidies and the provision of digital devices, can support the success and sustainability of online learning.

Overall, the innovation of technology-based learning models not only answers the challenges of distance learning but also opens up new opportunities for a more inclusive and future-oriented transformation of education. With collaborative support from all related parties, technology-based learning can continue to develop and become an effective solution in facing the dynamics of the modern education world.

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