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Application of Technology-Based IRE Learning Methods to Increase Student Learning Motivation

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ABSTRACT
This study analyzes the implementation of technology-based Islamic Religious Education (IRE) and its specific impact on student learning motivation at Al Ihsan Berau Junior High School. Employing a qualitative descriptive approach with data from observations, interviews, and documentation, this research moves beyond descriptive narratives to examine the mechanisms of student engagement. The findings reveal that technology enhances motivation through a dual-pathway mechanism: (1) the cognitive pathway, where multimedia design (following CTML principles) reduces cognitive load and sharpens focus; and (2) the emotional pathway, where interactive features satisfy students' psychological needs for competence and autonomy (aligning with Self-Determination Theory). Critically, however, the study finds that while digital engagement significantly boosts intrinsic motivation and cognitive understanding, it is less effective in internalizing religious values without teacher-led mentorship. Theoretically, this research contributes a conceptual framework integrating CTML and SDT within the context of Islamic education. Practically, it offers an inclusive "offline-first" strategy to mitigate digital divide challenges in suburban schools, ensuring that technological adoption enhances motivation equitably without compromising the depth of moral education.

INTRODUCTION

Islamic Religious Education (IRE) is an integral part of the national education system which has a strategic role in shaping the character and morals of students. In the Indonesian context, IRE not only functions as a transmission of religious values, but also as an instrument for the formation of a whole human being who has faith, piety, noble character, and is able to integrate Islamic values in daily life (Zulham Luthfi Tambunan et al., 2025). This is in line with the goals of national education as stated in Law Number 20 of 2003 concerning the National Education System, namely "developing the potential of students to become human beings who believe and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens".

Student motivation for Islamic Religious Education (IRE) subjects in active participation attendance is low when the lecture method is dominant, concentration decreases, and IRE learning outcomes are not optimal. This condition is in line with research findings that show that traditional

methods without media variations tend to reduce students' interest and involvement in religious materials (Febrina, 2025). Thus, the reality of IRE learning in various educational institutions, both at the elementary, secondary, and tertiary levels, still faces a number of challenges. The common phenomenon found is the low interest and motivation of students to learn religious lessons, which are often perceived as memorized, normative, and monotonous subjects. The results of research by the Center for Education and Culture Policy Research (2023) show that around 42% of secondary school students find religious lessons less interesting because of the teacher's delivery method which is still dominant in lectures and minimal interaction.

So far, most of the IRE learning process still uses traditional approaches, such as lectures and memorization. These models tend to be teacher-centered, where the teacher is the main source of information, while the student plays a passive role as the receiver. According to (Arifin, 2025), such a model is less able to foster students' critical power, creativity, and emotional involvement in understanding religious values. As a result, many students understand Islamic teachings cognitively, but have not been able to internalize their values in real actions and behaviors.

Nevertheless, most previous research has concentrated on aspects of students' visual experiences and increased motivation. There hasn't been much research focused on technology-based learning, which includes the ability to think critically, consider values, and apply those ideas to real-world situations. However, these skills are essential for learning technology so that students are not only proficient in using digital media but also can understand the moral, social, and spiritual values contained in Islamic religious education materials. Because of these limitations, research requires technology-based IRE innovations combined with deep learning approaches to improve students' learning motivation and significant understanding for sustained learning encouragement (Abdussyukur & Zulfah, 2025)

The development of information and communication technology has changed the pattern of social interaction and the way of obtaining information, including for junior high school students. Access to digital media (videos, apps, learning platforms) makes expectations for more interactive and contextual learning methods increase. A number of studies state that the integration of technology in learning is able to create a more dynamic and interesting learning atmosphere for today's digital generation (Zahrah et al., 2025)

To increase student motivation, understanding, and engagement and create a better learning atmosphere, IRE Teachers must now master digital. They must also be able to combine conventional learning methods and media with modern ones. (Akhyar et al., 2024). Islamic teaching methods that are based on technology help create a more interactive, dynamic, and accessible learning environment. This method also makes the material more interesting for students. Islamic education naturally aims to adapt to the challenges of the ever-evolving times by accepting change, progress, modernity, and positive thought innovations. Learning Islamic religion using technologies such as media, online platforms, social media, and specialized learning apps is a great way to incorporate these ideas into educational practices. (Martin & Simanjorang, 2022).

The integration of digital media in education has become a global imperative. Various empirical studies confirm that educational applications, interactive videos, and e-learning platforms significantly enhance student engagement when aligned with pedagogical objectives (Leuwol et al., 2023). However, a significant disparity remains in the implementation of these technologies within

Islamic Religious Education (IRE). In practice, IRE instruction is frequently confronted with the challenge of "pedagogical lag," where traditional, lecture-heavy methods fail to resonate with digital-native students. As noted by Melvi et al. (2024), this disconnect results in passivity and low motivation, creating a barrier to understanding complex religious concepts.

While the potential of digital media to visualize abstract concepts such as the history of the Prophet through animated simulations is well-documented (Aziz et al., 2019), existing literature has largely focused on the adoption of tools rather than the psychological mechanisms of motivation in religious contexts. This highlights a critical research gap: most prior studies discuss the general benefits of technology in urban settings, yet there is a scarcity of empirical research exploring how technology-based interventions specifically influence the internalization of Islamic values in suburban or semi-urban schools, where digital aspirations often clash with infrastructural realities. Furthermore, the specific intersection between innovation in IRE methods focusing on active engagement and autonomy(Nur'aini et al., 2024) and its actual impact on student morale requires deeper contextual investigation.

Addressing this gap, this study focuses on Al Ihsan Berau Junior High School as a strategic case study to examine the "black box" of technology implementation. Unlike previous generalist studies, this research aims to explicitly describe how technology-based IRE methods are operationalized and to critically measure their extent in shifting students from passive listeners to active learners. Additionally, it investigates the supporting and hindering factors, offering practical implications for educators navigating the digital transition in religious education. Therefore, the application of technology-based IRE learning methods can increase students' desire to learn through increased interactivity, active engagement, and relevance of the material to their lives. This study explains how IRE teachers use technology at Al Ihsan Berau Junior High School, and how the use of technology has an impact on students' enthusiasm and participation in the learning process.

METHODS

This study uses a descriptive qualitative approach because it aims to describe in depth the process of implementing technology-based IRE learning and its influence on students' learning motivation. According to (Moleong, 2017), qualitative research is appropriately used to understand educational phenomena from the perspective of the research subject 1. Research Design This research focuses on field research by observing learning practices directly at Al Ihsan Berau 2 Junior High School. Subjects and Informants The subjects of the study are IRE teachers and students of Al Ihsan Berau Junior High School. Informants were selected using the purposive sampling technique, namely those who were considered able to provide relevant information related to the use of technology in learning (Sugiyono, 2021) 3. The main research instrument is the researcher himself who acts as a data collector, processor, and analyst. To support the validity of the data, observation guidelines, interview guidelines, and supporting documents are used 4. Data Collection Techniques Data is obtained through: Observation, to see firsthand the implementation of technology-based learning, Interviews, to explore the experiences of teachers and students related to learning motivation and Documentation, in the form of notes, photos, and archives of learning activities. Data Analysis Techniques Analysis is carried out with a model (Miles et al., 2014). which includes three stages:

data reduction, data presentation, and conclusion drawn/verification. This analysis takes place simultaneously from the time the data is collected to the final interpretation.

RESULTS AND DISCUSSION

Based on the results of interviews, Observation and Documentation with Islamic Religious Education (IRE) teachers at Al Ihsan Berau Junior High School, it is known that IRE learning in this school is carried out with reference to the Independent Curriculum which emphasizes the formation of Pancasila student profiles. IRE teachers emphasized that the main purpose of learning is not just to transfer religious knowledge, but to form high morals and motivation to learn through understanding the values of monotheism Data analysis uses a thematic approach. From the analysis, six major themes emerged that describe the implementation, impacts, and obstacles to the implementation of technology-based IRE at the study site: (1) increased attention and appeal; (2) active involvement of students through interactivity; (3) strengthening cognitive understanding; (4) limitations on the internalization of values/norms; (5) infrastructure barriers and access inequality; (6) the variation of teacher competencies and the role of school management. Below is a complete description of each theme with participant quotes, documentary evidence, and situational descriptions.

Increased Attention And Learning Appeal

Preliminary classroom observations in grades VIII and IX at SMP Al Ihsan Berau revealed a learning environment that was predominantly one-directional prior to the intensive implementation of technology. During conventional lecture methods, the majority of students appeared passive, with several students in the back rows exhibiting signs of disengagement, such as drowsiness or doodling in their notebooks. Participation rates during oral Q&A sessions were negligible, with only the same two or three students consistently raising their hands. However, the situation shifted drastically when teachers began integrating application-based interactive quizzes (such as Quizizz and Kahoot) midway through the sessions. Field observations recorded a distinct change in the classroom atmosphere; students who were previously silent began to sit upright, handle their devices with enthusiasm, and actively discuss the correct answers with their peers.

In-depth interview data with several ninth-grade students confirmed that the “competition” and “instant scoring” features were the primary triggers for their motivation. One student stated, “If I just listen to lectures, I often get sleepy, but with quizzes on the screen, I have to pay attention to the material so I can get into the top 5 on the scoreboard.”This statement was corroborated by interviews with other students who claimed to feel more confident answering questions via the app because they did not have to feel embarrassed if they answered incorrectly, unlike when answering orally in front of the class. The anonymity feature or the use of pseudonyms in the quizzes provided a psychological safe space for introverted students to participate actively.

Furthermore, documentation studies of student activity logs in the school's Learning Management System (LMS) showed a surge in material access. Prior to the use of interactive quizzes, the average student downloaded text materials only once with no further interaction. After quizzes were implemented as a prerequisite, data showed students accessing video materials and summaries an average of 3-4 times before class hours began. This indicates that interactive technology not only

enlivened the classroom atmosphere but also encouraged pre-class independent learning behavior, as students wanted to prepare themselves for the challenges of the quiz.

However, teacher observations also noted nuances regarding the quality of participation. When interactivity was purely gamified without reflection pauses, students tended to rush and answer arbitrarily for the sake of speed points. IRE teachers then modified the strategy by conducting brief debriefings every time a quiz session ended. In an interview, a teacher explained, "Technology wakes them up, but my role is to put the brakes on for a moment to ensure they understand why the answer is A, not B." It was this combination of technological speed and teacher guidance that ultimately created meaningful active engagement, rather than mere classroom noise. Overall, data triangulation from observations, interviews, and documentation confirms that interactive technology successfully broke the ice in SMP Al Ihsan classrooms, transforming IRE from a subject perceived as rote memorization into an engaging challenge.

Strengthening Cognitive Understanding through Structured Multimedia

The implementation of multimedia in IRE learning at SMP Al Ihsan exerted a significant impact on students' cognitive capabilities, particularly concerning abstract or historical subject matter, such as Islamic Cultural History (SKI) and the Fiqh of Hajj. Based on observations in grade VII, when Hajj material was delivered solely using textbooks, students struggled to visualize the sequence of Hajj rituals. However, when the teacher displayed a 3D animated simulation video regarding Tawaf and Sa'i, student attention was fully locked on the screen. They were able to view visualizations of the Kaaba and the pilgrimage route, rendering abstract concepts concrete.

Documentation studies of students' daily assessment results showed a consistent upward trend in grades. For materials taught using video media and digital infographics, the class average increased by 15-20% compared to materials taught solely using lecture and whiteboard methods. Analysis of student essay answer sheets also showed a change in answer quality. Previously, student answers tended to be verbatim textual copies from textbooks. Following the use of multimedia, student answers became more descriptive and utilized their own language, indicating a deeper conceptual understanding rather than short-term rote memorization.

Interviews with grade VIII IRE teachers reinforced these findings. One teacher revealed, "Previously, it was extremely difficult to explain concepts like Shariah banking or inheritance laws verbally. The children were confused imagining it. With animated case study videos, they understand the logic, not just memorize the arguments." The teacher added that multimedia helped accommodate diverse student learning styles, particularly visual and auditory types that were previously underserved by conventional lecture methods. Multimedia acted as a cognitive bridge connecting textual scripture with visual realities understood by students.

Furthermore, observational data showed that multimedia triggered higher-quality discussions. After watching a documentary on Islamic history, the questions students asked were no longer merely "What year did it happen?" but "Why was that war strategy chosen?" or "What was the impact on society at that time?". This shift in questioning levels from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) serves as valid evidence that visual technology helps free up students' working memory capacity, allowing them to use their brains for critical thinking rather than

struggling to imagine the situation. However, task documentation also provided an important note: not all multimedia is effective; videos exceeding 15 minutes tended to make students passive again. Data showed the optimal duration for learning videos to maintain retention among SMP Al Ihsan students ranged between 5 to 7 minutes.

The Discrepancy Between Learning Motivation and the Internalization of Moral Values

One of the most critical findings in the research at SMP Al Ihsan Berau is the gap between high in-class motivation and the practice of worship in daily life. Based on observations of student behavior during the noon congregational prayer at school, it was evident that although students were very enthusiastic during technology-based IRE lessons in the classroom, their discipline in proceeding to the mosque did not show a commensurate significant change. Many students still required prompting by picket teachers to immediately perform ablution (wudu), even though they had just learned the Chapter on Prayer using sophisticated and enjoyable media.

In-depth interviews with several parents revealed deeper facts. A guardian stated, "My child is indeed very happy if there is a task to make an Islamic TikTok video or a quiz on their phone; they are spirited in doing it. But if asked to pray Maghrib or read the Quran without the phone, it is incredibly difficult." This data indicates that technology succeeded in building "interest in content" but has not fully succeeded in building "religious consciousness." The motivation built tends to be extrinsic because the media is fun rather than intrinsic due to spiritual awareness.

Documentation of student daily worship monitoring logs (mutabaah) showed fluctuating data. In weeks where teachers assigned tasks to post worship activities on social media, the graph of worship execution rose sharply. However, in the following weeks when there were no digital assignments, the graph declined again. This indicates that student worship behavior is still heavily dependent on rewards or digital assignments and has not yet become an inherent habit or character. Technology appears to act as a "supplement" that boosts momentary spirit, but has not yet become the "nutrition" that forms the backbone of character.

In an interview session with the School Principal, this limitation was acknowledged. "Applications and videos are tools for knowledge transfer, but the transfer of feeling (dzauq) and morals requires a human touch," he remarked. He emphasized that technology cannot replace direct exemplary behavior (uswah hasanah) and the eye contact of a teacher transferring values of humility. Students at SMP Al Ihsan require real figures, not just avatars or animated characters, to exemplify how Islamic etiquette and behavior are applied in real social interactions. Consequently, the findings conclude that while technology is highly effective as an initial motivator and cognitive reinforcer, it remains weak in the function of value internalization if it stands alone.

Infrastructural Barriers: The Digital Divide in Implementation

The implementation of technology at SMP Al Ihsan Berau is inextricably linked to the realities of regional infrastructure. Based on physical facility observations, the school possesses a relatively adequate computer laboratory and Wi-Fi network within the school area. During learning sessions inside the school environment, technical issues are relatively minimal. However, major problems

arise when learning employs a "blended learning" model requiring students to access materials from home. Distribution data of student residences shows that approximately 30-40% of students live in suburban areas of Berau where cellular signal quality is unstable.

Interviews with students from lower-middle economic backgrounds revealed constraints regarding device ownership. "I use a cellphone taking turns with my father. If my father is working and takes it with him, I can only open assignments at night. Sometimes the data quota also runs out," revealed a grade VII student. This causes access disparity. Documentation of digital assignment submissions showed a clear pattern: students with complete facilities at home tended to submit assignments on time with good visual quality, while students with limited access were often late or sent assignments in very simple formats due to device specification limitations.

Observations of class WhatsApp groups showed recurring complaints from parents regarding high data quota consumption for video conferencing or video streaming applications. Responding to this, IRE teachers at SMP Al Ihsan were forced to adjust their strategies. Lesson plan (RPP) data showed a shift in methods from mandating synchronous sessions (Zoom/Google Meet) to asynchronous ones (PDF files or low-resolution downloadable videos) . Teachers realized that enforcing high technology would discriminate against students who were infrastructure-disadvantaged.

Additionally, field observations found situational technical disruptions with major impacts, such as rolling blackouts that shut down the school's internet network. During such moments, technology-based learning was totally paralyzed. Teacher journal documentation noted several instances where teachers had to abruptly revert to total lecture methods because the school exam server was down or electricity was out. This demonstrates that full reliance on technology carries high operational vulnerability risks in areas with imperfect infrastructure. The "Offline-First" strategy became a tactical solution adopted by the school, where students are allowed to download all materials while in the school Wi-Fi zone to study offline at home.

Variations in Teacher Competence and School Management Support

The success of IRE technology application at SMP Al Ihsan is heavily influenced by the human factor: teacher competence. Participatory observation in the teacher's room showed a significant digital skills gap between junior and senior teachers. Younger teachers (under 35) appeared very agile in using video editing applications (such as CapCut or Canva) and managing classes on Google Classroom. Conversely, senior teachers often appeared to struggle even with basic technical matters, such as connecting laptops to projectors or troubleshooting audio issues.

Interviews with a senior teacher revealed psychological barriers. "I want to learn, but it feels very slow. I get taught today, and by tomorrow I've forgotten. Sometimes I'm afraid of pressing the wrong button and losing the data," they said. This impacted the quality of learning in the classroom. Based on class supervision observations, classes taught by senior teachers tended to merely transfer textbook text to text-heavy PowerPoint slides without interactive elements. Consequently, the motivational impact of technology in those classes was not as strong as in classes taught by digitally literate teachers.

School program documentation showed that the management had actually recognized this by conducting In-House Training (IHT) at the beginning of the semester. However, interviews with participating teachers revealed that such training was often "merely a formality" and lacked continuity. Enthusiasm for applying new apps usually lasted only 1-2 weeks post-training, then faded because there was no technical assistance when teachers encountered problems in the field. Without a real-time support system, teachers tended to revert to the comfort zone of old methods deemed safer and more controllable.

Responding to this data, school management began changing its approach. Recent observations showed a "peer-coaching" initiative, where a young teacher is IREred with a senior teacher to assist in digital material preparation. Interview data with senior teachers indicated positive responses to this model because they felt more comfortable asking colleagues than outside instructors. Furthermore, the School Activity and Budget Plan (RAPBS) documentation showed an increased allocation of funds for Wi-Fi maintenance and premium learning app subscriptions. These findings conclude that teacher competence cannot grow naturally through instruction alone but requires a supportive ecosystem: ranging from continuous training and peer coaching to pro-technology budget policies.

Discussion

The discussion below compares the field findings with relevant theories and previous research results, explains the mechanisms of how technology-based IRE affects students' learning motivation, analyzes limitations, and formulates theoretical implications and practical recommendations for Al Ihsan Berau Junior High School and similar schools.

The Mechanism Of The Influence Of Technology On Learning Motivation

The results of this study show two main pathways through which technology influences learning motivation: (a) the cognitive pathway of multimedia media designed following cognitive principles facilitates information processing so as to increase attention and understanding; (b) the motivational-emotional pathway of interactive features (quizzes, instant feedback, discussions) meets basic psychological needs such as competence, autonomy, and connectedness described by Self-Determination Theory (SDT), thereby increasing intrinsic motivation (Arif, 2023, 2024).

The Cognitive Theory of Multimedia Learning (CTML) states that structured combinations of words and images help minimize unnecessary cognitive burdens and maximize the formation of knowledge schemas; findings of increased attention and improved cognitive comprehension at Al Ihsan Junior High School support this reading (see also Mayer, CTML's classic source) (Arif, 2025; Mayer, 2020; Yusniar et al., 2024). Meanwhile, SDT explained that a learning environment that facilitates a feeling of competence (through feedback), provides autonomy, and provides interaction space (relatedness) will foster intrinsic motivation. The implementation of interactive quizzes and forums provides quick feedback and activity options (e.g., repeating material, choosing a topic), so that students report increased motivation to participate and learn further. This statement is in line with the study of SDT that is relevant to education (Najah, 2024; Ryan & Deci, 2000) Therefore, the combination of CTML + SDT forms a strong theoretical framework: a good multimedia design enhances cognitive engagement, while interactive elements modulate motivational factors. Both

mechanisms are evident in the field data: videos help "clarify" concepts, quizzes and feedback build confidence (Maarif, 2016).

The Limitations Of Internalizing The Value Of Technology As A Tool, Not A Substitute For Moral Experience

Technology in learning functions very effectively as a tool for imparting knowledge and cognitive stimulation, but it is difficult to replicate embodied moral experiences such as teachers' examples, collective ritual practices, and personal mentoring that are key to the formation of religious habits (Mithhar et al., 2021; Utama & Sunu, 2022). Literature reviews and field studies emphasize that the internalization of values requires practical repetition, affective experience, as well as interpersonal feedback of elements that are difficult to completely replace by videos, quizzes, or asynchronous modules even though technology helps expand access (Khairina et al., 2022; Muhammad et al., 2023).

Although technology reinforces understanding and triggers intentions, changes in religious behavior and the internalization of values do not always follow automatically. The results of observations and interviews show that students can answer correctly on quizzes and discuss reflectively, but behavioral change in the home/community environment requires a process of habituation, direct guidance, and example. This is in line with the literature that emphasizes that religious values should be built through social experiences, habituation, and mentoring digital media helps but is not enough. Therefore, the design of technology-based IRE programs must integrate applicative tasks (project-based learning, practice journals, service activities) that force students to apply values in real life (Halim & Hidayat, 2025; Kullah et al., 2025).

Inequality Of Access As A Problem Of Digital Education Justice (Add)

The digital divide includes network availability, device ownership, and quota fees, making learning opportunities dependent on family location and economic conditions. Students in urban areas tend to enjoy streaming services and LMS, while students in remote areas often only get print materials or limited access to school labs; This condition turns learning opportunities into unequal and deepens educational injustices (Akhyar et al., 2024; Jesica Dwi Rahmayanti & Muhamad Arif, 2021; Pierce & Id, 2024). Overcoming this inequality requires a multi-level approach: infrastructure investment (equitable broadband access), device lending or subsidy programs, as well as digital literacy training for students and teachers plus school policies that implement a hybrid/offline-first model so as not to leave students constrained. Policy literature and field studies recommend collaboration between governments, operators, schools, and local communities to ensure technology enriches rather than widens educational inequalities (Aranda, 2024).

The findings of access inequality (devices and connections) underscore the potential impact of technology on education disparities. When learning relies heavily on online access, students without devices or stable connections are left behind. At Al Ihsan Junior High School, the adaptive solutions implemented include providing downloadable materials (offline), school lab usage schedules, and

device borrowing schemes. Such steps are in line with the recommendations of e-learning implementation studies in the Indonesian context that emphasize a hybrid and offline-first approach for contexts with limited infrastructure. Institutional policies (management support) are the key to mitigating inequality.

The Role Of Teachers From Teachers To Digital Learning Designers

The role of teachers now goes beyond the delivery of their material to learning designers Designing a learning experience that combines pedagogical goals, digital media, and meaningful learning activities. As designers, teachers select and organize materials (videos, quizzes, project assignments), organize learning flows, and create feedback points so that technology truly supports learning, not just decoration. This concept is strengthened in the study of policies and practices that place teachers as designers of innovative learning environments (Fauzi et al., 2025; Paniagua & Istance, 2018). As a digital learning designer, teachers need a combination of technical competence to create/edit material, pedagogical competence to link media to learning objectives (e.g. segmentation, signaling), and reflective ability to assess the impact of their design on student engagement. Systematic research on teachers' digital competencies emphasizes that the ability to select contextual resources and design instructional activities is far more important than just operational skills. Investments in practical professional development (coaching, micro-courses) have proven to be effective in enhancing these capabilities (Domínguez-González et al., 2025; Supriandi et al., 2024; Zainuddin, 2024)

Thematic analysis highlights the importance of teacher capacity: teachers who receive training and support are able to design pedagogical multimedia materials, utilize LMSs, and design adequate formative assessments. In contrast, teachers without training tend to use static materials that are less motivating. Therefore, the professional development of teachers (pedagogical video making workshops, diagnostic quiz design, formative assessment strategies) is a major investment. R&D studies and other case studies have also found that teacher competence is a key determinant of the success of educational technology in schools (Anwar, 2023; Bahruddin et al., 2022)

Synergy Of School Management And Policies For Sustainability

Visionary school leadership and clear institutional policies are prerequisites for making digital initiatives not just a one-way project, but part of everyday school practice. Management that sets strategic goals, sustainable budget allocation, and maintenance and evaluation mechanisms ensure that teachers' devices, platforms, and capacities are maintained so that learning impacts can continue (Sana & Yan, 2022; Ye et al., 2024). Real synergy occurs when school policies are combined with capacity building (practical training for teachers), transparent data governance, and collaboration with external stakeholders (local governments, telecommunication operators, school committees). This management model strengthens accountability and allows for evidence-based policy adaptation—e.g. Shift strategies if access or effectiveness of digital materials prove to be uneven (Manaf, 2024; Sofyannuddin et al., 2025). The sustainability of technology-based learning initiatives requires school policies: budgets for infrastructure maintenance, facility utilization schedules, teacher learning

incentives, and evaluation monitoring. Al Ihsan Junior High School, which has management support, has been more successful in maintaining the use of technology. This emphasizes that technology must be accompanied by an institutional plan, not just a short-term pilot program.

Impact On Motivation Of Qualitative Evidence And Indications

Qualitatively, the evidence shows an increase in aspects related to motivation: attention, behavioral engagement, perceived competence. Students report a sense of pleasure and are more motivated to take part in quiz sessions and discussions. Teachers saw an increase in the frequency of participation. However, for causality claims and measurements of the magnitude of motivational changes (e.g., pre-post motivation scores), quantitative triangulation (standardized motivation scales, statistical analysis) is required. Quasi-experimental studies in the context of IRE that found positive effects on learning outcomes support these findings but also emphasize the variability of effects on long-term motivation (Aboud et al., 2012; Desrianti et al., 2021; Rifaldi et al., 2024).

IRE learning that integrates digital media produces the signs of increased motivation seen in qualitative data: students become more enthusiastic, actively ask questions, and are willing to participate in discussions after short video sessions or interactive quizzes. Teacher and student interviews often report behavioral changes such as increased self-learning initiatives and frequency of material rechecking indicators that are in line with the findings of field studies on the effects of multimedia and e-learning on attention and engagement (Arif et al., 2023; Rafli1 et al., 2024).

However, qualitative findings also indicate limitations: the effect on motivation tends to be short-term if not followed by pedagogical follow-up (reflection, applicative tasks, habituation of values); and the benefits are uneven due to access inequality. Therefore, qualitative evidence recommends learning cycle design (video + quiz + applicative assignment + mentoring) and longitudinal evaluation to ensure that motivation increase is stable and inclusive. Qualitative studies in the context of Islamic education support this kind of governance recommendation (Rahman et al., 2023; Riyadi & Sudiyatno, 2023).

Recommendations For The Design Of Technology-Based Ire Programs (Based On Findings And Literature)

Based on the study's results and discussion, several practical recommendations are proposed for Al Ihsan Berau Junior High School and similar institutions to optimize technology-based IRE learning. First, regarding instructional design, teachers should strictly adhere to Cognitive Theory of Multimedia Learning (CTML) principles to maximize engagement. This involves creating short, segmented videos (3–7 minutes) that utilize dual-channel processing combining narrative and visuals along with clear signaling to enhance cognitive comprehension and attention (Mayer, 2020). To further support student competence, learning sessions must integrate interactivity through formative quizzes, real-time polls, and reflective assignments that provide immediate feedback. Incorporating anonymity options in these interactive tools is also recommended to effectively boost participation among shy students (Bahruddin et al., 2022).

Second, to bridge the gap between cognitive understanding and spiritual behavior, schools must implement applicative strategies for value internalization. Educators should assign small projects or practice journals that compel students to apply IRE values within their family or community contexts, complemented by structured reflection sessions (Kullah et al., 2025). Simultaneously, to ensure equity amidst infrastructure challenges, an access-inclusive strategy is mandatory. Schools should provide offline learning alternatives such as low-bandwidth files or USB distribution and organize computer lab schedules or device borrowing schemes to ensure that students facing connectivity issues remain fully served and not marginalized.

Finally, the sustainability of digital adoption relies heavily on institutional support systems. Continuous teacher professional development is essential, focusing on practical skills such as pedagogical video creation, diagnostic quiz design, and LMS management. This capacity building must be underpinned by robust management and monitoring policies, including the establishment of technology coordination units, dedicated maintenance budgets, and clear evaluation indicators spanning motivation, participation, and value internalization that are subject to periodic review to ensure long-term effectiveness .

CONCLUSION

This study concludes that the application of technology-based IRE learning methods at Al Ihsan Berau Junior High School significantly enhances students' attention, engagement, and cognitive understanding. The findings confirm that technology operates through two primary mechanisms: the optimization of cognitive processing via multimedia (validating the Cognitive Theory of Multimedia Learning/CTML) and the amplification of intrinsic motivation through interactive feedback (aligning with Self-Determination Theory/SDT). However, a critical caveat remains: while technology successfully boosts “interest in content,” the internalization of religious values does not automatically follow without direct human mentorship.

Theoretical and Practical Contributions Theoretically, this research contributes to the literature by highlighting the limits of digital determinism in religious education. It suggests a modified framework where CTML and SDT must be integrated with Tarbiyah Ruhiyah (spiritual mentorship) to be effective in Islamic contexts. Practically, the study offers an “Offline-First” strategy as a vital contribution for suburban schools, demonstrating that inclusive access (via downloadable materials) is more critical for equitable motivation than high-tech synchronous features that may alienate economically disadvantaged students.

Pedagogical and Policy Implications The implications for pedagogy are clear: teachers must evolve from mere technology users to “learning designers” who blend digital engagement with offline character building. Schools should adopt a “Hybrid Character Building” model using apps for cognitive transfer and face-to-face sessions for moral habituation. At the policy level, school management must prioritize continuous professional development focused on TPACK (Technological Pedagogical Content Knowledge) rather than one-off technical training, alongside budget allocations for digital infrastructure maintenance to ensure sustainability. Future Research While this study provides a snapshot of motivation, future research should employ longitudinal designs to measure the long-term impact of digital IRE on students' religious behavior and character stability outside the school environment. Additionally, comparative studies between urban and rural

Islamic schools would be beneficial to further test the adaptability of the "Offline-First" strategy in diverse demographic contexts.

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