

Improving Student Engagement and Outcomes Through a Digital Project-Based Learning Model in Islamic Education

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Abstract

Conventional, teacher-centered instruction in Islamic education (PAI) remains a persistent barrier to student engagement and learning outcomes, particularly for abstract topics such as belief in the Prophets and Messengers of Allah, while research on digital learning models that integrate social media publication as an authentic assessment in PAI remains very limited. This study aimed to examine the effectiveness of a digital project-based learning (PjBL) model, in which Instagram served as the publication platform for an authentic assessment task and a vehicle for digital citizenship learning, in improving student engagement and learning outcomes in Islamic education at SMP Negeri 1 Ciwidey. The study employed Classroom Action Research across two cycles (31 students in Cycle I; 27 in Cycle II), with data collected through observation checklists, an essay-based online quiz, and a digital project assessment rubric, analyzed descriptively and quantitatively. Results showed significant improvement: average engagement rose from 59.17% (Cycle I) to 78.33% (Cycle II), and the proportion of students below the KKM dropped from 25.80% to 0%. These findings indicate that the Instagram-based digital PjBL model is not only academically effective but also provides an alternative instructional model for integrating digital literacy and Islamic character education.

Keywords: Project-Based Learning; Digital; Student; Junior High School; Islamic Education.

Abstrak

Pembelajaran Pendidikan Agama Islam (PAI) yang konvensional dan berpusat pada guru masih menjadi kendala utama rendahnya keaktifan dan hasil belajar murid, terutama pada materi yang bersifat abstrak seperti meyakini Nabi dan Rasul Allah, sementara penelitian tentang model pembelajaran digital yang mengintegrasikan publikasi media sosial sebagai asesmen autentik dalam PAI masih sangat terbatas. Penelitian ini bertujuan mengkaji efektivitas model pembelajaran berbasis proyek digital, dengan Instagram sebagai wahana publikasi proyek dan asesmen autentik sekaligus sarana pembelajaran digital citizenship, dalam meningkatkan

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keaktifan dan hasil belajar murid pada mata pelajaran PAI di SMP Negeri 1 Ciwidey. Penelitian menggunakan pendekatan Penelitian Tindakan Kelas dua siklus (31 siswa Siklus I; 27 siswa Siklus II), dengan data dikumpulkan melalui lembar observasi, kuis daring esai, dan rubrik penilaian proyek, dianalisis secara deskriptif kuantitatif. Hasil menunjukkan peningkatan signifikan: rerata keaktifan meningkat dari 59,17% (Siklus I) menjadi 78,33% (Siklus II), dan persentase siswa di bawah KKM turun dari 25,80% menjadi 0%. Temuan ini menunjukkan bahwa model PjBL digital berbasis Instagram tidak hanya efektif secara akademik, tetapi juga menawarkan model instruksional alternatif yang mengintegrasikan literasi digital dengan pendidikan karakter Islami.

Kata kunci : Pembelajaran Berbasis Proyek; Digital; Murid; Sekolah Menengah Pertama; Pendidikan Agama Islam.

I. Introduction

The 21st-century era has brought about fundamental transformations in the educational landscape, demanding that schools produce graduates equipped not only with academic knowledge but also with competencies such as critical thinking, creativity, communication, and collaboration, referred to as the 4C framework (Agustini et al., 2022; Herlinawati et al., 2024; Tian & Zheng, 2025). These competencies are regarded as indispensable for producing human resources capable of navigating an increasingly complex and digitally interconnected world (Martínez-Bravo et al., 2022). Indonesia's Merdeka Belajar curriculum aspires to cultivate independent, broad-minded learners whose thinking and collaborative skills are aligned with contemporary social and technological realities (Rosidin et al., 2025; Suharni et al., 2025). Among the subjects positioned at the forefront of this transformation is Islamic education, which carries the dual responsibility of developing students' academic understanding of Islamic teachings and nurturing their moral character in ways relevant to the demands of the digital era (Aldi, 2024; Sopian et al., 2025). Islamic education provides understanding of Islamic teachings and the values of goodness that students are expected to apply in their daily lives, making it uniquely positioned to integrate character formation with intellectually engaging instructional methods (Aeni et al., 2023).

Despite the aspirations embedded in this curriculum, a significant gap persists between ideal and actual classroom practice. Observations conducted at SMP Negeri 1 Ciwidey revealed that Islamic education instruction remained predominantly teacher-centered, relying heavily on conventional lecture-based methods that left students disengaged and passive. Students reported experiencing monotony, and lessons failed to connect Islamic content with their experiences as digital natives. This situation manifested in low rates of active student participation and suboptimal learning outcomes, particularly regarding the material on belief in the Prophets and Messengers of Allah.

This finding is consistent with broader scholarly evidence: conventional teaching models are insufficient to engage the current generation of learners, who are accustomed to interactive, technology-mediated experiences (Mili, 2025; Sayadi & Pangandaman, 2025). Learning outcomes, understood as the changes that occur in students in cognitive, affective, and psychomotor dimensions as a result of learning activities, are significantly shaped by the quality and relevance of instructional methods used (AlAfnan, 2025; Ekpenyong et al., 2023; Nikolic et al., 2026). The urgency of addressing this gap is therefore both pedagogical and ethical: Islamic education, as a character-building subject, requires not only cognitive transmission but also experiential, collaborative engagement that makes religious learning genuinely transformative.

Prior research on Project-Based Learning (PjBL) has consistently demonstrated its potential to overcome the limitations of conventional instruction. A comprehensive review of PjBL in higher education showed that the model produced significant improvements in student outcomes across a range of disciplines, particularly when students were engaged in authentic tasks with real-world relevance (Alsmadi et al., 2024). Child-centric PjBL environments supported by intelligent systems deepened conceptual understanding by giving students ownership over their learning (Zha et al., 2025). Integrating PjBL with technology-enriched approaches produced stronger student engagement and academic performance than traditional methods (Syamra & Suryadi, 2025). In Bloom's taxonomy, meaningful learning outcomes encompass knowledge, attitudes, and skills (Fauzi et al., 2025), all of which are more effectively cultivated through active, project-driven learning than through passive reception of teacher-transmitted content.

Within the Islamic education domain, the integration of digital media and technology-based approaches has begun to attract scholarly interest. Islamic education teachers in Madrasah Aliyah improved student motivation and creativity by incorporating digital strategies into their instruction (Wedi et al., 2025). Developing critical thinking and communication skills has become increasingly important in education, and these competencies are equally central to the Islamic education classroom (Ikhwan et al., 2025). Students taught through project-based methods achieved significantly higher academic performance compared to those taught through conventional experimental approaches (Pudjiarti et al., 2024). These findings converge on a consistent conclusion: innovative, technology-supported instructional models hold substantial promise for transforming Islamic education instruction. Compared to these prior studies, however, a critical gap remains, as summarized in Table 1.

Table 1. Summary of Prior Studies and Their Limitations Relative to This Study

Author (Year)	Method	Key Finding	Limitation Addressed by This Study
Zhang & Ma (2023)	Meta-analysis/ literature review	PjBL significantly improves academic achievement, thinking skills, and affective attitudes across disciplines	Evidence is generalized across disciplines; no study situates PjBL within Islamic education or uses social-media-based authentic publication
Syamra & Suryadi (2025)	Quasi-experimental e-learning environment	Technology-enriched PjBL produced stronger engagement and performance than traditional methods	Conducted in a general e-learning context, not in Islamic education or a CAR design responsive to classroom-specific conditions
Wedi et al. (2025)	Case study, Madrasah Aliyah	Digital strategies improved PAI teachers' capacity to motivate and stimulate student creativity	Focused on teacher-level strategy rather than a structured, cyclical student-centered PjBL intervention with measurable engagement data
Pudjiarti et al. (2024)	Quasi-experimental	Project-based methods produced significantly higher academic performance than conventional teaching	Did not examine digital/social-media-based publication as part of the project task or its role in authentic assessment
Ikhwan et al. (2025)	Curriculum-policy review	Critical thinking and communication competencies are central to Merdeka Belajar-aligned Islamic education	Conceptual/policy-level analysis; lacks classroom-level empirical evidence from an iterative CAR implementation

This study addresses these limitations by situating a digital, Instagram-mediated PjBL model within an authentic Islamic education classroom, evaluated iteratively through two Classroom Action Research cycles.

Beyond this empirical gap, two further gaps warrant attention. Methodologically, prior studies on PjBL and digital learning in Islamic education have relied predominantly on quasi-experimental or cross-sectional designs that capture a single snapshot of student performance, rather than the iterative, reflection-driven refinement that Classroom Action Research affords across successive cycles (Rabgay & Kidman, 2023). Theoretically, existing accounts of digital PjBL effectiveness have largely been framed around generic motivation or technology-acceptance constructs, without articulating the specific pedagogical mechanism through which a social media platform such as Instagram

translates into deeper engagement and learning outcomes within a values-laden subject such as Islamic education. This study addresses both gaps by combining an iterative CAR design with an explicit theoretical account of that mechanism.

This study directly addresses these gaps by implementing a digital PjBL model in which students collaboratively design and publish digital poster projects on Instagram as their culminating product for the topic of belief in the Prophets and Messengers of Allah. Rather than treating Instagram publication as a mere technological feature, this study conceptualizes it as a pedagogical mechanism operating through a specific causal chain: Instagram publication creates an authentic audience beyond the classroom, which in turn heightens students' intrinsic and extrinsic motivation to produce high-quality work; this heightened motivation drives deeper behavioral, cognitive, and emotional engagement during the project process; and this engagement, sustained across two CAR cycles, translates into measurable improvement in learning outcomes. By situating Islamic education learning within students' digital environments, this mechanism simultaneously cultivates responsible, purposeful, and morally grounded use of social media, positioning Instagram publication as both an authentic assessment mechanism and a digital citizenship learning experience, and thereby contributing to the formation of a generation that is simultaneously digitally literate and strongly characterful.

This study aims to examine the effectiveness of the digital PjBL model in improving student engagement and learning outcomes for Islamic education at the junior high school level in Indonesia, and to articulate the pedagogical mechanism through which Instagram-based publication contributes to that improvement. Accordingly, this study is guided by the following research questions:

1. RQ1: To what extent does the Instagram-based digital PjBL model improve student engagement across the observed behavioral, cognitive, and emotional dimensions over two Classroom Action Research cycles?
2. RQ2: To what extent does the Instagram-based digital PjBL model improve student learning outcomes on the topic of belief in the Prophets and Messengers of Allah between Cycle I and Cycle II?

As this study follows a Classroom Action Research design rather than an experimental comparison, no a priori hypothesis is formulated; instead, the research questions are addressed through the iterative, evidence-based cycle of planning, implementation, observation, and reflection.

II. Research Methods

This study employed Classroom Action Research (CAR) for two cycles. The CAR design is particularly appropriate for this study because it enables iterative refinement of instructional practices based on observable evidence gathered across multiple cycles,

ensuring that insights from one cycle directly inform the design and implementation of the next (Niwesworakarn et al., 2025). The study followed the cyclical framework proposed by Kemmis and McTaggart, widely recognized as the standard model for CAR in educational research (Saptono et al., 2023). This framework organizes each research cycle into four interconnected stages: planning, implementation, observation, and reflection (Creswell & Guetterman, 2024; Rabgay & Kidman, 2023).

The study was conducted at SMP Negeri 1 Ciwidey, located in the Ciwidey district of West Java Province, Indonesia. The research was carried out during the second semester of the 2025/2026 academic year, from the initial observation phase through the completion of Cycle II. The research participants were the students of class VIII, a class comprising 40 registered students at the outset of the study. Due to student absenteeism unrelated to the treatment itself — including illness, school-sanctioned activities, and family matters recorded in the class attendance log — 31 students participated in Cycle I, and 27 students participated in Cycle II; students who were absent in a given cycle were excluded from that cycle's data rather than replaced, which is disclosed here as a limitation of the comparative analysis. The students represented diverse academic profiles and character dispositions, providing a naturalistic and contextually rich research setting. The Islamic education teacher of class VIII served as the primary researcher and practitioner, implementing the PjBL model during regular class sessions, while a colleague teacher assisted in observational data collection. Prior to implementation, informed consent was obtained from the students' parents/guardians, and formal permission to conduct the research was granted by the principal of SMP Negeri 1 Ciwidey. The topic addressed throughout both cycles was the core Islamic education material on belief in the Prophets and Messengers of Allah, selected because it represented one of the most significant conceptual areas and had been identified through preliminary observation as a topic where student engagement was particularly low.

The study was implemented across two cycles, each consisting of a single 90-minute learning session. Both cycles utilized the PjBL model centered on digital poster projects conducted in collaborative student groups. The six key components of the PjBL model applied in this study were: (1) fundamental questioning, (2) product design planning, (3) scheduling, (4) monitoring of student engagement and product development, (5) testing of results, and (6) evaluation (Guo et al., 2022).

In Cycle I, the planning stage involved the teacher providing students with motivational framing, clear learning objectives, and a contextual introduction to spark curiosity about the material on belief in the Prophets and Messengers of Allah. A problem scenario drawn from real-life digital experiences relevant to the content was then presented to the class (Alsmadi et al., 2024). Students subsequently worked in groups to collaboratively design a digital poster project, with each group selecting a thematic focus

derived from the Islamic education material. During the implementation phase, groups began producing their digital poster projects according to their self-designed plans. The observation phase involved systematic monitoring of group activities, individual student participation, and the quality of the creative and collaborative process. The evaluation and reflection phase concluded the cycle, assessing student understanding and identifying instructional areas requiring improvement in Cycle II.

In Cycle II, the planning stage incorporated the lessons drawn from Cycle I's reflection, resulting in refined instructional scaffolding, more specific assessment feedback to students, and stronger preparation for the presentation format. Students were provided with renewed motivation before being guided to present their previously uploaded digital poster projects to the class in a structured group presentation format. During the implementation phase, each group delivered their presentation, articulating the content choices embedded in their digital poster and responding to questions from their peers and the teacher. The observation phase monitored the quality of presentations and the level of individual engagement during the public-facing activity. The evaluation and reflection phases assessed overall improvements in student engagement and academic performance across both cycles.

Data were collected using three complementary instruments. First, an observation checklist assessed student engagement across six dimensions: (a) visual activities, (b) oral activities, (c) listening activities, (d) motor activities, (e) mental activities, and (f) emotional activities. Each dimension was rated on a numerical scale by the observing colleague teacher, with scores then averaged to produce an overall engagement score for each cycle (Alwerthan, 2025; Heilporn et al., 2024). Second, a digital project assessment rubric evaluated group performance across five stages: planning, data collection, data organization, data processing, and data presentation, with numerical scores assigned per group (Amelia et al., 2024; Kaldaras et al., 2022). Third, student learning outcomes were assessed through essay-format online quizzes, administered and completed by students using their personal digital devices during the class session (Sharma et al., 2024). Quiz scores were categorized according to the following grade intervals: 90–100 (Excellent), 80–89 (Satisfactory), 70–79 (Quite Good), 60–69 (Less), and 0–59 (Deficient), with the school-established Minimum Mastery Criterion (KKM) set at 70.

Table 2. Digital Project Assessment Rubric (Scoring Guide)

Assessment Stage	1 – Needs Improvement	2 – Fair	3 – Good	4 – Excellent
Planning	No clear plan or division of tasks	Plan present but incomplete task division	Clear plan with defined roles	Clear, detailed plan with well-coordinated roles and timeline

Data Collection	Sources irrelevant or absent	Limited, partially relevant sources	Relevant sources adequately gathered	Rich, relevant sources gathered systematically
Data Organization	Information disorganized	Some structure, inconsistent	Logically organized information	Information disorganized Well-structured, clearly organized information
Data Processing	Content inaccurate or superficial	Partially accurate content	Accurate, adequately processed content	Accurate, in-depth, and contextually integrated content
Data Presentation	Unclear, unengaging presentation	Understandable but plain	Clear and reasonably engaging	Clear, visually engaging, and communicatively effective

Note: The scoring bands above underlie the group-level totals reported in Table 3 (Assessment of Student Participation in Groups) in the Results section; group scores were derived by summing the ratings across the five assessment stages.

Data analysis employed descriptive quantitative methods complemented by an effect-size calculation. Engagement scores were calculated as averages across all six dimensions and expressed as percentage measures of overall class participation in each cycle. To quantify the magnitude of improvement between cycles independent of the ceiling already present in Cycle I, the Normalized Gain (N-Gain) index (Hake, 1998) was calculated as $N\text{-Gain} = (\text{post-score} - \text{pre-score}) / (100 - \text{pre-score})$, both for the overall engagement score and for each of the six engagement dimensions. Learning outcome data were analyzed by calculating the frequency and percentage of students in each grade category, comparing these distributions between Cycle I and Cycle II to document patterns of improvement. Given the study's Classroom Action Research design, single-session-per-cycle structure, and the absence of matched individual-level pre-post score pairs across cycles, inferential statistical tests (e.g., a paired-samples t-test or Wilcoxon signed-rank test) were not applied to the cycle-to-cycle comparison; the N-Gain index was therefore used as a standardized, descriptive effect-size proxy appropriate to this design. The validity of findings was strengthened through data triangulation across the three instruments (Gutierrez et al., 2025; Kyliushyk et al., 2025).

III. Result and Discussion

A. Results

Prior to the implementation of the PjBL cycles, a preliminary observation was conducted to assess the existing instructional conditions. The observation revealed that Islamic education instruction was predominantly teacher-centered and lecture-based, with the teacher serving as the sole source of knowledge while students assumed a

uniformly passive role. Student engagement was visibly low: few students voluntarily asked questions, participation in class discussions was minimal, and many students appeared disengaged during lessons, with some showing signs of distraction or inattention.

Learning outcomes reflected this instructional deficit: a substantial proportion of students failed to achieve the established minimum mastery criterion (KKM) of 70, and the majority of student scores clustered in the lower performance categories. The teacher's instructional approach relied heavily on verbatim explanation of textbook content and offered minimal provision for student-driven inquiry, peer collaboration, or authentic application of Islamic education content to real-life digital contexts. Students were passive recipients of information instead of active builders of meaning. Critically, students reported experiencing learning activities as monotonous and disconnected from their daily experiences as digital natives, a disconnect that has been identified in prior research as a key barrier to meaningful learning in contemporary Islamic education classrooms. These baseline conditions confirmed the necessity for an innovative, student-centered instructional intervention and provided the empirical foundation against which the outcomes of the digital PjBL implementation could be systematically measured across two cycles.

As Figure 1 illustrates, the largest gains occurred in dimensions that were weakest in Cycle I: visual activities (N-Gain = 0.63) and motor activities (N-Gain = 0.56) improved most sharply, followed by mental (N-Gain = 0.50), oral, and emotional activities (both N-Gain = 0.40), while listening activities — already strongest in Cycle I — showed the smallest relative gain (N-Gain = 0.25). Figure 2 shows a consistent, multi-dimensional improvement in student engagement from Cycle I to Cycle II, with the overall average rising from 59.17% to 78.33% — an N-Gain of 0.47 (medium category, Hake, 1998). This pattern indicates that the targeted refinements introduced in the Cycle II planning stage most effectively closed the specific engagement deficits identified through Cycle I's observation data, rather than producing uniform gains across all dimensions.

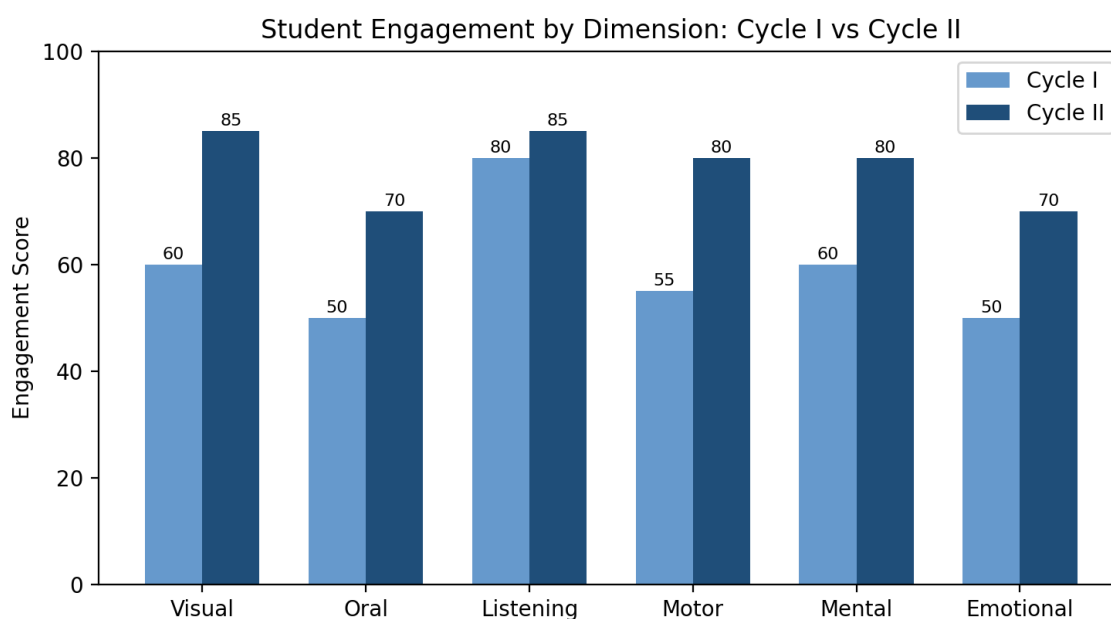


Figure 1. Student Engagement by Dimension, Cycle I vs Cycle II

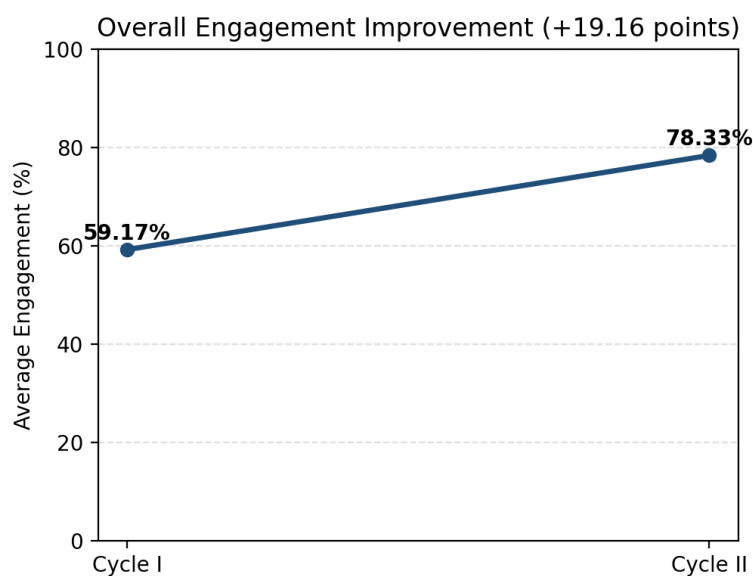


Figure 2. Overall Engagement Improvement Across Cycles (N-Gain = 0.47)

Table 3. Assessment of Student Participation in Groups

No.	Assessment Stage	G-I	G-II	G-III	G-IV	G-V	G-VI
1	Preparing Tools	4	5	5	4	4	5
2	Grouping	4	5	5	4	4	5
3	Data Collection	8	7	7	7	9	7
4	Data Organization	3	3	3	3	4	6
5	Data Processing	3	3	3	2	4	2

6	Data Presentation	9	7	6	7	8	7
Total Score		31	30	29	27	33	32

Source: Research project assessment, Cycle I

Table 3 indicates that all six groups completed the digital poster project across all five assessed stages, with total scores ranging from 27 (Group 4) to 33 (Group 5), reflecting the naturalistic diversity of collaborative readiness within a real classroom. Across groups, the data presentation and data collection stages recorded the strongest scores, while data processing was consistently the weakest, with Groups 4 and 6 scoring only 2 in this dimension.

Table 4. Distribution of Student Learning Outcomes in Cycle I

Score Range	Number of Students	Percentage	Category
$90 \leq X \leq 100$	6	19.36%	Excellent
$80 \leq X < 90$	10	32.26%	Satisfactory
$70 \leq X < 80$	7	22.58%	Quite Good
$60 \leq X < 70$	4	12.90%	Less
$0 \leq X < 60$	4	12.90%	Deficient
Total	31	100%	

Source: Online quiz results, Cycle I

Table 5. Distribution of Student Learning Outcomes in Cycle II

Score Range	Number of Students	Percentage	Category
$90 \leq X \leq 100$	14	51.85%	Excellent
$80 \leq X < 90$	7	25.93%	Satisfactory
$70 \leq X < 80$	6	22.22%	Quite Good
$60 \leq X < 70$	0	0.00%	Less
$0 \leq X < 60$	0	0.00%	Deficient
Total	27	100%	

Source: Online quiz results, Cycle II

Table 4 reveals that in Cycle I, 25.80% of students (8 of 31) scored below the KKM threshold of 70, while 74.20% met or exceeded it, distributed across the "Quite Good" (22.58%), "Satisfactory" (32.26%), and "Excellent" (19.36%) categories. As Table 5 and Figure 3 show, this baseline shifted markedly in Cycle II: no students scored below the KKM (an N-Gain of 1.00 on the below-KKM rate), and the proportion achieving "Excellent" grades more than doubled to 51.85%, with the entire cohort distributed within the three highest performance categories. This reflects both a floor improvement (elimination of below-KKM performance) and a ceiling improvement (a sharp rise in top-grade achievement).

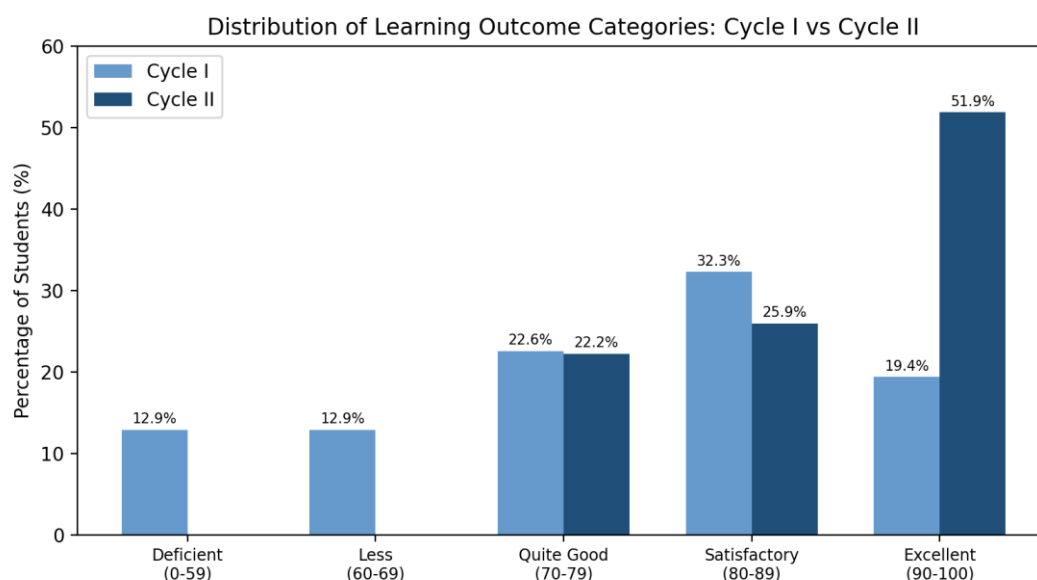


Figure 3. Distribution of Learning Outcome Categories, Cycle I vs Cycle II

B. Discussion

1. Improvement in Student Engagement

The improvement in student engagement from Cycle I (59.17%) to Cycle II (78.33%), an N-Gain of 0.47, provides evidence that the digital PjBL model progressively activated students' participation across behavioral, cognitive, and emotional dimensions. Rather than restating the magnitude already shown in Table 3 and Figure 1, this improvement is best explained through Self-Determination Theory (Deci & Ryan, 1985) by designing, creating, and publicly publishing digital posters on Instagram, students experienced greater autonomy over how religious content was represented, competence through visible mastery of both content and digital skills, and relatedness through peer collaboration and audience response — three conditions Self-Determination Theory identifies as drivers of intrinsic motivation. The requirement to upload projects to the school's Instagram account converted a private classroom task into a public, audience-directed one, which explains why oral activities (N-Gain = 0.40) and emotional activities (N-Gain = 0.40) improved specifically through the Cycle II presentation format: public accountability to peers and a broader Instagram audience, not merely task completion, is what motivated students to prepare more thoroughly and invest emotionally in their work (Sharma et al., 2024).

The sharper gains in visual (N-Gain = 0.63) and motor activities (N-Gain = 0.56) are consistent with the iterative logic of Classroom Action Research (Rabgay & Kidman, 2023) and with Experiential Learning theory (Kolb, 1984) in Cycle I, students encountered the digital poster format for the first time and had not yet completed a full

concrete-experience-reflection-conceptualization-experimentation cycle, whereas by Cycle II they had internalized the workflow through the reflective feedback built into the CAR design, allowing them to move from planning to execution with greater confidence. Listening activities, already strong in Cycle I, improved only marginally ($N\text{-Gain} = 0.25$) because this dimension was less dependent on the novel publication task and more on the dialogic classroom structure that was already in place before the intervention. This dimension-specific pattern, rather than a uniform across-the-board gain, is itself evidence that the mechanism driving improvement was the authentic-audience and iterative-practice structure of the model, not a general novelty effect.

A critical reading of Table 4, however, shows that not all dimensions improved uniformly: data processing remained the weakest stage across all six groups, with Groups 4 and 6 scoring only 2 of a possible higher total. This persistent weakness is unlikely to reflect a motivational deficit — since these same groups performed adequately in data collection and presentation — but more plausibly reflects a genuine skills gap in analyzing and synthesizing information, a higher-order competency that a single 90-minute session per cycle may be insufficient to develop, even under a highly engaging task structure. This distinction matters: it suggests that Instagram-mediated authentic assessment can raise motivation and participation rapidly, but cannot substitute for explicit instructional scaffolding of specific analytical sub-skills.

2. Improvement in Learning Outcomes

The improvement in learning outcomes — the elimination of below-KKM performance and the more than doubling of "Excellent" grades (19.36% to 51.85%; Table 6) — is consistent with the progressive deepening of content mastery that PjBL facilitates through iterative, multimodal engagement (Saptono et al., 2023). This pattern is well explained by Authentic Learning theory (Herrington & Oliver, 2000) the essay-format quiz required students to articulate their understanding in discursive written form rather than select from pre-formulated options, and because the digital poster task itself required students to represent Islamic content visually, explain it collaboratively, and communicate it to a real audience, students were effectively rehearsing the same higher-order cognitive operations — analysis, synthesis, and application — that the quiz subsequently assessed (Fauzi et al., 2025). Social Constructivism (Vygotsky, 1978) further accounts for why this transfer occurred: knowledge construction was distributed across group discussion, peer feedback, and public presentation rather than confined to individual, teacher-transmitted instruction, which is precisely the social mediation Vygotsky's framework identifies as central to durable conceptual understanding.

These findings align with reports that project-based approaches produce higher academic performance than conventional methods, particularly on assessments requiring higher-order thinking (Zhang & Ma, 2023), and that instructional models emphasizing critical thinking and communication competencies yield stronger academic

outcomes than those focused on knowledge transmission alone (Agustini et al., 2022). Within Islamic education specifically, these findings extend the growing evidence base suggesting that technology-integrated, active learning approaches actively enhance both the moral and academic objectives of the subject (Wedi et al., 2025).

It is important, however, to interpret these gains against evidence from the broader social-media-in-education literature, which is considerably more mixed than the results of this study alone might suggest. In a quasi-experimental study of Instagram used as an educational tool with 391 pre-service teachers, Martínez-Domingo et al. (2025) found that while the Instagram-using experimental group improved significantly within itself, its post-test scores were not significantly higher than a control group that used no social media at all, and the authors attributed part of the apparent gain to test-familiarity and Hawthorne-type effects — students performing better simply because they knew they were being observed and assessed, rather than because of Instagram specifically. Because the present study used a single-group CAR design without a non-Instagram control condition, the same alternative explanation cannot be fully ruled out here: part of the Cycle I-to-Cycle II improvement may be attributable to general practice effects, increased teacher attentiveness during the study, or growing task familiarity, rather than to the Instagram publication mechanism in isolation. This does not negate the study's findings, but it does mean the results should be read as evidence that the digital PjBL model as a whole is effective, rather than as isolated proof that Instagram publication specifically — as opposed to project-based collaboration or iterative CAR refinement — is the active ingredient; disentangling these components is a task for future controlled research.

3. Novelty, Contributions, and Implications

The primary novelty of this study lies not simply in using Instagram as a publication channel, but in the specific pedagogical mechanism this design instantiates: Instagram publication → authentic audience → heightened motivation → deeper engagement → improved learning outcome. Unlike previous PjBL implementations that confined project output to a classroom display or teacher assessment alone (Sayadi & Pangandaman, 2025), this study positioned the student-created digital poster as a public document shared with a real community of followers, which is what created the fundamentally different motivational dynamic documented in the Results section — not the platform itself, but the authentic audience it provided. The requirement to share Islamic content responsibly on Instagram simultaneously functioned as an embedded lesson in digital citizenship and social media ethics. In this respect, the digital PjBL model achieves a pedagogical integration that conventional instruction cannot: it cultivates academic content mastery and moral character formation through the same learning activity, treating them not as competing instructional objectives but as mutually constitutive goals of holistic Islamic education.

Theoretically, this study contributes to the growing literature on technology-integrated Islamic education by demonstrating that productive digital integration in Islamic education does not require complex or expensive technical infrastructure. A project framework built around accessible, student-familiar platforms such as Instagram can produce meaningful improvements in both engagement and academic outcomes while simultaneously cultivating the digitally responsible character formation that is central to the Islamic educational mandate (Aeni et al., 2023). This finding is particularly significant for Indonesian junior high schools in rural or semi-urban areas, where resource constraints often preclude adoption of sophisticated educational technologies. Practically, the model is directly replicable by Islamic education teachers with minimal additional resource requirements, making it a scalable contribution to digitally integrated Islamic education practice. At the institutional level, this study enriches the evidence base of CAR interventions available to Islamic education practitioners and curriculum developers working to operationalize the Merdeka Belajar curriculum's vision of student-centered, competency-based, character-forming education (Ikhwan et al., 2025). Rather than positioning technology as an external add-on to Islamic education, this model integrates it as an organic component of authentic religious communication and moral formation.

4. Limitations and Recommendations

Despite the positive findings, this study acknowledges several limitations that should inform the interpretation of results and the design of future research. First, the sample was limited to a single class at a single school, restricting the generalizability of the findings to broader and more diverse educational contexts across Indonesia. The specific characteristics may differ significantly from other schools, and the model's effectiveness in other contexts cannot be assumed without further empirical verification. Second, each cycle was implemented within a single 90-minute session, which may be insufficient to capture the full range of PjBL's effects on students' content mastery and moral character formation. A more extended implementation might produce stronger and more durable outcomes. Third, the study was affected by student absenteeism, which reduced the sample from 40 to 31 in Cycle I and 27 in Cycle II, introducing a potential selection effect into the comparative data, since students who were absent may have differed systematically from those who were present in ways that affect the observed outcomes. Fourth, the engagement measurement instrument relied on observer judgment without formal inter-rater reliability checks, introducing a degree of subjectivity that future studies should address through triangulated or standardized observation protocols.

Future researchers are recommended to expand the sample to multiple classes and schools to strengthen generalizability; adopt longitudinal designs that track the sustained impact of the digital PjBL model on students' moral character development and content mastery over a full academic semester; apply the model to other Islamic education topics

and grade levels to assess its broader curricular applicability within the Indonesian secondary education system; develop more standardized, inter-rater-reliable engagement measurement tools; and examine how the model can be adapted for contexts with limited internet access or device availability to maximize inclusivity across Indonesia's diverse educational settings. Collaboration between Islamic education teachers, curriculum developers, and digital technology specialists would further strengthen the model's ongoing refinement and support its broader implementation at the national level.

IV. Conclusion

This study demonstrates that the digital project-based learning model, implemented through two CAR cycles, constitutes an effective, practical, and innovatively designed instructional approach for Islamic education at the junior high school level. The implementation produced measurable improvements in both student engagement and learning outcomes, with students achieving good to excellent grades by the end of the study. These results confirm that situating Islamic education content within the collaborative design and public publication of digital posters on Instagram effectively transforms the learning process from passive reception to active, communicative, and socially meaningful participation.

Despite these positive findings, the implementation of the digital project-based learning model was not without challenges. Student absenteeism across cycles reduced the number of participants, introducing variability into the comparative data. Additionally, the reliance on students' personal digital devices and stable internet access represents a contextual limitation that may restrict the model's direct applicability in schools with limited technological infrastructure.

The implications of this research span multiple levels of educational practice. At the micro level, the digital project-based learning model contributes to transforming Islamic education instruction by providing students with experiential, collaborative, and authentic learning opportunities that simultaneously cultivate academic understanding and moral character formation. For learners, engagement with real-audience digital tasks enhances intrinsic motivation, promotes active knowledge construction, and develops responsible digital citizenship. At the meso level, this research offers a replicable instructional framework that Islamic education teachers can integrate into their pedagogical practice with minimal resource requirements while opening opportunities for professional development around technology-integrated moral education. Educational institutions can draw on these findings to inform digital learning policies and resource allocation decisions. At the macro level, this study contributes to ongoing efforts to bridge the gap between conventional Islamic education instruction and the lived digital

experiences of contemporary students, while strengthening the evidence base for technology integration in Indonesia's national religious education curriculum.

As a recommendation, future implementations of the digital project-based learning model should incorporate more varied digital platforms and project types be used in addition to making posters. This will help students improve their creative and technical skills. Further research is also needed to evaluate the model's long-term effectiveness across multiple Islamic education topics, grade levels, and school contexts, as well as to examine its sustained impact on students' moral character development and digital literacy. Collaboration between teachers, curriculum developers, and technology specialists will be essential to ensure the model's continued refinement and broader scalability across Indonesia's secondary education system.

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