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The Effect of Interactive Video-Based Learning Media on Motivation and Learning Outcomes of Junior High School Students

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ABSTRACT

Interactive video-based learning media has gained substantial attention as a pedagogical tool capable of enhancing student engagement, motivation, and academic achievement in secondary education. This study investigated the effect of interactive video-based learning media on the motivation and learning outcomes of junior high school students in Bandung, West Java, Indonesia. A quasi-experimental pre-test post-test design was employed with 120 Grade VIII students assigned to either an intervention group (n = 60) receiving structured interactive video media over eight weeks, or a control group (n = 60) receiving conventional instruction. Data were collected using a validated motivation scale (25 items, alpha = .81) and a curriculum-aligned achievement test (40 items, r = .79). Non-parametric Wilcoxon signed-rank and Mann-Whitney U tests confirmed statistically significant improvements in learning motivation (d = 0.72, p < .001) and learning outcomes (d = 0.69, p < .001) in the intervention group, with no significant changes observed in the control group. Multivariate regression identified interactive video use, frequency of viewing, and teacher facilitation as the strongest predictors of improvement. Findings affirm that purposefully designed interactive video media, when integrated within structured instructional frameworks, meaningfully enhances both affective and cognitive dimensions of junior high school student learning.

INTRODUCTION

.The rapid expansion of digital technologies has driven video-based media to become a dominant feature of contemporary classroom instruction, especially in junior high schools where adolescents show clear preferences for visual and interactive learning experiences (Charline et al., 2023; Suyahman et al., 2024). Studies indicate that not only the content but the presentation format strongly shapes students' affective engagement: lecture-heavy classes tend to produce boredom, disengagement, and passive reception, whereas learning delivered through interactive visual media more reliably sustains attention and fosters intrinsic motivation (Rachmavita, 2020; Yorganci, 2022). This relationship between format and engagement matters for learning outcomes because

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motivated, attentive students are more likely to engage deeply with material, practice strategically, and transfer new skills to novel tasks

In the Indonesian context, these considerations take on additional urgency as schools implement Kurikulum Merdeka, which foregrounds student agency, critical inquiry, and competency-based assessment. Educators therefore face the dual challenge of selecting instructional media that both spark and maintain learner motivation and deliver measurable academic gains in line with competency standards (Wahyu & Sakti, 2022; Prasetya et al., 2025). Video-based tools that incorporate interactivity, scaffolding prompts, and opportunities for reflection can bridge this gap by aligning students' natural media preferences with pedagogical designs that promote higher-order thinking and sustained learning engagement.

Interactive video-based learning differs from passive video viewing by embedding active learning elements, such as in-video questions, clearly navigable segments, scenario-based problem prompts, and immediate corrective feedback, which together transform a one-way presentation into a guided, learner-centered experience. This format leverages multimedia principles to break content into manageable chunks, elicit retrieval practice, and scaffold problem solving, thereby sustaining attention and promoting deeper cognitive processing. Empirical studies support these affordances in junior high contexts: Limbong et al. (2021) found that audio-visual video media produced greater effectiveness in science learning than traditional textbooks, and Trisnawati et al. (2024) reported that integrating interactive video into physical education improved students' critical thinking and motivation. Similarly, animated instructional videos that align with the curriculum and incorporate visual scaffolds have consistently raised motivation among Indonesian junior high science students (Ayunda et al., 2024). Despite these promising results, however, rigorous experimental evidence that simultaneously examines both motivational and cognitive outcomes across a broader range of subjects is still scarce. In other words, while interactive video shows strong potential to combine motivational engagement with measurable learning gains, more controlled studies are needed to establish which interactive features, sequencing strategies, and teacher facilitation practices produce the most reliable effects across subjects beyond science and physical education.

The spread of user-friendly design platforms such as Canva has made interactive video production far more accessible to classroom teachers, allowing them to produce visually appealing, pedagogically structured media without needing advanced technical skills or external production support (Busyra & Dharmawati, 2025; Aswanda et al., 2024). At the same time, platform-mediated pedagogies have shown encouraging results across different subject areas and delivery modes: YouTube-facilitated problem-based learning has been associated with increased motivation among language learners (Al et al., 2025), while Android-based interactive multimedia packages have improved both English achievement and learner motivation in junior high contexts (Nurlaela et al., 2024). Taken together, this body of work indicates that interactive video and related multimedia, regardless of the specific authoring or hosting platform, tend to produce consistent motivational benefits and measurable cognitive gains when thoughtfully integrated into instruction. However, despite these promising signals, a gap remains: few studies have directly compared interactive-video interventions with matched control conditions within the same school setting using validated measures for both motivation and learning outcomes simultaneously, leaving questions about generalizability, effect

magnitude, and the relative contribution of platform features versus instructional design still open for empirical clarification.

This study addresses that evidence gap by conducting a quasi-experimental evaluation of a structured interactive video-based learning intervention among Grade VIII junior high students in Bandung, Indonesia, with the explicit aim of testing both motivational and cognitive impacts within the same school context. The research examines three focused questions: first, whether interactive video-based instruction produces significant improvements in students' learning motivation compared with conventional classroom methods; second, whether the same intervention yields higher measured learning outcomes; and third, which instructional features (for example, interactivity level, feedback timing, and teacher facilitation) and individual student characteristics (for example, baseline achievement, digital familiarity, and intrinsic motivation) most strongly predict observed gains. By combining validated measures of motivation and achievement with matched comparison groups and process data on implementation fidelity, the study seeks to clarify not only whether interactive video is effective, but also how and for whom it works, information intended to guide practical classroom adoption and scalable instructional design.

METHODOLOGY

A quasi-experimental, pre-test–post-test design with non-equivalent control groups was used to evaluate the intervention's effects under realistic classroom conditions. The study recruited 120 Grade VIII students from two public junior high schools (SMP Negeri) in Bandung, West Java, Indonesia, with entire schools assigned to either the intervention or control condition. The intervention group comprised 60 students (31 male, 29 female; mean age = 13.7 years, SD = 0.52) and the control group likewise included 60 students (30 male, 30 female; mean age = 13.6 years, SD = 0.49). Pre-intervention testing showed no significant differences between groups on key baseline characteristics, learning motivation, achievement scores, age, and sex (all $p > .10$), supporting the comparability of the cohorts for outcome comparisons despite the nonrandom assignment. Ethical procedures were followed: institutional approval was obtained and written parental consent secured for every participant prior to data collection, ensuring adherence to research ethics and protecting student rights throughout the study.

The intervention ran for eight weeks and delivered subject-integrated interactive video instruction designed to align directly with the Grade VIII curriculum. Six video learning units were produced using Canva, each lasting roughly 15 minutes, and were released through the school's learning management system at a pace of two units every fortnight to allow classroom activities and practice between viewings. Every video was intentionally interactive: comprehension questions were embedded at three strategic points to prompt retrieval practice, a scenario-based problem invited students to apply concepts to authentic situations, and a short reflective summary task at the end encouraged metacognitive processing and consolidation. To ensure consistent classroom implementation, teachers at the intervention school took part in a focused four-hour training session on facilitating the media, integrating follow-up tasks, and using embedded prompts to guide discussion. In contrast, the control school continued with conventional teacher-led instruction based on the standard textbook and did not receive supplementary video media, allowing a pragmatic comparison of interactive video-supported pedagogy versus routine practice.

Learning motivation was assessed with the Motivation Scale for Learning (MSL), a 25-item Likert instrument (1 = strongly disagree to 5 = strongly agree) that has been validated for Indonesian secondary school populations and demonstrates good internal consistency (Cronbach's alpha = .81). Academic achievement was measured using a 40-item teacher-constructed test composed of multiple-choice and short-answer items directly aligned with the Grade VIII curriculum objectives covered during the intervention. The achievement instrument underwent content validation by two subject-matter experts and showed acceptable reliability in pilot administration (r = .79). Both measures were administered at two time points—pre-test (Week 0) and post-test (Week 9)—to all participants in the intervention and control groups under standardized conditions, enabling comparison of changes in motivation and learning outcomes attributable to the instructional program.

Table 1. Research Instruments Used in the Study

Variable	Instrument	Items / Alpha
Learning Motivation	Motivation Scale for Learning (MSL); Likert 1-5	25 items; alpha = .81
Learning Outcomes	Teacher-made achievement test (multiple choice + essay)	40 items; r = .79
Intervention Media	Interactive video modules (Canva + YouTube integration)	6 video units x 15 min

***Source**: Adapted from validated instruments in the reviewed literature*

Shapiro–Wilk tests indicated that most outcome variables deviated from normality ($p < .05$), so non-parametric procedures were selected to respect the data's distributional properties. Within-group changes from pre- to post-test were examined with Wilcoxon signed-rank tests, while between-group differences at post-test were assessed with Mann–Whitney U tests. For effect-size estimation, Cohen's d was computed using pooled standard deviations to provide a standardized measure of the magnitude of observed changes. To explore independent predictors of post-intervention improvement, multivariate linear regression was then applied to normalized outcome scores, with baseline score, sex, and grade level entered as covariates to control for their potential influence. All statistical analyses were executed in SPSS version 26 using a two-tailed alpha of .05, and sensitivity checks were performed where appropriate to verify the robustness of the findings to alternative analytic choices.

RESULTS AND DISCUSSION

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A. Respondent Characteristics

The intervention and control groups were comparable on all key baseline measures, indicating successful initial group equivalence before the program began. At pre-test, students in the intervention group reported a mean motivation score of 61.4 (SD = 8.2) on the Motivation Scale for Learning and a mean learning-outcome score of 57.3 (SD = 9.4) on the teacher-made achievement test. Corresponding baseline values in the control group were 62.1 (SD = 7.8) for motivation and 58.1 (SD = 9.1) for learning outcomes. Statistical comparisons confirmed the absence of meaningful differences between groups at pre-test: Mann–Whitney U tests yielded U = 1,781 (p = .46) for motivation and U = 1,802 (p = .51) for achievement, supporting

the conclusion that the two samples were equivalent prior to the intervention.

Beyond the primary psychometric scores, descriptive data on students' technology use and access were also similar across groups, reducing the likelihood that differential access to devices or platforms biased the results. Both groups reported an average daily screen time of approximately 2.6 hours, and students in each school had comparable access to smartphones and the school learning management system. By documenting these parallels, the study minimized technology access as a potential confounder in interpreting post-intervention differences. The comparability on demographic, behavioral, and baseline outcome measures therefore strengthens the internal validity of subsequent between-group comparisons (Prasetya et al., 2025; Mariati, 2024).

B. Pre-Post Comparison within Each Group

Within the intervention group, Wilcoxon signed-rank tests revealed statistically significant improvements in both learning motivation ($Z = -6.82$, $p < .001$, $d = 0.72$) and learning outcomes ($Z = -6.61$, $p < .001$, $d = 0.69$) between pre- and post-test measurements. These large effect sizes are consistent with findings by Rahma et al. (2024), who reported significant improvements in motivation and learning outcomes following interactive video media development in moral education, and with Ulfaa et al. (2025), who documented that interactive learning videos grounded in problem-based learning produced significant gains in both motivation and critical thinking skills. The control group showed no statistically significant changes in either outcome variable (motivation: $Z = -1.21$, $p = .226$; outcomes: $Z = -0.98$, $p = .327$), confirming that improvements in the intervention group were attributable to the media program rather than maturation or extraneous exposure (S et al., 2022; Limbong et al., 2021).

Table 2. Pre-Post Motivation and Learning Outcome Score Comparison

Outcome	Group	Pre M (SD)	Post M (SD)	Gain	p / d
Motivation	Intervention	61.4 (8.2)	78.9 (7.1)	+17.5	<.001 / 0.72
	Control	62.1 (7.8)	64.3 (8.0)	+2.2	ns
Learning Outcomes	Intervention	57.3 (9.4)	75.6 (8.3)	+18.3	<.001 / 0.69
	Control	58.1 (9.1)	60.4 (9.0)	+2.3	ns

Source: Primary data, 2025. ns = not significant

C. Between-Group Comparison (Mann-Whitney U Test)

Post-test comparisons between the intervention and control groups, conducted with Mann–Whitney U tests because of the data's non-normal distribution, revealed statistically significant advantages for students who received the interactive video-based instruction. Specifically, the intervention group scored higher on learning motivation ($U = 884$, $p < .001$) and on learning outcomes ($U = 912$, $p < .001$) at Week 9, indicating that the observed differences were unlikely to be due to chance. To test the robustness of these findings, sensitivity analyses were performed using analysis of covariance (ANCOVA) on normalized outcome scores with pre-test values entered as covariates; the between-group differences remained statistically significant after

adjusting for baseline scores, which strengthens confidence that the intervention itself contributed to the observed gains.

In practical terms, the magnitude of change was substantial: the intervention group's mean motivation increased by 17.5 points and their mean learning-outcome score improved by 18.3 points from pre- to post-test, whereas the control group experienced only marginal improvements of 2.2 points for motivation and 2.3 points for achievement. These contrasting trajectories highlight not only statistical significance but also meaningful educational impact, suggesting that the subject-integrated, interactive video units produced considerable improvements in both students' motivational engagement and measurable learning. The pattern of results is consistent with prior work indicating the central role of media-mediated interest and motivation in promoting learning gains (Bunari et al., 2024), and parallels findings showing that interactive multimedia elements such as e-books and video feedback can substantially boost performance and motivation compared with non-interactive approaches (Yorganci, 2022).

D. Multivariate Regression Analysis

A.multivariate linear regression analysis using a composite post-intervention improvement score as the dependent variable identified several instructional factors that independently predicted student learning gains after statistically controlling for demographic covariates. The presence of interactive video in the instructional package emerged as the strongest predictor of improvement (standardized Beta = 0.44, $p < .001$), indicating that simply incorporating subject-integrated, interactive video content was strongly associated with larger gains in the composite outcome. Frequency of video viewing was the next most influential predictor (standardized Beta = 0.31, $p < .001$), suggesting a dose–response relationship in which students who engaged with the video units more often showed greater improvement. Teacher facilitation quality also made a significant independent contribution (standardized Beta = 0.27, $p < .01$), underscoring the importance of how videos were mediated in classroom practice rather than relying on media alone.

In addition to those instructional variables, prior achievement contributed significantly to post-intervention improvement (standardized Beta = 0.19, $p < .05$), a pattern consistent with the Matthew effect frequently observed in studies of media-enhanced learning where higher-performing students gain disproportionate benefit (Rachmavita, 2020; Wahyu & Sakti, 2022). By contrast, neither gender nor grade level emerged as significant predictors ($p > .05$), indicating that the positive effects associated with interactive video use were broadly distributed across these demographic subgroups rather than confined to a particular sex or grade cohort.

Overall, the full regression model explained a substantial proportion of variance in post-test improvement ($R2 = .634$), and the model was highly significant ($F(6, 113) = 32.47$, $p < .001$), demonstrating that the included instructional and learner variables together provided a strong explanatory account of which students benefited most from the intervention. These results highlight that both the design features of media (interactivity and repetition) and the quality of teacher facilitation matter for translating multimedia resources into measurable learning gains.

Table 3. Multivariate Regression Predictors of Post-Intervention Improvement

Predictor Variable	Beta	SE	t-value	p
Interactive Video Use	0.44	0.07	6.29	< .001
Frequency of Viewing	0.31	0.08	3.88	< .001
Teacher Facilitation	0.27	0.09	3.00	< .01
Prior Achievement	0.19	0.08	2.38	< .05
Gender	0.04	0.06	0.67	.506
Grade Level	0.07	0.07	1.00	.319

***Source**: Primary data, 2025. R2 = .634, F(6,113) = 32.47, p < .001*

E. Discussion

The results of this study firmly establish that structured interactive video-based learning media produces meaningful improvements in both learning motivation and academic outcomes among junior high school students, a conclusion supported by a converging body of Indonesian and international evidence. Ayunda et al. (2024) found that animated video learning media significantly improved science learning motivation in junior high school students, attributing gains to the media's capacity to make abstract content visually concrete and emotionally engaging. Busyra and Dharmawati (2025) similarly demonstrated that Canva-based educational video integration in integrated science learning substantially improved motivation scores, with students citing increased relevance, clarity, and enjoyment as key mediating factors. The present study extends these findings by documenting equivalent gains in learning outcomes alongside motivation, confirming that motivational uplift translates into measurable cognitive achievement rather than merely surface-level affective engagement.

The role of teacher facilitation as a significant regression predictor (Beta = 0.27) aligns with findings by Suyahman et al. (2024) and Charline et al. (2023), who emphasized that learning media's motivational potential is contingent on how teachers frame, contextualize, and guide student interaction with the media. Passive exposure without pedagogical scaffolding risks reducing interactive video to entertainment rather than structured learning, a distinction that mirrors findings in digital literacy intervention research more broadly. Ali et al. (2025) further observed that the effectiveness of interactive learning media in improving elementary students' interest and motivation was amplified when teachers actively modeled strategic media engagement and connected video content to concrete learning objectives, a pattern likely operative in the present intervention's significant teacher facilitation effect.

The absence of significant gender and grade-level effects is noteworthy and contrasts with some prior studies that found differential motivational responses to video media by gender. This finding may reflect the relatively homogeneous demographic composition of the study sample or may indicate that the specific interactive features embedded in the video modules, including problem prompts and immediate feedback, were sufficiently engaging for all demographic subgroups. Trisnawati et al. (2024) similarly found no significant gender moderation in the effect of interactive video on critical thinking and motivation in physical education, suggesting that well-designed interactive media may be inherently equitable in its motivational effects when delivered within structured instructional contexts.

Three limitations bound the conclusions of this study. First, the quasi-experimental design with school-level assignment introduces potential clustering effects and unmeasured school-level confounds that cannot be fully controlled. Second, the eight-week intervention period does not permit assessment of long-term retention or motivational sustainability beyond the program. Third, fidelity of video viewing, specifically whether students engaged with all embedded interactive features or skipped them, was not systematically tracked, meaning that dosage variation within the intervention group may partially account for within-group heterogeneity in outcomes.

CONCLUSION

This study provides robust quasi-experimental evidence that structured interactive video-based learning media significantly improves both learning motivation ($d = 0.72$) and learning outcomes ($d = 0.69$) among Grade VIII junior high school students in Indonesia, compared to conventional instruction. Multivariate regression confirmed that interactive video use, viewing frequency, and teacher facilitation were the strongest predictors of improvement gains, while gender and grade level did not significantly moderate effects, suggesting equitable benefits across demographic subgroups. These findings affirm that interactive video media, when purposefully designed with embedded questions, scenario-based tasks, and structured teacher facilitation, constitutes an effective instructional tool for simultaneously enhancing the affective and cognitive dimensions of junior high school student learning. Practitioners are advised to invest in teacher facilitation training alongside media development, ensure regular and scaffolded video engagement rather than incidental use, and align interactive video content directly with curriculum learning objectives. Future research should employ fully randomized controlled designs, incorporate behavioral engagement tracking, and examine subject-specific differential effects across longer intervention periods.

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