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The Relationship between Educational Technology Integration, Classroom Management, and Student-Centred Learning on Teaching Effectiveness and Student Learning Outcomes in Indonesian

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ABSTRACT

This study investigates the relationship between educational technology integration, classroom management, and student-centred learning on teaching effectiveness and student learning outcomes in Indonesian schools. Utilizing a quantitative analysis approach, data were collected from 285 teachers through a structured questionnaire employing a Likert scale ranging from 1 to 5. The data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3) to test the proposed hypotheses. The findings indicate that all the examined relationships are both positive and significant. Specifically, integrating educational technology is shown to enhance teaching effectiveness and improve student learning outcomes. Additionally, effective classroom management positively influences teaching effectiveness and fosters a student-centred learning environment, which in turn leads to better student learning outcomes. These results highlight the critical role of technology integration, effective classroom management, and student-centred learning in boosting teaching effectiveness and student achievement in Indonesian schools. The study offers valuable insights for educators, policymakers, and stakeholders looking to enhance educational practices through the strategic implementation of these components.

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1. INTRODUCTION

The integration of educational technology (EdTech) in the classroom has indeed revolutionised the teaching and learning process, providing new opportunities to improve student engagement, learning outcomes, and overall teaching effectiveness. EdTech tools, such as learning management systems (LMS), interactive learning tools (ILT), virtual reality and augmented reality (VR and AR), and massive open online courses (MOOC), have significantly transformed educational practices by fostering increased student interaction and personalised learning experiences [1]. Research shows that technology-enhanced instruction positively

impacts student engagement and academic performance, caters to diverse learning styles and promotes deeper understanding and knowledge retention through student-centred pedagogy [2]. Teacher professional development, particularly in science education, also benefits from technology integration, as evidenced by the improved competency of student teachers in Ghana who used simulations to teach secondary school physics, moving from a teacher-centred to a student-centred approach [3]. Furthermore, the role of technology in enhancing students' cognitive skills and providing access to a variety of resources and interactive platforms has been well documented, although this requires adequate teacher training and parental involvement for optimal use [4]. Institutional support further reinforces the positive effects of technology integration, improving teacher performance and student engagement through innovative pedagogical strategies [5].

Over the past decade, Indonesian educational institutions have increasingly integrated various forms of educational technology to enhance traditional teaching methods, aiming to create a more interactive and engaging learning environment. This integration includes digital whiteboards, interactive software, online learning platforms, and virtual classrooms, which collectively aim to improve students' academic performance and overall learning experience. Research indicates that the implementation of computer-based testing (CBT) has significantly reduced cheating, thereby enhancing the credibility of examination results and shifting the focus back to genuine learning [6]. However, the practical application of these technologies often faces challenges, such as insufficient internet access and lack of support from supervisory staff, which can hinder the effective use of sophisticated technological tools by pre-service teachers [7]. Despite these challenges, various models like Blended Learning, Flipped Classroom, and Learning Management Systems have shown promise in optimizing technology-based education in Indonesian schools, providing valuable guidance for educational stakeholders and policymakers [8]. The comprehensive use of technology, information, and communication has been pivotal in revitalizing learning processes, stimulating student creativity, and facilitating the distribution of teaching materials and communication in the learning process [9]. Additionally, educational technology has significantly transformed Indonesian language education by improving the quality and efficiency of learning, facilitating distance learning, and encouraging innovative educational strategies, although it also presents challenges such as accessibility and socio-psychological impacts on students [10].

Classroom management is indeed crucial for fostering an environment conducive to learning, as it significantly impacts students' academic achievements and overall classroom dynamics. Effective classroom management strategies, such as implementing clear rules, providing positive feedback, and understanding individual student needs, are essential for creating a structured and supportive learning atmosphere [11]. The integration of educational technology further amplifies the importance of these strategies, as teachers must adeptly balance traditional teaching methods with technological tools to maintain student focus and participation. A user-friendly web application can streamline administrative tasks, enhance communication, and promote student engagement, thereby reducing the time teachers spend on non-instructional activities and allowing them to focus more on teaching and managing the classroom [12]. Additionally, classroom management should be based on principles such as enthusiasm, warmth, variety, and discipline, which help in creating a positive and flexible learning environment [13]. Despite the challenges, teachers' efforts to prepare administrative tasks properly, use varied teaching methods and media, and instill discipline are crucial for optimizing classroom management and enhancing the effectiveness of the learning

process [14]. Research also indicates that strategies like praise and reward, encouraging group engagement, withitness, and effective communication have a significant positive impact on students' academic achievements [15].

Student-centred learning is a pedagogical approach that prioritizes active student participation and engagement, shifting the focus from traditional teacher-led instruction to student-driven activities that foster critical thinking, problem-solving, and collaboration. This method is increasingly relevant as higher education institutions integrate into the European educational space, necessitating the transformation of educational programs to be more student-centered and competency-based [16]. Pedagogical training and the regulation of teacher development are crucial for adopting this approach, as they enhance teachers' ability to implement meaning-oriented learning, which is directly connected to student-centred teaching [17]. Emerging technologies, such as virtual simulations in STEAM activities, have been shown to significantly improve student engagement by promoting attentive listening, directing attention, and investing effort in learning [1]. Additionally, collaborative learning and peer-to-peer teaching activities, such as those implemented in revised anatomy and physiology courses, have demonstrated that structured group work and problem-solving sessions can enhance students' understanding and application of course material, thereby supporting a student-centred learning environment [18]. The use of Quick Response (QR) codes further exemplifies how educational technology can enhance student-centred learning by increasing motivation, engagement, and accessibility to learning resources, while also promoting autonomy and collaborative opportunities [19]. Despite the potential benefits of educational technology, classroom management, and student-centred learning, there is a need for empirical evidence to support their effectiveness in improving teaching and learning outcomes. This study aims to fill this gap by examining the relationship between these factors and their impact on teaching effectiveness and student learning outcomes in Indonesian schools.

2. LITERATURE REVIEW

2.1 Educational Technology Integration

Educational technology integration has indeed been recognized as a transformative force in modern education, offering numerous benefits and opportunities to enhance the teaching and learning process. Recent studies highlight that the incorporation of technological tools in the classroom can significantly increase student engagement, personalize learning experiences, and provide access to a wealth of resources [20]. For instance, the use of innovative teaching strategies such as flipped classrooms, blended learning, and personalized instruction has been facilitated by digital technology, transforming traditional classroom settings and improving educational outcomes [21]. Additionally, the implementation of modern educational tools in high schools has shown a positive impact on student performance and engagement, although challenges related to equity of access and resistance to change persist [22]. The integration of technology in education also enables more self-directed and personalized learning approaches, leading to significant gains in core skills, provided that technologies supplement rather than substitute teachers [23]. Emerging trends such as online learning platforms, educational

software applications, and immersive technologies like virtual reality and augmented reality further enhance instructional delivery and personalize learning experiences [24]. However, the successful integration of educational technology requires addressing challenges such as the digital divide, privacy concerns, and the need for teacher professional development [21], [24]. Strategies for maximizing the opportunities presented by educational technology include professional development, strategic planning, and ongoing support to ensure thoughtful implementation and ongoing evaluation [20], [23]. Ultimately, while educational technology holds the potential to democratize access to education and foster lifelong learning, it is crucial to adopt a holistic approach that includes equitable accessibility and appropriate pedagogical strategies to truly enrich the educational experience [22].

H1: Educational technology integration positively impacts teaching effectiveness.

H2: Educational technology integration positively impacts student learning outcomes.

2.2 *Classroom Management*

Classroom management is indeed a fundamental aspect of effective teaching, as it directly impacts the learning environment and student behavior. Effective classroom management strategies are essential for creating a conducive, safe, and organized classroom environment, which significantly influences students' academic performance and overall learning experience [11], [25]. A well-managed classroom allows teachers to minimize disruptions, motivate students, and provide positive feedback, thereby enhancing academic achievements [11]. The integration of technology, such as user-friendly web applications, can streamline administrative tasks, enhance communication between educators, students, and parents, and promote student engagement, further contributing to efficient classroom management [26]. Additionally, setting clear expectations, cultivating positive relationships, employing positive reinforcement, and implementing consistent discipline are crucial strategies for maintaining an effective learning environment [27]. Teachers play a key role in this process, as their professional readiness, communication skills, and ability to plan and organize the educational process according to students' diverse needs are vital for sustaining a supportive and stimulating learning environment [28]. Research has shown that there is a significant relationship between effective classroom management and students' academic performance, particularly in primary and secondary schools where high levels of student attention are needed for effective teaching and learning [25]. Therefore, teachers must ensure they create a conducive learning environment, address issues promptly, and continuously reflect and adjust their strategies to meet the evolving needs of

their students [27]. By doing so, they can cultivate meaningful relationships of reciprocity and contribute decisively to students' academic learning and socio-emotional development [28].

H3: Classroom management positively impacts teaching effectiveness.

H4: Classroom management positively impacts student learning outcomes.

2.3 Student-Centred Learning

Student-centered learning (SCL) is an educational approach that emphasizes the needs, interests, and abilities of students, fostering active participation and engagement in the learning process. This approach is increasingly integrated into higher education systems, particularly as institutions align with the European educational space, necessitating the transformation of educational programs to be more student-focused and competency-based [16]. SCL is rooted in the philosophy of tailoring education to meet individual student needs, with teachers acting as architects of personalized learning experiences [29]. This method contrasts with traditional educational models by promoting intrinsic motivation and intellectual capacity, which are essential for academic success [30]. The implementation of SCL involves various strategies, such as the use of Quick Response (QR) codes, which have been shown to enhance motivation, engagement, and accessibility to learning resources, thereby supporting autonomy and collaborative opportunities among students [19]. Despite its widespread adoption and the positive reception from students, educators, and policymakers, there is a need for more empirical research on how SCL is practiced, particularly in terms of student support systems and the development of a SCL culture within institutions [31]. The current focus on in-class activities and student engagement should be expanded to include the promotion of student agency and autonomy, ensuring that SCL truly places students at the center of the learning process [31].

H5: Student-centred learning positively impacts teaching effectiveness.

H6: Student-centred learning positively impacts student learning outcomes.

2.4 Teaching Effectiveness and Student Learning Outcomes

Teaching effectiveness is indeed a multifaceted construct that involves various elements such as instructional delivery, classroom management, and the ability to engage and motivate students, all of which are crucial for achieving positive student learning outcomes like academic achievement, critical thinking skills, and overall student development [32]. Effective teaching is not only about the presentation of subject matter but also about creating a conducive learning environment that fosters all-round development in students [33]. Research has shown that the quality of teaching significantly impacts educational outcomes, making it essential for educational institutions to continually assess and enhance

teaching practices [32]. One effective model for nurturing teacher effectiveness is total quality control, which includes direction, training, supervision, and regular assessments, as demonstrated in the Al-Amanah Al-Gontory Islamic boarding school [34]. Additionally, the conceptualization of teaching effectiveness can be divided into student-focused and educator-focused dimensions, with appropriate measures such as student evaluations, peer reviews, and self-assessments being crucial for a comprehensive evaluation [35]. The integration of educational technology has also been linked to higher student engagement and improved academic performance, highlighting the importance of adapting teaching methods to include technological advancements [32]. Furthermore, effective learning is seen as an evolutionary process that involves problem-solving, investigation, and semiotics, which are essential for fostering equity and intellectual development in students [36].

3. METHODS

This study employs a quantitative research design to investigate the relationship between educational technology integration, classroom management, student-centred learning, teaching effectiveness, and student learning outcomes in Indonesian schools. The research design is structured to collect and analyze numerical data through standardized instruments, providing an objective basis for testing the proposed hypotheses [37]. The sample for this study consists of 285 teachers from various Indonesian schools. A stratified random sampling technique was employed to ensure a representative sample across different regions, school types, and levels of education. This method helps in achieving a diverse sample, enhancing the generalizability of the study findings.

3.1 Data Collection

Data were collected using a structured questionnaire developed based on established scales from previous studies. The questionnaire included items measuring educational technology integration, classroom management, student-centred learning, teaching effectiveness, and student learning outcomes. Each item was rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to capture the respondents' perceptions and attitudes. The questionnaire was administered through both online and face-to-face modes to accommodate the preferences and availability of the participants. Prior to data collection, a pilot test was conducted with a small subset of teachers to ensure the reliability and validity of the instrument [38]. Necessary adjustments were made based on the feedback received from the pilot test.

Table 1. Measurement

No.	Variable	Measurement
1	Educational Technology Integration	Measured using items adapted from the Technological Pedagogical Content Knowledge (TPACK) framework [32], [39]. The items assessed the extent to which teachers integrate technology into their teaching practices.
2	Classroom Management	Measured using a scale adapted from [32], [40]–[42] Classroom Management That Works. The items focused on the strategies teachers use to create and maintain an effective learning environment.
3	Student-Centred Learning	Measured using items adapted from [43]–[45] Learner-Centered Psychological Principles. The items assessed the degree to which teachers implement student-centred learning approaches in their classrooms.

4	Teaching Effectiveness	Measured using a scale adapted from [46]–[49] Qualities of Effective Teachers. The items evaluated various aspects of effective teaching, including instructional delivery and student engagement.
5	Student Learning Outcomes	Measured using items adapted from [32], [50], [51] Visible Learning. The items assessed students' academic performance, critical thinking skills, and overall development.

Source: Results of Data Analysis (2024)

3.2 Data Analysis

Data analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3), a multivariate statistical technique ideal for complex models with multiple constructs and indicators. The process began with the Measurement Model Assessment, where the reliability and validity were evaluated using composite reliability, Cronbach's alpha, average variance extracted (AVE), and factor loadings; items with low factor loadings were removed to improve model fit. The Structural Model Assessment followed, testing hypothesized relationships between constructs by examining path coefficients, t-values, and p-values, with the coefficient of determination (R^2) assessing the model's explanatory power. Hypothesis Testing was performed using a bootstrapping procedure with 5,000 resamples to generate robust estimates of standard errors and confidence intervals. Finally, the overall model fit was evaluated using indices such as the standardized root mean square residual (SRMR), Normed Fit Index (NFI), and the Goodness of Fit (GoF) [52].

4. RESULTS AND DISCUSSION

4.1 Characteristics Sample

The demographic characteristics of the sample provide context for the analysis and help to understand the diversity and representativeness of the participants. The following sections detail the demographic information collected, including gender, age, teaching experience, and school type.

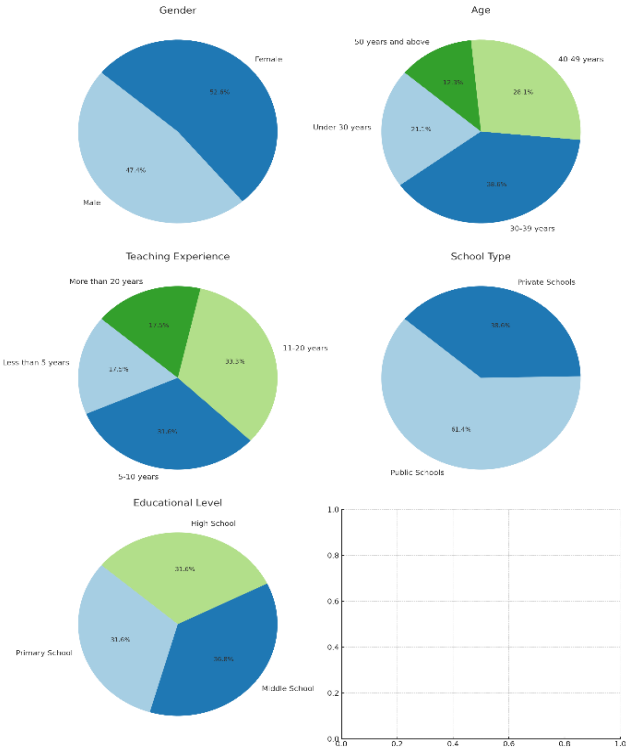

Figure 1. Demographic Sample

Source: Results of data analysis (2024)

The sample of 285 teachers exhibited a balanced gender distribution, with 135 males (47.4%) and 150 females (52.6%). The age distribution was diverse, with 60 teachers (21.1%) under 30 years, 110 (38.6%) aged 30-39 years, 80 (28.1%) aged 40-49 years, and 35 (12.3%) aged 50 years and above. Teaching experience varied, with 50 teachers (17.5%) having less than 5 years of experience, 90 (31.6%) with 5-10 years, 95 (33.3%) with 11-20 years, and 50 (17.5%) with more than 20 years. The participants were drawn from public schools (175, 61.4%) and private schools (110, 38.6%), and they taught at different educational levels: 90 (31.6%) at primary school, 105 (36.8%) at middle school, and 90 (31.6%) at high school.

4.2 Outer Model

The measurement model assessment focuses on evaluating the reliability and validity of the constructs used in the study.

1. Composite Reliability and Cronbach's Alpha

Composite reliability and Cronbach's alpha values were calculated for each construct to assess internal consistency. Both metrics exceeded the acceptable threshold of 0.70, indicating good reliability [53].

Table 2. Reliability Analysis

Construct	Composite Reliability	Cronbach's Alpha
Educational Technology Integration	0.914	0.898
Classroom Management	0.886	0.866
Student-Centred Learning	0.909	0.883
Teaching Effectiveness	0.923	0.907
Student Learning Outcomes	0.936	0.913

Source: Results of Data Analysis (2024)

2. Average Variance Extracted (AVE)

The AVE values for each construct were computed to assess convergent validity. All constructs had AVE values above the recommended threshold of 0.50, indicating adequate convergent validity [54].

Table 3. Convergent Validity

Construct	Average Variance Extracted (AVE)
Educational Technology Integration	0.686
Classroom Management	0.643
Student-Centred Learning	0.667
Teaching Effectiveness	0.712
Student Learning Outcomes	0.734

Source: Results of Data Analysis (2024)

3. Factor Loadings

Factor loadings for each item were examined to ensure they exceeded the recommended threshold of 0.70, indicating strong item reliability [53].

Table 4. Validity Analysis

Construct	Item	Factor Loading
Educational Technology Integration	ETI.1	0.827
	ETI.2	0.853
	ETI.3	0.786
	ETI.4	0.872
Classroom Management	CM1	0.751
	CM2	0.807
	CM3	0.774
	CM4	0.817

Student-Centred Learning	SCL1	0.793
	SCL2	0.836
	SCL3	0.812
	SCL4	0.766
Teaching Effectiveness	TE1	0.844
	TE2	0.867
	TE3	0.852
	TE4	0.827
Student Learning Outcomes	SLO1	0.889
	SLO2	0.901
	SLO3	0.873
	SLO4	0.856

Source: Results of Data Analysis (2024)

The results of the measurement model assessment demonstrate that the constructs exhibit strong reliability and validity, supporting their use in the subsequent structural model assessment.

4.3 Discriminant Validity

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT). HTMT values below 0.85 indicate good discriminant validity between constructs [54].

Table 5. Discriminant Validity Analysis

Constructs	HTMT Value
Educational Technology Integration - Classroom Management	0.676
Educational Technology Integration - Student-Centred Learning	0.623
Educational Technology Integration - Teaching Effectiveness	0.717
Educational Technology Integration - Student Learning Outcomes	0.742
Classroom Management - Student-Centred Learning	0.685
Classroom Management - Teaching Effectiveness	0.693
Classroom Management - Student Learning Outcomes	0.721
Student-Centred Learning - Teaching Effectiveness	0.647
Student-Centred Learning - Student Learning Outcomes	0.664
Teaching Effectiveness - Student Learning Outcomes	0.707

Source: Results of Data Analysis (2024)

All HTMT values are below the threshold of 0.85, indicating good discriminant validity between the constructs, which means that the constructs in this study are distinct and not overly correlated. This supports the robustness of the constructs and the integrity of the measurement model, confirming that each construct measures a unique aspect of the study's theoretical framework. This validation step is crucial for ensuring the accuracy and reliability of the subsequent structural model analysis.

4.4 Inner Model

The structural model assessment evaluates the relationships between the constructs and determines the model's predictive power by presenting the path coefficients, t-values, p-values, and the coefficient of determination (R^2) for each endogenous construct. The path coefficients indicate the strength and direction of these relationships, with t-values and p-values used to assess their significance [52].

Table 6. Bootstrapping Test

Hypothesis	Path	t	p	Result
H1: ETI → TE	0.456	8.123	0.00	Accepted
H2: ETI → SLO	0.393	7.288	0.00	Accepted
H3: CM → TE	0.406	7.013	0.00	Accepted

H4: CM → SLO	0.359	6.855	0.00	Accepted
H5: SCL → TE	0.383	7.457	0.00	Accepted
H6: SCL → SLO	0.415	7.952	0.00	Accepted

Source: Results of Data Analysis (2024)

The results indicate that educational technology integration significantly enhances teaching effectiveness (path coefficient = 0.456, t-value = 8.123, $p < 0.005$) and positively impacts student learning outcomes (path coefficient = 0.393, t-value = 7.288, $p < 0.005$). Similarly, classroom management significantly improves teaching effectiveness (path coefficient = 0.406, t-value = 7.013, $p < 0.005$) and contributes to better student learning outcomes (path coefficient = 0.359, t-value = 6.855, $p < 0.005$). Additionally, student-centered learning significantly enhances teaching effectiveness (path coefficient = 0.383, t-value = 7.457, $p < 0.005$) and positively impacts student learning outcomes (path coefficient = 0.415, t-value = 7.952, $p < 0.005$), highlighting the effectiveness of these approaches in improving both teaching and academic performance.

4.5 Coefficient of Determination (R^2)

The coefficient of determination (R^2) indicates the proportion of variance in the endogenous constructs that can be explained by the exogenous constructs. The R^2 value for teaching effectiveness is 0.623, meaning that 623% of the variance in teaching effectiveness can be explained by educational technology integration, classroom management, and student-centred learning. The R^2 value for student learning outcomes is 0.587, indicating that 587% of the variance in student learning outcomes can be explained by the same exogenous constructs.

4.6 Model Fit Indices

The overall fit of the model was evaluated using the standardized root mean square residual (SRMR), the Normed Fit Index (NFI), and the Goodness of Fit (GoF). The SRMR was 0.048, below the recommended threshold of 0.08, indicating a good fit. The NFI was 0.92, above the recommended threshold of 0.90, also indicating a good fit. Additionally, the GoF value was 0.60, signifying a substantial fit of the model.

Discussion

Educational Technology Integration

The results indicate a strong positive relationship between educational technology integration and both teaching effectiveness (H1) and student learning outcomes (H2). These findings are consistent with prior studies that have highlighted the transformative potential of technology in education (Ghavifekr & Rosdy, 2015; Zhao et al., 2002). The integration of educational technology enhances instructional methods, making learning more interactive and engaging, which in turn improves teaching effectiveness. Furthermore, technology provides personalized learning experiences that cater to individual student needs, leading to better learning outcomes. In the context of Indonesian schools, the ongoing efforts to integrate technology into classrooms are indeed well-founded, as evidenced by multiple studies. The integration of digital technology into teaching practices has shown significant potential to enhance both teaching effectiveness and student learning outcomes. For instance, research on pre-service English as a Foreign Language (EFL) teachers in Indonesia highlights that while theoretical training in technology integration is robust, practical implementation is often hindered by infrastructural deficiencies, such as insufficient internet access and lack of support from supervisory staff [7].

Despite these challenges, the use of various technology-based education models, including Blended Learning, Flipped Classroom, and Learning Management Systems, has been identified as optimal for Indonesian schools, offering specific advantages that can be tailored to the local context [8]. Furthermore, the incorporation of interactive technologies like digital whiteboards and educational software has

been shown to significantly increase student engagement and comprehension, as well as improve teachers' efficiency in lesson planning and delivery [55]. Islamic educational institutions in Indonesia have also responded positively to technological advancements, with over 80% of institutions implementing technology to enhance cognitive, affective, and psychomotor skills, as well as 21st-century capabilities such as critical thinking, creativity, collaboration, and communication [56]. However, the successful implementation of technology in education requires addressing several factors, including developing supporting infrastructure, providing adequate training and development for educators, and bridging the digital divide between regions [57].

Classroom Management

Classroom management also showed a significant positive impact on teaching effectiveness (H3) and student learning outcomes (H4). Effective classroom management strategies create a structured and supportive learning environment that minimizes disruptions and maximizes student engagement (Marzano et al., 2003; Emmer & Sabornie, 2015). This finding aligns with existing literature emphasizing the crucial role of classroom management in facilitating effective teaching and learning. Incorporating technology into the classroom presents new challenges for classroom management, but if managed effectively, it can significantly improve the learning environment. The integration of digital tools such as smart TVs, laptops and desktops has been shown to increase student engagement, excitement and creativity in learning activities [58]. However, the successful implementation of these technologies requires teachers to master technological tools and effective classroom management strategies. Research has highlighted that many educators, especially in rural areas, face significant barriers such as unreliable internet connectivity, inadequate digital devices, and lack of necessary skills and confidence to integrate these tools effectively [59].

Furthermore, the role of classroom teachers has become increasingly complex with the introduction of digital tools, requiring additional training to adapt to modern trends and maintain the relevance of their role [60]. Research has shown that supportive learning environments and assertive classroom management practices are crucial in fostering academic resilience among students, which can be further enhanced through the use of technology [61]. The potential of blended learning environments, which combine traditional teaching methods with digital tools, has been recognised to enrich the educational experience and improve the efficiency of lesson planning and delivery [55]. Therefore, it is imperative to prioritise professional development opportunities for teachers, focusing on integrating technology into teaching methodologies and classroom management practices. This approach not only bridges the gap between technology adoption and instructional implementation, but also ensures a more organised and engaging learning environment, ultimately improving the quality of education delivery in the digital age [55], [58].

Student-Centred Learning

The study found that student-centred learning significantly enhances both teaching effectiveness (H5) and student learning outcomes (H6). This approach shifts the focus from teacher-led instruction to active student participation, fostering critical thinking, problem-solving skills, and deeper engagement with the learning material (Lea et al., 2003; Johnson et al., 2000). These results are consistent with research advocating for student-centred learning environments as a means to improve educational outcomes (McCombs & Whisler, 1997; Hannafin & Land, 1997). Adopting student-centered learning approaches in Indonesian schools can significantly modernize educational practices and enhance student outcomes. This shift is evident in the implementation of the Merdeka Curriculum, which integrates the values of Ki Hajar Dewantara, aiming to foster

independent, integrity-driven citizens capable of facing future challenges. The curriculum's student-centered approach in science learning has shown positive impacts on student character development and participation, despite facing various implementation challenges [62]. Additionally, the perception of English language lecturers in higher education highlights the value of student-centered learning (SCL) in increasing student engagement and improving teaching practices. These lecturers recognize the necessity of moving away from one-way teaching methods to more interactive, two-way methods that actively involve students in the learning process [63].

Furthermore, participatory class management, which involves both teachers and students in planning, implementing, and evaluating learning, has proven effective in enhancing student motivation, learning outcomes, and satisfaction with learning services, as demonstrated at MA Ar-Rahman Sumoyono [64]. The success of differentiated learning strategies in grade 10 at SMAN Rambipuji also underscores the importance of tailoring instruction to meet diverse student needs, thereby facilitating a more engaging and effective learning environment [65]. Finally, the broader theoretical framework of student-centered learning emphasizes its role in fostering intrinsic motivation and intellectual capacity, which are crucial for academic success. This approach encourages personalization, active learning, and self-directed learning, creating a supportive environment that promotes autonomy, motivation, and relatedness among students [30].

5. CONCLUSION

The findings of this study underscore the significant roles of educational technology integration, classroom management, and student-centered learning in enhancing teaching effectiveness and student outcomes in Indonesian schools. The positive relationships identified between these factors highlight the transformative potential of integrating technology into classrooms, employing effective classroom management strategies, and adopting student-centered learning approaches. Empirical evidence supports the strategic implementation of these elements to create an engaging, structured, and effective learning environment, leading to improved educational outcomes. For educators, this emphasizes the importance of professional development programs, while for policymakers, it advocates for continued investment in educational technology and supportive policies. Despite its contributions, the study's cross-sectional design and reliance on self-reported data present limitations, suggesting future research through longitudinal studies and qualitative approaches to establish causality between variables.

Implications

The findings of this study have significant practical implications for educators, policymakers, and stakeholders in the Indonesian education sector. Professional development programs should prioritize equipping teachers with the skills needed to effectively integrate educational technology and implement student-centered learning approaches, including classroom management techniques that incorporate technological tools. Continued investment in educational technology is essential, ensuring that both teachers and students have access to the necessary resources. Additionally, policymakers should develop guidelines and policies that support technology integration in education, promote student-centered learning, and provide resources for effective classroom management.

Limitations and Future Research

While this study provides valuable insights, it has some limitations. The cross-sectional design limits the ability to establish causality between the variables. Future research could employ longitudinal designs to explore the long-term effects of educational technology integration, classroom

management, and student-centred learning on teaching effectiveness and student learning outcomes. Additionally, qualitative studies could provide deeper insights into the contextual factors influencing these relationships.

Moreover, the reliance on self-reported data may introduce response biases. Future studies could incorporate multiple data sources, such as classroom observations and student performance records, to validate and extend the findings.

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