

THE ROLE OF PARTICIPATIVE LEADERSHIP IN ENHANCING TEACHERS' DIGITAL INNOVATION AND LEARNING QUALITY

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Abstract

This study examines the role of school principals' participative leadership in fostering teachers' intrinsic motivation, technology adoption, and digital teaching innovation to improve post-pandemic learning quality. The research uses a quantitative explanatory approach, supported by qualitative interviews, involving middle and high school teachers who have integrated technology in their teaching practices. Structural Equation Modeling-PLS was used to analyze direct and indirect effects, while intrinsic motivation was tested as a mediating variable. The findings reveal that participative leadership has a significant positive effect on teachers' intrinsic motivation and technology adoption. Intrinsic motivation also strongly influences the adoption of digital tools, which in turn significantly enhances digital teaching innovation. Moreover, digital innovation positively impacts the quality of learning through improved student engagement, material relevance, and instructional effectiveness. The study also confirms that intrinsic motivation mediates the relationship between participative leadership and technology adoption. This research highlights that participative leadership through shared decision-making, support for creative ideas, and open communication can build a conducive psychological environment for innovation. The study offers theoretical contributions by integrating leadership, motivation, and innovation frameworks. Practically, the results suggest the need for school leadership strategies that empower teachers, encourage experimentation, and provide both technical and psychological support for sustainable digital transformation in education.

Keywords: Participative leadership, intrinsic motivation, technology adoption, digital innovation, learning quality

I. Background of the Problem

Improving the quality of education in the digital age has become one of the top priorities in Indonesia's education system. The development of information and communication technology (ICT) has driven significant transformations in teaching practices at all levels of education, from elementary schools to high schools and universities. These changes have become even more pronounced post-COVID-19 pandemic, when remote learning and the use of digital platforms became a necessity. Since then, teachers' skills in utilizing technology and innovating in learning have become key factors in determining the effectiveness and quality of the teaching and learning process. However, the reality on the ground shows that not all teachers have the same readiness to adopt technology, whether due to limitations in skills, resources, or support from school management.

Research conducted by Kusumawati, (2022) shows that participatory leadership by school principals can enhance teachers' intrinsic motivation, which in turn positively impacts the quality of learning. This intrinsic motivation includes teachers' sense of autonomy, competence, and social connectedness with colleagues and the school environment. These findings reinforce the view that a leadership style that actively involves teachers in decision-making, provides space for innovation, and supports creative ideas is an effective strategy for empowering teachers.

However, the research results do not explicitly link participatory leadership with teachers' ability to adopt technology and innovate in digital teaching. Yet, in the context of modern education,

technology adoption is not merely technical but also requires a work environment that encourages exploration, collaboration, and the courage to try new approaches. Participatory leadership has the potential to be a key catalyst in this process, as it provides teachers with trust, support, and a sense of ownership over the innovations being implemented.

Post-COVID-19 pandemic, the demand for technology integration in learning has increased dramatically. Blended learning models, the use of online learning platforms, and the utilization of AI-assisted teaching tools have become part of the education ecosystem. Teachers are expected not only to master these technologies but also to design creative teaching methods that integrate pedagogical, technological, and student needs (TPACK framework). Unfortunately, various reports indicate that the main barriers to technology adoption in schools are a lack of leadership support, limited training, and a school culture that does not fully encourage innovation.

The Technology Acceptance Model (TAM) theory explains that technology acceptance is influenced by perceived usefulness and perceived ease of use, both of which are greatly influenced by organizational support, including leadership style. School principals with a participatory leadership style can facilitate training, provide opportunities for teachers to experiment with technology, and appreciate teachers' innovative efforts, thereby enhancing teachers' positive perceptions of the technology.

Participative leadership is defined as a leadership style that actively involves team members in the decision-making process, provides autonomy in task execution, and builds open two-way communication. In the school context, this means that the principal not only directs but also listens to teachers' aspirations, supports new learning ideas, and ensures that decisions reflect teachers' needs and input. Previous studies have shown that this leadership style can increase teachers' engagement, job satisfaction, and commitment to the school.

However, in the context of technology-based teaching innovation, the effects of participatory leadership have been relatively understudied. Most previous research has focused on the impact of leadership on student academic performance or teacher motivation, without specifically outlining the role of leadership in driving digital innovation. However, the process of technology-based learning innovation requires both strategic support (provision of infrastructure and training) and psychological support (granting trust and appreciation), both of which can be facilitated by participatory leadership.

The relationship between participatory leadership and digital teaching innovation can be explained through several mechanisms. First, teacher participation in decision-making enhances a sense of ownership toward the implemented innovations. Second, the autonomy granted by school principals allows teachers to experiment with new teaching methods without fear of failure. Third, support for teachers' creative ideas enhances a sense of confidence.

The relationship between participatory leadership and digital teaching innovation can be explained through several mechanisms. First, teacher participation in decision-making increases their sense of ownership of the innovations implemented. Second, the autonomy granted by the principal allows teachers to experiment with new learning methods without fear of failure. Third, support for teachers' creative ideas increases their sense of competence and encourages them to integrate technology more effectively into learning. Fourth, open and collaborative communication creates a work environment conducive to the exchange of ideas and best practices among teachers.

In the Indonesian context, the challenge of technology adoption in schools has additional dimensions related to resource disparities, teacher readiness, and organizational culture. Schools in urban areas may have better access to technology infrastructure and training, while schools in remote areas face serious limitations. In such situations, participatory leadership can be an adaptive strategy that helps optimize teachers' potential according to the conditions of each school. By involving teachers in determining relevant and feasible technology priorities, school principals can ensure that digital learning innovations are more targeted.

Therefore, research on the influence of school principals' participatory leadership on technology adoption and digital teaching innovations among teachers, as well as its impact on post-pandemic learning quality, is important to conduct. This research is expected to contribute theoretically by integrating the concepts of participatory leadership, teachers' intrinsic motivation, and technology adoption into a single analytical framework. Additionally, practically, the results of this research can serve as a basis for developing school leadership strategies to accelerate digital transformation in education in Indonesia, particularly in preparing teachers to face the challenges of the 21st century.

II. Literature Review

2.1 Participative Leadership in the Educational Environment

Participative leadership is a leadership style that emphasizes the involvement of organizational members in the decision-making process, provides autonomy in task implementation, and encourages open two-way communication (Doğuş et al., 2025). In the context of schools, principals with this style will listen to teachers' aspirations, accommodate creative ideas, and foster a sense of ownership toward school policies and programs (Yalçınkaya & Çopuroğlu, 2021).

Kusumawati, (2025) research shows that participatory leadership increases teachers' intrinsic motivation through three main dimensions: autonomy, competence, and social connectedness. Additionally, this leadership style contributes to a collaborative climate in schools that supports pedagogical innovation. This aligns with the findings of (Olcum & Titrek, 2015), who state that teacher involvement in decision-making positively influences professionalism and job satisfaction.

2.2 Teachers' Intrinsic Motivation

Intrinsic motivation is the drive to perform tasks due to personal satisfaction and interest, rather than external pressure or incentives (Ryazanova et al., 2024). In education, teachers with high intrinsic motivation tend to be more creative, innovative, and committed to student learning (Yuan et al., 2022).

Participatory leadership can enhance teachers' intrinsic motivation through the provision of autonomy, recognition of contributions, and support for new ideas (Sağnak, 2016). A study by (Al-Mashhadani et al., 2024) shows that when teachers feel valued and involved, they are more motivated to try innovative learning approaches, including the use of technology. Thus, intrinsic motivation can function as a mediating variable between participatory leadership and digital learning innovation.

2.3 Technology Adoption in Learning

Technology adoption in education refers to the process of accepting, using, and integrating technological devices into teaching practices (Teo, 2011). The Technology Acceptance Model (TAM) (Davis, 1989) explains that technology acceptance is influenced by perceived

usefulness and perceived ease of use. Leadership support is a crucial factor in shaping both perceptions (Landa et al., 2023).

In the post-pandemic context, teachers are required to master various platforms such as Learning Management Systems (LMS), collaboration apps, and interactive learning media. The study by Christensen et al., (2018) emphasizes that teachers' readiness to adopt technology is highly dependent on training, technical support, and the innovative climate created by school leaders. Participatory leadership that encourages teacher participation in selecting and developing learning technologies can enhance the effectiveness of such adoption.

2.4 Digital Teaching Innovation

Digital teaching innovation involves the development and implementation of new and creative technology-based strategies, methods, or learning media to enhance student engagement and learning outcomes (Alonso-Sánchez et al., 2025). This form of innovation can take the form of gamification, digital project-based learning, artificial intelligence integration, or the use of interactive simulations.

Research by (Ghamrawi et al., 2024) shows that the success of digital innovation in schools is greatly influenced by leadership that allows for exploration, supports risk-taking, and provides the necessary resources. Principals who practice participatory leadership are more likely to accommodate teachers' creative ideas and facilitate their implementation in the classroom.

2.5 Quality of Learning

The quality of learning is measured through the effectiveness of the teaching process, student engagement, relevance of materials, and achievement of learning outcomes (Sanchez-Sibony, 2022). Teacher motivation, technological readiness, and pedagogical innovation contribute significantly to the quality of learning.

According to (Pugu & Mursidin, 2025), principals who are able to create a positive work climate and encourage innovation will have an impact on improving the quality of learning. The integration of appropriate technology, combined with innovative teaching strategies, has been proven to increase student engagement and academic achievement.

2.6 Research Gap

Based on the literature review, there are several research gaps that can be addressed:

- a. Many studies have discussed the influence of leadership on teacher motivation or learning quality, but few have directly linked it to technology adoption and digital teaching innovation.
- b. There are few studies in Indonesia that examine the role of intrinsic motivation as a mediator between participatory leadership and digital learning innovation.
- c. The post-pandemic context requiring digital transformation in education is still relatively new, so researchers

III. Research Methodology

This study uses a quantitative approach with an explanatory design to examine the direct and indirect effects between variables, as well as the mediating role of teachers' intrinsic motivation. Supporting qualitative data were obtained through in-depth interviews (mixed-method sequential explanatory). The variables studied include: (X) participatory leadership of school principals (indicators: involvement in decision-making, support for creative ideas, open communication,

autonomy); (M) intrinsic motivation of teachers (autonomy, competence, social connectedness); (Z) adoption of learning technology (perceived usefulness, ease of use, frequency, media variety); (Y1) digital teaching innovation (development of new methods, interactive media, technology integration); and (Y2) learning quality (student engagement, relevance of material, learning outcomes, effectiveness).

The population consists of middle and high school teachers in Jabodetabek, Indonesia who have used technology post-pandemic, using proportional stratified random sampling and a minimum of 200 respondents. The instrument is a 5-point Likert questionnaire, tested for content validity, construct validity, and reliability. Data were collected through the distribution of online/offline questionnaires and interviews with 10 teachers. Quantitative analysis used PLS-SEM (bootstrapping 5,000 resampling), while qualitative analysis used thematic analysis. The research adhered to research ethics through informed consent, data confidentiality, and the use of data solely for academic purposes.

IV. Result

Table.01 evaluation of SEM-PLS models

Evaluation Indicators	Value	Interpretation
R ² Intrinsic Motivation	0.37	Moderate
R ² Technology Adoption	0.56	Substantial
R ² Digital Teaching Innovation	0.32	Moderate
R ² Learning Quality	0.24	Weak
Q ² Predictive Relevance (Technology Adoption)	0.41	Highly predictive
Q ² Predictive Relevance (Digital Teaching Innovation)	0.28	Moderately predictive
Q ² Predictive Relevance (Learning Quality)	0.19	Weakly predictive
SRMR (Standardized Root Mean Square Residual)	0.062	Good model fit
GoF (Goodness of Fit)	0.51	Good Fit

Table 1 contains the results of the evaluation of the quality of the SEM-PLS model used in the study, which includes indicators of construct validity and reliability. This evaluation is important to ensure that the research model has good predictive accuracy and measurement consistency. In general, an Average Variance Extracted (AVE) value of more than 0.5 indicates that the indicators are able to explain more than half of the variance of the construct being measured. A Composite Reliability (CR) value above 0.7 indicates that the instrument used is internally reliable. Additionally, the R² value for the endogenous variables shows that the model has a sufficiently high explanatory power for variables such as technology adoption, digital innovation, and learning quality. Furthermore, a positive Q² value indicates the predictive relevance of the model. These results confirm that the SEM-PLS model in this study is valid and robust for explaining the relationships between the variables studied both statistically and theoretically.

Table.02 of Reliability and Construct Validity

Construction	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Participatory Leadership	0.89	0.92	0.64
Intrinsic Motivation	0.87	0.91	0.62
Technology Adoption	0.85	0.9	0.6
Digital Teaching Innovation	0.84	0.89	0.58

Table 2 shows the results of the construct validity and reliability tests used in this study through outer model measurements. Construct validity was evaluated using the Loading Factor value, where items were considered valid if they had a value above 0.70. All indicators in this study met this criterion, indicating that the instrument was able to measure the construct accurately. Additionally, the Average Variance Extracted (AVE) value for each variable exceeds 0.50, meaning that the latent variables can explain more than 50% of the variance in the indicators. For reliability, the Composite Reliability (CR) value for the entire construct is greater than 0.70, indicating that each construct has high internal consistency. These results show that the instrument used in this study meets measurement quality standards, both in terms of convergent validity and reliability, making it suitable for further structural analysis.

Table.03 SEM-PLS Research Results

Relationships Variables	Between Path Coefficient	p-value	Description
Participatory Leadership → Intrinsic Motivation	0.61	<0.001	Significant direct effect
Participatory Leadership → Technology Adoption	0.34	<0.01	Significant direct effect
Intrinsic Motivation → Technology Adoption	0.43	<0.001	Significant direct effect
Technology Adoption → Digital Teaching Innovation	0.57	<0.001	Significant direct effect
Digital Teaching Innovation → Learning Quality	0.49	<0.001	Significant direct effect
Participatory Leadership → Intrinsic Motivation → Technology Adoption	0.26	<0.01	Significant indirect effect (mediation)

Table 1 presents the results of path analysis using the SEM-PLS method, which tests the relationships between variables in this study, namely participatory leadership of school principals, intrinsic motivation of teachers, adoption of learning technology, digital teaching innovation, and learning quality. The results indicate that participatory leadership has a significant direct effect on teachers' intrinsic motivation ($\beta = 0.61$; $p < 0.001$) and also on technology adoption ($\beta = 0.34$; $p < 0.01$). Additionally, teachers' intrinsic motivation strongly influences the adoption of learning technology ($\beta = 0.43$; $p < 0.001$), which in turn drives digital teaching innovation ($\beta = 0.57$; $p < 0.001$). This innovation ultimately has a significant impact on improving learning quality ($\beta = 0.49$; $p < 0.001$). Interestingly, there is a significant mediating

effect of intrinsic motivation in the relationship between participatory leadership and technology adoption ($\beta = 0.26$; $p < 0.01$). This suggests that a leadership approach that actively involves teachers can create a positive psychological climate for digital learning transformation in schools.

V. Discussion

5.1 H1 Participatory Leadership → Teachers' Intrinsic Motivation

The results show that the principal's participatory leadership has a positive and significant effect on teachers' intrinsic motivation ($\beta = 0.61$; $p < 0.001$). This is consistent with research by (Sağnak, 2016), which confirms that participation in decision-making provides intrinsic rewards for teachers, increasing their sense of autonomy and engagement. This support reinforces the importance of a collaborative leadership style in building a healthy work environment and motivating teachers to continue to develop professionally.

5.2 H2 Participatory Leadership → Adoption of Learning Technology

Participatory leadership was also found to have a significant effect on technology adoption ($\beta = 0.34$; $p < 0.01$). School principals who are open to teachers' ideas and provide space for technology exploration encourage teachers to be more confident in implementing technology in learning. This aligns with the findings of (Howard et al., 2010) Howard et al. (2010), who stated that participatory management increases intrinsic motivation, which is the foundation for technology acceptance according to the TAM model.

5.3 H3 Intrinsic Motivation → Adoption of Learning Technology

Teachers' intrinsic motivation was found to have a strong influence on the adoption of learning technology ($\beta = 0.43$; $p < 0.001$). Teachers who feel competent, autonomous, and socially connected are more likely to accept and use technology in the learning process. This is reinforced by Mayangsari et al., (2025), who emphasize that intrinsically motivated teachers demonstrate high resilience in facing challenges and are more adaptive in integrating technology.

5.4 H4 Technology Adoption → Digital Teaching Innovation

Technology adoption has a significant impact on digital teaching innovation ($\beta = 0.57$; $p < 0.001$). Teachers who are familiar with digital devices are more likely to develop creative, interactive, and contextual learning strategies. Research by (Chen & Abd Rani, 2025) shows that teacher engagement and motivation strengthen the adoption of innovative teaching practices. Innovations such as gamification, simulation, and digital project-based learning are greatly influenced by teachers' technological readiness.

5.5 H5 Digital Teaching Innovation → Learning Quality

Digital teaching innovation contributes significantly to improving learning quality ($\beta = 0.49$; $p < 0.001$). This is evident from increased student engagement, relevance of materials, and achievement of learning outcomes. A systematic review by (Awang et al., 2025) concluded that the combination of digital competence and organizational support creates an environment conducive to pedagogical innovation, ultimately enhancing learning effectiveness.

5.6 H6 Mediation: Participatory Leadership → Intrinsic Motivation → Technology

Adoption Another important finding is the mediating effect of intrinsic motivation in the relationship between participatory leadership and technology adoption ($\beta = 0.26$; $p < 0.01$). This indicates that support and involvement from school principals will have a more optimal

impact if they can stimulate teachers' internal motivation to learn and experiment.(Sağnak, 2016) research also found that intrinsic motivation is an important bridge between leadership style and teachers' innovative behavior, including in the context of technology adoption.

VI. Conclusions and Recommendations

This study shows that the participatory leadership of school principals plays an important role in increasing teachers' intrinsic motivation, which in turn encourages the adoption of learning technology and digital teaching innovations. All relationships between variables were found to be significant, both directly and indirectly through the mediation of intrinsic motivation. The digital innovations implemented by teachers contribute significantly to improving the quality of learning, especially in the post-pandemic context.

Based on these findings, it is recommended that school principals adopt a participatory leadership style by providing teachers with opportunities to participate in decision-making, supporting creative ideas, and fostering two-way communication. Additionally, technology training should not only be technical in nature but also aimed at building teachers' motivation and self-confidence. This approach is believed to accelerate the sustainable and far-reaching digital transformation of education.

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