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Enhancing Teacher Innovativeness through Transformational Leadership, Organizational Commitment, and Motivation: The Mediating Role of Technological Literacy

Herman Lasrin[1*]; Bibin Rubini[2]; Lina Novita[3]

[1;2]Department of Educational Management Universitas Pakuan, Bogor, Indonesia

Corresponding Author: Herman Lasrin[1*]

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Abstract: This study aims to investigate the influence of transformational leadership, organizational commitment, and teacher motivation on teacher innovativeness, with technological literacy acting as a mediating variable. Recognizing the crucial role of teacher innovation in achieving quality education, this research adopts a sequential mixed-methods approach involving qualitative interviews and quantitative surveys. The qualitative phase involved 11 school principals in Bogor, Indonesia, who provided insights into the innovation landscape within schools, while the quantitative phase involved 127 permanent teachers from 12 accredited private high schools. Validated instruments and structured questionnaires were used to measure five key constructs: transformational leadership, organizational commitment, teacher motivation, technological literacy, and teacher innovativeness. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0, followed by the SITOREM method for strategic improvement mapping. The findings reveal that both transformational leadership and teacher motivation have direct and significant impacts on innovativeness. Furthermore, organizational commitment influences innovativeness indirectly through technological literacy. Among the strongest indicators of innovativeness were self-development and quality improvement. The SITOREM analysis highlighted several high-priority areas for intervention, including leadership support, reward mechanisms, and digital training programs. This research emphasizes the importance of aligning digital competence with motivational and leadership frameworks to enhance innovation capacity. Schools are encouraged to invest in digital literacy programs, foster a culture of innovation, and develop strategic leadership to support teacher growth. The study contributes a practical model for driving educational transformation in developing country contexts and informs policy on effective innovation strategies in schools.

Keywords: *Teacher Innovativeness, Transformational Leadership, Organizational Commitment, Motivation, Technological Literacy, PLS-SEM, SITOREM.*

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I. INTRODUCTION

In the era of digital transformation and educational disruption, the ability of teachers to innovate has become a central pillar of effective and adaptive education. Teacher innovativeness is no longer an optional competency but a necessity for navigating the rapidly changing demands of 21st-century learning. The global shift toward student-centered, technology-integrated, and outcome-based education models has placed immense pressure on teachers to continuously adapt, create, and lead innovations in instructional practices. In this context, the demand for a new generation of educators who are not only competent in subject content but also capable of initiating change and fostering creativity is stronger than ever.

Innovativeness refers to the ability and tendency of an individual or group to create, accept, develop, and apply new ideas, methods, products, or processes that bring benefits to individuals, institutions, and society. This trait reflects openness to change, willingness to take risks, and readiness to continue learning and adapting to developments in technology, society, and education [1] - [4].

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In the world of education, teacher innovation includes initiatives in creating and implementing updates in learning practices, including the development of lesson plans, media, evaluation strategies, and active roles in professional activities that encourage renewal [5]-[7]. Innovative teachers demonstrate an open attitude toward creative ideas, accept change, and actively disseminate innovations to improve teaching quality [8]..

From a psychological and social perspective, innovation reflects a positive attitude toward new things, high self-efficacy, and the ability to think and act creatively [9]-[10]. Referring to Rogers' theory of innovation adoption, innovation is understood as the speed at which an individual accepts and adopts innovation compared to other individuals in a particular social system [11]-[12].

More broadly, individual innovativeness reflects personal capacity to adapt to change, accept new ideas and practices, and actively participate in creating applicable solutions in various contexts, both personal and organizational [13]-[15]. Innovativeness consists of various dimensions, such as creative thinking ability, attitude toward change, and concrete actions in realizing innovation.

➢ *In an Educational Environment, Innovation has three main Aspects [16], Namely:*

- Individual readiness to adapt to the dynamics of a rapidly changing society
- The need for new approaches and technologies in the learning system
- The role of educational institution leadership in creating a climate that supports change.

Thus, innovation is not only a characteristic of creative and proactive individuals, but also an important indicator in the process of transforming the education system. This is marked by active involvement, flexibility in thinking, and readiness to face the ever-evolving dynamics of change [17],[18]. Transformational leadership is a leadership approach that focuses on guiding, motivating, and inspiring followers to go beyond their personal goals to achieve broader organizational goals. This leadership style plays a role in shaping the mindset, attitudes, and internal values of followers, thereby motivating them to perform beyond initial expectations [19], [20]..

As explained by [21] Abu-Rumman (2021), transformational leadership is the process of building loyalty and work enthusiasm to support the vision and mission of the organization. Meanwhile, [22] Berkovich & Hassan (2023) view transformational leaders as individuals who are able to broaden the horizons and goals of their followers and encourage them to achieve better results.

➢ *This Approach is usually Recognized through four main Elements [23]-[25], Namely:*

- Idealized Influence: Leaders become respected and emulated figures because of their moral exemplary behavior and high integrity. They build trust and admiration from their followers.
- Inspirational Motivation: Leaders convey a compelling vision, inspire enthusiasm, and foster high expectations for the future of the organization.
- Intellectual Stimulation: Leaders encourage followers to think creatively and challenge old habits in order to find new, more effective approaches.
- Individualized Consideration: Leaders give personal attention and support to each member, tailoring their approach based on individual needs and potential.

Transformational leadership is considered highly influential in improving organizational performance through increased motivation, engagement, and work commitment among followers [26]-[27. This style has proven effective in various contexts, ranging from school environments to the business world, including small organizations and the technology sector [28].

More than just conveying directions, transformational leaders shape their followers' thinking orientation, encouraging them to prioritize collective interests over narrow individual goals. By mobilizing collective awareness and reinforcing shared values, transformational leaders help create a competitive, innovative, and adaptable work environment [19]-[20].

Organizational commitment describes the psychological and emotional relationship between an individual and the organization where they work. This relationship is reflected in the level of loyalty, active involvement, and identification with the values and direction of the organization. Someone with high commitment will show a strong intention to remain in the organization and be willing to contribute maximally to achieve common goals [29].

According to Ivancevich and his colleagues, commitment to an organization consists of three main components, namely *involvement in organizational tasks*, *identification with the organization's vision and mission*, and *loyalty to the institution itself*. [30] Nguyen & Ngo (2020) also emphasize that commitment reflects employees' willingness to stay, give their best efforts, and play an active role in the organization in the long term.

This commitment acts as an internal driving force that influences individual attitudes and behavior and helps determine the sustainability of the organization. Committed individuals generally tend to avoid negative behaviors such as absenteeism or the desire to leave their jobs [31]-[32].

➢ *In Theoretical Studies, Organizational Commitment is Generally Divided into Three main Types [33], [28], Namely:*

- Affective Commitment; Refers to employees' emotional attachment to the organization, including a sense of belonging and pride in being part of it. Those with this type of commitment tend to work with dedication because they feel emotionally comfortable.

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- Continuance Commitment; Represents rational awareness of the potential losses that may arise from leaving the organization, whether in terms of economic benefits, job satisfaction, or personal stability [34]. Individuals stay not just because they are happy, but because they are aware of the risks.

- Normative Commitment; Based on a sense of moral and ethical responsibility to remain loyal to the organization, even if there are more lucrative job offers. This commitment arises from a sense of values, not merely a cost-benefit calculation [35].

As stated by experts such as [36] Cilek (2019), [37] Seema & Saini (2021), organizational commitment is not only about the desire to stay, but also the extent to which an individual identifies with the organization's values and goals, as well as their willingness to fight together.

In conclusion, organizational commitment is a key factor in ensuring the sustainability, stability, and long-term success of an organization. This commitment manifests itself in three main dimensions: affective (emotional), continuance (rational), and normative (moral), all of which form the basis of employee dedication and loyalty [38].

Teacher motivation is a psychological and emotional drive—whether internal or external—that inspires enthusiasm, directs actions, and maintains teachers' engagement in their educational roles. This drive plays a crucial role in determining the level of commitment, dedication, and effort a teacher invests in achieving optimal learning outcomes and supporting the advancement of educational institutions [19], [20], [39].

As explained by [40] Richardson et al. (2014), motivation in the context of teaching includes the reasons that drive a person to choose the teaching profession and the factors that keep them enthusiastic about their work. This motivation is divided into two main types: intrinsic motivation, which comes from within, such as satisfaction, enjoyment of teaching, or the desire to develop; and extrinsic motivation, which is triggered by external factors such as rewards, income, or career opportunities [41]-[42].

According to [39] Hung (2020), teachers with high motivation tend to be active in implementing new learning strategies, show more attention to students' needs, and are serious about improving the quality of teaching. Conversely, low motivation can lead to minimal involvement and a decline in the quality of the teaching and learning process [43]-[44].

[28] McShane & Glinow (2018) state that teacher motivation involves psychological processes that determine the direction of actions, the strength of effort, and perseverance in facing challenges while performing tasks. This motivation includes several aspects such as intensity, persistence, direction of behavior, and social support in the workplace.

➢ *Furthermore, Teacher Motivation can be Categorized into Three main Forms:*

- Intrinsic motivation, which is an internal drive that arises from satisfaction, enthusiasm, and the desire to give one's best in the learning process [45]-[46].

- Extrinsic motivation, related to external factors such as salary, promotion, work facilities, or recognition from the school.

- Altruistic motivation is the desire to have a positive impact on students, driven by moral values and social concern.

[47] Marouf (2023) also states that teacher motivation includes the desire to teach and a commitment to remain in the profession. These two forms are interrelated and influence a teacher's long-term performance.

Overall, motivation is an important component in shaping teacher professionalism because it influences the quality of learning, perseverance in work, and overall educational success [48]-[49].

Technology literacy is the ability of an individual to understand, use, and evaluate various forms of technology appropriately, safely, and responsibly in everyday life, particularly in the context of education. This ability not only encompasses technical skills in operating digital devices, but also includes critical thinking skills, decision-making, and understanding the relationship between technology and social, cultural, and environmental aspects [50]-[52].

➢ *In Educational Practice, Technological Literacy is an Important Competency for Teachers and Students, as it Enables them to:*

- Filter and use digital information effectively;

- Integrate technology into the learning process;

- Collaborate through digital media;

- Develop technology-based creativity and innovation.

➢ *This Literacy is not merely a Matter of Technical Skills in using Computers or the Internet, but Includes:*

- Understanding the principles and functions of technology in various fields;

- The ability to solve problems using digital tools and;

- Proficiency in using hardware, software, and following technological ethics [53];

- The ability to think critically, communicate, create, and evaluate digital content.

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As stated by [54] Hardinata et al. (2021) and [55] Bartin (2020), technological literacy also includes skills in searching for and managing information digitally, as well as understanding how technology can be used to support learning effectiveness and professional performance improvement.

In the context of the 21st century, technological literacy is an important indicator of a person's readiness to face the challenges of the digital era. This includes:

- The ability to continue learning and innovating in line with technological advances;
- Active participation in collaborative digital communities;
- The use of technology as a tool to achieve learning and professional goals.

➢ *Objectives of the Study*

This study aims to develop methods and strategies to enhance teachers' innovation at private high schools in Bogor City by examining other variables that positively influence teachers' innovation. The methods and strategies for enhancing teacher innovation that are subsequently identified will serve as recommendations for relevant stakeholders, including the Regional Education Office Branch II of West Java Province, private high school principals, educational foundations or institutions, and private high school teachers in Bogor City.

II. METHODOLOGY

This study applied a sequential exploratory mixed-methods design that integrates both qualitative and quantitative approaches to comprehensively explore the factors influencing teacher innovativeness. The methodology was structured in four primary stages: exploratory study, qualitative analysis, quantitative validation, and strategic synthesis.

➢ *Research Design*

The research adopted an embedded mixed-methods design wherein the qualitative phase was used to identify relevant constructs and contextual variables, and the quantitative phase was employed to validate the model empirically. This combination allowed for in-depth exploration followed by statistical generalization. The design is appropriate to address complex relationships among psychological and organizational variables within educational institutions.

➢ *Qualitative Phase*

The qualitative phase involved field studies and semi-structured interviews with 11 school principals from various private high schools in Bogor, Indonesia. The purpose was to uncover phenomena related to teacher innovativeness and explore leadership patterns, organizational culture, digital practices, and motivational dynamics. Data were analyzed using content analysis and coding schemes to identify emerging themes.

Findings from this phase were used to construct the initial model, which included five major constructs: Transformational Leadership (X1), Organizational Commitment (X2), Teacher Motivation (X3), Technological Literacy (X4), and Teacher Innovativeness (Y).

➢ *Quantitative Phase*

- *Participants and Sampling*

The target population comprised permanent teachers (Guru Tetap Yayasan) at accredited private high schools in Bogor City. The population totaled 423 teachers across 43 schools. A multistage random sampling technique was used to select 12 schools proportionally from six districts. Within each selected school, teachers were randomly chosen, yielding a sample of 127 respondents.

- *Research Instruments*

A structured questionnaire was developed based on theoretical indicators and validated constructs. Each variable was measured using a 5-point Likert scale, with responses ranging from “Strongly Disagree” to “Strongly Agree.” The questionnaire consisted of: 40 items for Teacher Innovativeness; 40 items for Transformational Leadership; 40 items for Organizational Commitment; 40 items for Teacher Motivation; 40 items for Technological Literacy.

Prior to administration, the instruments were pilot-tested on 30 teachers from schools outside the sample. Validity was tested using Pearson Product-Moment correlation; items with $r > 0.30$ were retained. Reliability was tested using Cronbach’s Alpha, yielding coefficients above 0.90 for all variables, indicating high internal consistency.

- *Data Collection Procedure*

After obtaining ethical clearance and school permissions, questionnaires were distributed both online and in-person. Respondents were given one week to complete the forms, with reminders issued to ensure optimal response rates. Qualitative interviews were recorded, transcribed, and coded.

- *Data Analysis Techniques*

✓ PLS-SEM (Partial Least Squares - Structural Equation Modeling) was employed using SmartPLS version 4.0 to analyze the direct and indirect effects of independent variables on teacher innovativeness, and to examine the mediating role of technological literacy.

✓ SITOREM (Scientific Identification Theory to Conduct Operation Research in Education Management) was used to identify priority indicators for improvement based on a cost-benefit-urgency-importance matrix. This technique bridges statistical data with practical recommendations.

➢ *Operational Definitions*

- Teacher Innovativeness (Y): The ability of teachers to respond to change, adopt new ideas, implement innovations, develop professionally, and improve instructional quality.

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- Transformational Leadership (X1): The extent to which principals exhibit behaviors such as visioning, motivating, intellectual stimulation, and personalized support.
- Organizational Commitment (X2): The teacher's psychological attachment and loyalty to the school organization.
- Teacher Motivation (X3): Internal and external drivers that energize and sustain teaching behaviors.
- Technological Literacy (X4): The teacher's ability to use, evaluate, and integrate technology into teaching practices effectively.

Each construct was operationalized using dimensions adopted from previous studies and aligned with local context based on the qualitative findings.

III. RESULTS AND DISCUSSION

➢ *Descriptive Analysis*

Descriptive statistics revealed that the overall level of teacher innovativeness was high among respondents, with a mean score of 162.50 and a standard deviation of 16.34. Among the five indicators measured, *improving instructional quality* had the highest mean (M = 4.24), followed by *self-development* (M = 4.15), suggesting that teachers consistently seek to enhance their competencies.

Transformational leadership was also perceived positively, with a mean score of 159.40. The dimension of *intellectual stimulation* (M = 4.05) was the most highly rated, indicating that principals frequently encouraged critical thinking and exploration. Teacher motivation registered the highest overall mean (M = 165.76), with *curiosity* (M = 4.51) and *enthusiasm* (M = 4.50) being dominant factors.

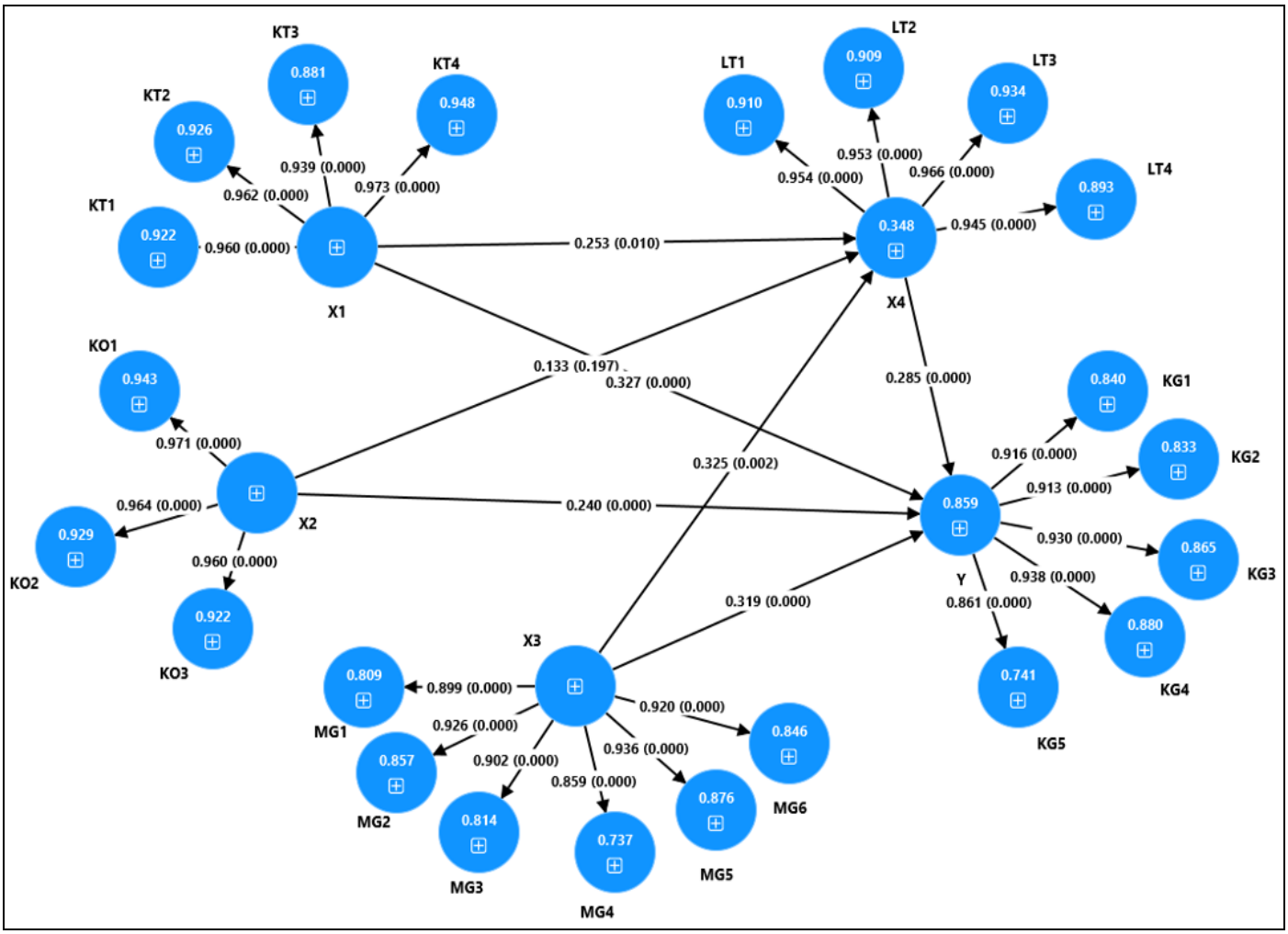

Fig 1 Output Graph of Inner Model P values and Outer Model

Table 1 F-Square and Q-Square Values of the Innovation Model

Variable	f-square	Category	Q square	Category
Teacher Innovation			0.476	Moderate
Transformational Leadership	0.464	Large	0.000	Low
Organizational Commitment	0.235	Medium	0.000	Low
Teacher Motivation	0.441	Large	0.000	Low
Technology Literacy	0.368	Large	0.215	Moderate

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- Category Classification f^2 : 0.02 (low), 0.15 (medium), 0.35 (Large) Hair et al. (2021)
- Hair et al (2019), if Q square is 0 (low), 0.25 (moderate), 0.50 (high)

Table 2 Testing Direct Effect Hypotheses

Hipotesis	Path Coefficient	T Statistic	p-value
H1. $X_1 \rightarrow Y$	0.327	5.390	0.000
H2. X2 → Y	0.240	3.955	0.000
H3. X3 → Y	0.319	4.569	0.000
H4. X4 → Y	0.285	4.243	0.000
H5. X1 → X4	0.253	2.567	0.010
H6. X2 → X4	0.133	1.291	0.197
H7. X3 → X4	0.325	3.121	0.002

Table 3 Testing the Hypothesis of Mediation Effect

Hipotesis	Path Coefficient	T Statistic	p-value
H8. $X_1 \rightarrow X_4 \rightarrow Y$	0.071	2.151	0.046
H9. $X_2 \rightarrow X_4 \rightarrow Y$	0.038	1.221	0.222
H10. $X_3 \rightarrow X_4 \rightarrow Y$	0.092	1.998	0.032

➢ *Structural Equation Modeling (PLS-SEM)*

Hypothesis testing was performed using PLS-SEM.

Table 4 Results of Sitorem Analysis

Tecaher Innovation		
Initial Indicators	**Indicators After Expert Assessment**	**Indicator Score**
1. Improving quality	1st Improving quality	4,24
2. Self Development	2nd Self Development	4,15
3. Adopting new ideas	3rd Finding ideas	3,97
4. Speed in responding to change	4th Transforming processes	3,96
5. Implementing innovation	5th Implementing ideas	3,88
Transformational Leadership (β=0.383) Rank 1		
1. Intellectual stimulation	1st Meningkatkan intelektual bawahan	4,05
2. Inspiring motivation	2nd Providing inspiration	3,97
3. Ideal influence	3rd Influencing charismatically	3,87
4. Individual consideration	4th Considerate attention and understanding of members' needs	3,76
Organizational Commitment (β=0.206) Rank 4		
1. Commitment to the organization	1st Dedication to the organization	4,08
Desire to pursue a career in the organization	2nd Desire to pursue a career in the organization	4,06
3. Commitment to the job	3rd Commitment to the job	4,02
4. Loyalty to the organization	4th Loyalty to the organization	4,02
5. Trust in the organization	5th Trust in the organization	3,99
6. Desire to remain in the job	6th Desire to remain in the job	3,98
7. Pride in working for the organization	7th Pride in working for the organization	3,97
8. Job satisfaction	8th Happiness at work	3,92
9. Willingness to sacrifice personal interests	9th Willingness to sacrifice personal interests	3,84
Teacher Motivation (β=0.303) Rank 2		
1. High enthusiasm	1st High enthusiasm	4,50
2. Curiosity	2nd Curiosity	4,51
3. Appreciation	3rd Appreciation	4,47
4. Career opportunities	4th Career opportunities	3,99
5. Self-satisfaction	5th Self-satisfaction	3,97
6. Compensation	6th Compensation	3,85
Technological literacy (β=0.269) Rank 3		
1. Application of technology	1st Understanding the role of technology in learning	4,35
2. Understanding the impact of technology	2nd Understanding technology for problem solving	4,29
3. Use of technology	3rd Use of basic technology functions and operations	3,97
4. Technical knowledge	4th Understanding technology concepts	3,95

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Table 2 presents the results of hypothesis testing for the direct effects among latent variables in the structural model. Each hypothesis (H1–H7) represents a specific path between constructs, assessed through path coefficient, t-statistic, and p-value, which together indicate the strength and significance of the relationships.

The results show that five out of the seven hypotheses are statistically significant at $p < 0.05$, confirming strong causal relationships. Specifically, H1 ($X_1 \rightarrow Y$) with a path coefficient of 0.327 and $t = 5.390$ ($p = 0.000$) indicates that transformational leadership has a significant positive effect on teacher innovativeness. Similarly, H2 ($X_2 \rightarrow Y$) and H3 ($X_3 \rightarrow Y$) are also significant, with coefficients of 0.240 and 0.319 respectively, suggesting that both organizational commitment and teacher motivation contribute positively and directly to innovativeness.

The variable technological literacy (X_4) is also shown to have a significant direct effect on innovativeness (H4: $X_4 \rightarrow Y$, $\beta = 0.285$, $t = 4.243$, $p = 0.000$), reinforcing its central role in enabling innovation.

As for the mediating pathways, H5 ($X_1 \rightarrow X_4$) and H7 ($X_3 \rightarrow X_4$) are both significant, with path coefficients of 0.253 and 0.325, respectively. This indicates that transformational leadership and teacher motivation positively influence technological literacy, which in turn contributes to innovation.

However, H6 ($X_2 \rightarrow X_4$) is not statistically significant ($\beta = 0.133$, $p = 0.197$), suggesting that organizational commitment does not significantly predict technological literacy in this model.

In summary, the table supports the conclusion that transformational leadership and motivation not only have direct effects on innovativeness but also work indirectly through technological literacy. Meanwhile, organizational commitment influences innovativeness directly, but its indirect effect via technological literacy is not supported by the data.

Table 3 displays the results of the mediation effect testing, which examines whether Technological Literacy (X_4) serves as a mediating variable in the relationship between the independent variables (X_1, X_2, X_3) and the dependent variable Teacher Innovativeness (Y). Each hypothesis (H8–H10) tests an indirect path involving the mediator X_4.

The results show that H8 ($X_1 \rightarrow X_4 \rightarrow Y$) is statistically significant, with a path coefficient of 0.071, a t-statistic of 2.151, and a p-value of 0.046. This indicates that Technological Literacy significantly mediates the effect of Transformational Leadership on Teacher Innovativeness. In practical terms, school leaders who exhibit transformational characteristics influence innovativeness not only directly but also by enhancing teachers' digital competence.

Similarly, H10 ($X_3 \rightarrow X_4 \rightarrow Y$) is also significant, with a path coefficient of 0.092, a t-statistic of 1.998, and a p-value of 0.032. This suggests that Teacher Motivation positively impacts Innovativeness through the mediating role of Technological Literacy, reinforcing the idea that motivated teachers are more likely to adopt and integrate digital tools in innovative ways.

However, H9 ($X_2 \rightarrow X_4 \rightarrow Y$) is not statistically significant ($\beta = 0.038$, $t = 1.221$, $p = 0.222$). This means that Organizational Commitment does not significantly influence Teacher Innovativeness through Technological Literacy, implying that while commitment may support innovation directly, it does not necessarily translate into enhanced digital capabilities.

- *SITOREM Analysis:*

Table 5 Priority Ranking of Indicators

Priority Order of Indicators to be Strengthened	**Indicators Maintained/Developed**
1st Inspire	Improve subordinates' intellectual abilities
2nd Influence charismatically	
3rd Be considerate, attentive, and understand members' needs	
4th Career opportunities	High enthusiasm
5th Self-satisfaction	Curiosity
6th Compensation	Appreciation
7th Use of basic technology functions and operations	Understanding the role of technology in learning
8th Understanding of technology concepts	Understanding technology for problem solving
9th Trust in the organization	Commitment to the organization
10th Desire to stay with the job	Desire to pursue a career in the organization
11th Pride in working for the organization	Commitment to the job
12th Happiness at work	Loyalty to the organization
13th Willingness to sacrifice personal interests	
14th Generating ideas	Improving quality
15th Transforming processes	Self-development
16th Implementing ideas	

Table 5 presents the Priority Ranking of Indicators derived from the SITOREM analysis, which categorizes indicators into two main groups: those that need to be strengthened and those that should be maintained or further developed. This table serves as a strategic framework for educational improvement by helping decision-makers focus

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on key areas that can enhance teacher innovativeness and institutional effectiveness.

In the left column, 16 indicators are listed in priority order for improvement, starting with the most critical. The top three priorities—"Inspire," "Influence charismatically," and "Be considerate, attentive, and understand members' needs"—highlight the essential role of transformational leadership in motivating and guiding teachers. These indicators reflect the emotional and interpersonal dimensions of leadership that directly affect teachers' engagement and willingness to innovate.

Mid-level priorities include career opportunities (4th), self-satisfaction (5th), and compensation (6th), which point to the need for structural support and recognition mechanisms. These elements influence motivation and job satisfaction, which are foundational for sustained teacher innovation.

The 7th and 8th priorities—"Use of basic technology functions and operations" and "Understanding of technology concepts"—indicate a pressing need to enhance technological literacy among educators. Without sufficient digital competence, teachers may struggle to implement innovative practices effectively.

The right column lists indicators that are already performing well and should be maintained or further developed. These include "High enthusiasm," "Curiosity," "Appreciation," and "Understanding the role of technology in learning", suggesting that teachers are generally motivated and have begun integrating technology meaningfully into their practice. Organizational strengths such as "Commitment to the organization," "Loyalty," and "Self-development" also appear, reflecting a supportive work environment that nurtures professional growth.

In summary, this SITOREM analysis offers a strategic roadmap for school leaders and policymakers to focus resources and improvement efforts on key behavioral, motivational, and digital indicators, while also preserving the existing strengths that contribute to an innovative school environment.

The findings validate existing literature while offering new insights in the Indonesian private school context. First, transformational leadership plays a pivotal role in shaping the innovation climate. This is consistent with Bass & Avolio (1994), who argue that transformational leaders stimulate higher levels of effort and innovation. In practical terms, transformational school leaders in this study demonstrated behaviors such as providing intellectual stimulation and individualized support, both of which were highly rated by respondents.

From a leadership development perspective, this suggests that building principals' capacity to enact transformational practices may yield significant returns in terms of teacher innovation. Training programs for school leaders should emphasize not only managerial functions but also visionary and motivational components that align with the needs of 21st-century educators.

Second, motivation emerged as the strongest predictor of innovativeness, particularly when intrinsic. This aligns with Deci and Ryan's Self-Determination Theory, which emphasizes autonomy, competence, and relatedness as key drivers of internal motivation. Teachers who are curious, enthusiastic, and intrinsically driven are more likely to seek professional growth and experiment with new instructional strategies. These motivational attributes serve as the foundation for risk-taking, reflection, and resilience—critical traits for innovation.

School systems should thus invest in motivation-enhancing strategies, including recognition systems, personalized goal setting, and collaborative learning communities. Encouraging teacher autonomy, celebrating innovative efforts, and providing meaningful professional development pathways will help sustain motivation over time.

Third, the mediating role of technological literacy underscores its function as an enabler of innovative teaching. In the era of Education 4.0, digital competence is not merely about knowing how to use devices, but about integrating technology meaningfully into pedagogy. The study revealed that technological literacy strengthened the indirect effects of organizational commitment and leadership on innovation.

This means that even committed or well-led teachers might not be innovative unless they are digitally equipped. The implication is twofold: (1) digital upskilling should be a strategic priority, and (2) technology training must go beyond basic functionality to include instructional design, digital assessment, and collaborative tools. For instance, schools might offer differentiated training on integrating LMS, digital portfolios, online discussions, and formative data analytics.

Fourth, organizational commitment—while positively correlated with innovation—did not significantly influence innovativeness directly. This contrasts with some prior studies that highlight commitment as a driver of extra-role behaviors. However, the indirect path through technological literacy shows that commitment must be accompanied by capacity.

This finding reinforces the idea that loyalty and dedication are insufficient in isolation; teachers must also be empowered with tools and support systems. It calls for a shift in school management practices from expecting innovation to enabling it. This includes removing bureaucratic barriers, reducing administrative overload, and providing time and space for innovation to emerge.

Fifth, the SITOREM analysis offers practical direction. High-priority indicators such as leadership feedback, digital training access, and reward mechanisms point to tangible levers that schools can pull to enhance innovativeness. The benefit of using SITOREM lies in its strategic focus—it helps decision-makers identify not just what to improve, but what to prioritize based on impact and urgency.

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For example, establishing a structured recognition system for innovative teaching practices can enhance motivation and establish a culture of excellence. Likewise, creating regular digital literacy workshops tailored to subject-specific needs can improve technology integration across disciplines. Moreover, refining the school vision to explicitly include innovation as a core value can align behaviors and expectations among stakeholders.

In comparative perspective, the findings of this study align with those from international contexts. Studies in Finland, Singapore, and Canada have shown that educational innovation thrives when professional trust, distributed leadership, and teacher agency are prioritized. These systems often integrate digital infrastructure with pedagogical reform, emphasizing the synergy between structure and culture.

In the Indonesian context, where many schools—especially private institutions—operate autonomously yet lack systemic support, the role of school leadership becomes even more critical. Leaders must act as facilitators of innovation rather than mere administrators. Their role extends to being culture-builders, vision-keepers, and change agents who create conditions for innovation to flourish.

Moreover, this study contributes to the theoretical integration of innovation, leadership, motivation, and digital competence. While previous studies often examined these constructs separately, this research offers a more holistic view that acknowledges their interdependence. The model tested herein demonstrates that innovation is not the result of isolated factors but of complex, mutually reinforcing processes. Limitations of the study should be noted. First, the sample was limited to private high schools in Bogor, which may not fully represent other educational contexts. Second, the use of self-report questionnaires may introduce social desirability bias. Third, the cross-sectional design restricts causal inference.

Future research should consider longitudinal designs to track innovation development over time and incorporate classroom observations or student outcome data to triangulate findings. Expanding the model to include factors such as organizational learning culture, teacher collaboration, or digital infrastructure readiness would also provide deeper insight.

This study affirms that enhancing teacher innovativeness requires a multifaceted strategy grounded in leadership, motivation, and digital capacity. The findings offer actionable recommendations for school leaders, policymakers, and educators seeking to foster innovation at scale. By understanding and operationalizing these interrelated factors, educational institutions can build a resilient and adaptive teaching force capable of driving meaningful change.

IV. CONCLUSION

This study confirms that teacher innovativeness is a multidimensional construct influenced by several interrelated factors, including transformational leadership, organizational commitment, teacher motivation, and technological literacy. Using a robust mixed-methods design, the findings demonstrate that transformational leadership and motivation significantly and directly influence teacher innovativeness. Meanwhile, organizational commitment impacts innovativeness indirectly through the mediating role of technological literacy. This nuanced understanding highlights the importance of aligning leadership practices, motivational strategies, and digital competencies in shaping an innovative teaching workforce.

The application of SITOREM analysis provided additional strategic insight by identifying priority areas for improvement. Key areas such as digital professional development, reward systems, and visionary leadership feedback emerged as levers that schools can utilize to accelerate innovation capacity.

Overall, this research emphasizes the need for a holistic and strategic approach to educational innovation. Enhancing teacher innovativeness requires more than enthusiasm or isolated interventions; it calls for a systemic transformation involving human resources, digital infrastructure, and organizational culture.

RECOMMENDATIONS

Strengthen Transformational Leadership Practices; Educational leaders should be equipped with transformational leadership competencies, including visioning, intellectual stimulation, and individualized support. Leadership training programs must prioritize these competencies to build a culture of innovation.

Enhance Teacher Motivation through Recognition and Autonomy; School management should foster intrinsic motivation by recognizing creative teaching efforts, involving teachers in decision-making, and encouraging personal goal setting. Motivation is best sustained when teachers feel valued and autonomous.

Invest in Targeted Digital Literacy Development; Schools should provide differentiated and continuous professional development in digital pedagogy, including the use of LMS platforms, online assessment tools, and content creation software. This enables teachers to integrate technology more meaningfully into instruction.

Integrate Innovation into School Vision and Policy; Innovation should be embedded in the school’s vision, mission, and strategic plans. Policy alignment ensures that innovation becomes an institutional goal rather than an individual initiative.

Implement Strategic Prioritization Using SITOREM; Education managers can adopt SITOREM to identify, classify, and address high-impact indicators. This data-driven approach enables efficient allocation of resources and accelerates targeted school improvement efforts.

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Encourage Collaborative Innovation Communities; Schools should establish teacher innovation teams or professional learning communities (PLCs) that facilitate the sharing of ideas, experimentation, and peer mentoring. Such collaboration promotes collective efficacy.

By acting on these recommendations, educational institutions, especially private high schools in developing regions, can foster a dynamic and innovative teaching environment. This will not only improve learning outcomes but also contribute to the resilience and adaptability of the education system in facing future challenges.

REFERENCES

[1]. Widowati, K. B. (2020). Hubungan Efikasi Diri (Self Efificacy) Dengan Keinovatifan Widyaiswara Di Lingkup Badan Penyuluhan dan Pengembangan Sumber Daya Manusia Pertanian, Kementerian Pertanian. Jurnal Agriwidya, Vol 1 No. 3

[2]. Trott, Paul. 2017. Innovation Management and New Product Development. Six Edition. England.

[3]. Mulyadi, Ali, H., & Imron Rosadi, K. (2023). The Influence of Principal Supervision and Pedagogic Competence On Teacher Innovativeness and Teacher Work Quality. International Journal of Advanced Multidisciplinary, 2(2). https://doi.org/10.38035/ijam.v2i2.316

[4]. Ozdemir, T.Y., & Cakalci, N. (2022). How School Climate Affects Teachers' Individual Innovativeness: The Mediating Role of Teacher Autonomy. Educational Process: International Journal, 11(4): 69-91.

[5]. Suharyati, H., Bibin, R., dan Abdullah, T. 2016. Relationship between Organizational Culture, Transformational Leadership, Working Motivation to Teacher's Innovativeness. International Journal of Managerial Studies and Research (IJMSR) Volume 4, Issue 3: 2934.

[6]. Dedering, K., & Pietsch, M. (2023). School leader trust and collective teacher innovativeness: on individual and organisational ambidexterity's mediating role. Educational Review. https://doi.org/10.1080/00131911.2023.2195593

[7]. Lin, Q. (2022). The relationship between distributed leadership and teacher innovativeness: Mediating roles of teacher autonomy and professional collaboration. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.948152

[8]. Žydžiūnaitė, V., & Arce, A. (2021). Being an innovative and creative teacher: Passiondriven professional duty. Creativity Studies, 14(1). https://doi.org/10.3846/cs.2021.14087

[9]. Parlar, H., & Cansoy, R. (2017). Examining the Relationship between Teachers' Individual Innovativeness and Professionalism. International Education Studies, 10(8). https://doi.org/10.5539/ies.v10n8p1

[10]. Kinay, I., & Suer, S. (2020). Investigation of relationship between prospective teachers' learning beliefs and state of individual innovativeness. Cypriot Journal of Educational Sciences, 15(3). https://doi.org/10.18844/cjes.v15i3.4642

[11]. López-Pérez, V. A., Ramírez-Correa, P. E., & Grandón, E. E. (2019). Innovativeness and factors that affect the information technology adoption in the classroom by primary teachers in Chile. Informatics in Education, 18(1), 165–181. https://doi.org/10.15388/infedu.2019.08

[12]. Aldahdouh, T. Z., Korhonen, V., & Nokelainen, P. (2019). What contributes to individual innovativeness? A multilevel perspective. International Journal of Innovation Studies, 3(2), 23–39. https://doi.org/10.1016/J.IJIS.2019.06.001

[13]. Mikhailova, O. B. (2019). High school students involved and not involved in mmorpg: Creativity and innovativeness. International Journal of Cognitive Research in Science, Engineering and Education, 7(2). https://doi.org/10.5937/IJCRSEE1902029M

[14]. Gündüz, Ş. (2021). Examining the Relationship between Individual Innovativeness and Digital Nativeness Levels of Teachers. Education and Science, 46(205), 261-277. https://doi.org/ 10.15390/EB.2020.9006

[15]. Atalay, N. (2022). The Prediction Power of Pre-Service Classroom Teachers' Individual Innovativeness Characteristics on Entrepreneurship Skills. Shanlax International Journal of Education, 10(S1-Aug). https://doi.org/10.34293/education.v10is1-aug.4525

[16]. Cobanoglu, N. (2021). The relationship between shared leadership, employee empowerment and innovativeness in primary schools: A structural equation modeling. European Journal of Educational Research, 10(1). https://doi.org/10.12973/EU-JER.10.1.327

[17]. Octasylva, A.R.P.; Yuliati, L.N.; Hartoyo, H.; Soehadi, A.W. (2022). Innovativeness as the Key to MSMEs' Performances. Sustainability, 14, 6429. https://doi.org/10.3390/su14116429

[18]. Kocasaraç, H. (2021). Evaluation of Innovativeness' Status of Teachers. International Journal of Progressive Education, 17(4), 79–98. https://doi.org/10.29329/ijpe.2021.366.6

[19]. Colquitt, J. A., LePine, J. A., & Wesson, M. J. (2018). Organizational Behavior 4thEd. New York: McGraw-Hill Education.

[20]. Kinicki, A., & Fugate, M. (2016). Organizational Behavior: A Practical, Problem Solving Approach. New York: McGraw-Hill Education

[21]. Abu-Rumman, A. (2021). Transformational leadership and human capital within the disruptive business environment of academia. World Journal on Educational Technology: Current Issues, 13(2). https://doi.org/10.18844/wjet.v13i2.5652

[22]. Berkovich, I., & Hassan, T. (2023). Principals' digital transformational leadership, teachers' commitment, and school effectiveness. Education Inquiry. https://doi.org/10.1080/20004508.2023.2173705

[23]. Zhu, J., & Huang, F. (2023). Transformational Leadership, Organizational Innovation, and ESG Performance: Evidence from SMEs in China.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may1700

Sustainability (Switzerland), 15(7). https://doi.org/10.3390/su15075756
[24]. Robbins, S. P., & Judge, T. A. 2019. Perilaku Organisasi. Jakarta: Selemba Empat.
[25]. Koh et al. (2019). Transformational Leadership and Creativity: A Meta-analytic Review and Identification of an Integrated Model. Research Institute for Management of Technology Sogang University.
[26]. Lai, F. Y., Tang, H. C., Lu, S. C., Lee, Y. C., & Lin, C. C. (2020). Transformational Leadership and Job Performance: The Mediating Role of Work Engagement. SAGE Open, 10(1). https://doi.org/10.1177/2158244019899085
[27]. Davids, I., Appiah, K., Davids, G., & Ofori, F. N. K. (2021). Effectiveness of Transformational Leadership: Archives of Business Research, 9(5), 28–46. https://doi.org/10.14738/abr.95.10191
[28]. McShane, S. L., & Glinow, M. A. V. (2018). Organizational Behavior: Emerging Knowledge. Global Reality, Eighth Edition. New York: McGraw-Hill Education.
[29]. Herrera, J., & de Las Heras-Rosas, C. (2021). The Organizational Commitment in the Company and Its Relationship With the Psychological Contract. In Frontiers in Psychology (Vol. 11). https://doi.org/10.3389/fpsyg.2020.609211
[30]. Nguyen, H. M., & Ngo, T. T. (2020). Psychological capital, organizational commitment and job performance: A case in Vietnam. Journal of Asian Finance, Economics and Business, 7(5). https://doi.org/10.13106/JAFEB.2020.VOL7.NO5.269
[31]. Donkor, F., & Zhou, D. (2020). Organisational commitment influences on the relationship between transactional and laissez- faire leadership styles and employee performance in the Ghanaian public service environment. Journal of Psychology in Africa, 30(1). https://doi.org/10.1080/14330237.2020.1712808
[32]. Wongsuwan, N., Phanniphong, K., & Na-Nan, K. (2023). How Job Stress Influences Organisational Commitment: Do Positive Thinking and Job Satisfaction Matter? Sustainability (Switzerland), 15(4). https://doi.org/10.3390/su15043015
[33]. Nguyen, T. H. & V. B. TU. (2020). Social Responsibility, Organizational Commitment, and Organizational Performance: Food Processing Enterprises in the Mekong River Delta. The Journal of Asian Finance, Economics and Business. Korea Distribution Science Association, 7(2), 309–316
[34]. Ramalho Luz, C. M. D., Luiz de Paula, S., & de Oliveira, L. M. B. (2018). Organizational commitment, job satisfaction and their possible influences on intent to turnover. Revista de Gestao, 25(1). https://doi.org/10.1108/REGE-12-2017-008
[35]. Alzoraiki, M., Ahmad, A. R., Ateeq, A. A., Naji, G. M. A., Almaamari, Q., & Beshr, B. A. H. (2023). Impact of Teachers' Commitment to the Relationship between Transformational Leadership and Sustainable Teaching Performance. Sustainability (Switzerland), 15(5). https://doi.org/10.3390/su15054620
[36]. Cilek, A. (2019). The effect of leadership on organisational commitment: A meta-analysis. Cypriot Journal of Educational Sciences, 14(4). https://doi.org/10.18844/cjes.v11i4.4244
[37]. Seema, Choudhary, V., & Saini, G. (2021). Effect of Job Satisfaction on Moonlighting Intentions: Mediating Effect of Organizational Commitment. European Research on Management and Business Economics, 27(1). https://doi.org/10.1016/j.iedeen.2020.100137
[38]. Syah, T. Y. R., Aprilda, R. S., & Purwandari, D. A. (2019). Servant leadership , OrganizationCommitment and Job Satisfaction on Organizational Citizenship Behaviour. Journal of Multidisciplinary Academic, 03(04), 57–64.
[39]. Hung, L. N. Q. (2020). Teachers' motivation and its influence on quality education: A study at a center for foreign languages in Vietnam. Can Tho University Journal of Science, 12(3). https://doi.org/10.22144/ctu.jen.2020.02
[40]. Richardson, P.W., Karabenick, S.A., Watt, Helen. (2014). Teacher Motivation: Theory and Practice. First Published by Routledge, 711 Third Avenue, New York.
[41]. Kalyar, M. N., Ahmad, B., & Kalyar, H. (2018). Does teacher motivation lead to student motivation? The mediating role of teaching behavior. Voprosy Obrazovaniya / Educational Studies Moscow, 3. https://doi.org/10.17323/1814-9545-2018-3-91-119
[42]. Zhang, Y. M. (2021). Research on Motivation Theory and Enlightenment to Teaching. Open Journal of Social Sciences, 9, 476-483. https://doi.org/10.4236/jss.2021.92031
[43]. Nwakasi, C. C., & Cummins, P. A. (2019). Teacher motivation and job satisfaction: a case study of North West Nigeria. Global Journal of Educational Research, 17(2). https://doi.org/10.4314/gjedr.v17i2.2
[44]. Orina, J. O., Kiumi, J. K., & Githae, P. K. (2022). Determinants of Teachers Motivation and Professional Development in Public Secondary Schools in Kenya. International Journal of Educational Administration and Policy Studies, 14(1). https://doi.org/10.5897/ijeaps2021.0702
[45]. Serin, H., & Akkaya, A. (2020). The Relationship Between School Principals' Perceived Transformational Leadership Behavior and Teachers' Motivation. International Education Studies, 13(10). https://doi.org/10.5539/ies.v13n10p70
[46]. Kumari, J., & Kumar, J. (2023). Influence of Motivation on Teachers' Job Performance. Humanities and Social Sciences Communications, 10(1). https://doi.org/10.1057/s41599-023-01662-6
[47]. Marouf, R. (2023). Examining Trajectories of Teacher Motivation in Correlation with Students' Perceptions in Computer Science: Toward Sustainable Motivation to Teach. International Journal of Engineering Pedagogy (iJEP), 13(1), pp. 102–109.
[48]. Jud, J., Hirt, C. N., Rosenthal, A., & Karlen, Y. (2023). Teachers' motivation: Exploring the success expectancies, values and costs of the promotion of self-regulated learning. Teaching and Teacher Education, 127. https://doi.org/10.1016/j.tate.2023.104093

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may1700

[49]. Yalçınkaya, S., Dağlı, G., Aksal, F. A., Gazi, Z. A., & Kalkan, Ü. (2021). The effect of leadership styles and initiative behaviors of school principals on teacher motivation. Sustainability (Switzerland), 13(5). https://doi.org/10.3390/su13052711
[50]. Rupnik, D., & Avsec, S. (2019). The Relationship between Student Attitudes towards Technology and Technological Literacy. World Transactions on Engineering and Technology Education, 17(1), 48–53.
[51]. Nuraeni, R., Pattiasina, P. J., & Ulfah, A. (2022). Peran Literasi Teknologi Dalam Dunia Pendidikan. Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah, 6(3). https://doi.org/10.35931/am.v6i3.1045
[52]. Santoso, A., & Lestari, S. (2019). The Roles of Technology Literacy and Technology Integration to Improve Students' Teaching Competencies. KnE Social Sciences, 3(11). https://doi.org/10.18502/kss.v3i11.4010
[53]. Ahmad, J., & Arif Wibawa, F. (2021). Peran Literasi Teknologi dalam Pembelajaran Daring. Jurnal Lentera Pendidikan Pusat Penelitian LPPM UM METRO, 6(2).
[54]. Hardinata, S., Suchyadi, Y., & Wulandari, D. (2021). Strengthening Technological Literacy In Junior High School Teachers In The Industrial Revolution Era 4.0. In JHSS (Journal of Humanities and Social Studies) (Vol. 05)
[55]. Bartin, T. (2020). Strengthening Non-formal Education Institutions in Indonesia through Accelerating the Implementation of Information Technology Literacy. Digital Press Social Sciences and Humanities, 6, 00020. https://doi.org/10.29037/digitalpress.46385