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Transforming Teacher Roles in Indonesia's Digital Era: Enhancing Learning Effectiveness and Student Engagement

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ABSTRACT

The rapid advancement of digital technology has significantly reshaped educational practices, requiring teachers to evolve from knowledge transmitters into dynamic facilitators of student-centred learning. This study adopts a library research method combined with content analysis to examine how teachers' roles have transformed in response to technological innovation, particularly in enhancing learning effectiveness and student engagement. By reviewing a broad spectrum of recent scholarly articles, policy reports, and empirical studies, the research highlights that the integration of tools such as Learning Management Systems (LMS), Artificial Intelligence (AI), and interactive online platforms has fundamentally changed classroom dynamics and instructional design. For example, the use of gamified learning applications has been shown to increase student participation by fostering a sense of achievement, while adaptive learning software enables teachers to tailor content to individual progress, thereby improving comprehension and retention. As a result, educators are expected to develop advanced digital literacy, create innovative learning experiences, and adopt flexible strategies that respond to diverse learner needs. This shift requires sustained professional development, supportive institutional frameworks, and responsive educational policies that equip teachers to thrive in technology-rich environments. Moreover, meaningful integration of technology rather than its mere adoption has emerged as the key factor in driving improvements in motivation, engagement, and academic outcomes. This study contributes to the discourse on teacher professionalisation in the digital age and offers recommendations for policymakers and educational leaders to design effective training initiatives and support mechanisms for educators adapting to these evolving demands.

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1. INTRODUCTION

Over the past two decades, the integration of digital technology has transformed not only communication and business but also fundamentally reshaped the field of education. Tools such as Learning Management Systems (LMS), Artificial Intelligence (AI), and online learning platforms have become integral to contemporary teaching and learning. According to UNESCO [1], digital transformation in education creates opportunities for more inclusive and adaptive learning ecosystems. At the same time, it introduces complex challenges, including unequal digital access and a growing demand for digital literacy among educators and learners alike.

Teachers, as the central agents of instructional practice, must continually adapt to this evolving digital landscape. Their traditional function as knowledge transmitters has expanded into multifaceted roles involving the design, facilitation, and evaluation of technologically enhanced learning experiences. In this capacity, educators are expected to orchestrate meaningful interactions, support personalised learning, and foster 21st-century skills such as collaboration and critical thinking. Rather than restating the facilitator role alone, it is more accurate to view teachers today as learning architects—individuals who integrate pedagogy, content, and technology within complex classroom ecosystems.

The rise of digital tools has also altered how students engage with learning. Online platforms offer flexible access to resources; AI-driven applications provide real-time feedback; and immersive tools like gamification and virtual reality have increased student motivation and interactivity. However, alongside these advancements, distractions and misaligned uses of technology remain ongoing concerns. To address this, educators must be capable of aligning technology use with instructional goals and guiding learners in ethical, critical engagement with digital content.

These shifts are best understood through key educational theories. The TPACK framework (Technological Pedagogical Content Knowledge) provides a foundation for understanding how teachers blend technology with pedagogy and subject matter expertise. In parallel, constructivist theory emphasises that learners actively construct knowledge through experiences, while connectivism highlights learning as a process of forming networks supported by digital tools. These theoretical perspectives guide the evolving roles of teachers in the 21st-century classroom.

While many studies have addressed the general impact of educational technology, few have critically examined how teacher roles are transformed specifically within the Indonesian context, particularly regarding the integration of technology to enhance learning effectiveness and student engagement. This study addresses that gap by analysing how technology redefines instructional practices and the competencies required of teachers in digital environments.

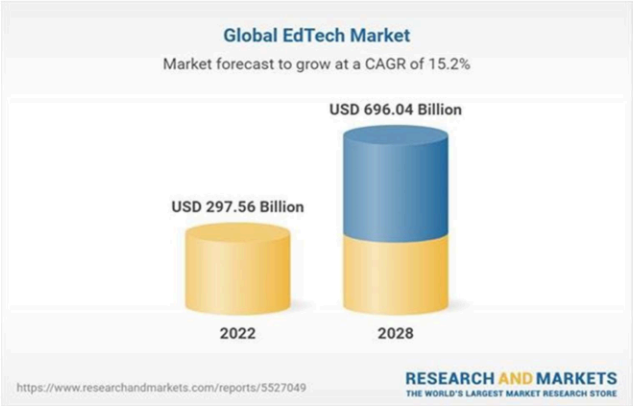

Figure 1. Global EdTech Market Forecast and Growth Projection (2022–2028)
Source: Research and Markets, 2023

Moreover, meaningful integration of digital tools requires sustained institutional support. Professional development, access to infrastructure, and responsive educational policies are essential to enable teachers to fulfil their evolving roles. As recent forecasts by Research and Markets [2] predict the global EdTech market to grow from USD 297.56 billion in 2022 to USD 696.04 billion by 2028, it becomes increasingly clear that educational technology is no longer supplementary but foundational. This ongoing expansion demands that educators shift from traditional instruction to flexible, data-informed practices that respond to students' individual learning needs.

Therefore, this study aims to explore the transformation of teacher roles in Indonesia amid technological innovation, with a particular focus on how these shifts enhance learning effectiveness and promote student engagement.

2. METHOD

This study adopts a library research method as the principal approach to explore the transformation of teachers' roles in the digital era through the lens of contemporary educational theories. This method is appropriate for in-depth conceptual and theoretical inquiry, enabling the synthesis of diverse scholarly viewpoints and empirical findings relevant to the evolving educational landscape.

The data collection involved a systematic literature review, targeting publications from 2019 to 2024 to ensure the relevance and novelty of the information. The search process utilised specific keywords such as "digital pedagogy," "teacher role transformation," "TPACK framework," "constructivism in education," "connectivist learning," and "educational technology integration." Sources were retrieved from academic databases, including Google Scholar, ScienceDirect, SpringerLink, and the Directory of Open Access Journals (DOAJ). To maintain academic rigour, only peer-reviewed journal

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articles, books, conference proceedings, and official reports from reputable institutions were included.

Inclusion criteria comprised: (1) publications within the past five years, (2) relevance to teacher roles and digital education, (3) availability of full text in English or Bahasa Indonesia, and (4) alignment with at least one of the core theoretical constructs (TPACK, constructivism, connectivism). Exclusion criteria included: (1) opinion pieces without empirical or theoretical backing, (2) non-academic blog articles, and (3) studies not situated in K–12 or tertiary education settings. From an initial pool of 134 documents, 43 key sources were selected for full-text review based on relevance and depth of content. Data saturation was achieved once recurring theoretical patterns and conceptual overlaps were consistently observed across the reviewed materials.

The content analysis technique was employed to identify thematic patterns, conceptual frameworks, and key educational paradigms reflected in the selected literature. Each source was analysed according to its contribution to one or more thematic clusters: digital tools and pedagogy, teacher competencies in the digital age, theoretical foundations of technology integration, and institutional support mechanisms. To enhance credibility, a triangulation strategy was implemented by comparing insights from theoretical articles, empirical studies, and policy documents. Additionally, peer consultation was conducted to verify the objectivity of source selection and categorisation. The literature synthesis was guided by a structured coding scheme to avoid interpretative bias and maintain analytical consistency.

To provide transparency and facilitate understanding, a summary table of the key reviewed studies is presented in the following section. This table outlines the source title, authorship, publication year, main focus, theoretical orientation, and relevance to the study objectives.

Through this methodological framework, the study establishes a robust foundation for mapping the interconnection between teacher role transformation and contemporary education paradigms in a technology-driven era.

3. RESULTS AND DISCUSSION

3.1 Transformation of Teacher Roles in Practice

The transformation of teacher roles in the digital era is a response to the changing learning paradigms influenced by the advancement of information and communication technology. This shift requires teachers to be not only conveyors of information but also facilitators, mentors, and learning partners for students. In this context, constructivist and connectivist theories serve as essential foundations in shaping a more adaptive and relevant learning approach. Constructivism posits that students construct their knowledge through active experiences and social interactions, while connectivism emphasises the importance of building knowledge networks through digital connections and widely dispersed sources of information. Consequently, the role of teachers has expanded from controlling the learning process to managing flexible learning environments. Teachers are also expected to navigate complex streams of information and guide students in selecting valid information.

This becomes the foundation for the development of teacher professionalism in the evolving digital era.

A study by Dwiastutik (2023) through the TPACK framework emphasises the importance of integrating three core components: technology, pedagogy, and content in teaching. The TPACK framework helps teachers understand how these three aspects are interconnected and influence learning effectiveness. In the digital era, it is no longer sufficient for teachers to master only the subject content; they must also possess appropriate pedagogical strategies and the ability to use technology effectively [7].

For instance, in mathematics instruction, teachers can utilise data visualisation applications to help students grasp abstract concepts. This indicates that technological mastery aligned with learning objectives is crucial. TPACK demands that teachers be reflective and creative in designing meaningful learning activities. Moreover, teachers need to participate in training and professional development to remain relevant to the demands of the times. Therefore, TPACK serves as a key guideline in preparing teachers to face 21st-century challenges.

Table 1. Comparison of Teacher Roles: Conventional vs. Digital Era

Role Aspect	Conventional Teachers	Digital Era Teachers	Reference
Material Delivery	Focused on lectures and textbooks	Multimedia-based, interactive, and online resources	Sutarman et al. (2019) [24]
Classroom Role	Main instructor (teacher-centred)	Facilitator and independent learning mentor (student-centred)	Ajar Baskoro et al. (2023) [3]
Learning Assessment	Standard tests and final grades	Authentic assessment through portfolios, projects, and reflections	Kadafi et al. (2022) [10]
Technology Usage	Minimal or not integrated	Integration of LMS, AI, gamification, and other digital tools	Santoso et al. (2021) [21]
Student Interaction	Limited to face-to-face class hours	Interactive, two-way communication through online platforms and synchronous communication	Afendi (2024) [1]

Table 1 presents a comparative overview of the teacher's role in conventional approaches and the context of digital education. In the conventional approach, material delivery is dominated by one-way lectures and textbook use, whereas digital teachers utilise interactive media and online resources. The teacher's role has shifted from being the main instructor to a facilitator who encourages student independence. Learning evaluation has also transformed from standardised tests to authentic assessments such as portfolios and projects. Conventional teachers tend to use minimal technology, while digital teachers integrate various digital tools such as LMS, AI, and gamification. Teacher-student interaction, once limited to physical meetings, now occurs flexibly through both synchronous and asynchronous online communication. These overall changes illustrate that teachers are required to master not only the subject matter but also digital literacy and innovative pedagogy. Thus, the transformation of the teacher's role becomes a strategic factor in addressing the challenges of 21st-century learning [11].

A case study at the Nurul Fadhilah Education Foundation, Deli Serdang, provides a concrete example of implementing the transformation of teacher roles within the school environment. Teachers at this institution have utilised technologies such as interactive

whiteboards and e-learning platforms to support the teaching and learning process. These changes positively impacted student engagement and encouraged active participation. Additionally, teachers used digital media such as instructional videos and online quizzes to enrich student learning experiences. Observations showed increased motivation and significant academic performance improvement. This demonstrates that proper technology utilisation can improve educational quality overall. This success is inseparable from consistent school management support and continuous technology training. This study proves that digital transformation in education can be effective if implemented in a structured and systematic manner [12].

However, the transformation of teacher roles is not without complex and diverse challenges. One of the main challenges is the digital literacy gap among teachers, particularly those from older generations. Many teachers are still unfamiliar with using digital devices in learning activities. This may hinder learning effectiveness and reduce the appeal of technology-based instruction. Additionally, managing online or hybrid classrooms requires new skills in maintaining student engagement and discipline. Teachers must be capable of creating interactive strategies to prevent learning fatigue. Support from educational institutions, such as regular training and technological mentoring, becomes crucial. Without such support, many teachers risk experiencing digital fatigue and resistance to change. Therefore, this transformation must be accompanied by comprehensive capacity-building strategies for teachers [13].

The "*Guru Penggerak*" (Driving Teachers) program initiated by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) is a strategic initiative aimed at developing transformational learning leadership. This program is designed to produce teachers who can act as change agents in their respective schools. Through this program, teachers receive intensive training covering pedagogical, managerial, and digital innovation aspects of learning. One of the main focuses of the program is to shape teachers who are reflective and adaptive to changing times. Guru Penggerak are also encouraged to build learning communities and share best practices with fellow teachers. Participation in this program presents a major opportunity to enhance professional competence and collaborative networks. Initial evaluations of the program show positive results in improving teacher confidence and innovation skills. Thus, this program is a concrete step in supporting the transformation of teacher roles in the digital era [14].

By understanding various aspects of the transformation of teacher roles in the digital era, it can be concluded that this change is not merely about using technology in learning. The transformation involves a paradigm shift from teacher-centred to student-centred learning approaches. Teachers now act as facilitators who create dialogical and collaborative spaces in the classroom. Additionally, teachers are responsible for developing students' critical thinking, creativity, and digital literacy skills. This requires openness to renewal and a commitment to lifelong learning. Teachers' social roles have also expanded as they model ethical and productive technology use. This transformation gives rise to a generation of educators who are not only adaptive but also proactive in creating learning innovations. Therefore, the teacher's role in the digital era is increasingly strategic in shaping an educational ecosystem that responds effectively to global challenges.

3.2 The Use of Technology and Its Impact on Learning Outcomes

The integration of technology into education has become a pivotal component in transforming teaching and learning practices. It allows for more flexible, interactive, and personalised delivery of educational content tailored to diverse student needs. Platforms such as Google Classroom, Moodle, and Edmodo enable structured remote learning environments, offering access to a broad range of multimedia resources and facilitating asynchronous discussions. One of the key benefits is the availability of adaptable content that caters to various learning preferences. For example, Nashrullah et al. (2025) found that blended learning significantly boosts student motivation, which subsequently enhances academic achievement [19]. Moreover, technology fosters student autonomy, accountability, and active engagement, positioning it as a central driver of educational quality in the digital era.

However, the successful implementation of technology-enhanced learning hinges on the readiness of all stakeholders: educators, learners, and institutions. Teachers are required to possess adequate digital competencies, including the ability to operate educational platforms and manage virtual classrooms effectively. Students must also develop foundational digital literacy skills to engage meaningfully with online learning tools, beyond their use for entertainment purposes. Without this foundational readiness, the integration of technology may become counterproductive, leading to confusion and decreased instructional quality. Hence, educational policies should prioritise the development of digital infrastructure, equitable internet access, and continuous technical support. Addressing the persistent digital divide, particularly in remote and underdeveloped regions, remains essential to ensure that all learners benefit equally from technological innovations [16].

The Effectiveness of technology in improving learning outcomes is closely linked to the pedagogical models adopted by teachers. Models such as Problem-Based Learning (PBL) and digital inquiry learning emphasise student-centred exploration and problem-solving, leveraging technology to facilitate research, collaboration, and reflection. These approaches transition learners from passive recipients to active constructors of knowledge. For instance, in digital inquiry models, students investigate real-world issues using curated online content, thereby sharpening critical thinking and information evaluation skills. Similarly, the flipped classroom model, where students access instructional materials prior to class and engage in collaborative problem-solving during synchronous sessions, has demonstrated positive effects on learning engagement and retention [17]. The strategic combination of these models with digital tools increases interactivity and depth of learning.

Technology also enhances conceptual understanding through multimedia-rich content. Educational videos, simulations, and interactive quizzes help students internalise abstract concepts by providing visual and experiential learning formats. This multimodal delivery improves comprehension and long-term retention compared to traditional lecture-based instruction. Teachers, in this context, must become learning designers, crafting digital experiences that align with curriculum goals and foster deep learning. Creativity in lesson planning is vital to ensure that technology is not merely layered onto existing practices but integrated purposefully into the instructional design.

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Furthermore, technology supports collaborative learning by creating virtual spaces for interaction across geographical boundaries. Online discussion forums, digital group projects, and cloud-based tools facilitate peer-to-peer engagement, promoting social learning aligned with constructivist principles. These interactions foster skills such as communication, teamwork, and negotiation. Project-based learning tasks carried out through digital platforms also cultivate higher-order thinking, including analysis, synthesis, and evaluation. Meanwhile, real-time digital assessment tools enable teachers to monitor student progress more efficiently and provide timely feedback, allowing for responsive instruction and adaptive learning paths [18].

The impact of technology on learning must be continually assessed to ensure its Effectiveness. Academic performance indicators such as pre- and post-intervention scores provide measurable evidence of progress. For example, increased student achievement in blended and flipped classrooms has been well-documented in both local and international studies. Non-cognitive outcomes such as motivation, engagement, and satisfaction have also improved, underscoring the holistic value of technology in education. Consequently, digital learning should be regarded as a strategic long-term investment, rather than a temporary adaptation. Its success, however, depends on robust policy frameworks, consistent professional development for teachers, and a commitment to iterative evaluation for ongoing refinement [19].

In the Indonesian context, the transformative role of digitalisation in education has been further highlighted in the publication "Cerita Data Statistik untuk Indonesia – Transformasi Digital" (2025) by BPS. The report illustrates how digital technology not only enhances education and health sectors but also contributes to broader human development and economic growth. Nevertheless, infrastructural inequality and geographical limitations continue to challenge equitable access. Despite this, digitalisation has yielded significant gains in educational quality, particularly in urban and semi-urban areas, reaffirming its strategic importance for national education reform (20).

To synthesise these findings, Figure 2 below presents a conceptual map illustrating the interconnected dynamics of teacher role transformation, digital tools, student engagement, and learning outcomes.

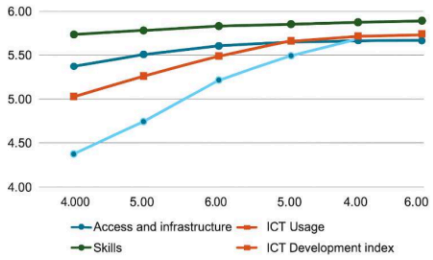

Figure 2. Indonesia's Information and Communication Technology Development Index (ICTDI), 2018–2023
Source: Statistics Indonesia (BPS), ICTDI 2024, processed

This graph illustrates a significant increase in the use of technology within Indonesia's education sector. Although there were fluctuations in some years, overall, there is a consistent upward trend. This indicates that educational institutions are increasingly adopting technology to support the learning process. This growth aligns with the *Merdeka Belajar* (Freedom to Learn) policy, which promotes digital transformation in education. However, despite these improvements, challenges remain in ensuring equitable access to technology across Indonesia's diverse regions. Hence, it is essential to continue developing infrastructure and providing training for educators to ensure that the benefits of technology can be evenly distributed [21].

3.3 Implementation of Blended Learning

The implementation of blended learning and the flipped classroom model represents innovative strategies that leverage technology to enhance learning quality. According to BPS's publication *"Penggunaan dan Pemanfaatan Teknologi Informasi dan Komunikasi (P2TIK) Sektor Pendidikan 2018"*, approximately 33.67% of students in Indonesia access the internet at school for learning activities [22]. This statistic indicates that while technology is increasingly utilised, there is still room for improvement in its integration into educational practices. Blended learning combines face-to-face instruction with online learning, while flipped classrooms invert the traditional model by delivering content outside the classroom and using in-class time for practical application and discussion. Both approaches allow students to learn at their own pace and promote greater engagement in the learning process. However, the successful implementation of these methods depends heavily on teachers' readiness and the availability of supporting technological infrastructure. Thus, it is crucial to provide adequate training for teachers and ensure the availability of resources to support these innovative learning models [23].

Table 2. Previous Research on LMS Implementation, 2023

Aspect	Quantitative Data	Source
Teacher Competency	The average score for LMS-based teaching improved from 56.92% (Low) to 79.85% (Good) after two training cycles.	*Jurnal Pembelajaran dan Ilmu Pendidikan*, Vol 3 No 4 (2023)
Learning Effectiveness	LMS activities showed a 13.74% improvement in data completeness in the first session and 14.05% in the second.	*Jurnal Pembelajaran dan Ilmu Pendidikan*, Vol 3 No 4 (2023)
LMS in Community Centres	LMS use in PKBM Bhakti Luhur improved learning outcomes by 70%.	*Jurnal Masyarakat Mandiri*, Vol 5 No 2 (2023)
Government Support	Through *belajar.id*, the Ministry provided free LMS accounts for all teachers in Indonesia.	Ministry of Education Repository (2021)
Benefits of LMS	LMS supports centralised learning, flexible instruction, learning data collection, assessments, and better learning experiences.	MPK e-Learning (2024)

The adoption of Learning Management Systems (LMS) in Indonesia's educational landscape reflects a significant transformation. Data from *Jurnal Pembelajaran dan Ilmu Pendidikan* shows an increase in LMS teaching performance scores from 56.92% to 79.85% after two cycles of training, indicating enhanced teacher competence in managing online instruction [24]. Moreover, LMS activities improved learning documentation, as

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shown by data completeness rising by 13.74% and 14.05% across two sessions. In community-based learning centres such as PKBM Bhakti Luhur, LMS implementation led to a 70% increase in learning achievements, highlighting LMS's Effectiveness across different educational levels [25].

Government support has played a pivotal role, particularly through the *belajar.id* initiative, which grants free LMS access to teachers nationwide. LMS benefits include centralised learning environments, teaching flexibility, seamless data tracking, assessment integration, and enriched learner experiences, all contributing to improved education quality [26].

Education serves as a strategic tool for improving human resources in response to evolving technological and social demands. According to the Coordinating Ministry for Human Development and Culture (Kemenko PMK), education must be adaptive to these changes. In the disruption era, education faces complex challenges such as low Gross Enrollment Rates (APK) in 3T regions and the urgent need for digital learning to broaden equitable access. Although Indonesia's PISA scores in 2023 declined, Mathematics: 366, Literacy: 359, and Science: 383, the country's global ranking improved, reflecting a resilient education system capable of addressing post-pandemic learning loss [27].

This resilience is supported by government policies like the *Merdeka Belajar* program, internet quota subsidies, and emergency curricula, which have maintained teaching and learning continuity. Within the digital transformation agenda, LMS has become the backbone of Distance Learning (PJJ), enabling flexible, effective, and structured instruction. With over 279,000 general education institutions and more than 87,000 madrasahs nationwide, digital education through LMS is vital to achieving equitable education quality.

LMS facilitates blended learning models that combine face-to-face, self-directed, and collaborative learning, along with digital evaluation systems that enrich students' learning experiences. The successful optimisation of LMS depends not only on technological infrastructure but also on teacher training, supportive policy frameworks, and cross-ministerial collaboration, including Kemendikbudristek, Kemenkominfo, and Kemenko PMK, to ensure data security and reinforce the foundation of a sustainable national education system [28].

3.4 Student Motivation Through Digital Teacher Support

Student motivation is a crucial factor in achieving optimal learning outcomes. In the context of digital learning, teachers play a vital role in fostering and sustaining students' motivation. Teachers can utilise various digital platforms to provide timely and personalised feedback, which stimulates students' sense of competence and autonomy, key drivers of intrinsic motivation based on Self-Determination Theory. When students receive constructive digital feedback acknowledging their progress and effort, they are more likely to develop a mastery-oriented mindset and persist in challenging tasks. Conversely, extrinsic motivation, such as earning badges, scores, or public recognition on online platforms, can also boost engagement in the short term, especially when strategically integrated with intrinsic motivators. For example, the implementation of Problem-Based

Learning (PBL) supported by digital textbooks has been shown to significantly improve student motivation from 28% to 88% by combining authentic problems (intrinsic appeal) with interactive gamified features (extrinsic reinforcement) [29]. This underscores the potential of digital integration as a mechanism to activate both intrinsic and extrinsic motivational pathways, thereby enhancing students' cognitive engagement and academic persistence.

Moreover, psychological mechanisms such as feedback loops and social presence in online environments also play a significant role. Immediate and individualised feedback, as enabled by digital assessment tools, helps reduce cognitive uncertainty and reinforces a growth mindset, while peer interaction through collaborative platforms satisfies the need for relatedness. These psychological satisfactions are linked to increased dopamine levels and enhanced attention spans, which are fundamental for deeper learning. Consequently, motivation facilitated through digital means has been correlated with higher academic achievement, including improvements in GPA, completion rates, and critical thinking skills.

Personalised learning, made possible through adaptive digital technologies, further supports student motivation by respecting their learning preferences and paces. For instance, Learning Management Systems (LMS) allow students to access differentiated resources anytime and anywhere, fostering a sense of control over their learning. When students are given the autonomy to choose how and when they engage with material, they are more likely to internalise motivation and become self-regulated learners. Adaptive learning software can analyse student performance data to recommend specific content or exercises, which not only improves Effectiveness but also provides a sense of progress that reinforces motivation. Teachers must actively leverage these tools to construct personalised feedback loops that adaptively respond to students' progress and needs [30].

Effective digital communication also contributes to the motivational climate of the classroom. Tools such as discussion boards, video chats, and real-time messaging enable continuous and authentic interaction between teachers and students. These interactions strengthen the psychological bond, build student trust, and enhance classroom presence—even in virtual settings. The sense of being "seen" and "heard" by teachers fosters a learning climate that is emotionally supportive and motivational. For example, a study on the use of Microsoft Teams in remote instruction showed that students who engaged in regular two-way communication with their teachers reported increased satisfaction and academic engagement [31]. Hence, digital communication is not merely a logistical tool but a psychosocial mechanism that fosters motivation through validation, encouragement, and clarity.

Nonetheless, significant barriers hinder the optimal use of digital tools for motivation. One key challenge is the digital divide—students in underserved areas often lack access to devices or reliable internet. Additionally, many educators are underprepared to deliver motivational digital instruction due to insufficient digital literacy or pedagogical training. Without the ability to customise instruction or provide meaningful feedback, motivational gains are limited. Addressing these systemic issues demands joint efforts: governments must invest in infrastructure and training; schools should foster a culture of

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innovation; and teachers must engage in continuous professional development, particularly in understanding how digital pedagogy intersects with motivational psychology [32].

In conclusion, the role of the teacher in digital environments has evolved from content transmitter to motivational architect. Teachers are now expected to design learning experiences that not only convey knowledge but also activate intrinsic interests and extrinsic incentives. They must monitor digital engagement metrics, offer differentiated scaffolding, and continually revise strategies based on learner feedback and performance analytics. By doing so, teachers not only improve student motivation but also positively impact learning outcomes such as academic achievement, retention, and skill mastery [33].

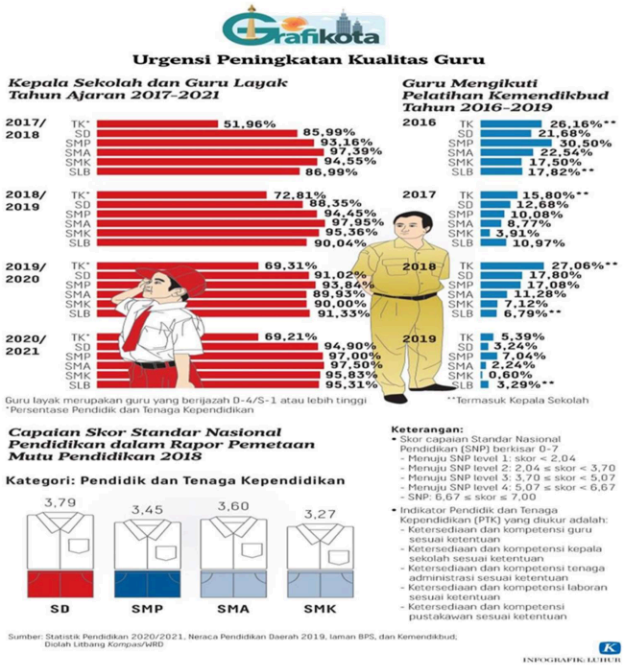

Figure 3. The Urgency of Teacher Quality Improvement
Source: Napitupulu, E. L. (2023)

Based on the figure, although the percentage of qualified teachers has increased annually, participation in Ministry of Education training programs has significantly declined from 2016 to 2019. This decline suggests that improving teacher quality cannot rely solely on formal training but must also involve a transformation in pedagogical roles in response to technological developments. Teachers who can pedagogically integrate

technology are more effective in building meaningful student relationships and enhancing engagement in learning activities [34].

Digital transformation in education creates space for teachers to become active facilitators rather than mere transmitters of information. In this role, teachers provide personal support that nurtures students' intrinsic motivation, especially in online or hybrid settings. The data also indicate that educator quality is still uneven across educational levels, even though teacher support is critical in shaping students' perceptions of learning. Teachers' emotional encouragement, reflective feedback, and positive reinforcement have a profound impact on student motivation, especially when combined with digital media familiar to today's learners.

This transformation makes the teacher's role even more essential in improving learning effectiveness, as students are more likely to stay motivated when teachers are actively present in the digital environments they use. Integrating technology into instructional strategies enables teachers to create more engaging, interactive, and meaningful learning experiences. Thus, the data presented in Figure 3 not only reflect administrative achievements but also reveal the urgent need for a paradigmatic shift in the teacher's role. Within the framework of this study on *The Transformation of Teachers' Roles Amid Technological Innovation*, these findings underscore that teacher quality must be supported by the ability to guide and connect with students through digital means. This transformation is not merely about adopting new tools but signifies a more profound shift in how educators engage, motivate, and empower learners in a sustainable digital learning ecosystem.

4. CONCLUSION

This study confirms that the transformation of teacher roles in Indonesia's digital era from content deliverers to digitally competent facilitators has a significant impact on learning effectiveness and student engagement. Teachers are expected to design flexible, technology-enhanced learning experiences that respond to students' individual needs while fostering motivation and higher-order thinking. To ensure the sustainability of this transformation, collaborative efforts among stakeholders are essential.

Key actionable recommendations:

a. Educational institutions should provide ongoing digital literacy training and support systems that empower teachers to implement innovative pedagogical strategies.
b. Policymakers must prioritise equitable infrastructure development and integrate digital pedagogy into national education frameworks.
c. Teacher training institutions need to embed practical, tech-integrated instructional design modules into pre-service teacher education, focusing on models like TPACK and problem-based digital learning.

By adopting these measures, stakeholders can collectively ensure that teachers are equipped to meet the demands of 21st-century learning environments and foster inclusive, engaging, and effective education systems across Indonesia.

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REFERENCES

[1] A. R. Afendi, "Pengembangan profesional guru di era digital: Strategi mengintegrasikan teknologi dan pedagogi (Studi kasus di MAN Insan Cendekia Paser Kalimantan Timur)," *Idarah: Jurnal Manajemen Pendidikan*, vol. 5, no. 5, pp. 490–513, 2024, doi: 10.32832/idarah.v5i5.18096.

[2] G. Afriani, I. Soegiarto, S. Suyuti, A. Amarullah, and A. Aristanto, "Transformasi Guru sebagai Fasilitator Pembelajaran di Era Digital," *Global Education Journal*, vol. 2, no. 1, pp. 91–99, 2024, doi: 10.59525/gej.v2i1.332.

[3] D. A. Baskoro, A. T. Umar, and J. Ahsan, "Transformasi Peran Guru di Era Digital: Studi Kasus di Perguruan Nurul Fadhilah, Percut Sei Tuan, Deli Serdang," *Jurnal Sustainable*, vol. 6, no. 1, pp. 224–236, 2023.

[4] Badan Pusat Statistik, *Indeks Pembangunan Teknologi Informasi dan Komunikasi (IPTIK) Indonesia 2018–2023*, 2024. [Online]. Available: https://www.bps.go.id

[5] Badan Pusat Statistik, *Cerita Data Statistik untuk Indonesia – Transformasi Digital*, 2025. [Online]. Available: https://www.bps.go.id

[6] Badan Pusat Statistik, *Penggunaan dan Pemanfaatan TIK (P2TIK) Sektor Pendidikan 2018*, 2018. [Online]. Available: https://www.bps.go.id

[7] W. Dwiastutik, "Peningkatan Kompetensi Pedagogik Guru melalui Pemanfaatan Learning Management System (LMS) Tahun Pelajaran 2022/2023," *Jurnal Pembelajaran dan Ilmu Pendidikan*, vol. 3, no. 4, pp. 293–300, 2023.

[8] *Jurnal Pembelajaran dan Ilmu Pendidikan*, "Peningkatan Kompetensi Guru dan Efektivitas LMS," vol. 3, no. 4, 2023.

[9] *Jurnal Masyarakat Mandiri*, "Pemanfaatan LMS di PKBM Bhakti Luhur," vol. 5, no. 2, 2023.

[10] A. Kadafi, D. N. Asri, P. Ardi, D. R. Afifah, and A. Andria, "Optimalisasi Learning Management System di Pusat Kegiatan Belajar Masyarakat," *JMM (Jurnal Masyarakat Mandiri)*, vol. 6, no. 4, p. 3237, 2022, doi: 10.31764/jmm.v6i4.9547.

[11] F. K. Husna et al., "Transformasi Peran Guru di Era Digital: Tantangan dan Peluang," *Perspektif: Jurnal Pendidikan dan Ilmu Bahasa*, vol. 1, no. 4, pp. 154–167, 2023, doi: 10.59059/perspektif.v1i4.694.

[12] Kemendikbudristek, *Repositori Institusi Kementerian Pendidikan dan Kebudayaan: Akun Pembelajaran belajar.id*, 2021.

[13] Kemendikbudristek, "Data PISA dan Transformasi Digital dalam Pendidikan Indonesia," 2023.

[14] Kemenko PMK, *Transformasi Pendidikan di Era Digital*, 2023. [Online]. Available: https://www.kemenkopmk.go.id/

[15] P. Mishra and M. J. Koehler, "Technological pedagogical content knowledge: A framework for teacher knowledge," *Teachers College Record*, vol. 108, no. 6, pp. 1017–1054, 2006.

[16] MPK e-Learning, "Manfaat dan Fungsi LMS dalam Pembelajaran Modern," 2024. [Online]. Available: https://mpk-elearning.id

[17] S. Munawar, D. Purbasari, and R. Gunawan, "Pengaruh Keterampilan Esensial Guru Pemula di SMK pada Era Digital," *Jurnal Profesi Keguruan*, vol. 8, no. 2, pp. 263–269, 2022. [Online]. Available: https://journal.unnes.ac.id/nju/index.php/jpk

[18] E. L. Napitupulu, *Laporan Statistik Nasional: Urgensi Peningkatan Kualitas Guru*, Jakarta: Kemendikbudristek, 2023.

[19] M. Nashrullah, S. Rahman, A. Majid, N. Hariyati, and U. N. Surabaya, "Transformasi Digital Dalam Pendidikan Indonesia: Analisis Kebijakan dan Implikasinya Terhadap Kualitas," 2025.

[20] Research and Markets, *Global EdTech Market Forecast 2023–2028*, 2023. [Online]. Available: https://www.researchandmarkets.com

[21] A. B. Santoso, M. Aminudin, and I. Kusmaryono, "Analisis Motivasi Belajar Siswa pada Pembelajaran Jarak Jauh dengan Menggunakan Aplikasi Microsoft Teams," *Prosiding Seminar Nasional SENDIKSA*, vol. 2, pp. 152–157, 2021.

[22] S. B. Sjukur, "Pengaruh blended learning terhadap motivasi belajar dan hasil belajar siswa di tingkat SMK," *Jurnal Pendidikan Vokasi*, vol. 2, no. 3, pp. 368–378, 2013, doi: 10.21831/jpv.v2i3.1043.

[23] S. B. Sjukur, "Pengaruh blended learning terhadap motivasi dan hasil belajar siswa," *Jurnal Teknologi Pendidikan*, vol. 14, no. 3, pp. 191–203, 2012.

[24] A. Sutarman, I. G. P. Wardipa, and M. Mahri, "Penguatan Peran Guru di Era Digital Melalui Program Pembelajaran Inspiratif," *Tarbawi: Jurnal Keilmuan Manajemen Pendidikan*, vol. 5, no. 2, p. 229, 2019, doi: 10.32678/tarbawi.v5i02.2097.

[25] H. H. D. Tasik, H. Karamoy, S. Wilnyson Alexander, and F. Ekonomi dan Bisnis Universitas Sam Ratulangi, "Techno Science Journal," *Techno Science Journal*, vol. 6, no. 1, pp. 41–53, 2024.

[26] UNESCO, *Reimagining our futures together: A new social contract for education*, 2021. [Online]. Available: https://unesdoc.unesco.org

[27] L. Husna and S. Siregar, "Implementasi Problem Based Learning berbantuan e-book terhadap motivasi belajar siswa," *Jurnal Pendidikan dan Pembelajaran Sains Indonesia*, vol. 8, no. 1, pp. 45–53, 2022.

[28] A. Siregar and T. Handayani, "Pengembangan model pembelajaran flipped classroom untuk meningkatkan keterlibatan belajar siswa," *Jurnal Pendidikan Edutama*, vol. 10, no. 1, pp. 11–19, 2023.

[29] A. Wulandari, "Strategi Guru dalam Menumbuhkan Motivasi Belajar melalui Media Digital," *Jurnal Inovasi Pendidikan dan Teknologi*, vol. 4, no. 2, pp. 102–110, 2022.

[30] I. Zainudin and M. Fathurrahman, "Peran LMS dalam Personalisasi Pembelajaran Abad 21," *Jurnal Pendidikan dan Teknologi Informasi*, vol. 5, no. 3, pp. 234–241, 2023.

[31] M. Yusuf and I. Nurmala, "Komunikasi Efektif Guru-Siswa dalam Pembelajaran Daring," *Jurnal Komunikasi Pendidikan*, vol. 8, no. 1, pp. 73–82, 2023.

[32] E. Suharto and T. Wahyuni, "Tantangan Akses Digital di Wilayah 3T," *Jurnal Pemerataan Pendidikan*, vol. 7, no. 2, pp. 200–210, 2022.

[33] D. A. Putri, "Pengaruh Kompetensi Digital Guru terhadap Hasil Belajar di Era Merdeka Belajar," *Jurnal Teknologi Pendidikan Indonesia*, vol. 5, no. 1, pp. 55–63, 2023.

[34] A. Prasetyo, "Analisis Integrasi LMS dalam Pembelajaran Matematika di Masa Pandemi," *Jurnal Pendidikan Matematika dan Sains*, vol. 6, no. 2, pp. 87–95, 2023.

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