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Analysis of Junior High School Teachers' ICT Framework in Depok City in Supporting Deep Learning (A Study on Schools Receiving the 2025 Performance-Based School Operational Assistance Program)

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ABSTRACT

Abstract, This study aims to analyze the readiness of junior high school teachers receiving the 2025 Performance-Based School Operational Assistance (BOS Kinerja) in utilizing Information and Communication Technology (ICT) to support deep learning. A total of 100 teachers from various public and private schools participated in this study. Data were collected using a questionnaire based on the UNESCO ICT Competency Framework for Teachers and analyzed using quantitative descriptive methods. The results indicate that 80 teachers (80%) got the "highly sufficient", 15 teachers were adequate, 5 teachers were deficient and 1 person was severely deficient in the domains of Knowledge Acquisition (KA) . Whether 75 teachers (75%) had the highly sufficient, 16 teachers were adequate, and 9 of them were severely deficient on Knowledge Deepening (KD). There were 49 teachers (49%) got highly sufficient, 20 teachers (20%) were adequate, and 16 teachers (11%) were deficient. The highest competency was observed in knowledge acquisition with a mean score of 4.12, followed by knowledge deepening at 3.75, and knowledge creation (KC) at 3.30, indicating "adequate" status and highlighting the need for further reinforcement. Challenges remain in increasing the consistent use of ICT and optimizing practice-based training. These findings are essential for data-driven, targeted, and sustainable policy-making aimed at enhancing teachers' digital competencies.

Keywords: ICT Framework, Deep Learning, Digital competence

A. INTRODUCTION

The transformation of 21st-century education requires fundamental changes in the learning process, particularly in equipping students with high-order thinking skills, creativity, and the ability to solve complex problems. One evolving approach that addresses these challenges is deep learning, which encourages students not only to memorize information but also to understand, apply, and critique knowledge within real-world contexts. Deep learning

integrates cognitive, social-emotional, and digital skill elements as part of shaping adaptive and innovative Pancasila student profiles.

In this context, the utilization of Information and Communication Technology (ICT) becomes a critical element that can accelerate the achievement of deep learning outcomes. ICT integration in learning not only facilitates information access but also enables broader interaction, personalized learning, and collaborative practices relevant to the real world. The quality of technology-supported learning strongly depends on the readiness of teachers to design, implement, and evaluate ICT-based learning processes effectively.

However, implementing ICT in education, especially at the junior high school level, still faces significant challenges. These include varying levels of digital competence among teachers, limited infrastructure, and a lack of practice-oriented training. Additionally, many teachers are still in the early stages of technology use—limited to presentation media or communication apps without deep pedagogical approaches. Therefore, it is crucial to systematically and measurably map teachers' readiness in utilizing ICT.

One relevant framework for analyzing teachers' competencies in technology utilization is the UNESCO ICT Competency Framework for Teachers (ICT-CFT). This framework provides guidance on the skills teachers must possess to use technology for improving teaching quality, professional development, and student engagement in the learning process. The ICT-CFT emphasizes three interrelated levels of competence—technological, pedagogical, and professional—that holistically form teachers' capacity.

The Ministry of Education's policy through the 2025 Performance-Based BOS program provides financial support to schools demonstrating outstanding RKAS performance, including excellence in technology use and learning innovation. This program also offers opportunities to enhance teachers' capacities in managing impactful learning. Therefore, BOS Kinerja serves as a strategic momentum to assess the extent of junior high school teachers' readiness to implement ICT-based learning.

This study focuses on 100 teachers from nine junior high schools receiving BOS Kinerja 2025 as the main subjects. The selection is based on the assumption that these schools are relatively more prepared in managerial and learning aspects. However, this assumption needs deeper examination through a standardized instrument-based quantitative approach to reveal the empirical reality of teacher readiness, especially in the context of technology-based deep learning.

The main objective of this study is to evaluate teachers' readiness to utilize ICT in supporting deep learning. The study also aims to identify key strengths and challenges in applying technology in learning, including device availability, ability to operate Learning Management Systems (LMS), and the frequency and quality of ICT integration in lesson plans (RPP). The findings are expected to serve as a basis for more targeted training development and data-driven teacher competency policy-making.

By analyzing teacher readiness through the ICT framework, this study contributes significantly to the development of innovative and impactful learning practices. Amid the paradigm shift in education, teachers—as agents of change—must be continuously empowered through data-based, reflective, and contextual approaches. Hence, the results of this research are also expected to serve as a strategic reference for schools, education offices, and the central government in designing teacher professional development policies and programs.

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B. METHODS

This study employed a quantitative descriptive approach with an analytical survey method. This approach was chosen to describe and analyze the level of readiness of junior high school teachers in utilizing Information and Communication Technology (ICT) based on the UNESCO ICT Competency Framework for Teachers (ICT-CFT) and its relevance to the implementation of deep learning. The main objective of the study was to obtain empirical data on how well teachers could integrate ICT into the learning process and identify the challenges they face. The population of this study included all junior high school teachers in schools receiving the 2025 Performance-Based School Operational Assistance (BOS Kinerja), as determined by the Directorate General of Primary and Secondary Education.

The sample consisted of 100 teachers, selected through purposive sampling based on the following criteria: Actively teaching for a minimum of two years, Using ICT tools in teaching activities, Willing to fully complete the research instrument. The study was conducted at public and private junior high schools in Indonesia that received BOS Kinerja, with a focus on Depok City, West Java. Data collection took place on June^{28th} to July^{3rd} 2025 through online instruments (Google Forms) and documentation of instructional planning aligned with the Merdeka Curriculum.

The main instrument used was a questionnaire adapted from the UNESCO ICT Competency Framework for Teachers (2018), contextualized for Indonesia's education system. The questionnaire consisted of three sections: Respondent profiles (age, educational background, ICT training), ICT competencies (knowledge acquisition, knowledge deepening, knowledge creation), ICT utilization in deep learning (instructional design, assessment, reflection, and digital tool usage). All items used a 5-point Likert scale ranging from "strongly disagree" to "strongly agree."

Data were gathered using three techniques: Online questionnaire distribution, Document analysis of lesson plans (RPP) and instructional modules from the Merdeka Curriculum. Quantitative data were analyzed using descriptive statistics (mean, median, mode, and standard deviation), along with analysis of lesson plan documents. The results were visualized through bar charts and radar diagrams.

. The indicators of teacher readiness in ICT use were based on the three levels of UNESCO's ICT-CFT: Knowledge Acquisition: mastery of basic ICT and access to digital information, Knowledge Deepening: use of ICT in designing active and collaborative learning, Knowledge Creation: ICT-based learning innovation and digital content production. The indicators for deep learning included project-based planning, authentic assessment, digital reflection, and integration of collaborative and exploratory learning applications

C. RESULTS AND DISCUSSION

1. ICT Competency Framework for Teachers (UNESCO)

The ICT Competency Framework for Teachers (ICT-CFT) developed by UNESCO is a framework designed to guide teachers in effectively integrating technology into teaching practices. The latest version of the framework (UNESCO, 2018) organizes teacher competencies into three main levels: Knowledge Acquisition, Knowledge Deepening, and Knowledge Creation. Each level consists of six core aspects: understanding the role of ICT in education policy, curriculum and assessment, pedagogy, ICT usage, school organization and administration, and professional development.

At the ***Knowledge Acquisition*** level, the focus is on basic ICT introduction and how teachers can use technology to access information and learning resources. This is a critical foundation, especially for teachers who are new to digital technology in education. Competencies at this level include the use of basic applications such as Microsoft Word, PowerPoint, and internet browsing for educational content (UNESCO, 2018; Alghamdi, 2020).

The ***Knowledge Deepening*** level emphasizes teachers' ability to integrate ICT into instructional strategies and assessments, enabling students to explore, collaborate, and conduct in-depth analysis. Teachers are expected to use Learning Management Systems (LMS), interactive media, and collaborative technologies such as Google Workspace, Padlet, or simulation-based STEM applications. At this stage, digital pedagogical competence becomes crucial (Redecker, 2021; Widodo, 2021).

The highest level, ***Knowledge Creation***, describes teachers as ICT-based learning innovators. Teachers not only use technology but also create digital content, design project-based learning models, and contribute to digital policy development at the school level. Teachers at this level have the competence to guide students in generating new knowledge through technology (Fauzi & Yulianti, 2022; Mishra & Koehler, 2020).

The UNESCO ICT-CFT framework is also oriented toward building the capacity of the entire education system. Not only teachers, but also principals, supervisors, and policymakers are expected to understand this framework as a guide for designing teacher training, learning assessments, and school digitalization policies (Mourlam, 2019). Thus, the framework serves not only as an assessment tool but also as a direction for developing ICT-based education systems.

Research by Putra & Rohayani (2023) showed that gradual implementation of ICT-CFT improved the digital pedagogical competence of secondary school teachers in Indonesia. In their study, systematic ICT-CFT-based training over six months significantly enhanced lesson planning quality and technology use. This indicates that the framework can be applied contextually across various regions and education levels.

In addition, a study by Khlaif et al. (2021) in Southeast Asia strengthened the relevance of ICT-CFT in reinforcing 21st-century learning practices. The study emphasized the importance of tiered training approaches so that digital competence is not only technical but also pedagogically deep. Teachers trained solely in hardware use tend to be less effective in developing learning that promotes critical and reflective thinking.

In Indonesia, ICT-CFT implementation has begun to gain traction in various teacher training programs, including the Guru Penggerak and Sekolah Penggerak initiatives. The Ministry of Education has also started referring to this framework in developing digital

training modules (Kemendikbudristek, 2022). This is a positive signal that ICT-CFT is considered relevant within the national teacher professional development framework.

However, several studies have noted challenges in implementing the framework, particularly regarding disparities in technology access, the lack of facilitators who deeply understand the framework, and insufficient monitoring and evaluation based on ICT-CFT indicators (Susanto & Fitriyah, 2020; Arifa, 2021). Therefore, more adaptive and collaborative strategies are needed to ensure that the framework serves as a real guide in educational practice, not just a policy document.

Overall, ICT-CFT provides a conceptual and practical foundation for teachers to progressively develop ICT-based learning. In the context of this study, the framework serves as a reference in constructing the measurement instrument for the readiness of junior high school teachers receiving BOS Kinerja 2025, as well as guiding the analysis of strengths and weaknesses in teachers' digital competencies to support deep learning.

2. Technology and Deep Learning

Deep learning is an approach that emphasizes active student engagement in understanding concepts, applying knowledge critically, and creating solutions to real-world problems. According to Hattie (2019), deep learning occurs when students are able to build connections between new information and prior knowledge through reflective and analytical thinking processes. Educational technology plays a strategic role in facilitating this process through open access to information, interactive simulations, and project-based learning.

In the context of 21st-century education, technology enables learning to be not only cognitive but also social and affective. Technology-based learning provides space for students to explore material through various media, engage in discussions across time and space, and reflect on their learning experiences independently. According to Redecker (2021), digital approaches such as flipped classrooms, blended learning, and inquiry-based learning strengthen the dimensions of deep learning because they enable differentiation and personalization of instruction.

Technology also supports the achievement of 4C skills (critical thinking, creativity, collaboration, and communication), which are essential components of deep learning. Through platforms like Google Workspace, Padlet, or Microsoft Teams, students can work in cross-class groups, communicate in real-time, and create collaborative digital products. Research by Huda et al. (2022) shows that the use of interactive digital media enhances students' learning outcomes while also building their intrinsic motivation.

Furthermore, deep learning requires teachers to design challenging, meaningful, and contextual learning scenarios. Technology can assist teachers in developing problem-based learning projects, case studies, or simulations where students are trained to explore and make decisions. The use of software such as GeoGebra, Canva Edu, or science simulation platforms has been proven to significantly improve students' conceptual understanding (Rahman & Siregar, 2021).

However, the integration of technology into deep learning cannot happen instantly. It requires teachers to possess digital pedagogical competencies, including the ability to select

appropriate applications, manage digital interactions, and provide constructive feedback. This highlights the importance of practice-based teacher training that not only focuses on tool usage but also on strategies for deep learning. A study by Nugroho & Kurniawati (2023) emphasizes that many teachers still focus on technical aspects and have not yet reached the level of pedagogical strategy implementation.

In practice, technology can also serve as a more authentic and reflective assessment tool. For instance, students can be asked to produce reflective videos, learning blogs, or digital portfolios that demonstrate their thinking processes and learning development. This type of learning allows teachers to assess not only the final outcomes but also the learning process itself. According to Anderson & Dron (2020), technology-based assessment can enhance students' metacognitive dimensions in deep learning.

In the Indonesian context, technology-based deep learning has been promoted through the Merdeka Curriculum, where Pancasila Student Profile projects serve as a platform for developing 21st-century skills. Technology is a supporting tool that enables students to access diverse learning resources and present their project outcomes in digital formats. A study by Damayanti & Rohman (2023) revealed that integrating technology into these projects increased students' participation and understanding of social and environmental issues.

Nonetheless, implementation challenges remain, such as internet access inequality, limited devices, and school cultures that do not yet fully support innovative learning. Therefore, it is important to design interventions based on the needs of teachers and students so that technology truly becomes a catalyst for deep learning rather than a mere supplementary tool. This aligns with the view of Beetham & Sharpe (2019) that digital education transformation must begin with a shift in pedagogical paradigms.

Ultimately, technology will not significantly impact deep learning unless supported by visionary school leadership, policies that foster innovation, and a collaborative learning ecosystem. Schools must become experimental spaces for both teachers and students to explore technology-based learning without the fear of failure. Within this framework, technology is not only a tool, but also a medium for cultivating reflective, independent, and transformative thinking among learners.

One of the widely adopted frameworks for ICT integration in the curriculum is the TPACK framework (Technological Pedagogical Content Knowledge) developed Thus, integrating technology into deep learning must be positioned as a pedagogical strategy oriented toward transformation. This study aims to assess the extent to which junior high school teachers, as the primary actors in classrooms, are ready to use technology to achieve the goals of deep learning within the framework of national education reform.

3. Integration of ICT into the Curriculum

The integration of Information and Communication Technology (ICT) into the education curriculum is a crucial strategy in equipping students with 21st-century skills. ICT is not merely a learning aid, but an integral part of the teaching and learning process itself. In a modern and adaptive curriculum, ICT is used to develop digital literacy, critical thinking, problem-solving skills, and collaboration across space and time (OECD, 2021). Therefore, a

curriculum that is responsive to technological developments is essential in primary and secondary education.

By Mishra and Koehler. In this model, ICT integration is not just about adding technological tools into learning, but ensuring that technology supports both content and pedagogy. These three elements—content, pedagogy, and technology—must intersect harmoniously to create meaningful learning (Mishra & Koehler, 2020).

ICT integration into the curriculum is also encouraged by national policies such as the **Merdeka Curriculum**, in which teachers are given flexibility to design contextual and differentiated instruction. Under this policy, teachers can use ICT to create project-based learning modules, digital assessments, and online student portfolios. This allows for more flexible, adaptive, and measurable learning (Kemendikbudristek, 2022).

Research by Asri & Dwiatmoko (2022) shows that schools that systematically integrate ICT into lesson planning report higher student learning outcomes, particularly in science and mathematics subjects. Teachers who are able to incorporate interactive applications, simulations, and LMS platforms in their teaching practices significantly improve students' conceptual understanding and engagement.

However, integrating ICT into the curriculum should not be limited to documentation or planning levels only. A cultural shift in learning that supports the creative and collaborative use of ICT is needed. Many teachers still use technology merely as a presentation tool or replacement for whiteboards, without making substantial changes to their teaching strategies (Supriyadi, 2021). Therefore, continuous training and mentoring are key to building teachers' digital curriculum competencies.

In practice, teachers need to design lesson plans (RPP) that explicitly integrate ICT in the introductory, core, and closing activities. Research by Dewi et al. (2021) found that lesson plans designed with ICT integration improved the effectiveness of online learning during the COVID-19 pandemic by providing clearer structure, digital learning resources, and technology-based student activities.

In addition, ICT integration also supports performance-based authentic assessments, such as using Google Forms for formative quizzes, portfolio applications like Seesaw, or reporting project outcomes through digital videos. A curriculum that accommodates digital assessments allows teachers to monitor students' learning progress in real-time and provide faster, more specific feedback (Anderson, 2020; Fauzi & Yulianti, 2022).

Internationally, countries like Singapore, South Korea, and Finland have long implemented comprehensive and consistent ICT integration in their curricula. They place digital literacy as a core component across all subjects—not just technology-specific classes.

Indonesia can learn from these approaches to develop a national curriculum that is more grounded in digital skills and future-readiness (OECD, 2021).

The main challenge in implementing ICT integration into the curriculum lies in teachers' readiness to design and deliver digital-based learning effectively. Without strong digital pedagogical competence, ICT risks becoming merely a decorative aspect of education. Therefore, a **whole school transformation** approach is required, where all school components (principals, teachers, and educational staff) collaborate in developing a curriculum that supports digital transformation (Putra & Rohayani, 2023).

Thus, integrating ICT into the curriculum is not just a technical innovation but a shift in learning paradigms. Teachers, as the main agents of change, must be continuously supported to develop adaptive, contextual, and transformative digital curricula. In this study, the level of ICT integration in lesson plans and teaching practices will serve as an indicator of teachers' readiness to support technology-based deep learning.

4. Digital Competence

Digital competence refers to the ability to use digital technologies effectively and responsibly in various life contexts—personal, professional, and social. It encompasses technical skills, digital literacy, problem-solving using technology, and awareness of digital ethics and security issues. According to **DigComp 2.2** (European Commission, 2022), digital competence is divided into five domains: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving.

In the field of education, digital competence is especially crucial, as teachers are expected not only to operate technology but also to integrate it pedagogically and contextually into the learning process. UNESCO (2019), in its ICT Competency Framework for Teachers, emphasizes that teachers must be capable of transforming their teaching practices through technology to help students develop 21st-century skills such as critical thinking, collaboration, and creativity.

Digital competence in education goes beyond knowing how to use devices or applications; it involves the ability to design learning that fosters active engagement, digital citizenship, and innovation. Teachers with strong digital competence are more likely to facilitate meaningful learning experiences that are relevant to students' futures in a digital society.

Research has shown that increasing digital competence among teachers positively correlates with improved student outcomes. Teachers who are digitally literate are better prepared to use data-driven instruction, manage online classrooms, assess students authentically through digital platforms, and respond to learners' needs more flexibly. In this regard, digital competence is not an optional skill, but a foundational professional standard in modern education systems.

Moreover, digital competence also includes understanding ethical behavior in the digital world, such as respecting intellectual property, maintaining data privacy, and promoting positive online interactions. This dimension is increasingly important as students spend more time in digital spaces. Teachers are expected to model and teach responsible digital behavior as part of comprehensive digital literacy education.

The development of digital competence must be continuous and supported by professional development programs, communities of practice, and institutional policies. Governments and schools should ensure that teachers have access to ongoing training, mentoring, and digital infrastructure that align with national education goals and technological advancements. Only through this holistic approach can digital competence be sustainably embedded in the teaching profession

5. Digital Pedagogy

Digital pedagogy is a pedagogical approach that meaningfully and integratively utilizes digital technology to improve the quality of learning. This concept goes beyond merely using digital tools; it involves a fundamental shift in how teachers teach and how students learn. According to Redecker (2021), digital pedagogy represents a paradigm shift from content-based learning to competency-based learning, emphasizing collaboration, creativity, and reflective thinking.

Digital pedagogy requires teachers to design learning experiences that allow students to explore digital resources, participate in online discussions, and build knowledge through interactions with technology. In practice, this may involve project-based digital learning, online simulations, or the creation of digital portfolios by students. This approach transforms the teacher's role from a source of knowledge to a facilitator of deep learning processes (Beetham & Sharpe, 2019).

In the context of the **Merdeka Curriculum**, digital pedagogy is highly relevant as it provides flexibility for teachers to choose learning strategies aligned with students' characteristics. Teachers can use digital platforms to conduct formative assessments, provide real-time feedback, and adapt instructional content based on student needs. A study by Putra & Kurniawati (2023) found that teachers implementing adaptive digital pedagogy significantly increased student engagement and motivation in junior high schools.

One important component of digital pedagogy is the use of **interactive media**. Resources such as instructional videos, podcasts, augmented reality (AR) applications, and science simulation software enrich learning experiences and provide more contextual understanding. According to research by Rahmawati & Nurfalah (2021), using interactive videos and visual tools improves students' comprehension of abstract Furthermore, digital pedagogy supports the principle of **learner-centered learning**. With technology, learning becomes more personalized and non-linear, allowing students to choose their learning paths based on their interests and abilities. Teachers can offer various options for learning resources, assignment formats, and assessment methods through platforms like Google Classroom, Edmodo, or Moodle. This creates opportunities for students to take ownership and responsibility for their learning processes (Huda et al., 2022).

concepts, particularly in mathematics and science subjects.

However, the effectiveness of digital pedagogy largely depends on teachers' digital literacy. Not all teachers possess adequate competence in selecting and applying the right technologies that align with learning goals. A study by Sari & Nugroho (2022) revealed that many teachers are still in transition—using technology only to a limited extent and not yet fully integrating it into their teaching strategies. Therefore, improving teacher capacity is a critical prerequisite for optimizing digital pedagogy.

Digital pedagogy also demands the ability to create a safe and ethical digital learning environment. Managing data security, ethical use of digital content, and promoting **digital citizenship** among students are integral parts of the learning process. In this regard, schools must also strengthen their roles as digital learning communities (Anderson, 2020).

Beyond the classroom, digital pedagogy plays a key role in hybrid and distance learning contexts. The COVID-19 pandemic has accelerated technology adoption in education and exposed gaps in teachers' digital skills. This experience underscores that digital pedagogy is not a temporary trend, but a **strategic necessity** for the future of education (OECD, 2021).

At the international level, digital pedagogy has become a foundational element in curriculum reform across developed countries. Nations like Australia, the United Kingdom, and Canada have even integrated digital pedagogy into professional teaching standards. They have developed specific frameworks to guide teachers in selecting technology, adjusting instructional designs, and conducting digital-based learning assessments (Redecker, 2021).

Thus, digital pedagogy is a key component in promoting technology-based deep learning. To realize meaningful, transformative, and future-ready learning, teachers must not only master digital tools but also understand pedagogical approaches suited to the dynamics of the digital world. In the context of this research, the level of understanding and application of digital pedagogy among teachers is a critical indicator of their readiness to support educational.

Discussion

1. Respondent Profile

The 100 teachers surveyed, 59.9% were female and 41.1% male. Most (63.2%) were aged between 31–45 years. Approximately 75.6% held a Bachelor's degree in education, while 24.4% held a Master's degree. Additionally, 67.8% had attended ICT training more than twice in the past five years. These data indicate that the respondents had a relatively adequate background to engage with questions on digital competence and ICT integration in learning.

2. ICT Competency Levels Based on UNESCO ICT-CFT 2018

Based on the questionnaire results, the average total ICT competency score was 3.82 (categorized as "adequate prepared") on a scale of 5, with the following readiness categories:

Average Score	Category

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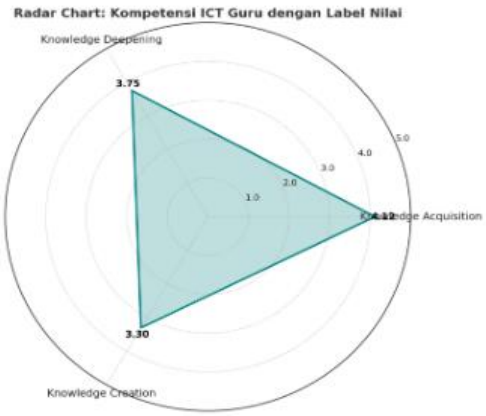
ICT-CFT Dimension	Score	Category
Knowledge Acquisition	4.12	highly prepared
Knowledge Deepening	3.75	Adequate Prepared
Knowledge Creation	3.30	Partially prepared

1.0-1.80	Critically unprepared
1.81-2.60	Minimally prepared
1.61 – 3.40	Partially prepared
3.41 – 4.20	Adequate prepared
3.21-5.00	Highly prepared



Radar Chart Visualization:

The strongest competency was in ***knowledge acquisition*** (use of basic ICT tools such as Office, internet access, and educational media), while the weakest was in ***knowledge creation*** (creating digital learning content, using LMS, or interactive simulations). This confirms that most teachers are capable of using basic digital tools functionally but have yet to optimally develop innovative ICT-based instructional strategies. These findings align with Nugroho & Mulyati (2023), who observed that advanced TPACK levels are still rare among junior high school teachers.

3. ICT Integration in Deep Learning

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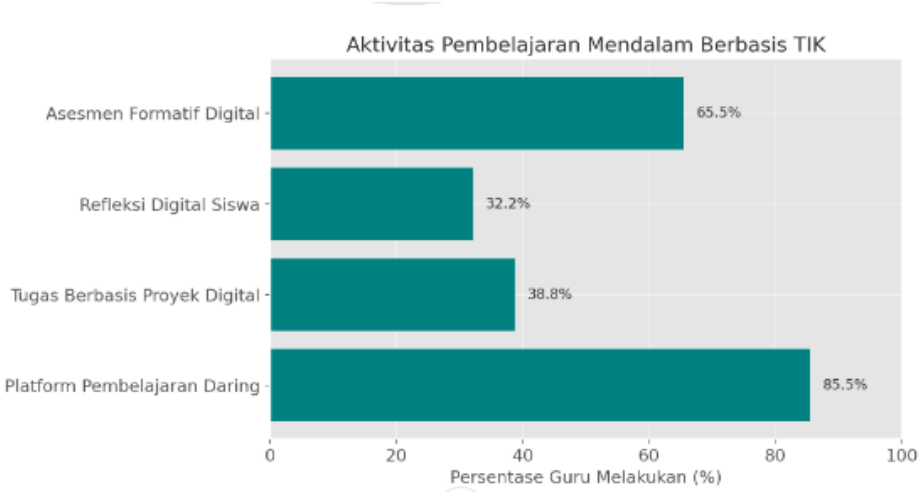
Lesson plan analysis revealed that 79 (78.9%) of teachers had integrated ICT into their lesson plans, but only 42 (42.2%) applied it to support project-based, collaborative, and reflective learning.



Bar Chart Visualization:

This shows a gap between digital tool usage and its actual support for deep learning strategies. While ICT tools are widely used, their pedagogical implementation remains conventional. Teachers often use technology merely as presentation media (e.g., PowerPoint, projectors), not as drivers of learning strategies. LMS tools such as Moodle or Google Classroom were largely abandoned post-pandemic. This suggests that digital competence requires not only technical ability but also pedagogical and strategic depth.

a. Discussion

The findings indicate that teachers' readiness within the ICT-CFT framework is at a "adequate prepared " level in *knowledge acquisition and deepening*. However, knowledge creation still requires reinforcement, particularly in digital creativity and pedagogical innovation. ICT-based deep learning implementation remains suboptimal, as most teachers operate at the substitution or augmentation level of the SAMR model.

ICT integration into the curriculum has occurred structurally but is yet to be fully reflected in classroom practice. Teachers with more extensive training experience demonstrate higher levels of readiness, highlighting the importance of intensive and contextual professional development.

In the context of 21st-century education and the ***Merdeka Curriculum***, teachers are expected to become facilitators of active and reflective learning. Thus, the TPACK and SAMR frameworks must be reinforced through structured training, coaching, and school policies that promote innovation.

Conclusion and Recommendations

Conclusion

Based on the analysis of 100 junior high school teachers receiving the 2025 Bantuan Operasional Sekolah Kinerja 2025 (BOSKIN 2025), it can be concluded that teacher readiness in utilizing ICT to support deep learning is categorized as "adequate prepared" The highest competencies were observed in knowledge *acquisition and deepening*, while *knowledge creation* still needs to be strengthened. Although teachers are familiar with basic digital tools, their use in designing innovative and reflective learning strategies remains limited.

There is a clear discrepancy between the availability of digital tools and their pedagogical application. Teachers frequently use digital platforms to deliver content but seldom design instruction that is project-based, collaborative, and reflective. Interviews and document analysis revealed several major obstacles: Lack of instructional design mentoring,Weak internal school policies to encourage innovation, Time constraints for teachers to experiment with ICT-based strategies.

Therefore, teachers' readiness within the ICT-CFT framework has yet to fully support optimal implementation of deep learning, though a strong foundational potential is evident. Strengthening efforts from multiple stakeholders is essential to advance more transformative technology integration.

Recommendations

Based on the study findings, the following recommendations are proposed to enhance ICT-based deep learning:Enhance pedagogically-focused ICT training, Training should go beyond technical skills to include instructional design, reflective assessment, and ICT integration aligned with deep learning principles. Implement TPACK and SAMR frameworks in instructional supervision and evaluation, Develop teacher professional learning communities (PLC).Schools should facilitate regular forums for teachers to share best practices, discuss technology use, and reflect on digital teaching. Integrate digital project-based learning into school curricula.Lesson plans and teaching modules should promote collaboration, creativity, and student reflection through technology use.Establish school policies that encourage digital innovation. School management should provide incentives, exploration time, and relevant digital resources to support ICT-based learning transformation.Offer coaching and mentoring from ICT facilitators to ensure sustainable transformation of teaching practices.Strengthen digital literacy for both teachers and studentsby incorporating digital ethics, data security, and digital citizenship across subjects. Conduct ongoing monitoring and evaluation of teachers' ICT use and its impact on student learning outcomes.

D. CONCLUSION

The conclusion provides answers to the problems addressed in the community engagement activities. Instead of repeating the results and discussion, it should summarize the outcomes and impacts of the activities as aligned with the stated objectives. Additionally, this section may include recommendations or limitations of the activities. (Use Book Antiqua font, size 11, single-spaced.).

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F. AUTHOR CONTRIBUTIONS

Here are the contribution list of this journal: Activity implementation: SY, Article preparation: SY, HS, Impact analysis: SY,HS, Results presentation: SY, Article revision: HS,

G. REFERENCES

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