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Teachers' Perceptions of Digital Technology Use in 21st-Century Learning at SMPN 18 Pekanbaru

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Abstract: In the 21st-century educational era, the use of digital technology has become an urgent need in the learning process. This study aims to examine teachers' perceptions of the use of digital technology in 21st-century learning at SMPN 18 Pekanbaru. Technology is not only used for administrative aspects but also as a tool to enhance the effectiveness of learning, teacher creativity, and student engagement. Teachers' perceptions are crucial as they influence the extent to which technology can be optimally integrated into classrooms. This study employs a descriptive quantitative approach using survey techniques. The instrument used was a questionnaire distributed to 33 teachers, and the data were analyzed using descriptive statistical techniques through SPSS. The research results showed that the average teacher perception score was 124.24 out of a maximum score of 150, indicating that teachers had a high and positive perception of the use of digital technology in learning. These findings indicate that teachers at SMPN 18 Pekanbaru are ready to adopt and integrate technology into learning. These results align with previous studies stating that teachers are enthusiastic about digital learning media, but this study offers a different contribution by providing specific quantitative evidence at the junior high school level. Therefore, ongoing technology training is highly recommended to enhance teachers' capacity in managing effective and meaningful digital learning.

Keywords: teacher perception, digital technology, 21st-century learning, secondary education

1. INTRODUCTION

In today's modern era, education systems are increasingly directed toward meeting the demands of the 21st century, which focus on four main pillars: learning to know, learning to do, learning to be, and learning to live together (Delors, 1996). Within this framework, the learning approach has shifted from teacher-centered to student-centered, reflecting a paradigm shift in education that emphasizes active student participation in the learning process (Firmansyah & Jiwandono, 2022).

21st-century education includes learning and innovation skills, literacy in accessing and managing information, and the ability to utilize digital technology and media (Nursaya'bani et al., 2025). In this context, technology becomes a vital component inseparable from the educational process. The use of technology not only supports learning but also plays a role in increasing efficiency, creativity, and graduates' competitiveness in the future. Khasanah & Herina (2019) emphasize that producing qualified graduates capable of competing globally with technological proficiency is a crucial aspect for a nation's advancement.

Initially, technology in education was mostly used for administrative aspects, such as recording grades and student attendance. However, as time progressed, technology began to penetrate classrooms, transforming teaching methods to be more interactive and engaging (Sidabutar, 2021). Teachers now have access to various digital platforms such as Google Classroom and Edmodo, allowing them to deliver materials, assign tasks, and communicate efficiently with students. Platforms like Zoom and Microsoft Teams have also facilitated distance learning, bridging geographical limitations (Setiawan & Prasetyo, 2021).

The advancement of technology undoubtedly requires educators to adapt. Teachers' perceptions of technology are an important factor in its successful implementation in classrooms. Some teachers see technology as a helpful tool to improve the quality of learning, while others struggle to keep up with rapid technological developments (Azizi et al., 2024). Kurniawan (2020) argues that teachers' skills in using technological devices are a dominant factor influencing their perception of educational technology. To understand teachers' perceptions more deeply, constructivist theory can be used as an analytical foundation.

According to constructivist theory, teachers act as facilitators helping students build knowledge through active learning experiences. The use of technology greatly supports this approach by enabling the creation of collaborative and interactive learning environments (Ratnasari et al., 2024). For instance, digital applications allow students to work in groups, complete projects together, and receive immediate feedback. This supports the development of active and meaningful learning experiences (Wibowo, 2019).

Several studies have been conducted to explore the role of digital technology in learning. For example, Mutmainnah & Khaerunnisa (2024) examined teachers' perceptions of technology-based learning media. Another study by Hidayat & Khotimah (2019) discussed the use of digital technology in learning activities, showing increased teacher interest and creativity in using technology. However, a deeper understanding of teachers' perceptions of digital technology in 21st-century learning still requires further investigation. Understanding teachers' perceptions of the use of digital technology in 21st-century learning is very important, as it reveals the extent of teachers' readiness and support in facing modern educational challenges. Banarsari et al. (2023) emphasize that in the context of 21st-century learning, both educators and students are required to be technologically literate, especially in digital educational technology.

Although many studies discuss the use of technology in education, most are still general and do not specifically highlight teachers' perceptions at the junior high school level, especially in regions like Pekanbaru. Moreover, previous research mostly employed qualitative approaches, which do not provide measurable quantitative insights into teachers' perceptions. Therefore, this study aims to fill that gap by presenting survey-based quantitative data to obtain a more measurable picture of junior high school teachers' perceptions regarding the use of digital technology in 21st-century learning. Hence, this research was conducted to examine teachers' perceptions of the use of digital technology in the 21st-century learning process, formulated with the research question: "What are teachers' perceptions of the use of digital technology in 21st-century learning at SMPN 18 Pekanbaru?"

2. METHODS

This study employed a descriptive quantitative approach. This design is used to describe teachers' perceptions of the use of digital technology in 21st-century learning without manipulating any variables. Descriptive research aims to provide a systematic, factual, and accurate description of the facts and characteristics of the studied object (Arikunto, 2013). The population of this study consisted of all teachers at SMPN 18 Pekanbaru. The sample consisted of 33 teachers selected using total sampling, considering the small population size, which allowed all members to be included. The research was conducted in June 2025 at SMPN 18 Pekanbaru, Riau Province.

Data were collected using a questionnaire distributed online via Google Form. The questionnaire used a Likert scale with five response options: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The questionnaire consisted of several statements representing teachers' perceptions regarding the use of digital technology in 21st-century learning. Data were analyzed using descriptive statistics by calculating the mean, standard deviation (SD), and percentage to determine the general trend of teachers' perceptions toward the questionnaire items.

3. FINDINGS AND DISCUSSION

3.1 Data Description

This study involved 33 teachers at SMPN 18 Pekanbaru as respondents. The data collected were the results of the teacher perception questionnaire on the use of digital technology in 21st-century learning. The descriptive statistical analysis of the total scores is as follows:

Descriptive Statistics

	N	Range	Minimum	Maximum	Sum	Mean	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TOTAL SCORE	33	66	84	150	4100	124.24	3.178
Valid N (listwise)	33						

Based on the results of descriptive statistical analysis of teachers' perceptions regarding the use of digital technology in 21st-century learning, a total of 33 teachers at SMPN 18 Pekanbaru participated as respondents in this study. The total perception scores had a range of 66, with a minimum score of 84 and a maximum score of 150. The total accumulated score was 4100, with a mean of 124.24 and a standard error of 3.178. These results indicate that, in general, teachers' perceptions of the use of digital technology are relatively high, reflecting a positive attitude and openness among teachers toward the integration of technology in the learning process.

Descriptive Statistics

	N	Std. Deviation	Variance	Skewness		Kurtosis		CV
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error	Statistic
SKOR TOTAL	33	18.257	333.314	-.576	.409	-.197	.798	14.69
Valid N (listwise)	33							

The descriptive statistics of the total score data from 33 teachers at SMPN 18 Pekanbaru show a standard deviation of 18.257 and a variance of 333.314, indicating a moderate spread of perception scores around the mean. The skewness value of -0.576 with a standard error of 0.409 suggests that the distribution is slightly skewed to the left, meaning more teachers scored above the average. Meanwhile, the kurtosis value of -0.197 with a standard error of 0.798 indicates a distribution that is relatively flat compared to a normal distribution (platykurtic). The coefficient of variation (CV) of 14.69% reflects a low level of variability, signifying that the teachers' perceptions toward the use of digital technology in 21st-century learning are relatively consistent.

3.2 Data Interpretation

The analysis of the data obtained from 33 teachers at SMPN 18 Pekanbaru reveals insightful findings regarding their perceptions of digital technology use in 21st-century learning. The average total score of teacher perceptions was 124.24 out of a possible 150, which suggests a generally positive perception. The standard deviation of 18.257 and variance of 333.314 indicate that while most teachers share similar views, there is still a moderate level of variation in individual responses.

The skewness value of -0.576 implies that the distribution of scores is slightly negatively skewed, meaning that a larger proportion of teachers tend to rate their perceptions above the mean — further supporting the finding that most teachers hold favorable views toward digital technology integration. Additionally, the kurtosis value of -0.197 suggests the data distribution is relatively flat or platykurtic, indicating that responses are more spread out and less peaked around the mean than a normal distribution. This implies a wide range of perceptions, though still generally positive.

Furthermore, the coefficient of variation (CV) is 14.69%, which is considered low. This means that the relative variability in teacher perceptions is minimal, indicating consistency in their positive views. Taken together, these statistical indicators demonstrate that the majority of teachers perceive the use of digital technology as beneficial and relevant to modern educational needs, aligning well with the goals of 21st-century learning, such as promoting critical thinking, collaboration, and digital literacy.

DISCUSSION

The results of this study indicate that teachers at SMPN 18 Pekanbaru have a generally high and positive perception of the use of digital technology in 21st-century learning. With an average score of 124.24 out of a possible 150, it is evident that the majority of teachers support the integration of digital tools in the teaching and learning process. This finding aligns with the study by Nursaya'bani et al. (2025), which emphasized that digital competence is essential for teachers to meet the demands of 21st-century education, particularly in terms of utilizing technology and media effectively. It also resonates with the paradigm shift from teacher-centered to student-centered learning, as proposed by Delors (1996) and reinforced by Firmansyah & Jiwandono (2022), where technology plays a key role in facilitating active, collaborative, and personalized learning experiences.

Compared to the findings by Hidayat & Khotimah (2019), which showed that digital tools increased teacher creativity and student engagement, this study further confirms that teachers not only acknowledge these benefits but also feel confident and positive about implementing such tools. However, while Hidayat & Khotimah focused more on qualitative observations of classroom activities, the current study offers a quantified perspective, reinforcing those qualitative insights with empirical data. This provides stronger evidence that digital technology is well-received and is being integrated effectively by educators at the secondary school level.

Moreover, the relatively low coefficient of variation (CV = 14.69%) and standard deviation (18.257) in this study suggest a high degree of consistency among teachers' perceptions. This homogeneity strengthens the argument that positive views toward technology are not limited to a few enthusiastic individuals but are widespread among educators in the school. This is in line with the research by Mutmainnah & Khaerunnisa (2024),

who highlighted that teachers recognize the value of technology-based media in enriching classroom experiences. Nonetheless, while their study was more focused on specific media platforms, this research presents a broader view encompassing the overall digital integration in teaching.

Interestingly, a slight negative skewness (-0.576) was observed in the data, indicating that a few teachers had lower perception scores compared to the majority. This contrasts with the more uniform findings of Setiawan & Prasetyo (2021), where all participating teachers demonstrated high enthusiasm for platforms like Zoom and Microsoft Teams during remote learning. The variation found in the current study suggests that although overall attitudes are positive, there still exist minor gaps in digital confidence or readiness among some teachers, possibly due to differences in training, experience, or access to technology. This highlights the ongoing need for professional development tailored to individual teacher needs.

Another key distinction lies in the level of analysis. Previous studies such as Azizi et al. (2024) and Kurniawan (2020) focused on the challenges teachers face, particularly in keeping up with rapid technological advancements. While those studies discussed obstacles and teacher anxiety in a general context, the current study provides a more optimistic picture, where the majority of respondents not only accept but embrace digital tools in their teaching. This difference may be attributed to the specific setting of SMPN 18 Pekanbaru, which could have better infrastructure or support systems in place, thereby influencing teacher perceptions positively.

In conclusion, this study contributes a valuable quantitative perspective to the ongoing discourse about digital technology in education. It affirms many of the insights reported in earlier qualitative studies, such as the growing importance of teacher digital competence and the shift toward technology-enhanced pedagogies. At the same time, it introduces a more measured and statistical understanding of how consistent and widespread these perceptions are among secondary school teachers. The findings underscore the critical role of continued support, infrastructure development, and targeted training programs to sustain and further enhance the positive momentum toward digital integration in classrooms.

4. CONCLUSION

Based on the findings of this study, it can be concluded that teachers at SMPN 18 Pekanbaru generally have a high and positive perception of the use of digital technology in 21st-century learning. The majority of teachers recognize the value of digital tools in enhancing the quality, effectiveness, and engagement of the learning process. The consistency of responses and the near-normal distribution of scores suggest that digital technology has been well-received and broadly accepted among educators. This reflects a readiness among teachers to integrate technology into classroom practices and align with the demands of 21st-century education.

In light of the findings, it is recommended that schools and education stakeholders continue to support teachers through ongoing professional development programs focused on digital literacy and technological innovation. Training should be tailored to various levels of technological proficiency to ensure inclusivity and address the remaining gaps among a small group of teachers. Additionally, infrastructure improvements and access to reliable digital platforms should be prioritized to maintain the momentum toward technology-enhanced learning. Future research is encouraged to explore deeper correlations between perception, teaching practices, and student outcomes, as well as to expand the study to other educational levels and regions.

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