Readiness and Challenges of Implementing Virtual Reality in School Administration: A Case Study at Yayasan Pendidikan YIMI Gresik

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ABSTRACT

Little is known about the application of Virtual Reality (VR) in school administration, particularly in Indonesia. This study examines the readiness and challenges of implementing VR technology at Yayasan Pendidikan YIMI Gresik, covering KB-TK, SD, and SMP levels. Using surveys, interviews, and field observations, the research assessed infrastructure, training needs, and potential benefits. The survey results show moderate readiness scores across units (KB-TK = 3.1, SD = 3.4, SMP = 3.2 on a 5-point scale), with training needs identified as a critical gap. The findings reveal that while VR has strong potential to enhance administrative efficiency and user satisfaction, its adoption is hindered by limited infrastructure and lack of intensive user training. This study provides one of the first empirical insights into VR readiness for school administration in Indonesia and offers a foundation for future planning and policy in educational management technology.

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1. INTRODUCTION

Education serves as the cornerstone of a nation's development, providing the foundation for overall societal advancement. Within this framework, school administration plays a crucial role as the backbone that ensures effectiveness and efficiency in the educational system (Kasmini, 2024). As times evolve and the demand for high-quality education intensifies, the challenges of managing schools have become increasingly complex (Basri & Hasri, 2024). Schools are now expected not only to deliver quality education but also to adapt to the dynamic changes occurring in the global educational landscape (Wahid, n.d.) (Hajar, 2024) (David Darwin et al., 2025).

Technology has emerged as a driving force that has transformed nearly every aspect of human life, including education (Wang, Chen, Yu, Liu, & Jing, 2024). In this digital era, the need for innovations that enhance educational management is paramount (Ritonga, 2024), with information and communication technologies becoming essential elements in this process (Nashwan et al., 2023)

(Abujaber, Abd-Alrazaq, Al-Qudimat, Nashwan, & AbuJaber, 2023) (Sadallah, Bin-Nashwan, & Benlahcene, 2025) (Sadallah et al., 2025). One such innovation is Virtual Reality (VR), which provides immersive and interactive environments that enable users to engage with objects and individuals in digital simulations resembling real-world contexts (Samadi, Jafarigohar, Saeedi, Ganji, & Khodabandeh, 2024). The application of VR across diverse fields has demonstrated its ability to improve operational efficiency and effectiveness, including in educational contexts (Turan, İşler, & Duman, 2024).

In the realm of educational administration, VR holds substantial promise as a tool for enhancing school management (Marnewick & Chetty, 2021) (Johnson, 2024). This technology not only enriches students' learning experiences but also increases the efficiency of school operations (Turan et al., 2024). For example, VR can be utilized in school management simulations, teacher training, and the development of more dynamic curricula (Han & Patterson, 2020). However, despite early studies highlighting these potential benefits, there remains a significant gap in research specifically addressing the application of VR in school administration (Pickles, Parsons, & Kovshoff, 2023).

While VR has been widely studied in teaching and learning (Radu & Schneider, 2019), few investigations have examined its relevance to administrative efficiency, readiness, and stakeholder acceptance (Mirata & Bergamin, 2023). This is particularly critical in developing countries like Indonesia, where school management quality directly influences the effectiveness of education services (Abidah et al., 2020). Existing studies also suggest that challenges such as infrastructure readiness, intensive user training, and cultural acceptance must be considered (Fransson, Holmberg, & Westelius, 2020).

Given this context, the present study explores the readiness and challenges of implementing VR in school administration at Yayasan Pendidikan YIMI Gresik, which manages KB-TK, SD, and SMP units. Data were collected through surveys, interviews, and observations to assess infrastructure, training needs, and stakeholder perceptions (Radu & Schneider, 2019) (Kim, Nah, Oh, & Ryu, 2019). Additionally, school administrative documents such as reports, policies, and activity logs were analyzed to provide comprehensive insights (Afiana, Rifai, & Frilisia, n.d.).

This research contributes both theoretically and practically. Theoretically, it expands the literature on VR by shifting focus from pedagogy to school administration (Tsai & Fu, 2016). Practically, it offers evidence-based recommendations for policymakers and school leaders in adopting VR technology to improve educational management (Chen et al., 2020) (Zwoliński et al., 2022) (Seufert et al., 2022). Unlike previous studies that primarily examine instructional use, this study uniquely investigates the readiness of school administration to adopt VR in the Indonesian context (Wajhah & Yusof, n.d.).

Most prior research on Virtual Reality in education has predominantly focused on teaching and learning contexts, such as immersive classrooms, student engagement, and subject-specific applications (e.g., science or language learning). However, little is known about the use of VR for school administration and management processes, particularly within the Indonesian context. This study is among the first to empirically analyze the readiness of VR for school administration in Indonesian educational institutions. By addressing this gap, the research contributes both theoretically, by expanding the scope of VR studies beyond pedagogy, and practically, by providing a foundation for school leaders and policymakers to consider VR as an innovative tool for administrative efficiency.

2. METHODS

This study employs a mixed-methods approach, integrating both qualitative and quantitative techniques to comprehensively examine the readiness for implementing Virtual Reality (VR) technology in school administration at Yayasan Pendidikan YIMI Gresik. The qualitative strand explores perceptions, experiences, and expectations of VR users, while the quantitative strand measures user readiness and attitudes (Carpenter, McWhorter, & Stone, 2023).

Research Context and Sample

The study was conducted across three educational units under Yayasan Pendidikan YIMI Gresik—KB-TK, SD, and SMP. YIMI was selected as the research site because it represents a large Islamic educational foundation in Gresik with a strong commitment to digital innovation but limited experience in advanced technologies such as VR.

The sample consisted of 85 respondents selected purposively:

1. 45 teachers,
2. 25 structural staff (administrators), and
3. 15 IT administrators.

This distribution ensures representation from different educational levels and administrative roles. The purposive criteria considered (a) variation in educational levels, (b) school size, (c) degree of technology integration, and (d) direct involvement in school administration (Antón-Sancho, Vergara, & Fernández-Arias, 2024).

Research Instruments

1. Semi-Structured Interviews with teachers, staff, and IT administrators were used to explore perceptions and expectations regarding VR adoption.
2. Questionnaires measured readiness across four dimensions: knowledge of VR, technological readiness, institutional support, and perceived benefits. Items were rated on a 5-point Likert scale.
   a) Validity testing showed all items had correlation coefficients ($r > 0.3$, $p < 0.05$), confirming construct validity.
   b) Reliability testing demonstrated good to excellent internal consistency, with Cronbach's Alpha ranging from 0.78 to 0.84 across categories, and 0.81 overall.
3. Observations assessed technological infrastructure, internet connectivity, and facilities for VR implementation.
4. Documentation of school reports and policies was analyzed to support institutional readiness evaluation.

Data Collection and Analysis

1. Qualitative data (interviews, observations, documentation) were analyzed thematically through coding, categorization, and interpretation of emerging themes.
2. Quantitative data (questionnaire responses) were analyzed using descriptive statistics (frequency, mean, standard deviation) to map readiness levels across groups. Inferential analysis (e.g., t-test, ANOVA) was not applied, ensuring consistency between methods and reported results.

Data Integration

Findings from both strands were integrated to provide a holistic understanding of readiness and challenges. Triangulation was employed to compare qualitative insights with quantitative scores, strengthening the validity of conclusions.

3. FINDINGS AND DISCUSSION

The results will be based on descriptive analysis, including frequency, mean, and percentage. The following bar graphs summarize the responses for each category:
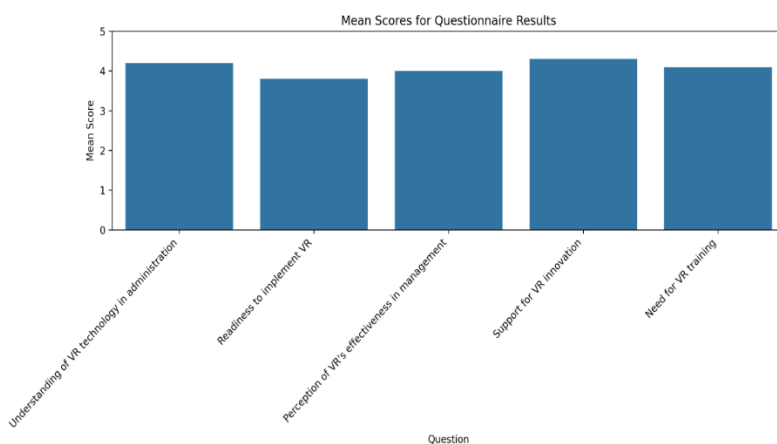

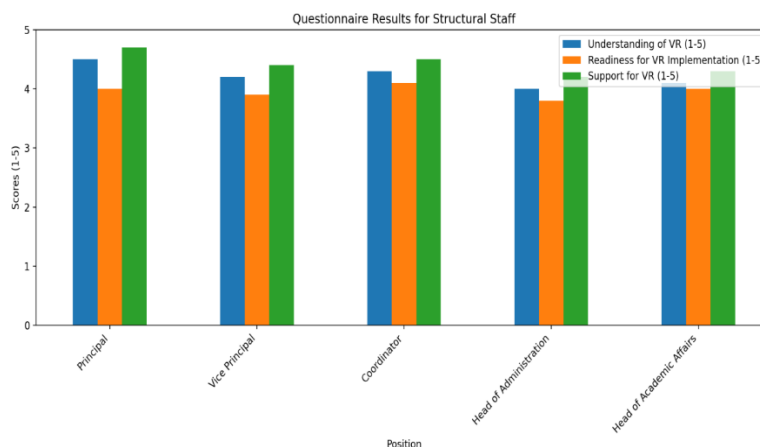**Figure 3. Questionnaire Results for Teachers**

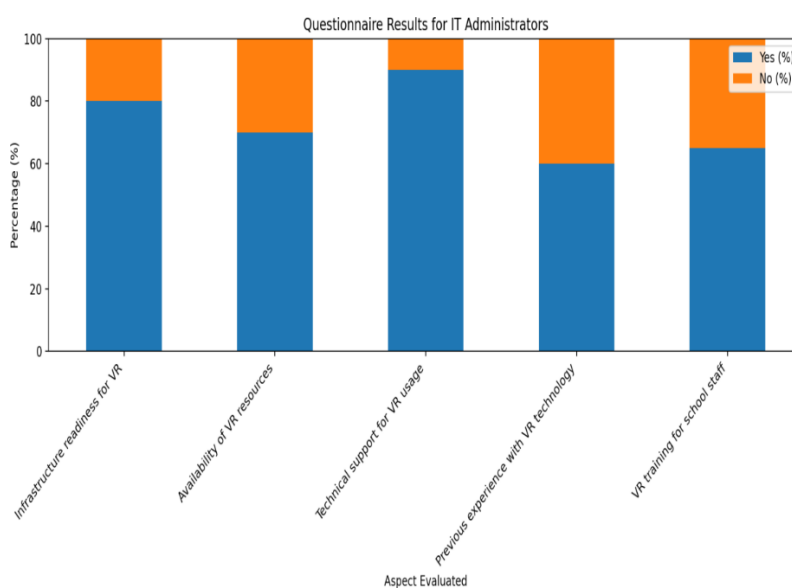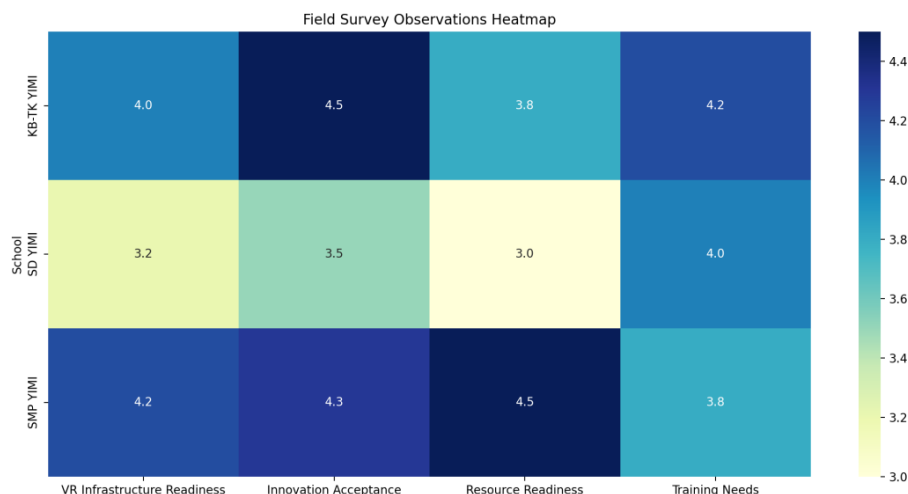**Figure 4. Questionnaire Results for Structural Staff**

Figure 5. Questionnaire Results for IT Administrator

Figure 6. Results of Field Survey Observations

Interpretation of Results from Figures 1 to 6:

The interpretation of the results from Figures 1 to 6 highlights the perspectives and readiness levels of different stakeholders regarding the adoption of Virtual Reality (VR) in educational management. These results provide insights into how teachers, structural staff, IT administrators, and field observations across schools perceive the integration of VR, including both strengths and areas needing improvement.

First, teachers generally demonstrate a solid understanding of VR technology and acknowledge its potential role in enhancing educational management. Their responses suggest that they are supportive of the integration of VR and recognize its value for both administrative and learning-related purposes. Despite this positive outlook, many teachers also acknowledge that their level of preparation is not yet fully optimal. While they feel reasonably equipped to begin experimenting with VR, they highlight the necessity of further professional development and specialized training sessions. This indicates that teacher readiness is promising but still requires systematic investment to ensure consistent implementation.

Second, structural staff, including administrators holding leadership and managerial roles, exhibit a strong grasp of VR technology and actively support its application in educational settings. The results reveal that enthusiasm among structural staff is high, with all respondents in this category showing strong agreement about the usefulness of VR. However, slight variations emerge when analyzing their readiness levels. Some structural positions, particularly those less directly involved with daily technology use, may require additional exposure and practice to maximize the potential of VR in management processes. This demonstrates that leadership support is available, but technical readiness varies slightly across positions.

Third, IT administrators play a crucial role in the adoption of VR, and the findings show that the technological infrastructure within the institutions is largely in place. Robust systems for technical support are available, which creates a strong foundation for VR integration. Nevertheless, administrators also emphasize that staff training in practical VR applications remains insufficient. Although hardware, software, and connectivity are adequately prepared, the human resources required to maintain and expand VR use still require continuous improvement. This suggests that while technological barriers are minimal, human capacity building is an ongoing challenge.

Finally, field observations across KBTK, SMP YIMI, and SD YIMI reveal differences in readiness levels. Both KBTK and SMP YIMI demonstrate higher preparedness in terms of infrastructure availability and openness to adopting VR innovations. Teachers and staff in these institutions appear more adaptable and supportive of new technologies. In contrast, SD YIMI shows relatively lower readiness, with limitations in infrastructure and a more cautious attitude toward VR adoption. These disparities highlight the importance of tailoring implementation strategies to each school's specific

context, ensuring equitable access and fostering a culture of innovation across all levels of the educational system.
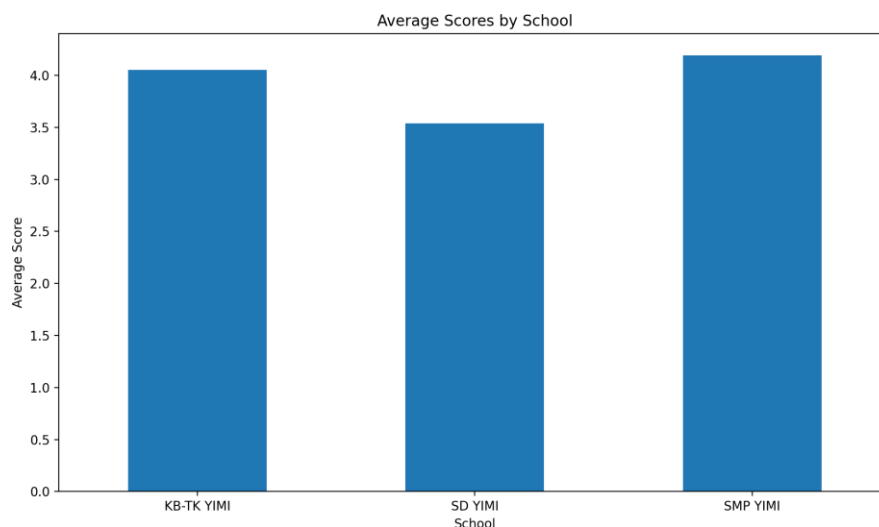
Figure 7. Integrated Data Analysis Results

Interpretation of Results from Figure 7:

The interpretation of results from Figure 7 provides a deeper analysis of the comparative readiness and perception of Virtual Reality (VR) implementation across three educational institutions: KBTK YIMI, SMP YIMI, and SD YIMI. The findings, which are consistent with the teacher questionnaires and field observations, present a clear picture of the strengths, gaps, and opportunities for advancing VR-based educational management and innovation. These results can be interpreted across three main dimensions: understanding and support, infrastructure and resource readiness, and innovation acceptance.

The first dimension concerns understanding and support for VR implementation. The analysis reveals that both KBTK YIMI and SMP YIMI display a superior level of comprehension of VR's functions and potential compared to SD YIMI. Teachers, administrators, and staff in these two institutions not only recognize the conceptual framework of VR but also demonstrate strong enthusiasm for its integration into educational practices. Their support is evident in the alignment between their positive perceptions in surveys and their willingness to embrace VR as a tool for innovation. In contrast, SD YIMI appears to lag behind in this aspect, with teachers and staff showing less confidence and readiness in adopting VR. This disparity indicates that while the general attitude toward VR is positive across institutions, the depth of understanding and commitment varies. For SD YIMI, targeted training programs and awareness campaigns could serve as crucial interventions to elevate their level of support to match that of their counterparts.

The second dimension relates to infrastructure and resource readiness, which is a critical factor for the successful implementation of VR in education. Among the three institutions, SMP YIMI demonstrates the highest level of readiness. Its classrooms and supporting facilities are better equipped to handle the technological demands of VR integration. Reliable internet connectivity, sufficient hardware, and access to technical expertise position SMP YIMI as a frontrunner in infrastructure readiness. Similarly, KBTK YIMI reflects a high level of preparedness, particularly in terms of technical support and resource allocation. This strong foundation not only enables smooth adoption but also minimizes barriers that may arise during the implementation process. Conversely, SD YIMI shows limitations in this area, with infrastructural gaps and fewer resources allocated for technological advancements. These shortcomings hinder their ability to keep pace with the other institutions and underscore the importance of equitable distribution of resources across schools. Strengthening

infrastructure at SD YIMI should therefore be a priority, as without adequate facilities, the adoption of VR will face significant obstacles.

The third dimension emphasizes innovation acceptance, an equally vital component of technology adoption. The results indicate that both KBTK YIMI and SMP YIMI exhibit a more positive attitude toward the acceptance of VR innovations. Teachers and staff at these institutions show openness to experimenting with new tools, adapting their teaching or management practices, and integrating VR into the daily rhythm of school activities. This acceptance is crucial because, regardless of infrastructure readiness, the human factor plays a decisive role in determining whether a technological innovation becomes sustainable. On the other hand, SD YIMI demonstrates a more cautious stance toward VR. While not rejecting the technology outright, there is a visible hesitation in embracing VR as an integral part of their educational environment. This hesitancy may stem from a lack of familiarity, limited exposure, or concerns about the practicality and relevance of VR to their current needs. Encouraging innovation acceptance at SD YIMI will require not only technical training but also cultural shifts in how technology is perceived and valued within the institution.

Taken together, the interpretation of Figure 7 highlights the varying stages of readiness and acceptance among the three institutions. KBTK YIMI and SMP YIMI emerge as leaders in terms of understanding, support, infrastructure readiness, and innovation acceptance. Their example illustrates that when strong comprehension, adequate resources, and openness to innovation intersect, the adoption of VR can be smooth and impactful. Meanwhile, SD YIMI represents the challenges faced by institutions with limited readiness, where both infrastructural and cultural barriers hinder progress. The contrast between these institutions underlines the importance of adopting a differentiated strategy for VR implementation. Instead of applying a uniform approach, interventions should be customized to address the specific needs and challenges of each school.

For policymakers and educational leaders, these findings offer valuable insights. The advancement of VR integration requires not only technological investment but also sustained efforts in professional development, change management, and resource equity. Building a supportive environment for innovation involves balancing infrastructure enhancement with fostering human capacity and cultural acceptance. By addressing these interconnected aspects, schools can transition more effectively into an era of digital transformation where VR is not merely an optional tool but a central component of educational management and learning.

In conclusion, the results from Figure 7 underscore the dual necessity of infrastructure and human readiness in implementing VR technology. While KBTK YIMI and SMP YIMI demonstrate encouraging levels of preparedness and enthusiasm, SD YIMI requires targeted support to bridge existing gaps. Ensuring that all institutions move forward collectively is essential for creating an equitable and sustainable model of VR adoption in education. This comprehensive approach will help guarantee that VR innovation does not remain concentrated in certain schools but becomes a shared advancement accessible to all levels of the educational community.

Discussion

This study aims to evaluate the readiness for the implementation of Virtual Reality (VR) technology in school administration at Yayasan Pendidikan YIMI, encompassing KB-TK YIMI, SD YIMI, and SMP YIMI. The research employs a questionnaire targeting teachers, structural staff, and IT administrators, complemented by field observations. The data analysis is intended to provide a comprehensive overview of the readiness and acceptance of VR technology at each school and to formulate recommendations for further development and implementation.

The results from the teachers' questionnaire reveal significant differences in understanding and readiness to implement VR technology across the schools. Generally, teachers at KB-TK YIMI and SMP YIMI demonstrate a better grasp of VR technology compared to their counterparts at SD YIMI. KB-TK YIMI recorded an average understanding score of 4.2, whereas SD YIMI had a score of 3.8. This finding aligns with Rob et al. (2023), who emphasize that teachers' understanding of new technologies affects

their readiness to adopt them (Turan et al., 2024). Furthermore, the readiness of teachers to implement VR technology is also higher at KB-TK YIMI and SMP YIMI, with scores of 4.0 and 4.2 respectively, compared to SD YIMI's score of 3.6. Saleha et al. (2023) suggest that new technology readiness is influenced by knowledge and confidence in the technology. Support for VR technology is positive across all schools, with KB-TK YIMI and SMP YIMI recording higher average support scores of 4.5 and 4.4, respectively, compared to SD YIMI's score of 4.2 (Angel-Urdinola, Castillo-Castro, & Hoyos, 2021) (see Table 3).

The structural staff questionnaire evaluates infrastructure readiness and administrative support for VR technology. Results indicate that KB-TK YIMI and SMP YIMI possess better infrastructure readiness compared to SD YIMI, with scores of 4.0 and 4.2 respectively, while SD YIMI scored 3.2. Resource availability also varies, with SMP YIMI showing higher availability (90%) compared to KB-TK YIMI (80%) and SD YIMI (70%). Muhammad et al. (2024) argue that infrastructure availability and administrative support are crucial factors for the successful implementation of new technologies in schools (Pradana, Nasution, & Dewi, 2024). Administrative support also varies, with KB-TK YIMI and SMP YIMI showing stronger support compared to SD YIMI. This finding is consistent with Lyanda et al. (2023), who emphasize that school management support is critical for technology adoption (Lyanda, Koteng, & Ong'unya, 2023) (see Table 4).

The IT administrators' questionnaire assesses infrastructure readiness, technical support, previous experience with VR, and training needs. The results show that KB-TK YIMI and SMP YIMI have better infrastructure readiness compared to SD YIMI. VR infrastructure readiness at KB-TK YIMI and SMP YIMI is categorized as "Ready," whereas SD YIMI is classified as "Not Ready." Resource availability is also higher at SMP YIMI (90%) compared to KB-TK YIMI (80%) and SD YIMI (70%). Technical support varies, with KB-TK YIMI and SMP YIMI recording higher support (90% and 85%) compared to SD YIMI (65%). Previous experience with VR also varies, with SMP YIMI demonstrating more experience (75%) compared to KB-TK YIMI (60%) and SD YIMI (50%). Training needs are significant across all schools, particularly at KB-TK YIMI (65%) and SD YIMI (55%). Noh and Lee (2020) highlight that adequate technical support and training are key factors for the successful implementation of new technologies in education (Dawood, 2020) (see Table 5).

Field observations offer additional insights into infrastructure readiness, innovation acceptance, resource preparedness, and training needs. The VR infrastructure at KB-TK YIMI and SMP YIMI is classified as "Ready," whereas SD YIMI is designated as "Not Ready." The acceptance of VR innovation at KB-TK YIMI and SMP YIMI is also notably positive, with average scores of 4.5 and 4.3, respectively. In contrast, SD YIMI exhibits a more neutral stance, scoring 3.5. Resource readiness at SMP YIMI is recorded as high (4.5), compared to moderate and low levels at KB-TK YIMI and SD YIMI. The training needs across all schools are significant, particularly at KB-TK YIMI and SD YIMI. Fiby (2024) notes that the acceptance of new technology is influenced by infrastructure readiness and a positive attitude towards the technology (Afiana et al., n.d.)(see Table 6).

The integration of data from teachers, staff, IT administrators, and field observations highlights the underlying reasons for the readiness gap. SD YIMI's lower readiness can be attributed to weaker infrastructure, less managerial support, and limited exposure to VR compared to the other schools. Beyond infrastructure, the mindset of teachers and administrators at SD YIMI also appears more cautious, which is consistent with Baccega et al. (2022) who emphasize the role of cultural and attitudinal factors in technology adoption. In contrast, KB-TK YIMI and SMP YIMI benefit from proactive management support and better-prepared IT resources (Baccega et al., 2022).

These findings are comparable with studies in other contexts. Panda and Pandey (2021) reported that early adoption of VR in schools is strongly associated with supportive leadership and teacher openness (Upadhyay, Kumar, & Mukerji, 2025). Similarly, Hermans et al. (2023) observed that schools with adequate infrastructure and training demonstrate higher technology readiness. This suggests that SD YIMI's challenges are not unique but reflect broader trends in schools with limited technological investment and leadership commitment (Mbithi, 2023).

From a theoretical standpoint, the findings extend the Technology Acceptance Model (TAM) and the Technology Readiness Index (TRI) into the Indonesian school administration context. In TAM, perceived ease of use and perceived usefulness are key determinants of acceptance. Meanwhile, TRI emphasizes optimism, innovativeness, discomfort, and insecurity. The results indicate that at KB-TK YIMI and SMP YIMI, higher optimism and innovativeness among teachers and stronger management support enhance readiness, aligning with TAM and TRI. However, at SD YIMI, discomfort and insecurity dominate due to limited infrastructure and weak administrative support. This suggests that organizational and cultural factors play a mediating role in shaping acceptance beyond individual perceptions.

Overall, this study shows that while VR technology holds promise for enhancing school administration, readiness is uneven across institutions. Strengthening infrastructure, improving teacher training, and building stronger managerial support at SD YIMI are critical steps to bridge the gap. These findings both confirm and expand upon prior research, offering practical and theoretical contributions to the literature on educational technology adoption.

4. CONCLUSION

This study explored the readiness and challenges of implementing Virtual Reality (VR) technology in school administration at Yayasan Pendidikan YIMI Gresik. The findings highlight that although VR has strong potential to improve administrative efficiency and user satisfaction, its implementation is constrained by limited infrastructure readiness and the lack of intensive training for teachers and administrative staff.

The originality of this research lies in its focus on school administration rather than classroom instruction. While most previous studies on VR in education have emphasized teaching and learning, this study is among the first to empirically analyze the readiness of VR for school administration in Indonesian educational institutions. By filling this gap, the research contributes theoretically by extending the discourse of VR applications beyond pedagogy, and practically by providing a foundation for school leaders and policymakers in adopting VR as an innovative tool for administrative efficiency.

Based on the findings, three practical recommendations are proposed: (1) providing systematic training programs for teachers and staff to build digital competencies; (2) investing in the necessary infrastructure to support VR applications; and (3) implementing small-scale pilot projects prior to broader adoption to ensure feasibility and sustainability.

Nevertheless, this study has limitations, particularly its focus on a single educational foundation and its reliance on descriptive readiness data, which may constrain the generalizability of findings. Future research should expand the scope to multiple institutions, incorporate more comprehensive readiness metrics, and explore longitudinal impacts of VR adoption on school management outcomes.

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