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Assistance of digital information systems to improve learning quality in vocational students

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ABSTRACT
The rapid development of information technology has significantly impacted various sectors of life, including education. This activity was carried out at SMK Muhammadiyah 2 Tempel and involved 28 eleventh-grade students from the Logistics Engineering program. The main objective of the activity was to enhance students' abilities in accessing, understanding, and managing digital information systems to support technology-based learning. The implementation process was divided into three stages: the preparation stage (which involved identifying the needs of both students and teachers), the implementation stage (encompassing workshops, technical training, and intensive mentoring), and the evaluation stage. Data collection techniques included direct observation, semi-structured interviews, and pre-tests and post-tests. The results showed a significant improvement in students' digital skills, as indicated by the increase in the average score. Students became more independent, confident, and active in utilizing digital platforms for learning purposes. Teachers also observed an increase in student engagement and participation during online learning activities. Reflections and feedback from both students and teachers indicated that a participatory approach combined with continuous mentoring proved highly effective in bridging the digital literacy gap.

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ABSTRAK
Perkembangan teknologi informasi yang pesat telah memberikan dampak yang signifikan terhadap berbagai sektor kehidupan, termasuk pendidikan. Kegiatan ini dilaksanakan di SMK Muhammadiyah 2 Tempel dengan melibatkan 28 peserta didik kelas XI Teknik Logistik. Tujuan utama dari kegiatan ini adalah untuk meningkatkan kemampuan peserta didik dalam mengakses, memahami, dan mengelola sistem informasi digital guna menunjang pembelajaran berbasis teknologi. Proses pelaksanaan kegiatan terbagi menjadi tiga tahap, yaitu tahap persiapan (melalui identifikasi kebutuhan peserta didik dan guru), tahap pelaksanaan (meliputi workshop, pelatihan teknis, serta pendampingan intensif), dan tahap evaluasi. Teknik pengumpulan data yang digunakan antara lain observasi langsung, wawancara semi-terstruktur, serta tes awal (pre-test) dan tes akhir (post-test). Hasil yang diperoleh menunjukkan adanya peningkatan signifikan pada kemampuan digital peserta didik, ditandai dengan kenaikan rata-rata skor. Siswa menjadi lebih mandiri, percaya diri, dan aktif dalam memanfaatkan platform digital untuk pembelajaran. Guru juga mencatat adanya peningkatan keaktifan dan partisipasi siswa dalam kegiatan belajar daring. Refleksi serta umpan balik dari peserta didik dan guru mengindikasikan bahwa pendekatan partisipatif dan pendampingan berkelanjutan sangat efektif menjembatani kesenjangan literasi digital.
Kata Kunci: *mutu pembelajaran; sekolah menengah kejuruan; sistem informasi digital*

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INTRODUCTION

The rapid development of information technology has significantly impacted various sectors of life, including education. In the education sector, the use of digital information systems has become a crucial need to support the effectiveness of the teaching and learning process (Haleem et al., 2022). The use of digital information systems is one innovation that can help improve the quality of learning (Ashary & Komara, 2022). This system allows students to access materials, assignments, and academic information more easily and flexibly. In this era of digital transformation, schools must adapt to meet the learning needs of the millennial generation. Digital information systems not only accelerate access to information but also enhance student participation and engagement in the learning process (Alenezi et al., 2023; Ghifari et al., 2022). Therefore, assistance in utilizing digital information systems is essential, particularly at the vocational school level.

SMK Muhammadiyah 2 Tempel is one of the vocational schools continuously striving to improve the quality of education through the integration of technology. One department with great potential for digital-based development is the Logistics Engineering Department. This field requires mastery of information technology, especially in data management and efficient distribution systems. Therefore, 11th-grade students in the Logistics Engineering Department must be equipped with the skills to access and manage digital information optimally. However, in practice, many students have not fully utilized the available digital information systems. This is due to a lack of understanding and skills in using technology productively. Hence, systematic and continuous assistance is needed to enable students to leverage technology in improving their learning quality.

Digital information system assistance can serve as a solution to bridge the digital literacy gap among students (Aprianto et al., 2023). Through such assistance, students will receive direct guidance on using various features and services provided by the school's digital system (Siswanto & Kuswantara, 2024). They will learn how to access materials, submit assignments, participate in online assessments, and utilize interactive learning media. This assistance also aims to foster student independence and responsibility in learning. By understanding how the digital information system works, students will feel more motivated and confident in their learning process (Handayani et al., 2021; Qawaqneh et al., 2023). On the other hand, teachers also need to receive training to become effective facilitators in guiding students to use the system. The synergy between teachers, students, and technology will create a more dynamic and high-quality learning environment.

The Logistics Engineering Department emphasizes both technical and managerial competencies in data-driven logistics management systems (Numang et al., 2020). To support learning in this field, integration between the curriculum and the digital information system is necessary (Abedi, 2024). With digital systems, students can access logistics simulations, supply chain analyses, and inventory data in real-time. This will enhance their competencies in understanding modern logistics processes driven by technology. However, to achieve this, students must have fundamental skills in using information systems effectively (Rodrigues et al., 2021). This is where the importance of assistance lies, ensuring students are not merely passive users but are capable of exploring and developing their potential through technology. Proper assistance will encourage students to think critically and creatively in solving data-based logistics problems.

In addition to academic aspects, digital information systems also improve communication between students and teachers. Through digital platforms, students can engage in discussions, ask questions, and receive timely feedback (Hutsalo et al., 2024). This strengthens constructive learning relationships between teachers and students. Eleventh-grade students, who are in a transition phase towards

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completing vocational education, require guidance in managing their learning information. They also need to be prepared for entering the workforce, which increasingly relies on digital systems (Siswanto et al., 2025). With appropriate assistance, students will become accustomed to system and data-based work patterns. This will serve as essential preparation for entering the fast-paced, data-driven logistics industry.

The implementation of digital information system assistance programs requires carefully designed strategies and approaches that align with the characteristics of students. This process should not only focus on the transfer of knowledge but also encourage the development of positive attitudes toward the use of technology. Active student involvement in the assistance process can foster a sense of ownership and responsibility for their learning (Rodríguez-Abitia et al., 2020). Such programs can be carried out through training sessions, workshops, and regular mentoring by teachers and school technical staff (Amin & Sundari, 2020). Periodic evaluations of students' understanding and skills in using digital systems are also crucial to measure the program's effectiveness (Rustandi et al., 2024). Furthermore, the availability of adequate infrastructure and stable internet connectivity are key factors supporting the success of the program. All elements within the school must collaborate to establish an effective and sustainable digital learning ecosystem (Nguyen et al., 2023).

Based on the aforementioned studies, it can be concluded that digital information system assistance is essential for improving the learning quality of 11th-grade students in the Logistics Engineering Department at SMK Muhammadiyah 2 Tempel. In addition to supporting the school's vision of becoming an institution that is adaptive to technological advancements, the program also positions teachers as mentors and motivators in creating more meaningful and relevant learning experiences. Strong collaboration among teachers, students, and technology serves as the primary foundation for realizing learning transformation that is responsive to the demands of the digital era.

However, several research gaps remain unaddressed. First, most previous studies are still general and have not specifically examined the effectiveness of digital system assistance programs in particular vocational departments such as Logistics Engineering. Second, the active involvement of students in the technology assistance process has not been sufficiently explored empirically. Third, the lack of optimal collaboration among teachers, technical staff, and school management in supporting the program's implementation is rarely discussed in depth. Lastly, there is limited long-term evaluation of the program's impact on students' preparedness for the digital workforce. Therefore, this study is significant in addressing these gaps through a participatory and collaborative approach that emphasizes the involvement of all stakeholders in creating a high-quality digital learning system in vocational schools.

Literature Review

The Role of Digital Information Systems in Education

The advancement of information technology has brought about significant transformation in the field of education, particularly through the implementation of digital information systems. These systems enable educational institutions to manage various academic aspects efficiently, ranging from learning administration and material distribution to reporting student outcomes (Makda, 2024). Digital information systems help create a more structured, accessible, and responsive learning environment tailored to students' needs (Isaeva et al., 2025). In the context of teaching and learning, these systems allow teachers to deliver material more flexibly and interactively (Suryatama et al., 2024). Students can access learning materials at any time and from anywhere, thereby reinforcing the concept of lifelong learning. In vocational schools, digital information systems play a crucial role in bridging the gap between theoretical knowledge

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and practical work through digital simulations and project management platforms. This makes education more relevant to the demands of today's industries.

Beyond supporting the teaching and learning process, digital information systems also encourage greater student participation and engagement. With features such as discussion forums, online quizzes, and automated reporting, students are more motivated to actively engage in their learning process (Ardiansyah et al., 2024). The digitalization of educational information significantly enhances students' motivation and interest in learning (Rodríguez-Abitia et al., 2020). Furthermore, teachers benefit from the ease of monitoring students' academic progress and conducting data-driven evaluations. The time efficiency and improved communication facilitated by these systems make them highly relevant tools in 21st-century education (Thelma et al., 2024). The availability of multimedia content also helps bridge the diverse learning styles of students. Therefore, digital information systems serve as a critical foundation in the transformation toward modern and inclusive education.

The Importance of Support in Implementing Educational Technology

The implementation of educational technology, including digital information systems, does not always proceed smoothly without proper support. Both students and teachers still face challenges in operating devices and understanding the digital systems in use. Structured support can enhance digital literacy and the effective use of technology within school environments (Hadiapurwa et al., 2023; Lasaiba, 2024). Support not only functions as technical guidance but also provides a space for exploration, boosting users' confidence (Wahyuni et al., 2024). In practice, this support may take the form of training sessions, simulations, or one-on-one consultations between facilitators and users. In vocational schools, support is especially crucial as students are expected not only to use technology but also to apply it within vocational contexts. Without adequate support, educational technology risks being underutilized in achieving learning objectives.

Support also positively impacts students' attitudes and behaviors in facing new technology. Students who receive support tend to be more proactive, confident, and enthusiastic about accessing digital learning systems (Makda, 2024). Moreover, the interactions that develop during the support process help strengthen the relationship between teachers, students, and technology facilitators. This fosters a collaborative and supportive learning environment, which is essential for digital adaptation. Support also addresses the digital divide among students, particularly in areas with limited access to or experience with technology (Isaeva et al., 2025). Therefore, support strategies must be designed systematically and sustainably. Practical support can transform technological challenges into opportunities for improving overall educational quality.

The Impact of Digital Information Systems on Vocational High School Students' Learning Quality

Digital information systems play a strategic role in improving the learning quality of students in Vocational High Schools (SMK). The use of such systems increases the efficiency, accuracy, and accessibility of academic information for students (Osorio et al., 2024). Through digital systems, vocational students can access competency-based materials, conduct self-assessments, and participate in online training tailored to their vocational fields. Additionally, features such as tutorial videos, interactive simulations, and project-based assignments enable students to understand concepts in a more contextual manner, which is crucial in vocational education, as it requires mastery of both theory and practice. With the support of digital information systems, learning becomes more focused, independent, and aligned with the needs of the

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workforce (Scheel et al., 2022). Therefore, implementing digital information systems directly contributes to enhancing the quality and relevance of vocational education.

Another positive impact of digital information systems is the increased motivation and activeness of students in learning. Students who are accustomed to using technology in their learning activities show greater interest and engagement in the learning process (Khotimah et al., 2024). They become more disciplined, as digital systems enable attendance tracking, assignment submission, and faster feedback (Firman et al., 2025). The transparency offered by digital systems also allows students to monitor their academic progress independently (Khotimah et al., 2024). As a result, students are not merely passive recipients of information but are actively involved in managing their learning process. The implementation of these systems also helps teachers develop learning strategies that are more data-driven and tailored to students' individual needs. The overall improvement in learning quality indicates that digital information systems are not merely tools but integral components of modern education in vocational schools.

METHODS

This community service activity was conducted at SMK Muhammadiyah 2 Tempel, targeting 28 grade XI students from the Logistics Engineering study program who needed to improve their skills in accessing and managing digital information systems. Additionally, two subject teachers served as facilitators in the digital-based learning process. The flow of the community service activities is illustrated in **Figure 1**.

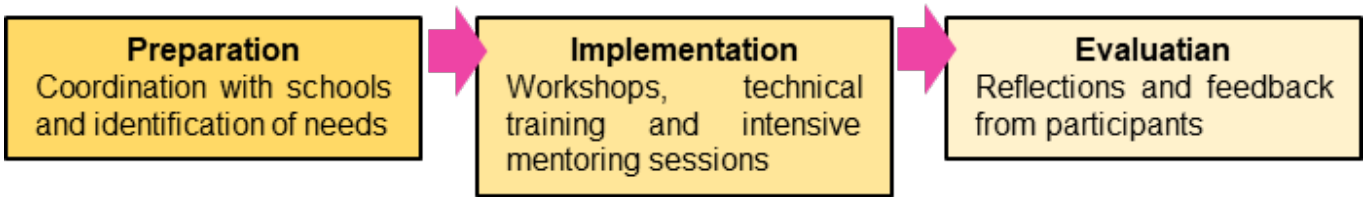

Figure 1. Activity stage
Source: Modification from Kementerian Riset, Teknologi, dan Pendidikan Tinggi (2017)

Figure 1 illustrates the structured flow of the community service activities, which consist of three main stages. The first stage is preparation, which involves coordinating with the school and identifying both student and teacher needs related to the use of digital information systems. This is followed by the implementation stage, which includes workshops, technical training, and intensive mentoring sessions designed to enhance participants' digital skills and expertise. The final stage is evaluation, conducted through reflection and the collection of participant feedback to assess the program's effectiveness and to design improvements for future initiatives. A participatory approach was adopted throughout the process, emphasizing active student involvement and the role of teachers as facilitators.

Data collection techniques employed during this community service activity included direct observation during the mentoring sessions, semi-structured interviews with students and teachers, and the distribution of pre-tests and post-tests to measure students' understanding and skills before and after the intervention. Data analysis was carried out using a qualitative descriptive approach, referencing triangulated data results to observe changes in students' understanding, attitudes, and skills regarding digital information systems. The findings were used to evaluate the program's effectiveness and provide recommendations for long-term implementation improvements.

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RESULTS AND DISCUSSION

Identification of Student Needs in the Use of Digital Information Systems

The mentoring activity began with identifying students' needs regarding the use of digital information systems in learning. Based on the results of observations and interviews, it was found that many students still faced difficulties in independently accessing digital platforms. The majority of students do not fully understand the function of the learning information system available at school. Additionally, their digital literacy levels remain relatively low, particularly in the use of Learning Management System (LMS), such as Google Classroom and Microsoft Teams. These findings highlight the importance of intervention in the form of training and technical mentoring.

The needs assessment also involved teachers, who are the most familiar with the challenges faced by students in the classroom. Teachers provided insights regarding students' irregularities in submitting digital assignments and their low participation in online discussions. These were reinforced by preliminary data showing limited access to digital learning resources. By mapping these needs, the mentoring program could be more targeted and aligned with the actual context faced by students. This stage served as a crucial foundation for the successful implementation of subsequent phases.

Implementation of Workshops and Technical Training

After identifying the students' needs, the next stage involved implementing workshops and technical training. These activities were designed to improve students' competencies in operating various digital learning applications and systems. The training materials covered the use of the school's LMS, creation of digital assignments, online communication, and the management of learning resources via the internet. The training was conducted interactively, combining theoretical explanations with hands-on practice. Participants were provided with modules and real-life classroom simulation scenarios. Workshop implementation activities are illustrated in **Figure 2**.

Figure 2. Workshop Activities
Source: Community Services 2025

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Students showed high enthusiasm during the workshops, particularly in hands-on sessions with digital devices. They were trained to use laptops and mobile phones to access learning materials and submit assignments online. Furthermore, the training also emphasized the importance of protecting personal data while using the internet. These sessions were facilitated by experts in educational technology and supported by school teachers. The outcome of the training indicated an improvement in students' understanding and optimal use of digital information systems.

Intensive Mentoring

The next stage was intensive mentoring, which was conducted periodically over several weeks following the workshop. This activity aimed to provide direct support to students as they applied the knowledge and skills they had acquired. The mentoring included consultation sessions, monitoring of digital assignments, and technical assistance whenever students encountered difficulties using the platforms. Teachers actively participated as facilitators, monitoring students' progress in digital learning activities. The interaction developed during these sessions helped students feel more confident and unafraid to explore.

During the mentoring process, it was observed that most students showed improvements in managing digital assignments. They became more independent in accessing materials, participating in online quizzes, and submitting assignments on time. Teachers also noted increased student discipline and participation in digital-based learning. This mentoring strategy proved effective in bridging the digital literacy gap previously experienced by students. Through a personalized and collaborative approach, students were able to adapt more easily to the school's digital learning system.

Evaluation Results

To measure the effectiveness of the mentoring program, evaluations were conducted using a pre-test and a post-test that assessed students' abilities in using digital information systems. The results of the pre-test and post-test are presented in **Figure 3**.

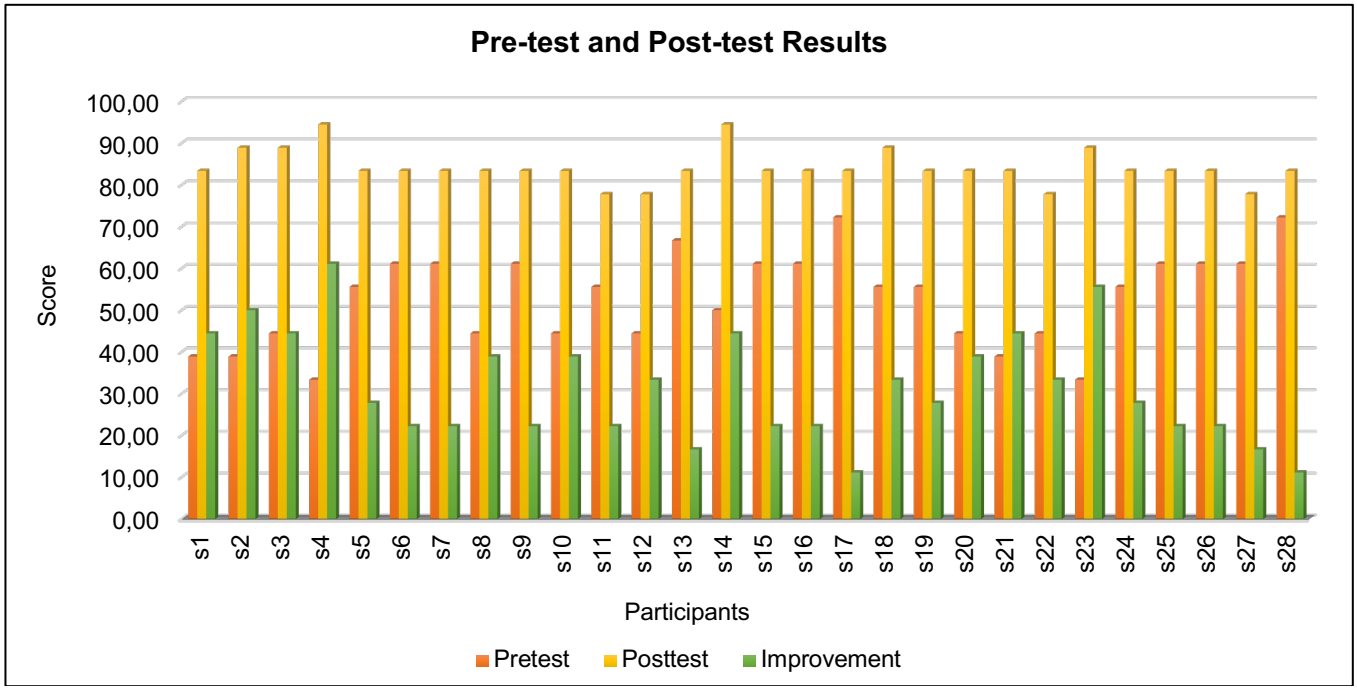

Figure 3. Pre-test and Post-test Results
Source: Community services 2025

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Based on **Figure 3**, it can be explained that the maximum post-test score reached 94.44, while the minimum pre-test score was recorded at 16.67. The highest pre-test score was 50.00, while the lowest post-test score was 83.33. In terms of improvement, the highest increase was 50.00, and the lowest was 11.11. Overall, the average pre-test score of participants was 38.89, the average post-test score was 88.33, and the average improvement was 49.44. This indicates a significant increase in the results between the pre-test and post-test after the implementation of the assistance and training program in the use of digital information systems. In addition, students reported feeling more comfortable using digital systems for learning after participating in this program.

Beyond the test results, evaluation was also conducted through reflection and feedback from participants. Students expressed that the activities helped them better prepare for the challenges of technology-based learning in the future. Teachers also observed positive changes in how students managed digital tasks and learning materials. This evaluation serves as evidence that supports digital information systems not only enhance students' learning quality but also foster habits of independent and responsible learning. This success opens opportunities for the development of similar programs in the future.

Discussion

Based on the identification of students' needs in using digital information systems, it was found that many students still face difficulties in accessing and utilizing digital platforms independently. This includes a limited understanding of the functions of Learning Management Systems (LMS) and collaborative media such as Google Classroom. Interview results also revealed that students often do not know how to submit assignments online properly. Low digital literacy among students is a significant obstacle to online learning (Aydınlar et al., 2024; Palvia et al., 2018). The involvement of teachers in the needs identification process is crucial to ensure that the interventions provided are tailored to the actual conditions in the field. This needs to form a strong foundation for designing more targeted training programs.

The implementation phase of the workshops and technical training was carried out in response to the identified needs of the students. These activities not only provided theoretical understanding but also directly engaged students in the practical use of digital information systems. The training content included essential skills such as managing online documents, participating in virtual discussions, and using the Learning Management System (LMS) effectively. Practice-based training significantly improves students' technological skills, aligning with the findings of the current program, in which students showed great enthusiasm, especially during the practical sessions (Suyitno et al., 2023; Yang., 2024). These activities marked the beginning of students building their confidence in using educational technology.

Furthermore, intensive mentoring activities were conducted to ensure the continuity of the training that had already been provided. The mentoring took the form of regular consultations and technical assistance in addressing challenges students faced during digital learning. Teachers played an active role as facilitators and mentors in this process. Observational data indicated an increase in students' independence in accessing and managing online learning materials. The success of digital learning programs is highly influenced by the intensity and quality of mentoring, which also helps strengthen the teacher-student relationship within the digital learning ecosystem (Akram & Li, 2024; Wang & Liu, 2024).

The program's effectiveness was evaluated through a pre-test and a post-test, which revealed a significant improvement in students' ability to use digital information systems. The average pre-test score was 38.89, increasing to 88.33 in the post-test, with an average improvement of 49.44. These results reflect the

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positive impact of the support program, which was systematically designed to address students' actual needs. Additionally, the uniform increase in post-test scores among nearly all participants indicates that the training was inclusive and accessible to students with various skill levels. The program successfully addressed the digital literacy gap that had previously been a significant challenge.

Reflections from students and feedback from teachers reinforced the quantitative evaluation results. Students reported feeling more confident in using digital systems for learning and expressed that they were more capable of managing assignments and participating independently in learning activities. Teachers also reported positive changes in students' participation during online learning sessions. Successful integration of technology in education is marked by behavioral changes in student learning, not merely academic score improvements (Pulungan et al., 2024). The development of new habits, such as discipline and responsibility, is a long-term impact expected from this program. This evaluation also serves as a reference for future initiatives that aim to improve similar efforts.

In conclusion, the digital information system training and support program has successfully addressed students' needs in a precise and contextual manner. The findings from this program align with previous studies that emphasize the importance of digital literacy in modern education. With significant score improvements and changes in students' attitudes towards technology, it can be concluded that the program was both effective and relevant. This success provides a foundation for expanding similar initiatives to other schools with comparable needs. Moreover, the role of teachers as active mentors is crucial in bridging the gap between students and technology. This program demonstrates that data-driven and collaborative interventions can have a tangible impact on digital transformation in education.

CONCLUSION

The training and mentoring program on digital information systems, designed based on the actual needs of students, has proven effective in enhancing students' digital literacy and learning independence. The significant improvement in evaluation results, along with positive changes in learning behavior, demonstrates that a collaborative and practice-oriented approach can successfully address gaps in the use of educational technology. As an implication, schools should consider integrating digital literacy training as a continuous program within the curriculum, while also optimizing the role of teachers as facilitators in the process of technological adaptation. The success of this program also provides a strong foundation for replicating similar intervention models in other schools, promoting inclusive and equitable digital transformation in education.

AUTHOR'S NOTE

The author declares that there is no conflict of interest related to the publication of this article. The author also affirms that the data and content of the article are free from plagiarism.

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