

Learning management system utilization and perceived training benefits among vocational teachers

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ABSTRACT

The use of Learning Management Systems (LMS) in teacher training is now an important strategy for improving professional competence in the digital era, especially in vocational education in business and tourism. However, so far, little research has specifically examined the relationship between LMS use and the benefits teachers experience after participating in training. Given these conditions, this study was conducted to analyze the relationship between LMS utilization and training benefits from the perspective of upskilling and reskilling program participants. The study used a quantitative approach with a questionnaire instrument distributed to 108 teachers who had participated in the upskilling and reskilling program. The data were processed using descriptive statistics and Spearman's Rho correlation test due to their non-normal distribution. The analysis results showed a strong positive relationship between LMS utilization and training benefits ($\rho = 0.771$; $p < 0.001$). This means that the more effectively the LMS is used during training, the greater the benefits for teachers, especially in terms of ease of access to materials, increased interaction, and strengthened professional competencies. Thus, the LMS not only serves as a platform for delivering materials but also becomes a medium for reflective learning and supports the professional development of vocational teachers. The results of this study provide practical contributions for training institutions and policymakers to strengthen the implementation of LMS in teacher development, while also opening space for further research on its long-term impact on the quality of learning in vocational high schools.

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INTRODUCTION

The acceleration of digital transformation is encouraging educational institutions to integrate technology into teacher professional development. Learning management systems (LMS) are often chosen because they provide flexible learning access, structured interaction spaces, and tracking of learning progress (Al-Fraihat et al., 2020; Basilotta-Gómez-Pablos et al., 2022). In the realm of vocational education, particularly business and tourism, industry demands for digital literacy, adaptability, and service innovation place teachers in a key role in aligning pedagogy with dynamic industry practices (Busulwa et al., 2024). This context emphasizes the urgency of LMS-based training that is not merely a repository of materials, but rather a learning ecosystem that facilitates feedback, collaboration, and professional reflection (Pinilla et al., 2021).

The need for effective digital professional development is particularly important in business and tourism vocational education because these sectors are experiencing rapid technological transformation. The adoption of digital hospitality systems, online customer service platforms, e-commerce, digital marketing, and data-driven decision-making has significantly changed workplace practices. Consequently, vocational teachers are expected not only to master subject-matter content but also to continuously update their digital competencies to ensure that learning remains relevant to contemporary industry standards (Busulwa et al., 2024; Minor et al., 2025). In this regard, LMS-

supported training can provide opportunities for continuous learning, collaboration, and knowledge sharing beyond conventional face-to-face professional development activities.

Beyond the issue of technology adoption, the effectiveness of LMS-based professional development should also be evaluated from the perspective of perceived benefits experienced by teachers (Mella-Norambuena et al., 2025). According to the Information Systems Success Model, the value of a digital learning system is reflected not only in its use, but also in the extent to which it generates positive outcomes for users, such as improved performance, learning effectiveness, and professional growth (DeLone & McLean, 2003). In teacher professional development contexts, perceived benefits may include enhanced pedagogical competence, greater confidence in technology integration, improved collaboration, increased learning motivation, and a stronger capacity to apply newly acquired knowledge in classroom practice (Al-Fraihat et al., 2020; Cattaneo et al., 2022). Therefore, examining teachers' perceptions of LMS-related benefits provides a more meaningful understanding of training effectiveness than merely measuring platform access or frequency of use (Bonilla-Priego et al., 2026; Mella-Norambuena et al., 2025). Furthermore, previous studies have shown that trust and satisfaction are important antecedents of perceived benefits and successful LMS implementation in online learning environments (Mohammadi et al., 2021).

Several recent studies have shown that the digital competence of vocational education and training (VET) teachers varies and is influenced by training design, institutional support, and the quality of online learning experiences (Cattaneo et al., 2022; Meyer et al., 2023). Previous studies have also reported that LMS implementation can positively influence teacher engagement, learning flexibility, and professional learning experiences. However, most studies have focused on technology acceptance, system usability, digital readiness, or overall user satisfaction, while relatively limited attention has been given to the actual benefits perceived by teachers following participation in LMS-based professional development programs. This limitation is particularly evident in the context of business and tourism vocational education, where empirical evidence remains scarce despite increasing investments in digital training initiatives.

Recent systematic reviews of LMS use in educational settings emphasize the importance of moving beyond adoption-oriented measures and examining how LMS utilization contributes to meaningful learning outcomes and professional development benefits (Bonilla-Priego et al., 2026; Mella-Norambuena et al., 2025). Nevertheless, empirical studies investigating the relationship between LMS utilization intensity and perceived training benefits among vocational teachers remain limited. As a result, it is still unclear whether greater LMS utilization is consistently associated with greater professional benefits for teachers participating in vocational training programs.

Building on this gap, this study examines the relationship between the intensity of LMS use and teachers' perceived benefits following vocational training. A quantitative approach was employed to identify patterns of association among vocational teachers participating in upskilling and reskilling programs in business and tourism education. Unlike previous studies that primarily focused on technology adoption, digital readiness, or user satisfaction, this study emphasizes the relationship between LMS utilization and the professional benefits perceived by teachers after training. The scientific contribution of this study is threefold. First, it provides empirical evidence regarding the association between LMS utilization and perceived training benefits in the relatively underexplored context of business and tourism vocational education. Second, it extends the literature on technology-enabled teacher professional development by focusing on user-perceived outcomes rather than solely on system acceptance or implementation. Third, it offers practical implications for training providers, school leaders, and policymakers in designing LMS-based professional development programs that are aligned with teachers' learning experiences, institutional support systems, and the evolving competency demands of contemporary industries..

METHOD

This study employed a quantitative research approach using a survey design to examine the relationship between LMS utilization and teachers' perceived benefits following vocational training. The survey method was selected because it enables researchers to objectively and systematically describe respondents' perceptions, experiences, and behavioral tendencies within a relatively large

population (Meyer et al., 2023). The study focused on teachers participating in the 2024 upskilling and reskilling programs in business and tourism organized by the Center for Development and Quality Assurance of Vocational Education for Business and Tourism under the Ministry of Primary and Secondary Education of Indonesia.

The population consisted of all teachers who participated in the training program. From this population, 108 teachers were selected as respondents. The sampling process combined random and purposive sampling techniques. Respondents were required to have completed the training program and actively used the LMS during the learning process. These criteria ensured that participants possessed sufficient experience with the LMS and were able to provide informed responses regarding its utilization and perceived benefits.

Data were collected using a closed-ended questionnaire based on a four-point Likert scale. The instrument was designed to measure two main variables. The first variable was LMS utilization, which included accessibility, ease of use, and navigation features. The second variable was perceived benefits of LMS use, encompassing learning satisfaction, interaction with instructors, competency improvement, and the ability to apply training outcomes in classroom practice. The questionnaire consisted of 30 items distributed across six indicators. Specifically, items 1–5 measured ease of access and LMS usability, items 6–10 assessed navigation ease, items 11–15 measured satisfaction with online learning, items 16–20 evaluated interaction with instructors, items 21–25 examined competency improvement, and items 26–30 measured the implementation of learning outcomes in classroom settings.

Prior to the main data collection, a pilot study involving 20 respondents was conducted to evaluate the validity and reliability of the instrument. Item validity was assessed using Pearson’s Product-Moment Correlation by comparing the calculated correlation coefficients with the critical value of 0.468. The results indicated that all questionnaire items exceeded the required threshold, demonstrating satisfactory validity and confirming that the instrument was appropriate for measuring the intended constructs. A summary of the instrument validity results is presented in Table 1.

Table 1. Instrument Validity Test Results

Indicator	Test Item	Valid	Invalid
The ease of access and use of the LMS	1-5	1-5	-
Ease of navigation	6-10	6-10	-
Satisfaction with online learning	11-15	11-15	-
Interaction with the instructor	16-20	16-20	-
Improving teacher competency	21-25	21-25	-
Implementation of learning in the classroom	26-30	26-30	-

Instrument reliability was subsequently evaluated using Cronbach’s Alpha. The analysis yielded a Cronbach’s Alpha coefficient of 0.959 for the 30-item questionnaire, indicating excellent internal consistency and exceeding the commonly accepted threshold of 0.70 (Tomczyk, 2024). This result suggests that the questionnaire items consistently measured the intended variables and were suitable for use in the primary data collection phase. The reliability test results are presented in Table 2.

Table 2. Instrument Validity Test Results

Cronbach's Alpha	N of Item
.959	30

The collected data were analyzed using both descriptive and inferential statistical techniques. Descriptive statistics, including mean, minimum, maximum, and standard deviation values, were used to provide an overview of respondents’ characteristics and responses. Before conducting correlation analysis, a normality test was performed using the Kolmogorov–Smirnov test. The results indicated that the data were not normally distributed ($p < 0.05$). Therefore, the relationship between LMS utilization and perceived benefits was analyzed using Spearman’s Rho correlation, which is appropriate for ordinal data and does not require the assumption of normality (Nikitina & Chernukha,

2023). The strength of the correlation coefficients was interpreted according to the following criteria: 0.00–0.19 (very weak), 0.20–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.79 (strong), and above 0.80 (very strong) (Mella-Norambuena et al., 2025).

RESULTS AND DISCUSSION

Results

This study involved 108 vocational teachers in the fields of business and tourism who had participated in the 2024 upskilling and reskilling training program. Based on the respondent profile, most participants were female, totaling 92 teachers or 85.2%, while male participants accounted for 16 teachers or 14.8%. This composition indicates that the respondents represented teachers who had direct experience in using the LMS during the training process, making them relevant sources of information for examining the relationship between LMS utilization and perceived training benefits.

Table 3. Respondent Gender Profile

Gender	Amount
Male	16
Female	92
Total	108

Descriptive analysis was conducted to provide an overview of the two main research variables, namely LMS utilization and perceived benefits of LMS use. The results show that LMS utilization reached a mean score of 86.74, which falls within the very high category. This indicates that teachers actively used the LMS during the training process, particularly for accessing materials, managing learning activities, and following the training structure. The high score also suggests that the LMS was perceived as accessible and flexible, allowing teachers to participate in training activities without being limited by time and place. This finding supports previous studies stating that vocational teachers' readiness to use digital learning platforms is influenced by digital competence, training design, and institutional support (Cattaneo et al., 2022).

The perceived benefits of LMS use also showed a high mean score of 82.26. This indicates that teachers did not merely access the LMS as a technical platform, but also experienced meaningful benefits from its use. These benefits included increased learning satisfaction, interaction with instructors, improved professional competence, and the ability to apply training outcomes in classroom practice. In this sense, the LMS functioned not only as a repository of learning materials but also as a medium that supported reflection, communication, and continuous professional learning. This finding is in line with (Meyer et al., 2023), who emphasized that effective online professional development depends on the quality of learning experiences and its relevance to teachers' professional practices.

Table 4. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Utilization of LMS	108	73	100	86.74	9.766
Benefit of LMS	108	60	100	82.26	10.157
Valid N (listwise)	108				

The standard deviation value for perceived LMS benefits was 10.157, slightly higher than the standard deviation for LMS utilization, which was 9.766. This indicates that although teachers generally used the LMS at a high level, their perceptions of its benefits varied more widely. This variation may be influenced by differences in digital skills, learning motivation, prior experience with online training, access to technology, and the extent of interaction with instructors and learning content. Therefore, high LMS utilization does not automatically produce the same level of perceived benefit for all teachers. The effectiveness of LMS-based training depends not only on platform

availability but also on how the LMS is designed, facilitated, and integrated into meaningful learning activities.

The use of an LMS in vocational teacher training is important because it supports flexible access to learning materials, independent learning, interaction among participants, and professional reflection. Through an LMS, teachers can review materials, submit assignments, participate in discussions, and engage in learning activities beyond conventional face-to-face training sessions. This is particularly relevant in vocational education, where teachers are expected to continuously adapt to changes in industry practices, especially in business and tourism sectors that are increasingly influenced by digital services, online customer interaction, and technology-based work processes. Therefore, LMS-based training can help bridge the gap between teacher professional development and the evolving competency demands of industry.

Nevertheless, the successful implementation of LMS-based training requires more than technological infrastructure. Teachers' digital readiness, the quality of training design, instructor support, and institutional commitment are essential factors that determine whether LMS use can generate meaningful benefits. Teachers with stronger digital competence may be more capable of using LMS features for reflection, collaboration, and classroom application. Conversely, teachers with limited digital skills may need additional technical support and pedagogical guidance to fully benefit from the LMS. Thus, LMS implementation should be accompanied by continuous mentoring, clear instructional design, and institutional support so that its benefits can extend beyond the training program and influence teaching practices in vocational schools.

Before testing the relationship between LMS utilization and perceived benefits, a normality test was conducted to determine the appropriate statistical analysis technique. The Kolmogorov–Smirnov and Shapiro–Wilk test results showed significance values of less than 0.001 for both LMS utilization and perceived LMS benefits. Since these values were lower than the significance level of 0.05, the data were considered not normally distributed. This result indicates that the use of parametric correlation analysis was not appropriate, and a nonparametric statistical method was required.

Table 5. Normality Test

	Kolmogorov-Smirnov ^a		Shapiro-Wilk	
	Statistic	df	Sig.	Statistic df Sig.
Utilization of LMS	.152	108	<.001	.866 108<.001
Benefit of lms	.172	108	<.001	.905 108<.001

a. Lilliefors Significance Correction

Based on the non-normal distribution of the data, Spearman's Rho correlation test was used to examine the relationship between LMS utilization and perceived benefits. Spearman's Rho is suitable for analyzing relationships between variables when the data do not meet the assumption of normality. This method is also appropriate for educational and social science data, where respondent perceptions often do not follow a normal distribution. Therefore, the use of Spearman's Rho in this study provided a more appropriate statistical basis for examining the association between the two variables.

Table 6. Nonparametric Correlations

		Utilization of LMS	Benefit of LMS
Spearman's rho	Utilization of LMS	1.000	.771**
	Correlation Coefficient	.	<.001
	Sig. (2-tailed)	.	108
	N	108	108
	Benefit of LMS	.771**	1.000
	Correlation Coefficient	<.001	.
Sig. (2-tailed)	<.001	108	
N	108	108	

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis showed a Spearman's Rho coefficient of 0.771 with a significance value of $p < 0.001$. This result indicates a strong and statistically significant positive relationship between LMS utilization and teachers' perceived benefits. In other words, the more effectively teachers used the LMS during training, the greater the benefits they perceived. These benefits were reflected in improved access to learning materials, increased interaction with instructors, strengthened professional competence, and greater confidence in applying training outcomes in classroom practice.

This finding confirms that LMS utilization is not merely a matter of technical access or frequency of platform use. Rather, effective LMS utilization is closely associated with meaningful professional development outcomes. Teachers who actively engage with LMS features are more likely to experience richer learning interactions, better understanding of training materials, and stronger opportunities for professional reflection. Therefore, the LMS can be understood as a digital learning ecosystem that supports teacher development, particularly when its features are used intentionally to facilitate interaction, collaboration, assessment, and feedback.

In the context of vocational education, this finding has important implications. Business and tourism teachers are expected to prepare students for industries that increasingly rely on digital technology, service innovation, and adaptive professional practices. Therefore, teachers' positive experiences with LMS-based training may contribute to their readiness to integrate digital tools into their own teaching. The strong relationship between LMS utilization and perceived benefits suggests that training institutions should not only provide LMS platforms but also ensure that teachers are guided to use them effectively. LMS-based professional development should be designed to promote active participation, reflective learning, peer collaboration, and practical application in classroom contexts.

Overall, the results demonstrate that LMS utilization plays an important role in supporting the professional development of vocational teachers. The high level of LMS use and the strong positive correlation with perceived benefits indicate that LMS-based training has the potential to improve teacher learning experiences and professional competence. However, the variation in perceived benefits also suggests that training providers need to pay attention to differences in teachers' digital readiness, learning needs, and institutional contexts. Strengthening LMS implementation through better instructional design, facilitator support, and follow-up activities may further enhance the impact of digital training on vocational teaching practices.

Discussion

LMS Utilization in Vocational Teacher Training

The findings indicate that vocational teachers demonstrated a high level of LMS utilization throughout the training program. This suggests that the LMS was not merely used as a platform for accessing learning materials but also functioned as an environment that supported communication, assignment submission, assessment, and collaborative learning activities (Garcia et al., 2021; Pinilla et al., 2021). The high utilization score reflects teachers' readiness to engage in digital learning environments and their willingness to adopt technology as part of professional development (Cattaneo et al., 2022; Mailizar et al., 2022). This finding supports previous studies emphasizing that LMS platforms can facilitate learner engagement, interaction, and self-directed learning when supported by appropriate instructional design and meaningful online professional development practices (Meyer et al., 2023; Pinilla et al., 2021).

The results are particularly relevant in the context of vocational education, where teachers are expected to continuously update their knowledge and skills in response to rapid technological and industrial changes. In business and tourism education, teachers must understand not only pedagogical practices but also contemporary digital trends such as online customer service, digital marketing, hospitality management systems, and technology-based business operations. Therefore, the LMS provides a flexible learning environment that enables teachers to access professional development opportunities regardless of geographical and time constraints. This finding is consistent with Busulwa et al. (2024), who argued that digital transformation in vocational education requires teachers to actively engage with digital learning technologies to maintain industry relevance.

Benefits of LMS for Teacher Competence Development

The findings also reveal that teachers perceived substantial benefits from LMS utilization during the training process (Al-Fraihat et al., 2020). The benefits were reflected in increased learning satisfaction, improved interaction with instructors, strengthened professional competence, and greater confidence in applying newly acquired knowledge in classroom practice (Cattaneo et al., 2022; Mella-Norambuena et al., 2025; Tomczyk, 2024). These results indicate that LMS-based training contributes not only to knowledge acquisition but also to teachers' professional growth and instructional readiness (Meyer et al., 2023). From the perspective of the Information Systems Success Model, these outcomes represent the net benefits generated by effective LMS utilization and demonstrate the broader value of digital professional development for teachers (DeLone & McLean, 2003).

From the perspective of the information systems success model (DeLone & McLean, 2003), these findings suggest that LMS effectiveness should be evaluated through the benefits generated for users rather than merely through usage frequency. Teachers who perceived higher benefits were more likely to report improvements in pedagogical competence, digital confidence, and classroom implementation. This finding aligns with Cattaneo et al. (2022), who emphasized that digital competence development among vocational teachers is closely associated with meaningful engagement in technology-supported learning environments. Likewise, Tomczyk (2024) highlighted that continuous exposure to digital learning environments contributes to teachers' confidence in integrating technology into instructional practice.

Another important finding concerns the role of LMS in supporting reflective and collaborative professional learning. Through discussion forums, online assignments, feedback mechanisms, and asynchronous learning activities, teachers were able to exchange experiences and reflect on teaching practices. Such opportunities are particularly important in vocational education because they encourage teachers to connect theoretical knowledge acquired during training with real-world industry practices.

Relationship between LMS Utilization and Perceived Benefits

The correlation analysis demonstrated a strong positive relationship between LMS utilization and perceived benefits ($\rho = 0.771$, $p < 0.001$). This result indicates that teachers who utilized LMS features more intensively tended to report greater benefits from the training program. The strength of the correlation suggests that LMS utilization is not merely associated with technical participation but also contributes to meaningful professional learning outcomes.

This finding supports the growing body of literature suggesting that the value of LMS implementation lies not only in system availability but also in the quality of user engagement with the platform. Teachers who actively accessed learning materials, participated in discussions, completed assignments, and interacted with instructors were more likely to experience increased competence, learning satisfaction, and professional confidence. Similar findings were reported by Mella-Norambuena et al. (2025), who found that meaningful LMS engagement contributes to enhanced learning outcomes and stronger professional development experiences.

The strong relationship observed in this study also reinforces the argument that LMS utilization should be viewed as a process rather than a technological outcome. Merely providing access to an LMS does not guarantee meaningful benefits. Instead, the effectiveness of LMS-based professional development depends on active participation, quality instructional design, interaction opportunities, and institutional support. Therefore, training providers should focus not only on LMS implementation but also on strategies that encourage sustained engagement and meaningful learning experiences.

Relevance to Vocational Education and Industry Needs

The findings have important implications for vocational education, particularly in business and tourism programs. These sectors are increasingly shaped by digital technologies, including e-commerce platforms, digital hospitality systems, online booking services, customer relationship

management tools, and data-driven business decision-making. Consequently, vocational teachers are expected to develop digital competencies that align with evolving industry expectations.

The positive relationship between LMS utilization and perceived benefits suggests that LMS-based professional development can serve as a bridge between educational practices and industry requirements. Teachers who become familiar with digital learning environments are more likely to transfer these experiences into classroom instruction, thereby preparing students for technology-rich workplaces. This finding is consistent with [Minor et al. \(2025\)](#), who emphasized that addressing the digital skills gap in tourism and hospitality education requires continuous professional development opportunities that integrate digital technologies into teaching and learning.

From a policy perspective, the results suggest that investments in LMS infrastructure should be accompanied by efforts to strengthen teachers' digital competencies, instructional design quality, and ongoing technical support. Sustainable implementation of LMS-based professional development requires not only technological readiness but also organizational commitment, professional mentoring, and alignment with industry competency standards. By integrating these elements, vocational education institutions can maximize the benefits of LMS utilization and enhance teachers' readiness to prepare students for the demands of the digital economy.

CONCLUSION

This study demonstrates that the utilization of a Learning Management System (LMS) is strongly and positively associated with perceived training benefits among vocational teachers in the fields of business and tourism. The results of the Spearman's Rho correlation analysis ($\rho = 0.771$; $p < 0.001$) indicate that teachers who utilized the LMS more intensively tended to perceive greater benefits from the training program. These benefits included improved access to learning resources, enhanced interaction with facilitators, increased professional competence, and greater confidence in applying newly acquired knowledge to classroom practice. The findings suggest that LMS utilization extends beyond technical participation and contributes meaningfully to teachers' professional learning and development. Consequently, the LMS should be viewed not merely as a content-delivery platform but as a digital learning ecosystem that supports continuous professional growth. This study also contributes empirical evidence to the growing literature on technology-enhanced professional development by demonstrating that the effectiveness of LMS-based training is closely linked to the extent to which teachers actively engage with the platform and its learning features.

From a practical perspective, the findings highlight the importance of integrating LMS-based learning consistently into vocational teacher professional development programs. Teachers are encouraged to utilize LMS platforms not only during formal training activities but also as part of their ongoing professional learning through reflective practice, knowledge sharing, collaboration, and the implementation of innovative teaching strategies. Training providers and vocational education institutions should optimize LMS features beyond content distribution and assessment by incorporating discussion forums, reflective learning activities, e-portfolios, collaborative projects, and microlearning approaches, while also providing continuous technical support and digital literacy development. Policymakers are encouraged to strengthen the integration of LMS-based learning within national teacher professional development frameworks and promote collaboration among vocational schools, industry partners, and government agencies to ensure alignment with evolving workplace demands. Despite its contributions, this study is limited by its correlational design, which does not permit causal inference. Therefore, future research should examine additional variables such as learning motivation, digital self-efficacy, organizational readiness, institutional support, and technology acceptance, as well as investigate the impact of LMS utilization on teaching performance and student learning outcomes through longitudinal, mixed-methods, or experimental research designs.

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