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Influence of Education Technology Innovation and Instructor Competency on Quality of Graduates with OHS (Occupational Health and Safety)

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ABSTRACT

Jayapura Aviation Polytechnic must adapt to technological developments by integrating educational technology such as flight simulations, e-learning, and aviation software into learning, with instructor competence playing a crucial role in ensuring these innovations effectively enhance graduate quality and meet industry demands. This study aims to analyze the effect of educational technology innovation and instructor competence on the quality of graduates, with the implementation of Occupational Health and Safety (OHS) as a mediating variable at Jayapura Aviation Polytechnic. This explanatory quantitative research at Jayapura Aviation Polytechnic analyzes variable relationships in education, using total sampling of 74 students from D3 Airport Management and D3 Airport Electrical Engineering programs through a Google Forms questionnaire. The results show that educational technology innovation does not affect the quality of graduates, instructor competence has a positive effect on the quality of graduates, educational technology innovation does not affect occupational health and safety, instructor competence positively affects occupational health and safety (OHS), occupational health and safety positively affects the quality of graduates, OHS does not mediate the effect of educational technology innovation on the quality of graduates, and OHS mediates the effect of instructor competence on the quality of graduates. The conclusion highlights the importance of an integrated approach involving technology, teaching competence, and occupational health and safety to improve graduate quality, providing valuable insights for policymakers in formulating sustainable education strategies.

I. Introduction

Vocational education is a type of education that focuses on developing practical and technical skills needed in the workplace (Wiriadidjaja et al., 2019). In contrast to academic education, which emphasizes theory, vocational education emphasizes hands-on training in fields such as engineering, health, tourism, and creative industries (Utomo, 2021). The main goal of vocational education is to prepare graduates to be ready to work with relevant and applicable skills (Sukoco et al., 2019). In Indonesia, vocational education can be found in Vocational High Schools (SMK), polytechnics, and other vocational training institutions. Vocational education faces significant challenges in meeting the needs of an industry that continues to grow rapidly (Arnita & Fadriati, 2022).

Major changes in higher education and vocational training are key to realizing the vision of Indonesia Maju. Minister Nadiem Makarim stated that the Ministry of Education, Culture, Research, and Technology is focusing on three main areas of transformation: first, revolutionizing the previously rigid education system to make it more responsive to innovation; second, designing learning that is aligned and closely connected with industry needs and local potential; and third, creating an inclusive, safe, and empowering educational environment for all students (Pancawati, 2023). These reforms in vocational education have had a significant impact on students, academic institutions, and the business world. According to data from the Central Statistics Agency (BPS), there has been a trend of increasing participation of SMK and diploma graduates in the labor force each year. During the period from 2020 to 2023, the open unemployment rate (TPT) of vocational school graduates decreased by 4.24 percent, while the labor force participation rate (TPAK) increased by 4.24 percent for vocational school graduates and 3.29 percent for diploma graduates an indicator that the industry increasingly recognizes the strategic value of vocational education graduates (Arimbi, 2024).

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Jayapura Aviation Polytechnic is one of the vocational education institutions that must adapt to this development. As an institution aiming to produce skilled workers in the aviation sector, it must integrate technological innovation into education to ensure graduates have competencies relevant to industry needs. Educational technology innovation is essential in improving learning effectiveness and helping students prepare for the dynamic workplace. Educational technology serves as a teaching tool and improves the overall quality of education (Baruno & Padama, 2024; Rosyadi et al., 2023).

Educational technology innovations at Jayapura Aviation Polytechnic, such as the use of computer-based flight simulations, the implementation of e-learning, and the introduction of advanced software in the aviation field, are expected to improve the competence of graduates. Educational technology provides greater opportunities for vocational education institutions to facilitate interactive learning, improve students' technical skills, and deepen their understanding of the material (Harasim, 2021). Therefore, technology is one factor that influences the quality of graduates in this institution. Airlines are challenged to manage their air cargo operations efficiently by devising operational strategies to adapt quickly and respond to the changing dynamics of global competition (Bunahri et al., 2023). Technological innovation in education, however, will not be maximized if the competence of qualified instructors does not support it (Yunita et al., 2023). Competent instructors have the ability not only to understand and master technology but also to integrate it into the learning process effectively. The importance of instructor competence in creating a comprehensive learning experience for students. Instructors with pedagogical skills and mastery of technology will find it easier to deliver learning materials and provide appropriate guidance for students to apply technology in a practical context (Garrison & Anderson, 2022). In this case, instructor competence at Jayapura Aviation Polytechnic is a key factor in creating quality graduates.

Other than technological innovation and instructor competence, another equally important variable in determining graduates' quality is the implementation of occupational safety and health (OHS) (Budiutomo, 2024). OHS in the campus environment is essential, especially in educational institutions involving field practice and high-risk equipment, such as Jayapura Aviation Polytechnic. Implementing good OHS in the academic environment can create a safe learning environment, allowing students to focus on learning without worrying about the risk of accidents (Karanikas & Tyson, 2022). A secure and comfortable learning environment can also affect students' mental well-being, ultimately impacting the quality of their learning outcomes. Optimal OHS implementation at Jayapura Aviation Polytechnic serves a dual purpose: maintaining students' physical safety and reducing stress levels. Prolonged stress can hurt academic performance. A stressful learning environment, especially with safety risks, can increase students' stress levels, interfering with their learning process (Deng et al., 2022; Quansah et al., 2022). Therefore, exemplary OHS implementation is expected to mediate the relationship between technological innovation, instructor competence, and graduate quality. The quality of graduates is the leading indicator of the success of vocational education institutions.

Graduates' quality is measured by their academic abilities and ability to adapt to a dynamic work environment (Hoque et al., 2023; Mainga et al., 2022). In the industrial era 4.0, competent graduates must be able to innovate, master technology, and adapt quickly to changes in the workplace. Therefore, efforts to improve the quality of graduates must involve various factors, including technological innovation, instructor competence, and a conducive learning environment. This study aims to analyze the effect of educational technology innovation and instructor competence on the quality of graduates with the application of K3 as a mediating variable at Jayapura Aviation Polytechnic. With the development of technology in aviation, graduates from this Polytechnic must possess competencies that meet industry needs, particularly in applying technological innovation in vocational settings. Education plays a vital role in preparing graduates who are employable and competent in their fields (Firmansyah et al., 2021).

Ernawati et al. (2023) on their study showed that teachers' understanding of the Minimum Competency Assessment (MCA) varies into translation, interpretation, and extrapolation levels. Only those with an interpretation-level understanding adjusted their classroom assessments, while others made no significant changes. (Gurion & Limbong, 2025) Also, their research showed that teacher competency positively and significantly affected education quality for 17 respondents (23%), and educational facilities had a similar effect for 16 respondents (21.5%). When combined, both factors significantly influenced education quality for 23 respondents (32.1%), indicating that improvements in teacher competency and infrastructure can further enhance educational outcomes. However, the study Rafsanjani (2022) differs in that its findings show no significant evidence to support the influence of academic background and training on teacher competence. This study failed to prove a positive correlation between educational background, involvement in training, and teacher competence. These conflicting findings highlight the complexity of factors that influence teacher competency and their impact on education quality. Therefore, this study aims to analyze education technology innovation and instructor competency on the quality of graduates with OHS (Occupational Health and Safety) at Jayapura Aviation Polytechnic.

II. Method

This explanatory quantitative research aims to analyze phenomena and relationships, among other variables, in the context of education at Jayapura Aviation Polytechnic. The authors favoured the quantitative method for its greater validity and ability to analyze a wide range of factors numerically, unlike the qualitative method, which relies solely on non-numerical descriptions and analysis (Bunahri, 2023).

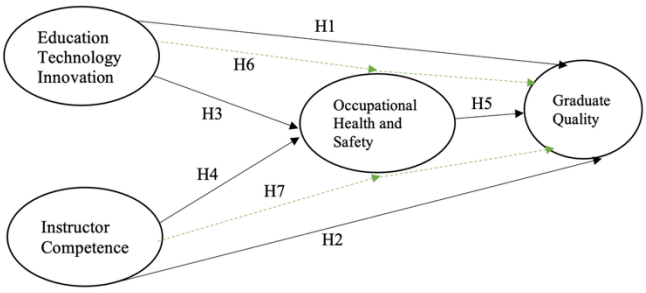

Fig. 1. Research Model

The population studied consisted of students from the D3 Airport Management and D3 Airport Electrical Engineering programs, with 74 respondents taken through purposive sampling, where the entire population was used as a sample. Data was collected using a questionnaire distributed via Google Forms, which consisted of a validation questionnaire and a questionnaire for respondents. The questionnaire was disseminated over a one-week period through class WhatsApp groups and email, accompanied by instructions and informed consent, ensuring that participants understood the purpose of the study and how to respond accurately.

Table 1. Indicator of Variables on Questionnaire

Variables	Indicators
Educational Technology Innovation (X1)	1. Use of e-learning platforms 2. Integration of technology in learning (videos, apps, simulations) 3. Ease of access to online materials
Instructor Competence (X2)	1. Understanding of learning material 2. Communication skills 3. Technological proficiency in teaching 4. Classroom management
Occupational Health and Safety (K3) (Z)	1. Compliance with campus safety standards 2. Availability of health facilities 3. Emergency response procedures 4. Implementation of OHS protocols
Graduate Quality (Y)	1. Technical skills (hard skills) 2. Interpersonal skills (soft skills) 3. Graduate employability rate 4. Relevance of graduate competencies to labor market

Data analysis was carried out using the Partial Least Squares (PLS) method, which allows analysis with more flexible data assumptions and a relatively small number of respondents. The analysis process includes several stages, namely Measurement Test (Outer Model) to test the validity and reliability of the instrument, Structure Test (Inner Model) to test the relationship between variables, and Hypothesis Testing to test the hypothesized relationship in this study.

III. Results and Discussion

Data analysis was conducted using the Partial Least Squares (PLS) method using SmartPLS software version 4. The Partial Least Squares (PLS) method explains the structure of data diversity. Partial Least Squares (PLS) is related to the Principle of Component Regression (PCR). The model generated by the Partial Least Squares (PLS) method optimizes the relationship between two sets of variables. Estimate the Y-X relationship model and use the algorithm to estimate a specific Y value. Determining the model is an iterative process considering the diversity of variables X and Y. The variance structure in Y affects the calculation of the linear combination component in X, and vice versa; the variance structure in X affects the linear combination in Y (Creswell & Creswell, 2023). The outer loading is as follows.

The validity test in this study was carried out using the standard size set, namely the outer loading value, which must be greater than 0.7, and the Average Variance Extracted (AVE) value, which must be greater than 0.5. The research variables show encouraging results based on the analysis results in Tables 1 and 2.

Table 2. Outer Loading Value

	Education Technology Innovation	OHS	Instructor Competence	Graduate Quality
ETI 1	0.907			
ETI 2	0.951			
ETI 3	0.912			
IC 1			0.897	
IC 2			0.909	
IC 3			0.904	
IC 4			0.896	
OHS 1		0.943		
OHS 2		0.919		
OHS 3		0.948		
OHS 4		0.904		
GC 1				0.898
GC 2				0.938
GC 3				0.928
GC 4				0.912

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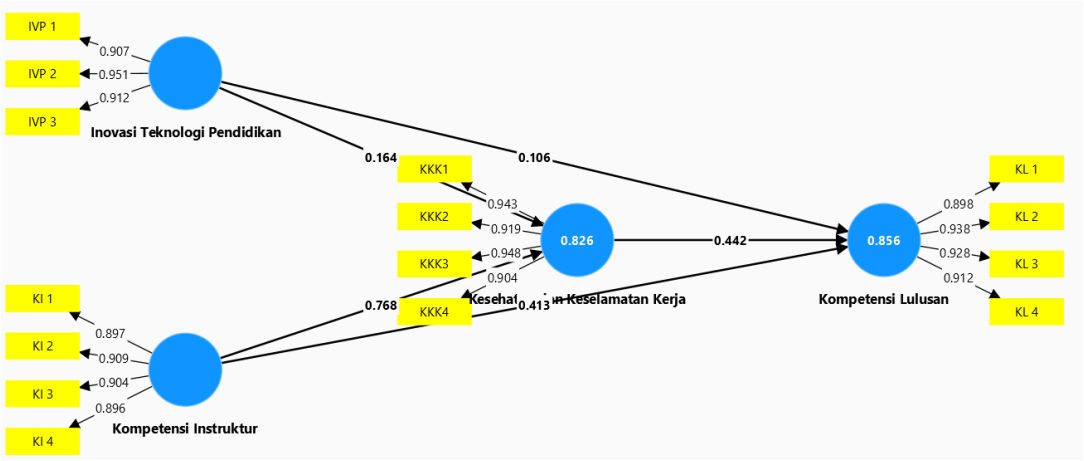

Fig. 2. Outer model

Table 3. AVE Value

	Average Variance Extracted (AVE)
Education Technology Innovation	0.853
Occupational Health and Safety	0.862
Instructor Competence	0.812
Graduate Quality	0.845

Educational Technology Innovation, for example, has all indicators (ETI 1 to ETI 3) with outer loading values higher than 0.7, which indicates that these indicators are valid and contribute significantly to their constructs. In addition, the AVE value for this variable was recorded at 0.634, which is also greater than 0.5. This indicates that the Educational Technology Innovation latent variable can explain its associated indicators well.

The Instructors' Competence variable also showed positive results, with all indicators (IC 1 to IC 4) having outer loading values above 0.7, indicating its validity. The AVE value for this variable was recorded at 0.709, which means that the Instructor Competence latent variable can explain its indicators well. Occupational Health and Safety (OHS) and Graduate Quality also showed satisfactory results. All OHS indicators (OHS 1 to OHS 4) have outer loading values higher than 0.7, and the AVE for OHS of 0.737 indicates the ability of this latent variable to explain its indicators. Graduate Quality, with outer loading values from GC 1 to GC 4, which are also higher than 0.7 and an AVE of 0.681, shows that this variable is valid and can explain its indicators. In general, the results of this validity test indicate that all research variables are of good quality and can be used for further analysis.

Based on Table 3 regarding Discriminant Validity, the diagonal values (bold) representing the square root of Average Variance Extracted (AVE) in each construct are higher than the correlations between other constructs. For example, the discriminant validity value for Education Technology Innovation is 0.923, which is higher than its correlation with other constructs such as Occupational Health and Safety (0.802), Instructor Competence (0.831), and Graduate Quality (0.804). The same applies to other constructs, such as Graduate Quality, with a value of 0.919, which is higher than its correlation with different constructs. This indicates that each construct in the model has good discriminant validity, meaning that each variable can clearly measure distinct concepts without significant overlap, thereby establishing the model's discriminant validity.

Table 4. Discriminant Validity

	Education Technology Innovation	Occupational Health and Safety	Instructor Competence	Graduate Quality
Education Technology Innovation	0.923			
Occupational Health and Safety	0.802	0.929		
Instructor Competence	0.831	0.904	0.901	
Graduate Quality	0.804	0.901	0.901	0.919

Based on Table 4 regarding the Reliability Test, all constructs showed excellent reliability levels. This is evident from the Cronbach's Alpha values, all of which were above 0.90, such as Occupational Health and Safety (0.947) and Graduate Quality (0.939), indicating high internal consistency among the indicators within each construct. Additionally, the Composite Reliability values (both rho and rho_c) all exceed the threshold of 0.70, further validating the reliability of the constructs. For example, the Composite Reliability (rho_c) for

Occupational Health and Safety reached 0.962, and for Graduate Quality it was 0.956, indicating that the indicators within each variable consistently measure the intended construct. Thus, the data used in this study can be considered highly reliable for further analysis.

Table 5 shows that the accuracy of the estimation of the Occupational Health and Safety R2 model is 0.826. Based on this value, it has a moderate accuracy estimation. The accuracy of estimating the R2 Graduate Competency model is 0.856. Based on this value, it has a large accuracy estimation. Goodness of Fit (GoF) validates the entire structural model. The GoF index is a single measure that evaluates the combined performance of the measurement and structural models. The value of predictive-relevance (Q¬≤) is then calculated using the formula Q¬≤ = 1 - (1 - R1¬≤) (1 - R2¬≤). In this case, R1¬≤ = 0.856 and R2¬≤ = 0.826, so that by entering these values into the formula, Q¬≤ = 1 - (1 - 0.856) (1 - 0.826) = 1 - (0.732) (0.682) = 0.500. The Q¬≤ result of 0.500 indicates that the model has a moderate predictive ability, which means that about 50% of the variation in the dependent variable can be explained by this model. The results of the predictive relevance calculation of 0.500 or 50% are significant/high. The criteria for accepting/rejecting the hypothesis are that Ha is accepted and H0 is rejected when the t-statistic> 1.96. To reject/accept the hypothesis using probability, Ha is accepted if the P value is <0.05 (Hair et al., 2021).

Table 5. Reliability Test

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Education Technology Innovation	0.914	0.923	0.945
Occupational Health and Safety	0.947	0.948	0.962
Instructor Competence	0.923	0.923	0.945
Graduate Quality	0.939	0.939	0.956

Table 6. Coefficient of Determination (R-squared)

	R-square	R-square adjusted
Occupational Health and Safety	0.826	0.821
Graduate Quality	0.856	0.850

Table 7. Hypothesis Test of Direct Effect

	R-square	R-square adjusted
Occupational Health and Safety	0.826	0.821
Graduate Quality	0.856	0.850

The data obtained from Path Coefficients is used to test the hypothesis regarding the direct effect between the variables in this study. Based on the results of the analysis, the relationship between educational technology innovation and graduate quality shows a coefficient value of 0.106 with a P-value of 0.265, greater than 0.05. This indicates that the effect of Educational Technology Innovation on Graduate Quality is insignificant, so the first hypothesis can be rejected. In contrast, the relationship between Instructor Competence and Graduate Quality resulted in a coefficient value of 0.413 with a P Value of 0.004, which is smaller than 0.05. This indicates that Instructor Competence significantly influences Graduate Quality, and the second hypothesis is accepted.

In addition, the effect of Educational Technology Innovation on Occupational Health and Safety (OHS) was recorded with a coefficient of 0.164 and a P-value of 0.068, indicating that this effect was also insignificant, so the third hypothesis was rejected. However, Instructor Competence significantly influenced Occupational Health and Safety, with a coefficient of 0.768 and a P-value of 0.000. This indicates that Instructor Competence is essential in improving OHS, so the fourth hypothesis is accepted. Finally, the effect of Occupational Health and Safety on Graduate Quality has a coefficient value of 0.442 with a P-value of 0.002, which also shows a significant positive impact. Thus, the fifth hypothesis is accepted, confirming that exemplary implementation of OHS contributes positively to improving Graduate Quality.

Table 8. Hypothesis Test of Indirect Effect

	Original Sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T statistics	P Values
Education Technology Innovation → Graduate Quality	0.106	0.111	0.095	1.115	0.265
Instructor Competence → Graduate Quality	0.413	0.403	0.143	2.891	0.004
Education Technology Innovation → Occupational Health and Safety	0.164	0.169	0.090	1.825	0.068
Instructor Competence → Occupational Health and Safety	0.768	0.757	0.085	9.077	0.000
Occupational Health and Safety → Graduate Quality	0.442	0.445	0.141	3.137	0.002

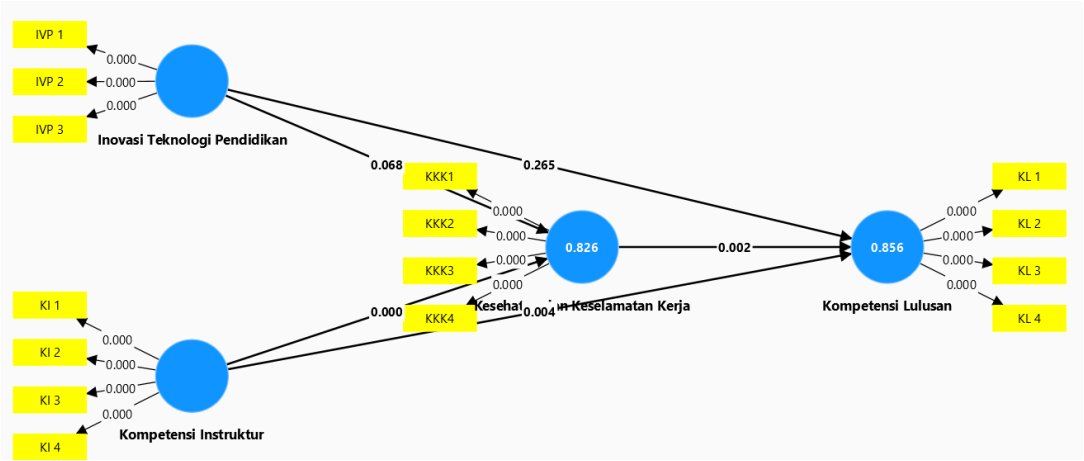

Fig. 3. Hypothesis Test

Based on the data obtained, the indirect or mediating effect between Educational Technology Innovation, Occupational Health and Safety (OHS), and Graduate Quality shows different results for each pathway. For the path of Educational Technology Innovation to Graduate Quality through OHS, the coefficient value was recorded at 0.072 with a P-value of 0.149, greater than 0.05. This indicates that the mediating effect is insignificant, so the sixth hypothesis is rejected. Despite the positive relationship, this suggests that Educational Technology Innovation does not effectively influence Graduate Quality through OHS implementation. In contrast, for Instructor Competence to Graduate Quality through OHS, the mediation coefficient value reached 0.339 with a P-value of 0.002, which is smaller than 0.05. This finding shows that Instructor Competence significantly influences Graduate Quality through Occupational Health and Safety, so the seventh hypothesis is accepted. In other words, improving Instructor Competence not only has a direct impact on Graduate Quality, but also contributes positively through the creation of a safer and healthier environment in the learning process.

The findings indicate that educational technology innovation does not have a significant effect on graduate quality, suggesting that other, more foundational factors may play a greater role in shaping student outcomes. While tools such as e-learning platforms, educational applications, and simulation-based learning are designed to enhance engagement and interactivity, their effectiveness is highly dependent on contextual factors, most notably the competence and pedagogical skills of instructors (Gadzali, 2023). Without proper guidance and instructional design, technological tools may not be utilized to their full potential, reducing their impact on learning outcomes.

The insignificant role of educational technology in this context can be attributed to several factors, including low adoption and limited digital readiness among instructors and students, as well as inadequate infrastructure such as poor internet access and device availability. Cultural preferences for traditional face-to-face learning and the lack of digital literacy further hinder effective implementation. Moreover, instructors often lack the training to integrate technology meaningfully, and generic digital tools may not suit all disciplines, emphasizing the need for context-specific application of educational technology.

Additionally, the lack of active interaction between students and instructors in technology-driven environments can further diminish the learning experience. Technology, while offering flexibility and access, cannot substitute the value of human interaction, feedback, and mentorship, which are critical for developing both hard and soft skills in graduates (Zbar, 2022). Therefore, the insignificant effect of educational technology underscores the importance of adopting a holistic educational approach, integrating not only digital tools but also instructor competence, pedagogical strategies, curriculum relevance, and adequate infrastructure.

In the context of occupational health and safety (OHS) education, educational technology similarly shows limited influence. Although online modules and digital materials can support OHS instruction, they primarily serve informative purposes and do not address the tangible aspects of health and safety implementation. Critical components of OHS, such as the provision of safety equipment, emergency response simulations, and on-site health facilities, require physical infrastructure and procedural enforcement elements that digital tools alone cannot provide (Vukićević et al., 2021). Thus, while educational technology may assist in disseminating OHS knowledge, it cannot replace the experiential learning and real-world safety protocols necessary for cultivating a safe academic environment.

In summary, educational technology's non-significance in this study may stem from a combination of limited infrastructure, cultural resistance, low digital readiness, and technology's inherent limitations in addressing the physical and interactive components of

vocational education. Future initiatives should focus on improving digital literacy, providing targeted instructor training, and ensuring technology is strategically aligned with pedagogical goals to maximize its contribution to graduate quality and workplace safety.

Meanwhile, instructor competence positively affected graduate quality, demonstrating the importance of the instructor's role in education. These competencies include a deep understanding of the material, practical communication skills, technology skills, and good classroom management (Flor-Unda et al., 2023). Instructors with a strong sense of the material can clearly and relevantly convey information. At the same time, good communication skills create an inclusive and motivating learning environment for students. Technology integration in teaching also enriches the learning experience, while effective classroom management creates a conducive atmosphere that helps students focus and develop their technical and interpersonal skills (Naelgas & Malonisio, 2022).

Instructor competence is essential in improving occupational health and safety (OHS) on campus by creating a safer and healthier learning environment. Instructors who possess a solid understanding, good communication skills, and the ability to manage a class effectively. The teacher can effectively convey OHS rules and safety procedures in a way that is easy to understand, thereby increasing student awareness (Chatigny, 2022). Organized. Classroom management also helps reduce the risk of accidents and supports implementing safety protocols. In addition, mastery of technology enables instructors to disseminate OHS information and simulate emergency procedures effectively. Thus, instructor competencies influence the learning process and shape an OHS culture that supports health and safety in the educational environment. Research shows that implementing occupational health and safety (OHS) positively impacts graduate quality by creating a safe and healthy learning environment that protects students physically and supports their academic outcomes (O'Connor et al., 2024). Often, when OHS standards are well implemented, students feel more comfortable and focused, thereby improving concentration on learning and skill development. A safe environment, with health facilities and clear emergency procedures, creates a sense of security crucial to the learning process. In addition, the implementation of OHS reflects the institution's commitment to student welfare, teaching the values of discipline and responsibility essential for graduates. In the long run, graduates who understand the principles of OHS will be better prepared to face challenges in their profession, especially in industries that demand high compliance with safety protocols (Sulistyowati & Susetiyono, 2023).

Occupational health and safety (OHS) is not mediating the relationship between educational technology innovation and graduate quality. While educational technologies, such as e-learning platforms and interactive applications, can improve learning efficiency and accessibility, their impact on graduate quality is independent of OHS implementation (Pramudibyo et al., 2023). Technological innovation focuses more on teaching and easy access, with no direct link to OHS standards. The findings suggest that improving graduate quality through technology is more related to improving students' understanding and skills, while OHS remains essential for safety and health during education (Ton et al., 2024). Therefore, educational institutions are advised to utilize technology for learning while still paying attention to OHS as an independent aspect that creates a safe learning environment, without directly affecting graduate quality. Occupational health and safety (OHS) serves as a mediator in the relationship between instructor competence and graduate quality, suggesting that instructor competence not only directly impacts graduate quality but is also influenced by the application of OHS in the learning environment.

Instructors who understand the material and deliver it effectively can improve student learning, but good OHS implementation creates a safe and conducive environment, increasing student motivation and comfort (Zulfakar, 2022). With safety procedures, adequate health facilities, and good OHS protocols in place, the positive effect of instructor competence on graduate quality will be more substantial. In a safe environment, students participate more actively, are more open to questions, and are more focused, resulting in technically competent graduates with better soft skills (Chang et al., 2021). From a practical standpoint, these results emphasize the importance of educational institutions investing in instructor competency development and strengthening OHS aspects. Institutions can create a strong synergy between instructor proficiency and graduate quality through a concerted focus on OHS. Success in both aspects can result in graduates who are ready to face workforce challenges and understand the importance of health and safety in their future workplace.

The results of this study make an essential contribution to the development of theory regarding the factors that influence graduate quality, particularly in the context of higher education. The finding that instructor competence and occupational safety and health (OSH) have a significant influence on graduate quality, while educational technology innovation does not, highlights the need for a holistic approach to improving the quality of education. Theoretically, this indicates that improving graduate quality cannot be achieved solely through the use of technology but must be accompanied by strengthening fundamental aspects of education, such as instructor quality and a safe learning environment (Bush et al., 2019). Additionally, the mediating role of OSH between instructor competence and graduate quality enriches our understanding of the importance of healthy and safe learning conditions in supporting teaching effectiveness.

Practically, the results of this study encourage educational institutions to review their human resource development strategies and learning support facilities. Improving graduate quality can be achieved more effectively through investment in enhancing instructor competence—through training, mastery of learning technology, and strengthening pedagogical skills as well as the implementation of strict OHS standards on campus. Educational technology can still be utilized, but it must be adapted to the subject context and supported by competent instructors to ensure its appropriate use (Dieck-Assad et al., 2021). Additionally, effective OSH implementation not only creates a sense of safety and comfort in the learning process but also instills values of discipline and responsibility in students, which are essential assets as they enter the workforce, particularly in industries with high safety requirements.

This study has several limitations that need to be considered. The scope was confined to Jayapura Aviation Polytechnic, which may limit the applicability of the findings to other vocational institutions with differing technological readiness, cultural practices, and instructional environments. The use of self-reported questionnaires may also introduce potential biases and does not fully capture the complexities of technology integration in teaching and learning. In addition, the absence of qualitative data limits the exploration of deeper insights into instructor and student experiences with educational technology. Future research should involve a broader range of institutions, utilize mixed-method approaches to enrich data interpretation, and consider longitudinal studies to track the evolving impact of educational technology on graduate quality over time.

IV. Conclusion

This study comprehensively examines the influence of educational technology innovation, instructor competence, and occupational safety and health (OSH) on graduate quality. The analysis results show that instructor competence has the most significant influence on improving graduate quality, followed by the role of OSH in creating a safe and conducive learning environment. Meanwhile, educational technology innovation remains essential, but its impact on graduate quality is not as significant as the other two factors. Therefore, academic institutions need to prioritize the development of instructor competencies, ensure optimal implementation of OSH, and select educational technology that is relevant and contextually appropriate for learning needs. Based on the findings of this study, it is recommended that higher education institutions develop strategies to enhance instructor competencies through continuous training, professional certification, and academic mentoring based on best practices. Additionally, institutions need to instill a K3 culture in all learning activities to create a sense of safety and comfort for both faculty and students. The use of educational technology should also be tailored to the characteristics of learners and learning objectives to support the learning process effectively. With this combination of strategies, it is hoped that the quality of graduates will improve comprehensively and be ready to compete in the ever-evolving job market.

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