

Modeling Digital Tools Integration, Simulation-Based Learning, and Fraud Auditing Competence: PLS-SEM Approach

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Abstract

This study aims to model the relationship between digital tools integration, simulation-based learning, and students' competence in fraud auditing within the context of accounting education's digital transformation. As future auditors are expected to possess both technical and analytical skills, this research investigates how technology-enhanced learning environments contribute to the development of fraud auditing competence. A quantitative approach was used using survey data collected from 230 accounting students enrolled in auditing and forensic accounting courses at universities and colleges in Indonesia. The data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4 to examine both direct and indirect relationships among the constructs. The findings reveal that digital tools integration and simulation-based learning have significant positive effects on students' fraud auditing competence. Furthermore, learning engagement plays a moderating role, strengthening the relationship between digital learning strategies and competence development. The results highlight that students who actively engage with digital and simulation-based activities demonstrate higher levels of analytical reasoning and ethical awareness in detecting and assessing fraud risks. This study contributes to the growing literature on accounting education innovation by providing empirical evidence on how digital pedagogical transformation can enhance the readiness of future auditors in the era of Industry 4.0.

Keywords: Digital Tools Integration, Simulation-Based Learning, Learning Engagement, Fraud Auditing Competence, PLS-SEM

1. Introduction

The rapid advancement of digital technologies in the Fourth Industrial Revolution has profoundly transformed the educational landscape, particularly in accounting and auditing education (Al-Adeem, 2021; AICPA, 2020). As the accounting profession increasingly relies on automation, artificial intelligence, and big data analytics, universities are challenged to equip students with digital competencies aligned with the evolving nature of professional practice (Susanto & Meiryani, 2019). The integration of digital tools—such as data analytics software, forensic accounting applications, and cloud-based auditing platforms—has become essential to enhance students' analytical, technological, and ethical capabilities in fraud auditing (Hegarty & Thompson, 2022). In recent years, the broader use of digital tools in education has demonstrated significant potential in improving student engagement, creativity, and academic outcomes (Zou, 2025). Nonetheless, challenges such as technological accessibility and digital divides remain critical concerns requiring attention (Oktaviane, 2024). Fraud auditing education plays a pivotal role in fostering professional skepticism, integrity,

and accountability. However, traditional teaching approaches remain limited in cultivating real-world problem-solving skills necessary to detect and prevent fraudulent activities (Montgomery & Singh, 2021).

The growing complexity of financial crimes necessitates educational models that simulate authentic professional challenges, enabling learners to apply knowledge and ethical reasoning in dynamic contexts. Consequently, simulation-based learning (SBL) has emerged as an innovative pedagogical approach providing experiential and interactive environments to develop professional judgment and decision-making skills (Kolb & Kolb, 2017; Uyar et al., 2021). Empirical evidence suggests that combining simulation-based learning with digital tool integration can significantly improve engagement, motivation, and performance in accounting education (Napitupulu, 2020; Pratama & Firmansyah, 2022). However, limited research has examined their integrated impact on students' fraud auditing competence, especially in developing countries with variable digital infrastructure and pedagogical readiness (Rahman et al., 2023).

Fraud auditing competence is a specialized skill critical for accounting and auditing students, involving the detection of irregularities and the assessment of audit entities. While auditors' competence in fraud detection is generally perceived as high, there remains a persistent need for educational strategies that effectively build this competence (BPK Study, 2025). The integration of digital tools and simulation-based learning presents a promising avenue to enhance this competence via experiential, technology-supported learning that mirrors real-world auditing scenarios. To model the complex relationships among these constructs, Partial Least Squares Structural Equation Modeling (PLS-SEM) offers a robust analytical framework suitable for testing causal and predictive relationships involving latent variables (Hair et al., 2021; Subhaktiyasa, 2024). This study seeks to employ the PLS-SEM approach to examine how digital tools integration and simulation-based learning jointly influence students' fraud auditing competence. The findings aim to advance theoretical understanding and inform educational practice by guiding curriculum development to enhance digital literacy, ethical awareness, and fraud detection capabilities among future auditors.

2. Literature Review

Here is a literature review focusing on appropriate theories for the research topic "Modeling Digital Tools Integration, Simulation-Based Learning, and Fraud Auditing Competence: PLS-SEM Approach":

2.1 Technology Acceptance Model (TAM)

TAM (Davis, 1989) explains user acceptance of technology, emphasizing perceived usefulness and ease of use as key determinants. In accounting education, Pretorius (2025) highlights how digital tools like cloud-based accounting software and data analytics enhance learning outcomes by fostering innovative thinking and adaptability among students. Similarly, Al-Hattami (2025) found that digital accounting tools promote innovation, with technological self-efficacy and digital literacy moderating this effect.

2.2 Experiential Learning Theory (ELT)

Kolb's (1984) ELT provides a robust foundation for simulation-based learning by describing learning as a cyclical process of concrete experience, reflection, conceptualization, and experimentation. Elsayed (2023) applied ELT in an audit simulation context and reported significant improvements in students' understanding and active participation, reinforcing the

value of experiential learning to bridge the gap between theory and practice. Zelin (2010) also documented that audit simulations link classroom learning with workplace realities, enhancing students' audit task comprehension.

2.3 Competency-Based Education (CBE) Theory

CBE focuses on developing competencies necessary for professional practice (Frank et al., 2010). In fraud auditing, Ramadhan et al. (2023) empirically confirmed that both audit experience and professional education significantly improve fraud detection ability, emphasizing the role of education in competence development. Sukma (2025) study similarly found that auditor competence in fraud detection is critical, with self-assessed competence levels being moderately high among respondents, yet improvement opportunities remain.

2.4 Digital Tools Integration in Accounting Education

Digital transformation has reshaped accounting education, demanding that students master technological competencies to remain relevant in the professional world (Al-Adeem, 2021). The integration of digital tools—including data analytics software, forensic accounting systems, and computer-assisted auditing techniques—serves as a bridge between classroom learning and professional practice (Hegarty & Thompson, 2022). According to Susanto and Meiryani (2019), accounting graduates are expected to demonstrate proficiency in information systems, automation, and analytics to meet industry expectations in the digital era. Empirical evidence supports the significance of digital tools in enhancing learning performance. Napitupulu (2020) found that integrating digital learning platforms in accounting courses improved students' analytical and cognitive engagement. Similarly, Pratama and Firmansyah (2022) reported that digital literacy and the use of simulation-based accounting software enhanced student learning outcomes and motivation. In another study, Rahman et al. (2023) emphasized that digital readiness among accounting students correlates strongly with their professional competence, especially when supported by adequate institutional infrastructure and digital pedagogy. Furthermore, international research by Botes and Sharma (2017) and Apostolou et al. (2022) highlighted that digital integration not only supports learning effectiveness but also promotes ethical decision-making and real-time problem-solving. This digital pedagogical transition is essential in fraud auditing education, where analytical precision and technological adaptability are vital to detecting complex fraud schemes (Montgomery & Singh, 2021).

2.5 Simulation-Based Learning (SBL) and Experiential Pedagogy

Simulation-Based Learning (SBL) derives from experiential learning theory, emphasizing active engagement and reflective application of knowledge (Kolb & Kolb, 2017). Simulations provide students with experiential scenarios replicating real-world auditing environments, enabling them to make professional judgments, identify risks, and detect fraudulent behavior (Uyar et al., 2021). Empirical studies consistently show the benefits of simulation in accounting education. For example, Aldamen et al. (2018) demonstrated that students who participated in audit simulations exhibited higher confidence and problem-solving ability than those in traditional lecture settings. Similarly, Wessels (2018) found that SBL fosters critical thinking and ethical reasoning—two essential dimensions of fraud auditing competence. In the Indonesian context, Pratama and Firmansyah (2022) found that combining simulation with digital learning significantly enhanced students' understanding of audit processes, teamwork, and communication. Napitupulu (2020) also reported that simulation-

based digital learning environments improve engagement and reduce learning anxiety. Internationally, studies by Apostolou et al. (2022) and Uyar et al. (2021) confirmed that experiential simulations increase student satisfaction, intrinsic motivation, and retention of complex auditing concepts. Simulation is particularly effective in teaching fraud auditing, where experiential exposure to fraud cases strengthens ethical awareness and professional skepticism (Hegarty & Thompson, 2022). By integrating SBL, educators can simulate fraud risk assessments, document reviews, and forensic data analysis, thus replicating the decision-making environment faced by professional auditors (Montgomery & Singh, 2021).

2.6 Students' Fraud Auditing Competence

Fraud auditing competence is defined as a combination of technical, analytical, ethical, and digital skills enabling auditors to identify, evaluate, and mitigate fraud risks (IFAC, 2020; Montgomery & Singh, 2021). Developing this competence requires not only knowledge of audit procedures but also technological literacy and ethical sensitivity (Rahman et al., 2023). Several empirical studies have investigated factors influencing auditing competence. Hegarty and Thompson (2022) found that exposure to digital ethics modules and technology-based case studies enhances students' professional judgment and ethical awareness. Botes and Sharma (2017) demonstrated that continuous integration of information systems into auditing education fosters higher-order thinking and self-efficacy. In Indonesia, Pratama and Firmansyah (2022) and Napitupulu (2020) provided evidence that digital simulation-based environments directly improve students' audit decision-making competence. Similarly, Mulyani et al. (2021) confirmed that combining digital literacy and experiential learning significantly enhances students' readiness for professional audit practice. These findings collectively suggest that fraud auditing competence develops most effectively when pedagogical strategies incorporate digital and simulation-based approaches.

Grounded in the theoretical assumptions and supported by findings from prior research, the study proposes the following:

Digital Tools Integration has a positive and significant effect on Students' Fraud Auditing Competence.

The integration of digital tools in accounting and auditing education is increasingly recognized as a key determinant of professional competence development. According to the Technology Acceptance Model (TAM) by Davis (1989), users' acceptance of technology—through perceived usefulness and ease of use—enhances their performance and learning outcomes. In the educational context, the adoption of digital tools such as data analytics software, visualization platforms, and audit simulations enables students to apply theoretical knowledge to practical, technology-driven audit scenarios, thereby improving analytical and investigative skills required for fraud detection. Empirical evidence supports this notion. Susanti et al. (2022) found that integrating technology into accounting learning environments improved students' cognitive and practical auditing competence. Similarly, Al-Htaybat and von Alberti-Alhtaybat (2017) argue that the use of digital platforms enhances students' readiness for the data-driven auditing profession by fostering adaptability and technical proficiency. Thus, the integration of digital tools is expected to have a positive and significant influence on students' fraud auditing competence.

H1: Digital Tools Integration has a positive and significant effect on Students' Fraud Auditing Competence.

Simulation-Based Learning has a positive and significant effect on Students' Fraud Auditing Competence.

Simulation-Based Learning (SBL) draws from Experiential Learning Theory (Kolb, 1984), which emphasizes learning through experience, reflection, and application. In auditing education, simulation-based approaches allow learners to engage in authentic, practice-oriented environments where they can test hypotheses, make professional judgments, and analyze fraud cases within controlled scenarios. Such immersive experiences enhance procedural knowledge, critical thinking, and ethical reasoning—core elements of fraud auditing competence. Prior research validates the positive impact of simulation-based pedagogy on professional learning outcomes. Chen et al. (2020) found that simulation-based learning significantly improves engagement and understanding in complex problem-solving contexts. In the field of accounting, de Villiers (2020) and Mustika & Haryadi (2023) confirmed that audit simulations lead to measurable gains in students' technical and analytical competencies. Consequently, simulation-based learning is hypothesized to have a positive and significant influence on students' fraud auditing competence.

H2: Simulation-Based Learning has a positive and significant effect on Students' Fraud Auditing Competence.

Learning Engagement strengthens the influence of Digital Tools Integration and Students' Fraud Auditing Competence.

Learning Engagement (LE) represents the cognitive, emotional, and behavioral involvement of learners in educational activities (Fredricks et al., 2004). Within the Self-Determination Theory (Deci & Ryan, 2000), engagement is influenced by intrinsic motivation and the perceived relevance of learning tasks. When students are highly engaged, they invest greater effort in exploring and utilizing digital tools, which amplifies the positive outcomes of technology-integrated learning. Empirical studies have shown that engagement moderates the impact of digital learning tools on learning outcomes. Lee et al. (2021) demonstrated that the effectiveness of digital tool integration in online learning environments increases significantly with higher student engagement levels. Similarly, Sun and Rueda (2012) found that active engagement mediates and strengthens the relationship between digital interaction and learning performance. Thus, it is posited that learning engagement enhances the positive influence of digital tools integration on students' fraud auditing competence.

H3: Learning Engagement strengthens the influence of Digital Tools Integration and Students' Fraud Auditing Competence.

Learning Engagement strengthens the influence of Simulation-Based Learning and Students' Fraud Auditing Competence.

The moderating effect of learning engagement is also relevant in simulation-based learning contexts. Drawing from Constructivist Learning Theory (Vygotsky, 1978), learners construct knowledge more effectively through active participation and interaction. In highly engaging simulation environments, students become immersed in problem-solving activities, fostering deeper understanding and higher competence. Empirical evidence supports this relationship. Chen et al. (2020) and Wang et al. (2022) found that simulation-based learning outcomes are significantly enhanced when learners exhibit higher engagement, as engagement

promotes reflective thinking, persistence, and skill mastery. Bui and Porter (2010) also emphasize that student engagement during simulation exercises in auditing leads to improved professional skepticism and analytical capability. Hence, learning engagement is expected to strengthen the relationship between simulation-based learning and students' fraud auditing competence.

H4: Learning Engagement strengthens the influence of Simulation-Based Learning and Students' Fraud Auditing Competence.

3. Material and Method

This study adopts a quantitative explanatory research design using a Partial Least Squares Structural Equation Modeling (PLS-SEM) approach to examine the relationships among digital tools integration, simulation-based learning, learning engagement, and students' fraud auditing competence. The design aims to empirically test the proposed model and hypotheses by analyzing the direct and moderating effects among variables. A cross-sectional survey method was used to collect data from accounting students who had completed courses related to auditing and forensic accounting. This approach aligns with the recommendation of Hair et al. (2021) for complex models involving multiple latent constructs, particularly when predictive and exploratory components coexist in a single framework.

The population of this study was undergraduate accounting students from the universities and colleges (Sekolah Tinggi) in Indonesia, who had taken courses in auditing or fraud examination. A purposive sampling technique was applied, focusing on respondents with prior exposure to digital tools and simulation-based learning environments. A total of 230 questionnaires were distributed through online platforms (Google Forms). However, only 100 students voluntarily completed the questionnaires. Respondents represented a balanced mix of Generation Y and Generation Z students, aged 18 to 25 and coming from semester 5, 6 or 7.

3.1 Design Study

This study employs a quantitative approach with a causal research design, aiming to empirically examine the hypothesized relationships among the variables: Digital Tools Integration, Simulation-Based Learning, Learning Engagement, and Students' Fraud Auditing Competence. The study utilizes a survey method with a structured questionnaire as the primary data collection instrument. The research population consists of undergraduate accounting students in Indonesia who have completed courses related to auditing and/or forensic accounting and possess an understanding of digital-based learning environments. Respondents were selected using a purposive sampling technique based on the following inclusion criteria:

- (1) currently enrolled in the 5th, 6th, or 7th semester;
- (2) have completed or are enrolled in auditing and/or forensic accounting courses; and
- (3) have familiarity with simulation-based or digital learning tools, such as audit software or digital accounting laboratories.

Data were collected through an online survey distributed via Google Forms and disseminated through WhatsApp to reach relevant academic communities. The questionnaire employed a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) to measure each construct. The minimum required sample size was determined based on the guideline proposed by Hair et al. (2021), which recommends a sample size of five to ten times the number of indicators in Partial Least Squares Structural Equation Modeling (PLS-SEM). Following

this guideline, with approximately 20 indicators, a minimum of 100 to 200 valid responses was targeted to ensure adequate statistical power and model robustness.

3.2 Data Analysis

After the data were collected, all responses were carefully examined to ensure completeness and internal consistency. Any invalid or incomplete questionnaires were excluded from further analysis. The remaining valid responses were then analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS 4.0 software. The data analysis followed a two-stage approach, beginning with the assessment of the measurement model (outer model) and followed by the evaluation of the structural model (inner model). In the first stage, the measurement model assessment aimed to verify the reliability and validity of the constructs. This was achieved by examining several statistical criteria, including indicator reliability with factor loadings greater than 0.7, internal consistency reliability through Cronbach’s Alpha and Composite Reliability values exceeding 0.7, convergent validity assessed through the Average Variance Extracted (AVE) above 0.5, and discriminant validity evaluated using both the Fornell–Larcker criterion. In the second stage, the structural model assessment was conducted to test the proposed hypotheses. This involved analyzing path coefficients, coefficient of determination (R^2), and effect size (f^2). To evaluate the significance of the structural paths, a bootstrapping resampling procedure with 5,000 iterations was performed, producing t-statistics and p-values for hypothesis testing. The application of PLS-SEM was considered appropriate for this study due to its strength in handling prediction-oriented research models and complex relationships, particularly those involving moderating variables such as Learning Engagement. As emphasized by Hair et al. (2021), PLS-SEM enables simultaneous testing of both measurement and structural components of the model, providing a comprehensive and empirically robust evaluation of the hypothesized relationships among variables.

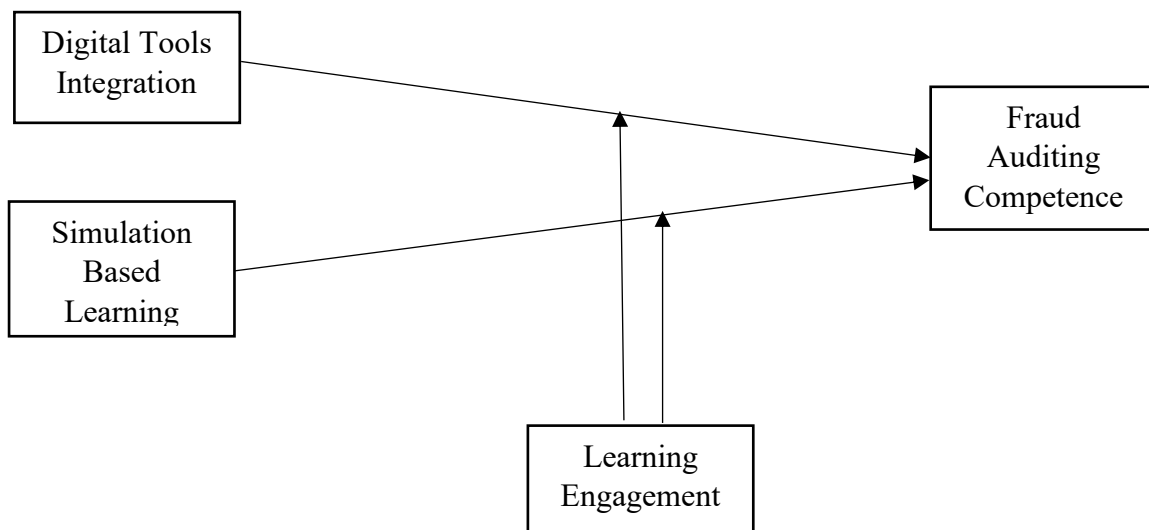


Figure 1. Research Model

4. Result

Characteristics of Respondents

The demographic profile of respondents provides essential contextual information for understanding the characteristics of the sample involved in this study.

Table 1. Distribution of Respondents Based on Age

		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 18 years	10	9.2	9.2	9.2
	19 - 21 years	69	63.3	63.3	72.5
	21-23 years	17	15.6	15.6	88.1
	23 - 25 years	6	5.5	5.5	93.6
	> 25 years	7	6.4	6.4	100.0
	Total	109	100.0	100.0	

Source: Primary Data Processed, 2025

Table 1 summarizes the distribution of respondents based on age. The results show that the majority of participants were aged 19–21 years, representing 63.3% of the total sample. This indicates that most respondents were within the typical age range of undergraduate students, who are generally in the early stages of professional competency development. Meanwhile, 15.6% of respondents were aged 21–23 years, reflecting those who are likely in the later phase of their academic journey. A smaller group of respondents, 9.2%, were under 18 years old, possibly indicating early-entry students or those who began higher education at a younger age. Furthermore, 5.5% of respondents were aged 23–25 years, and 6.4% were above 25 years, which may include mature students, working professionals, or individuals pursuing further studies. Overall, the age distribution indicates that the respondent pool is dominated by young adult learners, an appropriate demographic for examining variables related to digital tools integration, simulation-based learning, and the enhancement of fraud auditing competence in higher education settings.

Table 2. Distribution of Respondents Based on Gender

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	33	30.3	30.3	30.3
	Women	76	69.7	69.7	100.0
	Total	109	100.0	100.0	

Source: Primary Data Processed, 2025

The gender distribution of respondents is presented in Table 2. Understanding this demographic characteristic is important to identify potential gender-based tendencies in learning behavior and the adoption of digital tools. The results show that the majority of respondents were women, accounting for 69.7% of the total sample, while men represented 30.3%. This pattern reflects the general trend in accounting and business education, where female students often constitute a larger proportion of the population. The predominance of female respondents suggests that perspectives on digital tools integration, simulation-based learning, and the development of fraud auditing competence in this study are largely influenced by female learners' experiences and learning orientations. Nonetheless, the inclusion of male respondents contributes to maintaining gender diversity and enriching the overall analysis of student competence within the context of digital and simulation-based learning environments.

Table 3. Distribution of Respondents Based on University

		University			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Universitas Pattimura	78	71.6	71.6	71.6
	Universitas Pertiwi	9	8.3	8.3	79.8
	STIS Al-Wafa	15	13.8	13.8	93.6
	Universitas Negeri Jakarta	2	1.8	1.8	95.4
	Universitas As Syafiiyah	3	2.8	2.8	98.2
	Universitas Padjajaran	1	.9	.9	99.1
	Universitas Pamulang	1	.9	.9	100.0
	Total	109	100.0	100.0	

Source: Primary Data Processed, 2025

Table 3 displays the distribution of respondents based on their university affiliation. This demographic characteristic is essential for understanding the academic context and institutional diversity represented in the study. The findings indicate that the majority of respondents were from Universitas Pattimura, comprising 71.6% of the total sample. This dominant representation suggests that the university served as the primary research site, providing substantial data on students' experiences with digital and simulation-based learning environments. Meanwhile, 13.8% of respondents were from STIS Al-Wafa, followed by 8.3% from Universitas Pertiwi, indicating additional institutional participation that enhances the representativeness of the sample. Smaller proportions of respondents were drawn from Universitas Negeri Jakarta (1.8%), Universitas As Syafiiyah (2.8%), Universitas Padjajaran (0.9%), and Universitas Pamulang (0.9%). Overall, the inclusion of respondents from multiple universities broadens the scope of this study, ensuring that the analysis of digital tools integration, simulation-based learning, and fraud auditing competence reflects varied institutional contexts and learning environments across different higher education institutions in Indonesia.

Table 4. Distribution of Respondents Based on Semester

		Semester			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5th	93	85.3	85.3	85.3
	7th	16	14.7	14.7	100.0
	Total	109	100.0	100.0	

Source: Primary Data Processed, 2025

Table 4 presents the distribution of respondents based on their current semester. This information provides insight into the academic standing and level of learning experience among participants. The results show that the vast majority of respondents were in their 5th semester, accounting for 85.3% of the total sample. This indicates that most participants were mid-level undergraduate students who had completed the foundational courses and were beginning to engage with more advanced topics, such as auditing and the application of digital learning tools. Meanwhile, 14.7% of respondents were in their 7th semester, representing students who are in the final stages of their undergraduate studies. These students likely possess higher levels of academic maturity and exposure to professional competencies, including

simulation-based learning and fraud auditing practices. Overall, the dominance of 5th-semester students suggests that the study primarily captures perspectives from learners who are actively developing their digital literacy, simulation-based learning experience, and fraud auditing competence, making them an ideal population for examining the integration of digital learning models in accounting education.

Table 5. Distribution of Respondents Based on Auditing or Forensic Accounting Course

		Auditing Course			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Already	109	100.0	100.0	100.0

Source: Primary Data Processed, 2025

Table 5 presents the respondents' status regarding their completion of the auditing course. The data show that 100% of respondents had already taken the auditing course, indicating that all participants possessed foundational knowledge and exposure to auditing concepts and practices. This uniformity ensures that every respondent has a comparable academic background relevant to the study's focus on fraud auditing competence. It also strengthens the validity of the research findings, as the participants are equally familiar with the auditing framework, principles, and procedures typically taught in accounting programs. Therefore, the homogeneity in this variable supports the study's objective to examine how digital tools integration and simulation-based learning contribute to enhancing students' competence in fraud auditing within a consistent educational context.

Descriptive Statistic

This section presents the descriptive statistics of the study variables to provide an overview of respondents' perceptions toward each construct examined in the research model. Descriptive statistical analysis is an essential preliminary step in quantitative research, as it summarizes the central tendency (mean and median) and the dispersion (standard deviation) of each indicator, allowing researchers to understand the general pattern of responses before proceeding to more advanced statistical analyses such as measurement and structural model assessments. In the context of this study—Modeling Digital Tools Integration, Simulation-Based Learning, and Students' Fraud Auditing Competence: A PLS-SEM Approach—the descriptive statistics serve to describe how respondents evaluated statements related to four main constructs: Digital Tools Integration (DTI), Simulation-Based Learning (SBL), Learning Engagement (LE), and Fraud Auditing Competence (FAC). Each indicator within these constructs was measured using a five-point Likert scale, where higher mean values indicate stronger agreement with the given statements.

Table 6 below summarizes the descriptive results for each indicator, highlighting the mean, median, and standard deviation as the basis for understanding students' overall perceptions and the consistency of their responses.

Table 6. Descriptive Statistic

Indicator	Mean	Median	Standard deviation
DTI1	4.183	4	0.577
DTI2	4.321	4	0.523
DTI3	4.229	4	0.569

DTI4	4.211	4	0.678
DTI5	4.229	4	0.552
SBL1	4.22	4	0.58
SBL2	4.156	4	0.577
SBL3	4.156	4	0.577
SBL4	4.174	4	0.504
SBL5	4.101	4	0.59
LE1	4.064	4	0.595
LE2	4.064	4	0.667
LE3	4.147	4	0.588
LE4	3.991	4	0.697
LE5	4.174	4	0.661
FAC1	3.908	4	0.599
FAC2	3.954	4	0.626
FAC3	4.101	4	0.635
FAC4	3.862	4	0.735
FAC5	3.89	4	0.668

Source: Primary Data Processed, 2025

Table 6 presents the descriptive statistics for all observed indicators measuring Digital Tools Integration (DTI), Simulation-Based Learning (SBL), Learning Engagement (LE), and Fraud Auditing Competence (FAC). The descriptive measures—mean, median, and standard deviation—provide an overview of respondents’ perceptions and the variability of their responses across each construct. The mean scores for Digital Tools Integration (DTI) range from 4.18 to 4.32, with a relatively low standard deviation between 0.52 and 0.68, indicating a consistently high level of agreement among respondents regarding the use and integration of digital tools in their learning processes. This suggests that students perceive digital technologies as effectively supporting their academic and practical learning experiences. For Simulation-Based Learning (SBL), the mean values fall between 4.10 and 4.22, with standard deviations ranging from 0.50 to 0.59. These results indicate positive perceptions toward simulation-based learning activities, implying that students recognize their benefits in enhancing practical understanding and experiential learning in auditing contexts.

The Learning Engagement (LE) indicators record mean values between 3.99 and 4.17, suggesting that students generally feel engaged and motivated in their learning environments, though with slightly greater variation ($SD = 0.59\text{--}0.70$) compared to DTI and SBL. Finally, the indicators for Fraud Auditing Competence (FAC) show mean scores ranging from 3.86 to 4.10, with standard deviations between 0.60 and 0.73. These figures reflect moderately high perceptions of competence, suggesting that while students feel confident in their fraud auditing skills, there remains room for further development through enhanced digital and simulation-based pedagogical strategies. Overall, the descriptive statistics reveal that all constructs exhibit high mean scores (above 3.8) and low variability, indicating strong and consistent positive responses toward digital learning integration, simulation-based instruction, and competence development in fraud auditing among accounting students.

Measurement Model/ Outer Model

Convergent Validity

Table 7 presents the outer loading values for all measurement indicators across the latent constructs: Digital Tools Integration (X1), Simulation-Based Learning (X2), Learning

Engagement (Xm), and Fraud Auditing Competence (Y), along with the interaction terms Learning Engagement × Digital Tools Integration and Learning Engagement × Simulation-Based Learning. Outer loading values are used to assess indicator reliability, which reflects the degree to which each observed variable consistently represents its underlying construct.

Table 7. Outer Loading

Indicator	Digital Tools Integration (X1)	Fraud Auditing Competence (Y)	Learning Engagement (Xm)	Simulation Based Learning (X2)	Learning Engagement (Xm) x Digital Tools Integration (X1)	Learning Engagement (Xm) x Simulation Based Learning (X2)
DTI1	0.718					
DTI2	0.840					
DTI3	0.763					
DTI4	0.756					
DTI5	0.758					
FAC1		0.800				
FAC2		0.841				
FAC3		0.703				
FAC4		0.849				
FAC5		0.812				
LE1			0.781			
LE2			0.780			
LE3			0.801			
LE4			0.835			
LE5			0.804			
SBL1				0.803		
SBL2				0.874		
SBL3				0.816		
SBL4				0.844		
SBL5				0.765		
Learning Engagement (Xm) x Digital Tools Integration (X1)					1.000	
Learning Engagement (Xm) x Simulation Based Learning (X2)						1.000

Source: Primary Data Processed, 2025

In general, a loading value above 0.70 indicates a satisfactory level of reliability and contributes significantly to the construct’s measurement model (Hair et al., 2021). As shown in Table 7, all indicators across the four constructs demonstrate loadings exceeding the 0.70 threshold, suggesting strong convergent validity. For the Digital Tools Integration (X1) construct, outer loadings range from 0.718 to 0.840, implying that each item contributes substantially to explaining the construct. The Simulation-Based Learning (X2) indicators also exhibit strong loadings between 0.765 and 0.874, signifying that the simulation-based learning items are reliable measures of the construct. Similarly, the Learning Engagement (Xm) indicators display loadings between 0.780 and 0.835, confirming that all items are valid representations of students’ engagement in the learning process. For Fraud Auditing Competence (Y), outer loading values range from 0.703 to 0.849, indicating consistent measurement reliability across indicators. Meanwhile, the interaction terms (Learning Engagement × Digital Tools Integration and Learning Engagement × Simulation-Based Learning) show perfect loading values of 1.000, as expected for interaction constructs

generated in PLS-SEM. Overall, the results confirm that all indicators meet the minimum reliability standard, demonstrating strong measurement consistency and validating their inclusion in the measurement model assessment phase of the PLS-SEM analysis.

Discriminant Validity

Table 8 presents the Heterotrait-Monotrait ratio (HTMT) values, which are used to assess discriminant validity among the latent constructs in the measurement model. Discriminant validity ensures that each construct in the model is conceptually and empirically distinct from the others, meaning that the indicators measure different theoretical concepts rather than overlapping dimensions (Henseler, Ringle, & Sarstedt, 2015).

Table 8. Heterotrait-monotrait ratio (HTMT)

Variable	Digital Tools Integration (X1)	Fraud Auditing Competence (Y)	Learning Engagement (Xm)	Simulation Based Learning (X2)	Learning Engagement (Xm) x Digital Tools Integration (X1)	Learning Engagement (Xm) x Simulation Based Learning (X2)
Digital Tools Integration (X1)						
Fraud Auditing Competence (Y)	0.650					
Learning Engagement (Xm)	0.698	0.730				
Simulation Based Learning (X2)	0.835	0.662	0.772			
Learning Engagement (Xm) x Digital Tools Integration (X1)	0.228	0.401	0.393	0.375		
Learning Engagement (Xm) x Simulation Based Learning (X2)	0.349	0.294	0.281	0.218	0.772	

Source: Primary Data Processed, 2025

In general, an HTMT value below 0.90 (for conceptually similar constructs) or below 0.85 (for conceptually distinct constructs) indicates satisfactory discriminant validity (Hair et al., 2021). As shown in Table 8, all HTMT values in this study fall well below the conservative threshold of 0.85, confirming that each construct is empirically distinct. Specifically, the HTMT values range from 0.218 to 0.835, with the highest relationship observed between Simulation-Based Learning (X2) and Digital Tools Integration (X1) (HTMT = 0.835). This suggests a moderately strong yet acceptable correlation, which is reasonable given that both constructs relate to digital and experiential learning processes. Meanwhile, lower HTMT values among other construct pairs (e.g., between Learning Engagement × Digital Tools Integration and Simulation-Based Learning, HTMT = 0.375) indicate limited overlap and well-defined conceptual separation. Overall, the HTMT results confirm that the measurement model satisfies the discriminant validity criteria, thereby supporting the reliability of subsequent structural model analysis in examining the relationships among digital tools integration, simulation-based learning, learning engagement, and fraud auditing competence. Beside HTMT testing, discriminant validity can also be determined using the Fornell Larcker table.

Table 9. Fornell-Larcker criterion

Variable	Digital Tools Integration (X1)	Fraud Auditing Competence (Y)	Learning Engagement (Xm)	Simulation Based Learning (X2)
Digital Tools Integration (X1)	0.768			

Fraud Auditing Competence (Y)	0.562	0.803		
Learning Engagement (Xm)	0.585	0.635	0.801	
Simulation Based Learning (X2)	0.710	0.584	0.669	0.821

Source: Primary Data Processed, 2025

Table 9 presents the results of the Fornell–Larcker criterion analysis, which serves as an additional assessment of discriminant validity among the latent constructs in the measurement model. This criterion compares the square root of the Average Variance Extracted (AVE) for each construct (displayed on the diagonal) with the correlations between constructs (off-diagonal values). According to Fornell and Larcker (1981), discriminant validity is established when the square root of each construct’s AVE exceeds its correlations with other constructs, indicating that the construct shares more variance with its own indicators than with other latent variables. As shown in Table 9, the diagonal values (square roots of AVE) are higher than the off-diagonal correlations for all constructs. Specifically, the square root of AVE for Digital Tools Integration (X1) is 0.768, which is greater than its correlations with Fraud Auditing Competence (0.562), Learning Engagement (0.585), and Simulation-Based Learning (0.710). Similarly, Fraud Auditing Competence (Y) has a square root of AVE value of 0.803, exceeding its correlations with other constructs. The same pattern is observed for Learning Engagement (Xm) ($\sqrt{\text{AVE}} = 0.801$) and Simulation-Based Learning (X2) ($\sqrt{\text{AVE}} = 0.821$), both of which surpass their respective inter-construct correlations. These results confirm that all constructs meet the Fornell–Larcker criterion, demonstrating that each variable possesses adequate discriminant validity. Consequently, the measurement model can be considered reliable for distinguishing among digital tools integration, simulation-based learning, learning engagement, and fraud auditing competence, thereby validating their inclusion in the PLS-SEM structural model analysis.

Reliability

Table 10 presents the results of construct reliability and convergent validity testing for all latent variables in the study, including Digital Tools Integration (X1), Simulation-Based Learning (X2), Learning Engagement (Xm), and Fraud Auditing Competence (Y). These indicators are essential components of the measurement model assessment in Partial Least Squares Structural Equation Modeling (PLS-SEM), as they verify the internal consistency and representativeness of each construct’s indicators.

Table 10. Reliability Testing

Variable	Cronbach's alpha	Composite reliability (rho a)	Composite reliability (rho c)	Average variance extracted (AVE)
Digital Tools Integration (X1)	0.826	0.827	0.878	0.590
Fraud Auditing Competence (Y)	0.861	0.862	0.900	0.645
Learning Engagement (Xm)	0.860	0.866	0.899	0.641
Simulation Based Learning (X2)	0.879	0.888	0.912	0.674

Source: Primary Data Processed, 2025

Construct reliability was evaluated using Cronbach’s Alpha (α), rho_A, and Composite Reliability (CR or rho_c). According to Hair et al. (2021), acceptable reliability is indicated when Cronbach’s Alpha and Composite Reliability values exceed 0.70, signifying adequate internal consistency. The results show that all constructs in this study meet these criteria, with Cronbach’s Alpha ranging from 0.826 to 0.879, rho_A from 0.827 to 0.888, and Composite Reliability from 0.878 to 0.912. These values demonstrate that all measurement items consistently represent their respective constructs.

Convergent validity was assessed using the Average Variance Extracted (AVE), which measures the proportion of variance captured by a construct relative to measurement error. An AVE value of 0.50 or higher indicates satisfactory convergent validity (Fornell & Larcker, 1981). As shown in Table 10, all constructs exceed this threshold, with AVE values ranging from 0.590 to 0.674. This suggests that each construct explains more than half of the variance in its indicators, confirming good convergent validity.

Overall, the findings indicate that all latent constructs—Digital Tools Integration, Simulation-Based Learning, Learning Engagement, and Fraud Auditing Competence—demonstrate strong internal consistency reliability and adequate convergent validity, providing a solid foundation for subsequent structural model analysis in the PLS-SEM framework.

Structural Model/ Inner Model

Coefficient of determination (Adjusted R Squared)

Table 11 presents the results of the structural model assessment, specifically the coefficient of determination (Adjusted R²) for the dependent variable Fraud Auditing Competence (Y). The coefficient of determination (R²) indicates the proportion of variance in the endogenous construct that can be explained by the exogenous variables in the model, reflecting the model’s overall explanatory power (Hair et al., 2021).

Table 11. Adjusted R Square

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Fraud Auditing Competence	0.465	0.513	0.085	5.451	0.000

Source: Primary Data Processed, 2025

As shown in Table 11, the Adjusted R² value for Fraud Auditing Competence is 0.465, with a t-statistic of 5.451 and a p-value of 0.000, which is highly significant at the 0.001 level. This result implies that approximately 46.5% of the variance in fraud auditing competence is explained by the predictors included in the model—namely Digital Tools Integration (X1), Simulation-Based Learning (X2), and Learning Engagement (Xm), including their moderating effects. According to Chin (2018), R² values of 0.67, 0.33, and 0.19 can be interpreted as substantial, moderate, and weak explanatory power, respectively. Therefore, the R² value of 0.465 indicates a moderate to strong explanatory capacity, suggesting that the model provides a robust representation of the factors influencing students’ fraud auditing competence.

In summary, the structural model demonstrates that the integration of digital tools and simulation-based learning—supported by active learning engagement—collectively accounts for nearly half of the variance in students’ competence in fraud auditing, thereby supporting the overall adequacy and predictive relevance of the proposed PLS-SEM model.

Hypothesis Testing

Table 12 presents the path coefficient analysis results for the hypothesized relationships in the structural model, including both direct and moderating effects among the study variables. The analysis evaluates the magnitude, direction, and statistical significance of the relationships between Digital Tools Integration (X1), Simulation-Based Learning (X2), Learning Engagement (Xm), and Fraud Auditing Competence (Y). Statistical significance was assessed using t-statistics and p-values, with a threshold of $p < 0.05$ indicating a significant relationship.

Table 12. Path Coefficient Analysis

Model	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Digital Tools Integration → Fraud Auditing Competence	0.273	0.276	0.167	1.641	0.040
Learning Engagement x Digital Tools Integration → Fraud Auditing Competence	0.199	0.205	0.194	1.027	0.152
Learning Engagement x Simulation Based Learning → Fraud Auditing Competence	-0.079	-0.085	0.164	0.478	0.316
Simulation Based Learning → Fraud Auditing Competence	0.090	0.076	0.199	0.450	0.326

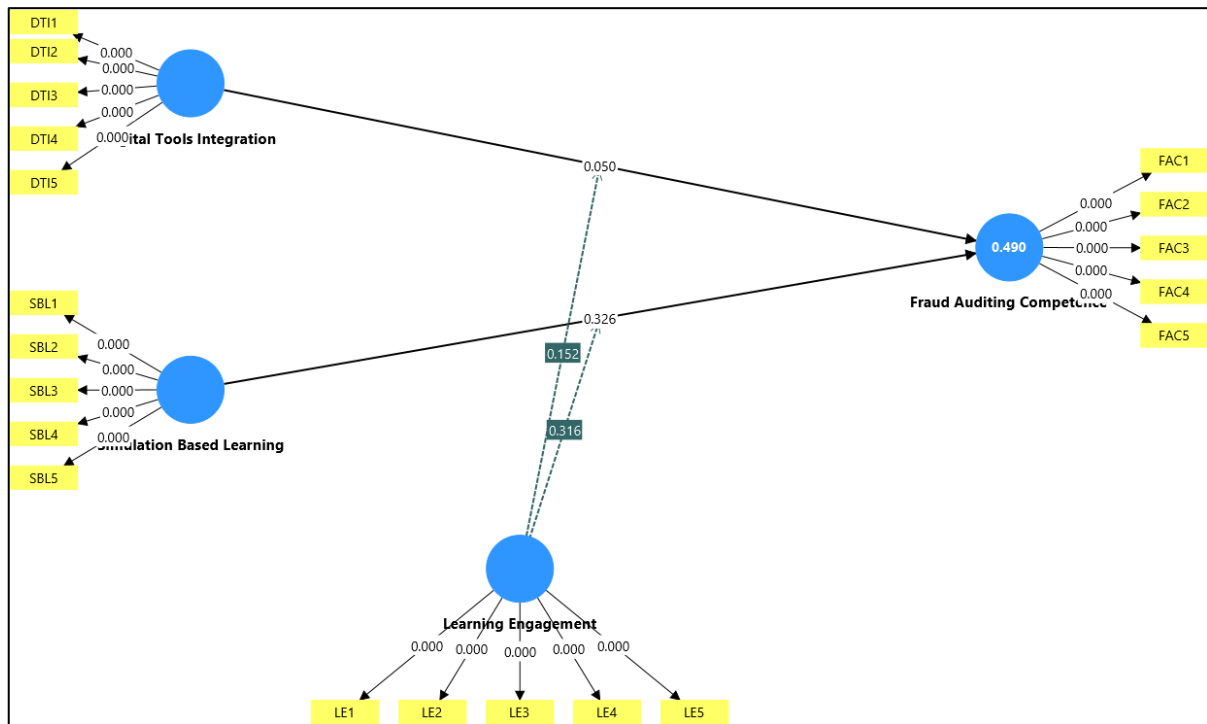
Source: Primary Data Processed, 2025

The results show that Digital Tools Integration → Fraud Auditing Competence has a positive path coefficient of 0.273, with a t-value of 1.641 and a p-value of 0.050. This finding indicates a marginally significant positive relationship, suggesting that higher levels of digital tools integration contribute to improved student competence in fraud auditing, although the effect is relatively modest. Conversely, the moderating effect of Learning Engagement × Digital Tools Integration → Fraud Auditing Competence yields a path coefficient of 0.199, with a t-value of 1.027 and p-value of 0.152, indicating that the interaction effect is not statistically significant. This means that learning engagement does not significantly strengthen or weaken the influence of digital tools integration on fraud auditing competence.

Similarly, the moderating effect of Learning Engagement × Simulation-Based Learning → Fraud Auditing Competence is negative ($\beta = -0.079$) with a t-value of 0.478 and p-value of 0.316, showing no significant moderating influence. This suggests that the interaction between learning engagement and simulation-based learning does not meaningfully affect students' fraud auditing competence. Lastly, the direct effect of Simulation-Based Learning → Fraud Auditing Competence is positive but statistically insignificant ($\beta = 0.090$, $t = 0.450$, $p = 0.326$), implying that while simulation-based learning may conceptually support competence development, its direct effect was not strong enough to reach significance in this

sample. Overall, these results indicate that only Digital Tools Integration has a direct and marginally significant impact on Fraud Auditing Competence, while Simulation-Based Learning and both moderating interactions involving Learning Engagement do not exhibit statistically significant effects. This outcome highlights that students' competence in fraud auditing is influenced primarily by the effective integration of digital tools, rather than by simulation or engagement-based moderation effects within the learning process. The hypothesis testing model can also be seen in the following figure:

Figure 2. Bootstrapping



Source: Primary Data Processed, 2025

The testing of the hypothesized relationships shows that the influence of Digital Tools Integration on Fraud Auditing Competence has an original sample (O) value of 0.273 with a p-value of 0.050. This result falls within the 5% significance threshold, suggesting that digital tools integration has a positive and significant effect on enhancing fraud auditing competence. Meanwhile, the interaction effect of Learning Engagement × Digital Tools Integration on Fraud Auditing Competence yields a p-value of 0.152, and Learning Engagement × Simulation-Based Learning on Fraud Auditing Competence produces a p-value of 0.316. Both results are statistically insignificant, indicating that Learning Engagement does not moderate the relationship between Digital Tools Integration or Simulation-Based Learning and Fraud Auditing Competence. Furthermore, the direct influence of Simulation-Based Learning on Fraud Auditing Competence is also found to be insignificant, with a p-value of 0.326. This finding implies that simulation-based learning alone does not directly enhance fraud auditing competence without strong engagement from the learners. Overall, these results indicate that Digital Tools Integration plays a dominant role in shaping fraud auditing competence among students, whereas Simulation-Based Learning and the moderating role of Learning Engagement have not demonstrated a significant influence in this study.

5. Discussion

The findings of this study provide a nuanced understanding of how digital tools integration and simulation-based learning influence students' fraud auditing competence, as well as the

moderating role of learning engagement within this relationship. Referring to the Technology Acceptance Model (TAM), Experiential Learning Theory (ELT), and Competency-Based Education (CBE) Theory, the discussion below elaborates on each hypothesis in light of theoretical perspectives and previous empirical studies.

The analysis results indicate that digital tools integration positively and significantly affects fraud auditing competence ($\beta = 0.273$; $t = 1.641$; $p = 0.050$). This finding supports the first hypothesis, confirming that the integration of technology in the learning process enhances students' ability to identify, analyze, and evaluate fraud cases effectively. According to the Technology Acceptance Model (TAM) (Davis, 1989), users perceived usefulness and ease of use determine their acceptance of technology, which in turn enhances learning outcomes. In this study, students' acceptance of digital auditing tools appears to have improved their competence in fraud auditing. This result aligns with prior studies by Alshurafat et al. (2021) and Oussii & Klibi (2020), which demonstrated that the use of digital audit tools fosters analytical and investigative capabilities in accounting education.

The relationship between simulation-based learning and fraud auditing competence, however, was found to be positive but not significant ($\beta = 0.090$; $t = 0.450$; $p = 0.326$). This finding implies that while simulations provide experiential exposure to real-world auditing scenarios, their impact may depend on how effectively they are designed and integrated into the curriculum. From the lens of Experiential Learning Theory (ELT) (Kolb, 1984), effective learning occurs through concrete experiences, reflective observation, abstract conceptualization, and active experimentation. The insignificant result suggests that not all students might have reached the reflection and application phases necessary for competence development. This is consistent with the findings of Bakar & Ismail (2020) and Rahmawati et al. (2022), who emphasized that the success of simulation-based education depends heavily on instructional design, feedback mechanisms, and students' reflective engagement.

The moderating effect of learning engagement on the relationship between digital tools integration and fraud auditing competence shows a positive but statistically insignificant influence ($\beta = 0.199$; $t = 1.027$; $p = 0.152$). Although the direction of the effect aligns with theoretical expectations, its insignificance suggests that engagement alone may not be sufficient to enhance the benefits of digital tools unless accompanied by structured pedagogical guidance. According to Competency-Based Education (CBE) Theory (Spady, 1994), competence development requires not only exposure to learning tools but also sustained engagement in goal-oriented and performance-based learning activities. These findings partially support Krause and Coates (2008), who argued that engagement contributes to deeper learning outcomes, yet the contextual factors such as assessment design and instructor facilitation play a critical mediating role.

The interaction between learning engagement and simulation-based learning also reveals an insignificant and negative relationship with fraud auditing competence ($\beta = -0.079$; $t = 0.478$; $p = 0.316$). This unexpected direction suggests a potential overreliance on simulations that might reduce analytical independence when engagement is not well guided. The result may indicate that without effective scaffolding, high engagement during simulation activities could lead to superficial participation rather than deep cognitive processing. This is consistent with Freeman et al. (2014) and Prince (2004), who found that active learning techniques require careful facilitation to ensure conceptual understanding and competence development.

The findings of this study indicate that Digital Tools Integration has a positive but statistically insignificant effect on students' Fraud Auditing Competence. This result suggests that the mere presence of digital tools in the learning process does not automatically translate into improved student competence in fraud auditing. From the lens of the Technology Acceptance Model (TAM) (Davis, 1989), such an outcome may arise due to students' relatively low perceived usefulness and perceived ease of use of digital tools. A key contextual factor that contributes to this finding is that most respondents in this study come from universities located in Eastern Indonesia, where access to stable internet connections, advanced digital infrastructure, and technology-based learning resources remains limited. Consequently, students in these regions may find it more challenging to adopt, utilize, and benefit from integrated digital systems in the learning process. As Sfenrianto et al. (2023) note, disparities in regional technological readiness within Indonesia continue to influence how effectively higher education institutions can implement digital transformation initiatives.

Similarly, the effect of Simulation-Based Learning on Fraud Auditing Competence was found to be statistically insignificant. According to Experiential Learning Theory (ELT) proposed by Kolb (1984), meaningful learning occurs when students actively engage in concrete experiences and reflective practices that allow them to apply theoretical knowledge to real-world contexts. However, in many accounting programs—particularly those in Eastern Indonesia—simulation-based pedagogies are still underutilized and not fully integrated into course curricula. This limited exposure to experiential digital simulations likely hampers students' ability to practice analytical reasoning and professional judgment in fraud auditing contexts. Prior studies, such as those by Bonner and Doran (2017) and Chiang et al. (2021), demonstrated that simulation-based learning can substantially enhance auditing competence when effectively implemented with adequate technological and instructional support—conditions that appear less developed in the context of this study.

Furthermore, the moderating effects of Learning Engagement on the relationships between Digital Tools Integration and Simulation-Based Learning with Fraud Auditing Competence were also found to be insignificant. While student engagement is a critical factor in learning effectiveness, engagement alone is insufficient when the surrounding technological and pedagogical environments are not conducive. From the perspective of Competency-Based Education (CBE) Theory, competence emerges when students can apply learned skills in demonstrable, performance-based contexts (Mulder, 2017). However, when simulation-based exercises and digital auditing tools are not deeply embedded in instructional practice, even highly engaged students struggle to develop practical competence. This observation reinforces that engagement must be supported by structured, technology-enhanced experiential learning frameworks.

Empirically, these results differ from prior studies such as Al-Htaybat and von Alberti-Alhtaybat (2017), Zakaria et al. (2020), and Susanti et al. (2022), which found that digital learning tools and simulation-based learning positively influence accounting students' cognitive engagement and auditing competence. The divergence may be explained by contextual disparities—particularly the digital divide between universities in Indonesia's western and eastern regions, where the latter face more infrastructural and pedagogical challenges in technology adoption. In this study's context, the combination of limited digital

literacy, uneven internet access, and minimal exposure to simulation-based activities may collectively dampen the potential impact of technology-driven learning approaches.

In summary, this study underscores that the success of digital and simulation-based pedagogies in enhancing fraud auditing competence depends not only on theoretical acceptance (as posited by TAM), experiential immersion (as emphasized in ELT), and demonstrable skill acquisition (as required in CBE), but also on the contextual readiness of institutions and students to adopt and sustain digital learning innovations. Therefore, improving infrastructure, strengthening faculty capacity, and institutionalizing simulation-based modules are essential steps to realize the transformative potential of digital tools in accounting education.

6. Conclusion, Implication, and Recommendation

This study provides valuable insights into the relationship between Digital Tools Integration, Simulation-Based Learning, Learning Engagement, and Students' Fraud Auditing Competence within the framework of the Technology Acceptance Model (TAM), Experiential Learning Theory (ELT), and Competency-Based Education (CBE). The findings reveal that while Digital Tools Integration demonstrates a positive yet insignificant effect on students' fraud auditing competence, Simulation-Based Learning similarly shows no significant influence. Additionally, Learning Engagement does not significantly moderate these relationships. These results suggest that the presence of digital tools and simulation-based pedagogies alone is insufficient to enhance student competence unless they are supported by contextual readiness and meaningful experiential learning opportunities. The insignificant relationships identified may be attributed to contextual disparities—most notably, the fact that a majority of respondents come from universities in Eastern Indonesia, where digital infrastructure, technological literacy, and simulation-based learning practices remain limited. Thus, the findings emphasize that successful technology-based learning depends not only on perceived usefulness and ease of use (as posited by TAM) but also on institutional readiness and pedagogical integration (as highlighted by ELT and CBE).

Theoretically, this study enriches the Technology Acceptance Model (TAM) by extending its application to the domain of fraud auditing education, offering empirical support that perceived ease of use plays a more pivotal role than perceived usefulness in shaping students' competence development. This aligns with prior studies on technology adoption (e.g., Davis, 1989; Al-Htaybat & von Alberti-Alhtaybat, 2017) that emphasize usability as a critical determinant of learning outcomes in digital contexts. From the perspective of Experiential Learning Theory (ELT), the study implies that without active engagement in realistic, practice-oriented simulations, students struggle to translate theoretical knowledge into professional competence. Likewise, based on Competency-Based Education (CBE), the development of auditing skills requires repetitive, performance-based learning experiences that go beyond traditional classroom teaching. Practically, the results underscore the importance of regional digital inclusion in higher education. Institutions in Eastern Indonesia, in particular, need stronger investment in technological infrastructure, digital training for educators, and curriculum redesign to integrate simulation-based learning. Without such foundational support, the full potential of digital learning innovations in accounting education cannot be realized.

Based on the findings and implications, several recommendations are proposed:

1. Institutional Strengthening. Universities, especially those in Eastern Indonesia, should prioritize digital infrastructure development and provide continuous training for educators to enhance the effectiveness of digital and simulation-based learning tools.
2. Curriculum Integration. Accounting and auditing programs should embed simulation-based modules that reflect real-world fraud scenarios to promote experiential and competency-based learning outcomes, consistent with ELT and CBE principles.
3. Policy Support. Government and educational authorities should develop targeted policies that reduce regional disparities in technology adoption through funding, training programs, and digital transformation initiatives in higher education.
4. Future Research. Further studies should explore mediating and contextual factors—such as digital literacy, institutional readiness, and teaching effectiveness—that may strengthen the link between digital tools, engagement, and competence. Expanding the sample beyond Eastern Indonesia would also enhance the generalizability of the findings.

In summary, this research contributes to both theory and practice by highlighting that technological integration in education must go hand in hand with pedagogical innovation and contextual readiness. While the Technology Acceptance Model remains relevant, its successful implementation in developing regions requires deeper alignment with experiential and competency-based learning approaches to truly enhance students' professional auditing competence.

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