International Journal of Education and Practice
2026 Vol. 14, No. 4, pp. 42-56
ISSN(e): 2310-3868
ISSN(p): 2311-6897
DOI: 10.18488/61.v14i4.5099

Integrating emerging technologies into internal auditing education: Insights from academia and industry

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Article History
Received: 12 February 2026
Revised: 23 April 2026
Accepted: 31 July 2026
Published: 18 August 2026

Keywords
Academia insights
Auditing curricula
Digital pedagogies
Emerging technologies
Industry expectation.

ABSTRACT

Swift advancement of technology, which includes artificial intelligence (AI), data analytics, robotic process automation (RPA), and blockchain, demands an immediate transformative advancement in the curriculum of internal auditing. Following a qualitative research approach, this study sought to examine academics' and industry perspectives regarding integrating emerging technologies into the internal auditing syllabus. Semi-structured interviews were used to collect data, and thematic analysis was employed to analyse the data. The findings of this study have revealed a mutual agreement between lecturers and industry experts regarding the importance of integrating emerging technology advancements into the internal auditing syllabus. The results also noted various challenges that limit the universities from integrating these digital competencies. Implementation readiness and resource capacity. Furthermore, the findings revealed a need for new pedagogical strategies, alignment of expectations, collaboration, and resource sharing. These findings have implications for academia, industry, policymakers, and professional bodies. There is an urgent need for curricular reconfiguration in the internal auditing syllabus to reflect the digital transformation of the profession. This study contributes to the growing body of literature regarding digital transformation imperatives. To ensure the institutions of higher learning in South Africa continue to meet the needs or demands of the auditing firms. Thus, encouraging universities to produce future-ready internal auditing graduates.

Contribution/Originality: This study adds to Technological Pedagogical Content Knowledge. This study closes the gap between what auditing students are taught and what the industry expects. This study posits the integration of emerging technologies into the internal auditing curriculum to improve their employability.

1. INTRODUCTION

1.1. Background and Context

The internal auditing function (IAF) is known for its vital role in enhancing institutional governance and risk management, and providing some level of assurance that institutional objectives are met. It is IAF's traditional role to conduct risk assessment and evaluation, internal control evaluation and monitor compliance mechanisms. However, the rapid developments in emerging technologies such as artificial intelligence (AI), blockchain, and automation are demanding an integration of the historical auditing role into a digital integrated. As a result, there is a growing need for internal auditors to acquire digital skills and competences, which will enable them to conduct their role beyond traditional education standards, to include technological acumen essential for navigating this new environment.

The way audits are going to be conducted is significantly influenced by the adoption of these emerging technologies. Take, for instance, the blockchain technology, it basically modifies the audit trail that the users are relying on by providing a secure and transparent transaction documentation (Schmitz & Leoni, 2019). These emerging technologies require auditors to acquire skills and competencies necessary to effectively evaluate the implications of these technologies within the institutions they serve. Schmitz and Leoni (2019) assert that integrating blockchain into auditing processes redefines the future research agenda, which bears a need to adapt traditional frameworks to accommodate these innovations. Moreover, while scholars have noted the importance of these technologies in improving timeliness and enhancing audit quality, there is also a concern over challenges that come with the complexity and supposed opacity of AI systems, poses a potential disconnect with traditional auditing practices and principles (Seethamraju & Hecimovic, 2023).

Furthermore, AI goes beyond simplifying data analysis procedures to projecting insights that might considerably enhance risk assessment capabilities. According to Hasan (2022), integrating AI digital tools in auditing can enhance accuracy and efficiency; this necessitates a need for continued collaboration between lecturers and industry experts to equip future auditors with the necessary skills to meet this demand. This notion is affirmed by Luan et al. (2020), stating that the trends of using big data and AI in educational frameworks solidify their relevance in auditor training procedures.

Even though the importance of these technologies is undeniable, there is still an existing gap between what future auditors are taught at South African universities and the skills that are demanded by digital environments. As illustrated by Clohessy and Acton (2019), there is limited emphasis on the importance of emerging technologies in historical accounting syllabi, resulting in a disconnect between the theory learned and the competencies required in practice. This misalignment may potentially result in universities producing underprepared graduates for the corporate world, as they would be lacking the prerequisite skills and competencies for working with AI, blockchain, and data analytics. Institutions are now gradually prioritising tech-driven activities in their operational frameworks, which indicates the importance of bridging the gap.

Perhaps the first step in closing this gap would be requiring universities in South Africa to revise their curriculum to reflect emerging technologies and training skills for future auditors. Fülöp et al. (2022) affirm this notion by stating that it is undeniable that digitalisation is rapidly reshaping the pathway for accounting and auditing; universities must adapt to these advancements to remain relevant. Therefore, integrating digital skills into the auditing syllabus is paramount; for instance, having an auditing syllabus that incorporates case studies on how to work with AI and blockchain could provide students with practical insights, ultimately provide an extensive learning experience, and improve the employability of future auditors in an evolving marketplace.

In conclusion, technological advancement is suggestively reshaping the traditional pathway of internal auditing. As a result, there is a need to align the skills and competencies required from future auditors. Such alignment will enable auditors to effectively integrate AI, blockchain, and process automation into auditing practice. The importance of integrating these emerging technologies into auditing practices can never be overemphasized, more especially in relation to enhancing risk management and efficiency; equally so, there are complexities that cannot be ignored, which must be understood and navigated thoroughly. Future generations of auditors must be prepared in accordance with the industry demands and expectations, thus equipping auditors to be proficient in dealing with challenges posed by an increasingly digital landscape.

1.2. Problem Statement

Many companies are now slowly digitalising their operation, risk assessment, controls, and auditing methodologies are changing to accommodate technology developments required by emerging technologies. Data analytics and AI, for example, offer a more proactive audit approach by assisting auditors to effectively recognise unusual patterns before they can become a problem (Sousa, 2026; Zhao, 2024). With the application of these emerging

technologies, auditors can focus on areas that have extensive analytical work because there is robotic process automation that streamlines repetitive transactions and flags them (Essien, 2023). There is also blockchain technology, which is critical for the auditing process by enhancing the reliability and integrity of data (Ali, Khattak, Rabbani, Hussian, & Mateen, 2025). More businesses are gravitating towards using continuous auditing solutions, which provide them with real-time assessment and instant remedial solutions (Liu, Wang, Liu, & Qu, 2023).

The integration of these emerging technologies into the internal auditing process comes with a set of competences that are crucial for auditors to have. Auditors are now required to also be proficient in the application of these progressive analytical tools and techniques (Alzadjali, Adedeji, & Adwan, 2023).

Even though there is an agreement in the literature regarding the importance of these technological skills, scholars are worried that universities are not keeping pace with auditing education with these technological advancements. The majority of universities continue to teach auditing students only theoretical auditing, even though the industry requires graduates to be taught about the simulative application of emerging technologies (Prasetio, Sobandi, & Mulyani, 2025). According to the literature, auditing graduates are lacking practical experience related to the use of emerging technologies; as result they are underprepared for the market (Essien, 2023). There is a misalignment of expectations, auditing students are equipped with traditional auditing principles and frameworks, while the industry expects graduates with hands-on experience of emerging auditing technologies. This highlights a significant competence gap, which directly affects the employability of new auditing graduates.

1.3. Purpose and Research Objectives

The purpose of this study was to propose the integration of emerging technologies into internal auditing education to ensure auditing graduates meet industry expectations. Ultimately, enhance auditing graduate employability. Therefore, this study seeks to meet the following objectives:

RO1: To establish industry expectations of internal auditing graduates in the digitised working environment.

RO2: To align auditing education with the industry expectations for employability of auditing graduates.

RO3: To confirm challenges and opportunities for aligning auditing curriculum with industry needs.

2. LITERATURE REVIEW

2.1. Emerging Technologies in Auditing Practice

AI, machine learning, and data analytics are recognised as emerging technologies that have significantly transformed auditing procedures, providing auditors the ability to perform more comprehensive and predictive assurance activities. This advancement enhances efficiency and accuracy, which requires a shift in auditing methodologies.

2.1.1. Enhanced Auditing Capabilities

With the capabilities of AI and machine learning, auditors may engage in extensive data analysis, surpassing traditional methods. Issa, Sun, and Vasarhelyi (2016) state that it is important to enhance accuracy and comprehensiveness of auditing procedures using AI's potential to support big data analytics widely. These technologies improve assurance outcomes as they provide auditors with the ability to conduct comprehensive data testing as opposed to relying on sampling techniques (Kend & Nguyen, 2020). Furthermore, the use of AI applications that can process huge amounts of data allows for an early detection of risk and patterns that would be impossible for an auditor to identify alone (Fedyk, Hodson, Khimich, & Fedyk, 2022).

Nothing that the auditor's judgment is greatly influenced by results of data analysis, which makes data analytics a crucial technology. Research conducted by Sihombing, Narsa, and Harymawan (2023) established that the way auditors evaluate audit risks is mostly influenced by data analytics. This assists auditors to focus on areas that are highly susceptible to risk and developing controls to curb potential flaws in financial reporting (Sihombing et al.,

2023). The importance of adopting these emerging technologies is shared in the study conducted by Kend and Nguyen (2020), which cautions that the failure to adapt to these emerging technologies could lead to existing firms being undermined by tech-savvy competitors.

2.1.2. Predictive Insights through Advanced Analytics

The use of projective analytics has gained importance within the auditing field. Auditors can predict areas with potential risk and fraud using insights that are generated by analytical tools, which are equipped with machine learning abilities (Fedyk et al., 2022). Fedyk et al. (2022) further mentioned that auditing processes are enhanced using systematic machine learning, which generates more reliable forecasts related to various audit outcomes. The capability of this forecast is vital in assisting auditors to detect potential risks before they come into existence, thus being proactive rather than being reactive.

Lastly, the use of machine learning and data analytics provides more rigorous audit frameworks, as indicated by Al-Ateeq, Sawan, Al-Hajaya, Altarawneh, and Al-Makhadmeh (2022). The perception and attitude of auditors regarding the adoption of these emerging technologies into their audit practices is shaped by the redefined role of data analytics (Al-Ateeq et al., 2022).

2.2. Internal Auditing Education

Internal auditing assumes an important role that enhances corporate governance and risk management. The Committee of Sponsoring Organisations of the Treadway Commission (COSO), risk assessments, and compliance standards are frameworks that guide their operations. However, the emphasis on auditing tools such as technical skills in programming, innovative analytics, and proficiency is still lacking (Awuah, Onumah, & Duho, 2022). This is also evident in the current auditing curriculum, as much as it fairly covers important aspects of auditing, it also lacks the integration of emerging technologies into auditing processes, which raises alarm about readiness and employability of new auditors in a digital business environment (Abou-El-Sood, Kotb, & Allam, 2015).

2.2.1. Traditional Focus vs. Technological Integration

The current internal auditing curriculum is lacking the integration of necessary technical competencies related to emerging technologies; in essence, the curriculum is mainly prioritising frameworks and standard compliance. According to Abou-El-Sood et al. (2015), even discussions by audit frameworks such as COSO are fairly falling short in addressing the importance of integrating innovative analytical skills and programming capabilities into auditing curriculum. As a result, various internal audit units remain unequipped with the skills and competencies required to function in a digital business environment, despite scholars indicating that the effectiveness of internal audit functions can be enhanced through technological tools (Awuah et al., 2022; Barta & Görcsi, 2021).

Furthermore, the studies conducted by Abdullah, Ismail, and Smith (2018) and Oussii and Boulila (2021) have affirmed the necessity for auditors to be competent in the use of modern auditing software, this is because technical knowledge of auditors significantly affects audit quality and effectiveness as much as their management with audit committee does. It is important for auditors to become proficient in these emerging technologies and their methodologies, especially in a business environment where technology is used to detect fraud and conduct risk assessment (Barta & Görcsi, 2021).

2.2.2. Call for Improvement and Future Directions

The auditors are now expected to acquire digital skills and competencies necessary for their auditing activities and to keep up with the evolving dynamics of the business world. The integration of emerging technologies into the auditing process is noted by previous scholars as another means of improving the employability of auditing graduates and boosting audit effectiveness (Asiedu & Deffor, 2017). The study conducted by Awuah et al. (2022) indicates that

emerging technologies related to computer-assisted audit have gained prominence, especially in areas that are vital for the attainment of operational objectives, for instance, fraud detection. To ensure the auditing profession remains relevant, complexity related to the adoption of these technologies must be addressed through integration into educational curriculum (Abou-El-Sood et al., 2015).

Internal auditing frameworks play a crucial role in guiding the operations of auditing profession; therefore, it is paramount to align the integration of emerging technologies into auditing curriculum with the frameworks. The internal auditing syllabus should teach future auditors how to apply these technology advancements within the perimeters of auditing frameworks to assess and analyse risks. The various scholars agree that the adoption of these emerging technologies is significantly improving the operations of internal auditing units, supporting the need to integrate them into the auditing curriculum and balance traditional audit expertise with technological competence.

2.3. Bridging Academia and Industry Gap

There is an existing gap between what auditors are taught at universities and the practical skills and competencies the industry expects from auditing graduates. This misalignment poses a serious challenge that limits the employability of auditing graduates, as the industry considers them underprepared. Previous scholars have indicated this significant deficiency in offering auditing students technology-based practical case studies (Dagilienė & Klovienė, 2019; Kend & Nguyen, 2020). The study conducted by Kend and Nguyen (2020) suggested that this persistent gap reflects constraints that academia is faced with in relation to the curriculum and the transition from academic settings to professional environments (Kend & Nguyen, 2020).

2.3.1. Gap in Technology-Based Auditing Skills

The computer-assisted audit tools and techniques (CAATTs) are one of the technology-based auditing practices, which are crucial in the digital auditing process; however, industry reports suggest that auditing graduate are lacking practical experience of CAATTs. These tools and techniques assist auditors in successfully conducting specific audit functions, including data extraction and analysis (Awuah et al., 2022). Dagilienė and Klovienė (2019) highlight the importance of big data and analytics in rethinking auditing and improving auditor competencies. There is a growing need for digital skills and competences as documented by Kend and Nguyen (2020), who note that auditing landscape is rapidly reshaped by new developments in big data analytics and AI, which ultimately requires a new skill set among auditors.

Underprepared auditing graduates are forcing auditing firms to invest additional resources in training them as a result of inadequacy in practical teaching; this often results in a greater number of unemployable graduates (Tarek, Mohamed, Hussain, & Basuony, 2017). The urgency of auditing curriculum that is integrated with emerging technologies is eminent. It is mandatory for universities to offer an auditing curriculum that is integrated with emerging technologies to ensure graduates' employability (Dagilienė & Klovienė, 2019).

2.3.2. Constraints in Academic Curriculum

There is a pressing challenge of curriculum overload, which sometimes makes it extremely difficult for universities to easily adapt to evolving industry needs. This overload exhausts lecturers and creates an overwhelming feeling, noting existing module content and expectations, which discourage interest in integrating emerging technologies into their content (Tarek et al., 2017). As indicated by Tarek et al. (2017), future auditors must be equipped with emerging technology skills and competencies, further emphasising the imminent need for a curriculum that has structured practical training from the beginning. Furthermore, the regulatory and legislative compliance expectations pose a significant challenge to how audit strategies are developed, ultimately making it difficult to integrate technology-infused auditing training programmes (Kend & Nguyen, 2020).

Nothing the above constraints and serious implications, which seek to suggest auditing graduates are underprepared, it is paramount important for universities to provide curriculum that is integrated with emerging technologies to balance comprehensive traditional knowledge with practical competences in the use of technology applications. The universities should align their programmes with business expectations and improve faculty expertise on the application of advanced technologies, including robotics and data analytics (Kend & Nguyen, 2020).

2.4. Technological Pedagogical Content Knowledge (TPACK) Framework

This study has adopted the technological pedagogical content knowledge (TPACK) framework to understand the integration of emerging technologies into auditing education. The TPACK offers a comprehensive method for incorporating emerging technologies into the renewal of internal auditing curriculum. The TPACK further guides towards establishing a thoughtful connection between pedagogy, content, and technology. Such connection is vital and assists lecturers to realise that integration of emerging technologies goes beyond just including them in the curriculum, it actually changes how the lessons are conducted in a lecture.

2.4.1. The Shift from Superficial Tool Inclusion to Curriculum Redesign

One of the major implications of the TPACK is to require a complete curriculum redesign approach when integrating technology; it does not support superficial inclusion of digital tools. The universities must ensure that lecturing practices adapt to ensure effective alignment of these technologies with learning outcomes. For instance, Frangou, Länsman, and Keskitalo (2023) affirm the importance of studying the relationship between these domains within a specific context when there is a significant change in digital and remote areas. Especially in rural universities such as some of the South African universities. This suggests that the potential benefits of emerging technologies can only be realised when technological understanding is deeply integrated into pedagogical strategies and content.

Furthermore, the study conducted by Galindo (2023) demonstrated a substantial relationship between lecturers' technological competencies and their abilities to effectively apply instructional approaches through TPCK. This relationship indicates that successful integration of emerging technologies requires more than just being familiar with one tool; however, a comprehensive understanding of how this integration can improve auditing curriculum, supporting the redesign, which extend beyond integration of technologies.

2.4.2. Importance of Lecturer's Technological Competence

The successful integration of these technological tools into lecturing practice depends on the competencies of a lecturer in applying emerging technologies. The lecturers who are skilled and proficient in the application of digital tools stand a better chance of navigating inherent challenges that arise from integrating technologies into their lecturing practices. For instance, Ebow and Ackon (2020) affirm that a robust understanding of how to apply numerous digital tools and methods results in an effective integration of technological tools with lecturing approaches (Ebow & Ackon, 2020). In support of this assertion, the study by Taopan, Drajati, and Sumardi (2020) which adds that understanding the TPACK. This assertion is further supported by the findings of who clarifies that understanding the TPACK equips lecturers with valuable information to design, assess, and integrate emerging technologies into the auditing curriculum.

2.4.3. Addressing Academics' Challenges

The insights into the hindrances that are experienced by lecturers in relation to expertise and university constraints are illustrated using the TPACK framework. Foulger (2023) suggests that an organised, technology-infused preparation program based on TPACK can help to solve these hindrances by making sure that all lecturers at the beginning of their employment get a thorough training on how to apply emerging technologies in their lecture

rooms. This systematic approach improves lecturers' confidence and assists them mitigate the feelings curriculum overload, allowing lecturers to choose and use technological tools relevant to their needs and lecturing objectives.

Moreover, Naz, Hani, and Muhammad (2020) claim that understanding a lecturer's proficiency in the application digital tools is a crucial element that is supported by TPACK; it assists lecturers to navigate hindrances related to effectively lecturing in a technology-advanced environment (Naz et al., 2020). Overall, this study underscores the importance of TPACK in improving lecturers' flexibility and efficiency in an evolving demand for integrating emerging technologies into the auditing curriculum.

2.5. Synthesis and Research Gap

Even though there are undeniable developments in technology that require the auditing profession to adapt, auditing education remains stagnant. The auditing curriculum in various universities mostly covers historical auditing frameworks, governance principles, and compliance with regulatory frameworks. Limited attention is given to technological competencies that are required by the contemporary auditing environment. This has caused a disconnect between academic preparation and the skills and competencies the industry needs. Majority of auditing firms are increasingly requiring internal auditing graduates who possess practical competencies in the use of data analytical tools, IA-assisted audit methods, and automated data analysis. However, many graduates entering the profession require on employment training due to limited exposure to digital auditing tools. The employers often incur additional costs of employing these graduates because of the need to bridge the existing competency gap. Although there are current studies which acknowledge the importance of embedding digital skills into auditing education. There is a scarcity of empirical studies assessing how universities should effectively align internal auditing curriculum with the skills required by the industry. Therefore, this study intends to fill this gap.

3. METHODOLOGY

3.1. Research Design

This study has followed a qualitative research approach. This was to extract a deeper understanding of work experiences of lecturers and industry experts regarding integration of emerging technologies in auditing curriculum. The study is underpinned by three criteria: (1) participants' identity as university lecturers and chief audit executives (CAE), (2) lecturing internal auditing or CAE with intensive experience in technology integration, and (3) producing internal auditing graduates and employing internal auditing graduates in an auditing environment.

This study is theoretically intersected by three key elements of the TPACK framework: Content Knowledge (Governance frameworks, risk assessment, and principles of internal auditing), Pedagogical Knowledge (Lecturing approach and learning strategies), and Technological Knowledge (competence in the use of digital auditing tools and systems). The interview question design was informed by these elements, including thematic coding of lecturers' and industry professionals' narratives and organised data interpretations. By drawing on TPACK in this manner, this study intends to close the gap between what auditing students are taught and what the industry expects.

3.2. Participants

This study sample frame consists of selected South African universities that are offering an internal auditing qualification. With over 5 000 students across selected universities in South Africa. These universities are still equipping internal auditing students with traditional auditing theoretical frameworks and principles, and are neglecting technological advancements. The study also sampled Chief Audit Executives with extensive experience in technology integration. To ensure a proper selection of respondents, the purposive sampling method was used. This resulted in the selection of 25 participants, which comprises: 12 internal auditing lecturers from universities in South Africa and internationally, and 13 Chief Audit Executives with extensive experience in technology integration from global organizations. The purposive sampling was selected to ensure that participants possessed relevant lecturer

experience in auditing or technological integration. The demographics of participants are further illustrated in Table 1.

Table 1. Demographics of participants.

Designation	Qualification	Years of experience
Senior lecturer (CASA)	Master's in Accountancy	10 years
Senior lecturer (HoD)	PhD in Accountancy	17 years
Lecturer	PhD in Accountancy	20 years
Lecturer	Master's in Auditing	12 years
Lecturer (CASA)	Master's in Accountancy	11 years
Lecturer	PhD in Auditing	5 years
Lecturer (CASA)	PGdip in Accounting Sciences	7 years
Lecturer	Master's in Auditing	18 years
Lecturer	Master's in Auditing	8 years
Lecturer	Master's in Auditing	4 years
Lecturer	Master's in Auditing	6 years
Lecturer	Master's in Auditing	9 Years
Chief audit executive	PhD in Accounting Sciences	12 Years
Chief audit executive	Post Grad diploma: Auditing	15 years
Chief audit executive	Post Gad diploma, MBA	16 years
Chief audit executive	Bcom Hons in Auditing	10 years
Chief audit executive	Bcom Hons in Auditing	8 years
Chief audit executive	Bcom Hons in Auditing	9 years
Chief audit executive	Bcom Hons in Auditing	5 Years
Chief audit executive	Bcom Hons in Auditing	11 years
Chief audit executive	Bcom Hons in Auditing	7 years
Chief audit executive	PhD candidate	5 years
Chief audit executive	PhD candidate	6 years
Chief audit executive	PhD candidate	4 years
Chief audit executive	PhD candidate	3 years

All these participants have extensive knowledge of internal auditing. The participants are also aware of technological advancements that require an enhanced set of skills and competencies in the contemporary internal auditing market.

3.3. Data Collection

To gather comprehensive insights about integration of digital auditing tools into internal auditing curriculum, data was collected from two complementary sources (Accademia and auditing firm). The data collection instrument that was used for this study was semi-structured interviews. The interviews were conducted over Microsoft Teams, and each interview lasted approximately 40–60 minutes. The interview themes were established as follows: Current curriculum content related to technology, Perceptions of essential technological competencies, Challenges in teaching and applying technology, and Collaboration between academia and industry

3.4. Data Analysis

The data of this study were analysed using thematic method. This study also followed Braun and Clarke (2006) thematic analysis steps, which include: familiarization, theme identification, review, definition, and reporting. The free version of ChatGPT was only used to establish data themes. All the respondents' answers were uploaded to the free version, and a prompt to develop research themes from the answers was used. The output was further analysed to eliminate errors, and its accuracy was confirmed. After familiarization and initial coding, categories were refined and interpreted through the lens of TPACK. The main themes reflected recognition of technological importance, curriculum integration challenges, pedagogical Strategies, misalignment of expectations, collaboration and resource sharing, and faculty development needs.

4. FINDINGS AND ANALYSIS

Thematic analysis revealed six main themes.

4.1. Recognition of Technological Importance

All the participants acknowledged that internal auditing is currently redefined by emerging technologies. The industry professional further stressed the practical use of emerging technologies, while academia is still teaching theoretical auditing principles.

"*Look, digital auditing tools are no longer optional. I mean, it is crucial for effectiveness of audits. These tools offer more than improving audit effectiveness and timelines; they put the profession at the centre of innovation, resilience, and informed decision maker with the firm.*" – Industry participant (#1)

"*Internal auditing curriculum should incorporate digital auditing tools such as data analytics, audit management software, AI, robotic process automation, machine learning, and cloud-based platforms" – Lecturer participant (#9)*

"*There are automated tasks that handle voluminous amounts of data that students need to know how to apply in auditing context. Most importantly, they need to learn how this tool improves risk assessment, thus enhancing accuracy, efficiency, and completeness of audits*" – Lecturer participant (#2)

4.2. Curriculum Integration Challenges

Lecturers have reported that there are limitations that prevent effective integration of emerging technologies into auditing education, such as limited resources, inadequate expertise, and rigid curriculum structures.

"*We want to teach data analytics, but our faculty lack training and time.*" – Lecturer participant (#3)

"*There is a lack of adequate review of the curriculum, lack of training of those responsible to review, lack of budget to capacitate the infrastructure, electricity outages, student protests, and lack of venues*" – Lecturer participant (#11)

"*Related expenses are significantly high, and resources are somewhat restricted; there are also uncertainties around complying with related regulations and ethics*" – Lecturer participant (#5)

The industry experts stress the limited integration of digital auditing tools into internal auditing education, budget and resource constraints, limited lecturers with digital auditing tool competence, and inadequate academia and industry partnership.

"Many universities are confronted with budget and resource constraints, which makes it difficult to successfully infuse digital content into internal auditing curriculum renewal. The budget constraints also make it challenging to buy necessary digital auditing tools and software licenses needed for practical training of students."

One of the challenges we are facing is a shortage of lecturers with both traditional auditing frameworks, principles, and digital technology expertise. I mean it this affects quality output of instruction. Another hurdle related to the updating of curriculum, the approval processes a quite long, after first approval, the course can only be update when it's due for review, which is after 5 years. Keeping pace with rapidly evolving technologies proved rather challenging.

"This now became one of reasons there is currently limited partnership between the university and auditing firms, which disadvantages students and opportunity to gain valuable insights into the real-world digital audit environment. As the university, we need to attract more strategic investments, forge partnerships, and review the curriculum to align auditing syllabus with emerging technologies in the profession." – Industry participant (#5)

4.3. Pedagogical Strategies

Respondents have identified the following strategies for technology integration: project-based learning, partnerships with audit firms, guest lectures from practitioners, and simulated audit environments.

The project-based learning offers students an experiential learning opportunity where students are given an opportunity to work on real-world auditing case studies. This will improve critical thinking of students and enhance their practical skills.

One of the best methods for enhancing the curriculum is to collaborate with the industry in which the students are prepared. In the case of integrating emerging technologies into auditing curriculum, a collaboration between universities and auditing firms will be beneficial. Such collaboration stands to provide access and insights into current digital auditing tools used by auditing firms when conducting their audits, ultimately improving their curriculum.

Another effective strategy to enhance auditing curriculum is to incorporate guest lectures from auditing industry and other universities that have integrated technology. The guest speakers will provide practical examples of the real-world application of auditing digital tools and competencies required in the profession. This interaction gives students exposure to the current software, technologies, and processes that are being used in the auditing field.

The final proposed pedagogical strategy to enhance the internal auditing syllabus is the simulated auditing curriculum. This type of curriculum enables students to engage with emerging technologies in a controlled environment. The simulations could easily duplicate real-world auditing case studies, thus providing insights into the complications that are prevalent in the auditing practice currently. These pedagogical strategies are further illustrated in Figure 1.

Figure 1. Pedagogical strategies.

4.4. Misalignment of Expectations

There is an existing gap between what universities are teaching auditing students and the industry's expectation of curriculum that should be taught to students. The industry experts are now expecting graduates with more hands-on practical experience, and universities are still lacking in that part.

"*Internal auditing graduate skills must continue to be enhanced, infusing digital competence to remain relevant and effective in the digitally driven business. Such competence should be aligned to mitigate evolving risks, governance expectations and their systems.*" – Industry participant (#3).

"*Graduates should at least be equipped with data analytics and real-time auditing. Currently, they are being taught theoretical aspects of major business cycles, namely revenue and receipts, recruitment and payroll; this needs to be enhanced, maybe by a simulated practical scenario, which is not currently the case.* – Industry participant (#13).

"*The universities should at least incorporate practicals for data analytics and literacy in trying to bridge this expectation gap to meet industry needs. Also, emerging technologies such as machine learning and AI as part of internal auditing curriculum.*" – Lecturer participant (#7).

4.5. Collaboration and Resource Sharing

All the respondents have acknowledged the importance of collaboration: with industry experts considering bringing real-world scenarios and access to auditing technological tools, and academics providing research and theoretical grounding.

4.6. Faculty Development Needs

There is a need for continuous training to equip lecturers with emerging technological skills and competencies to keep up with rapidly evolving digital auditing technologies and practices.

"*I think I should speak for the majority; we need professional standards to guide our digital skills and competences we need, or distributed guidelines and the early mentioned collaborating with institutions that are currently digitalised auditing, to equip us with the necessary skills and competences*" – Lecturer participant (#6).

5. DISCUSSION

5.1. Integrating Theory and Practice

The findings of this study revealed a gap between what lecturers are teaching auditing students and the industry's expectations. The current curriculum of auditing is putting more emphasis on traditional frameworks, yet the industry requires auditing graduates who are skilled in the application of emerging technologies. In closing this gap, universities should redesign the auditing curriculum to offer a more balanced content integrated with practical technological skills.

5.2. Curriculum Framework Proposal

Steaming from the above thematic themes, this study suggests a technology-infused curriculum framework that includes: Core Concepts: foundational auditing standards and risk frameworks; Technology Modules: teach auditing students the application of AI, data analytics, and blockchain fundamentals; Applied Practicum: real-world case studies, audit software labs; Industry Mentorship: a collaboration of universities with auditing firms, which will offer students vacation work.

6. IMPLICATIONS

6.1. Academia Implication

This study underlines the urgent need for updating internal auditing curriculum to reflect emerging technologies as part of digital transformation of the profession. There is an agreement in literature regarding the importance of emerging technologies. However, despite this agreement, the findings of this study have revealed that the current auditing curriculum remains more theory-based with limited practical orientation, resulting in a mismatch with audit firms' expectations.

This calls for universities to immediately adopt embedded, scaffolded integration of emerging technologies such as AI, data analytics, and blockchain fundamentals into internal auditing curriculum context. The universities should focus this integration on emphasising applied data analytics, such as to understand the meanings of analytics results in relation to the evaluation of risk, audit planning, and for conducting the actual audits. It is against this background the study suggests teaching methods that support project-based learning, simulated auditing lessons, real world practical case studies to close that gap between what auditing students are taught and the practical competence industry requires.

The study results also highlight the need for capacity building of faculty employees. The universities should focus more on continuous professional development of academics. In doing so, university may consider enrolling lecturers in short courses and training on emerging technologies, where certificates may be awarded to competent academics. To leverage and sustain curriculum reforms, the universities should invest in training faculty academics. Lastly,

universities might need to review their lengthy curriculum approval processes so that they can quickly make changes in response to emerging audit technologies.

6.2. Industry Implication

The findings of this study suggest a need for collaboration between universities and industry regarding the alignment of what universities are offering and industry expectations. This will give the industry a more active role in shaping audit curriculum context and ensuring graduate readiness. The prevalent gap revealed by this study suggests an imminent need for extensive academic-industry partnerships, which will ultimately provide more access to real-world auditing case studies.

The academic-industry partnership can easily contribute by facilitating the process of having industry experts as guest lecturers, short learning training programmes, offering graduate trainees, and vacation work that would expose students to a real-world digital environment. The audit firm can even share non-confidential auditing data, allowing students limited access but impactful practical experience on the use of emerging technological auditing tools (e.g., ACL, IDEA, analytics dashboards). This would ultimately improve graduate readiness and meet industry expectations.

Furthermore, professional bodies such as the Institute of Internal Auditors may assist universities by providing guidance and establishing a practice-informed digital auditing framework, detailing required minimum digital competency for auditing graduate trainees. This assistance is going to reduce the training cost that auditing firm would incur in training auditing trainees on the use of digital auditing tool. Ultimately, enhances employability of auditing graduates.

6.3. Policymakers and Professional Bodies Implications

The findings of this study suggest the establishment of an informed policy to support digital transformation of internal auditing curriculum. Both the university quality assurance committee and policymakers should understand that the current auditing curriculum syllabus does not adequately address the technology-driven auditing environment. As such, these bodies must advocate for flexible, technology-infused accreditation frameworks.

Regulators and professional bodies should exercise their vital role and establish clear digital proficiency standards, provide guidelines and accreditation aligned with a technology-infused auditing curriculum. There should be well-coordinated initiatives across industry, universities, policymakers and regulators aimed at ensuring internal auditing graduates are well prepared and equipped with digital auditing tools to improve audit quality, institutional sustainability and public trust.

7. LIMITATIONS

The participants of this study were limited to 25 members. The study lacks generalizability due to employing a qualitative method only. The study was predominantly conducted within selected South African universities; therefore, it may not reflect the global curriculum context. Future research should consider a larger sample and perhaps employ mixed research methods to assess competency outcomes. Lastly, future research could consider conducting a triangulated research study that compares the global auditing curriculum with that of South African universities.

8. CONCLUSION

This study examined the alignment of internal auditing curriculum with the emerging technologies with the selected universities in South Africa. Drawing from academia and industry experts' insights, the study examined how internal auditing graduates are prepared for a digitalised auditing environment by South African universities. The results of this study confirmed an existing agreement that emerging technologies like AI, data analytics, robotic

process automation, and other digital auditing systems are fundamental to the digitalised auditing environment. There is, however, still an existing gap between university preparation and audit firm experience, despite this recognition.

The findings further demonstrated that the current internal auditing curriculum covers mostly conceptual and theoretical knowledge despite the growing need for graduates with practical digital skills. The study further highlighted institutional constraints within universities, such as limited resources, inadequate faculty digital tools expertise, that are preventing effective integration of emerging technologies into auditing curriculum. These issues are perpetuated even further by the lack of collaboration between universities and surrounding auditing firms.

To close this gap, the results suggested potential pedagogical strategies, namely: project-based learning, simulated auditing lessons and university-industry partnership. The study suggested that universities should invest in training and development of academia to prepare for a sustainable curriculum transformation. In the absence of competent educators and a policy framework, integration of emerging technologies into the auditing curriculum will be futile.

Overall, the findings of this study provide empirical evidence of an existing gap between internal auditing curriculum and industry graduate readiness expectations, thus adding to the growing body of literature regarding digital transformation imperatives.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Author obtained university ethics permission for this study, which led to the issuance of an ethical clearance certificate by Walter Sisulu University Ethics Committee (Certificate number: 32/16/10/2025/DRI), dated 16 October 2025. Before data collection, all respondents gave informed consent. I informed respondents of their freedom to engage in the study and withdraw without punishment. Research respondents' data were kept confidential, and I ensured that responders were protected from harm.
Transparency: The author states that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The author declares that there are no conflicts of interest regarding the publication of this paper.
Disclosure of AI Use: ChatGPT (free version) was used to refine some data interpretation discussions. The author has thoroughly reviewed and verified all outputs.

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