

The essential AI skills and knowledge that business accounting students should acquire

Las habilidades y conocimientos esenciales de IA que los estudiantes de contabilidad empresarial deben adquirir

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ABSTRACT

This paper examines the transformative impact of artificial intelligence (AI) on the accounting profession, the need for curriculum reform in accounting education, and the essential AI skills and knowledge that business accounting students should acquire. It explores the essential AI skills and knowledge required for future accountants to thrive in an AI-driven landscape. These include technical proficiencies in data management, programming fundamentals, AI and machine learning concepts, and AI-specific accounting software. Analytical and interpretive skills encompassing data analysis, statistical modeling, predictive analytics, and critical evaluation of AI outputs are equally crucial. Furthermore, the paper emphasizes the importance of professional and soft skills such as communication, critical thinking, professional skepticism, business acumen, adaptability, and ethical awareness. By integrating these competencies into accounting curricula, educational institutions can effectively prepare future accountants for the challenges and opportunities presented by AI, ensuring they possess the skills and knowledge to navigate the evolving landscape of the profession. The aim is to provide a roadmap for equipping future accountants with the competencies needed to thrive in the evolving world of AI-driven finance and business.

Keywords. Artificial intelligence, Skills, Machine Learning, Data Mining, Cognitive Computing

RESUMEN

Este artículo examina el impacto transformador de la inteligencia artificial (IA) en la profesión contable, la necesidad de una reforma curricular en la educación contable y las habilidades y conocimientos esenciales de IA que los estudiantes de contabilidad empresarial deben adquirir. Explora las habilidades y conocimientos esenciales de IA necesarios para que los futuros contadores prosperen en un panorama impulsado por la IA. Estos incluyen competencias técnicas en gestión de datos, fundamentos de programación, conceptos de inteligencia artificial y aprendizaje automático, y software de contabilidad específico de inteligencia artificial. Las habilidades analíticas e interpretativas que abarcan el análisis de datos, el modelado estadístico, el análisis predictivo y la evaluación crítica de los resultados de la IA son igualmente cruciales. Además, el artículo enfatiza la importancia de las habilidades profesionales y sociales como la comunicación, el pensamiento crítico, el escepticismo profesional, la perspicacia para los negocios, la adaptabilidad y la conciencia ética. Al integrar estas competencias en los planes de estudios de contabilidad, las instituciones educativas pueden preparar eficazmente a los futuros contadores para los desafíos y oportunidades que presenta la IA, asegurando que posean las habilidades y el conocimiento para navegar en el panorama cambiante de la profesión. El objetivo es proporcionar una hoja de ruta para dotar a los futuros contadores de las competencias necesarias para prosperar en el mundo en evolución de las finanzas y los negocios impulsados por la IA.

Palabras clave. Inteligencia artificial, Habilidades, Aprendizaje automático, Minería de datos, Computación cognitiva

INTRODUCTION

The accounting profession finds itself at the cusp of a transformative era with rapid advancements in artificial intelligence and its integration into the accountancy profession. This technology, encompassing automation, data analysis, and predictive modeling, transforms conventional accounting practices while affording new opportunities to create value. The universities/colleges must provide the necessary AI-related skills and knowledge that business accounting students should acquire, from the basic technical competencies in data analytics and machine learning to high-order competencies like critical thinking, professional skepticism, and ethical awareness. Assessing the preparedness of existing business students for engaging with AI technologies requires assessing the extent to which they have been exposed to and have gained an understanding of AI concepts, tools, and applications in a business context. While most business schools have initiated the inclusion of AI-related courses in their curricula, the coverage in terms of depth and breadth is still highly variable. This preparedness may vary in regard to the institution's focus on technology, the availability of AI-specific courses, and individual student interest in pursuing AI-related knowledge. For this reason, these key areas are being addressed to provide a road map towards the competencies of future business accountants in AI-driven finance and business.

Generally, business students have a growing awareness of the importance of AI in the modern business landscape. In fact, one study published by (Wuckich et al., 2024) revealed that 58.6% of students surveyed said they tried to use ChatGPT to do the assignments, while 41.4% did not use the technology. In that same research, business accounting students relied less on ChatGPT than non-accounting majors. Furthermore, the study reported far less reliance on ChatGPT for qualitative than quantitative assignments.

For business accounting students, essential AI skills and knowledge should encompass both theoretical understanding and practical application. Data analytics, machine learning basics, and AI-driven financial modeling are vital areas. Students should be familiar with AI-powered accounting software and tools, understanding their capabilities and limitations. They also need to be skilled in

interpreting insights from AI, ethics related to the application of AI to financial decision-making, and implications for audit and compliance processes. Proficiency in programming languages commonly applied in AI applications, such as Python or R, would also be helpful. Ultimately, the goal is to prepare students for the active use of AI technologies in their future accounting careers and provide them with a critical understanding of the technology's implications for the profession.

Research problem

This research explores AI-driven essential skills and knowledge that business accounting students should acquire. Therefore, this effort tries to give answers to the following questions:

Q1. Considering the demand for AI knowledge, what curriculum changes are needed to prepare accounting students for the workforce?

Q2. How can we teach accounting students to work with AI, not against it?

Q3. What are the foundational technical skills related to AI that students should learn?

Q4. What skills will remain relevant in an AI-driven world?

Q5. How can we shift from traditional courses to continuous, on-demand learning?

This paper aims to provide a focused summary of the essential AI skills and knowledge that business accounting students should acquire as demanded by the profession. Thus, this research employs a systematic review of the PRISMA framework (Page et al., 2021; Appendix A). The selection of the literature includes publications from professional accounting bodies with significant influence over the standards and curriculum content of higher education programs. Selected literature includes international and local publications. Furthermore, the selection of literature includes publications from several years, from the past to the present, in databases such as Google Scholar, Academic Search Complete (EBSCO), Taylor & Francis, and Emerald Publishing. The search strategy involved keywords related to the accounting curriculum, Artificial intelligence, Skills, Machine Learning, Data Mining, and Cognitive Computing.

The search strategy focused on peer-reviewed articles. The data was extracted through a qualitative analysis. The information was organized and interpreted, and patterns were identified with non-numerical data using peer-reviewed articles to gain insights and understand the qualitative research findings through thematic analysis, content analysis, and grounded theory. The study's inherent limitations derived from this methodology and design include considerations for site selection, research design, difficulty in generalizing findings, and potential bias.

AI AND THE ACCOUNTING PROFESSION

The transformative impact of ai on the accounting profession

Artificial intelligence (AI) in accounting is currently transforming the industry. Lazanis (2024) defines AI in accounting as the use of AI technologies, such as machine learning algorithms and natural language processing, to automate and enhance various accounting processes. As a result, prospective employees must gain AI skills such as fundamental data skills, storytelling ability, and the ability to automate (Tysiac, 2018). The requirement for skilled employees who can work with the new technologies used in accounting is on the rise. The CPA Training Center has an AI For Accountants Certificate Program so accountants can study AI and their ability to become "AI Accounting Specialists. Amirul et al. (2017) highlighted IT competency as a significant attribute required among accounting graduates. Also, institutions of higher learning can take cognizance. Universities/colleges are starting to develop new opportunities for students, such as Rutgers, which has created a new graduate program at Rutgers Business School that will bring artificial intelligence and a tech-heavy focus to accounting (Leckrone, 2024). The new graduate program aims to prepare students for those emerging technologies that are reshaping the accounting industry.

The transformational impact that AI has had on the accounting profession should first be duly recognized. Research by Wu (2021) suggests that AI plays a positive role in accounting work, such as improving the ability to deal with risks, improving the efficiency of accounting information processing, more standardized accounting work, and finally, improving the quality of accounting work. To this end, AI has brought a host of benefits to the accounting profession, revolutionizing established practices and even opening up new opportunities in areas such as the following:

Table 1. New Opportunities and Benefits

New Opportunities	Benefits
Automation of Repetitive Tasks	AI can automate time-consuming, manual tasks such as data entry, invoice processing, and reconciliation, freeing accountants to concentrate on more value-added activities like analysis and strategic decision-making (AccountancyAge, 2023).
Enhancing Accuracy and Reducing Errors	AI algorithms reduce the chances of human error, making financial reporting and analysis more accurate (Raj, 2023).
Improved Efficiency and Productivity	Automation and better accuracy translate into massive gains in efficiency and productivity, enabling accounting professionals to do more in less time (Liao, 2023).
Real-Time Insights and Analysis	AI helps analyze large datasets in real time. It provides valuable insight into financial trends, patterns, and anomalies that might have gone unnoticed through manual analysis (AccountancyAge, 2023).
Better Fraud Detection	AI algorithms can identify patterns and discrepancies that may suggest fraudulent activity, enhancing fraud detection and prevention (Levitt, 2024).
Improved Forecasting and Predictive Capabilities	AI can analyze history and spot trends to create more accurate financial forecasting and predictions, supporting better decisions (AccountancyAge, 2023).
Cost Reduction	AI can automate tasks that improve the efficiency of accounting processes, thus reducing operational costs (Lazanis, 2024).
Improved Client Service	AI-powered tools help provide fast, accurate, and customized services, which improves client satisfaction (Lazanis, 2024).
Continuous Auditing	AI assists in continuous auditing, which involves ongoing monitoring and analysis of financial data (Liao, 2023).
Invisible Accounting	AI can automatically perform accounting tasks behind the scenes to maintain a smooth workflow (Liao, 2023).
Embracing AI in Accounting	Routine and repetitive tasks can be automated with the help of AI. This way, accounting professionals can focus more on strategic tasks that require human expertise (Benefits of Artificial Intelligence in Accounting, 2023).
Addressing Complex Regulatory Compliance	Compliance with ever-changing regulations is a crucial aspect of accounting. AI can help streamline compliance processes by automatically monitoring and interpreting regulatory changes. By analyzing relevant laws and regulations, AI systems can identify potential compliance gaps and provide recommendations for adherence (Benefits of Artificial Intelligence in Accounting, 2023).
Overcoming Language and Cultural Barriers	AI-powered language translation and interpretation tools bridge these gaps by facilitating seamless communication and understanding (Benefits of Artificial Intelligence in Accounting, 2023).
Supporting Sustainable Practices	AI in accounting promotes sustainable practices by enabling efficient resource management. By analyzing energy usage, supply chain data, and operational efficiency, AI systems can identify opportunities for cost savings and eco-friendly initiatives. This integration of AI helps organizations align their financial practices with sustainability goals (Benefits of Artificial Intelligence in Accounting, 2023).

How the Big 4 accounting firms utilize ai in operations

The Big 4 accounting firms of Deloitte, Ernst & Young, PwC, and KPMG use AI in a multitude of ways to better their services and facilitate ease regarding processes:

- Deloitte: Has developed an AI-powered document review platform for evaluating contracts and extracting key information (Reuters, 2024).
- EY: Makes use of AI in auditing to analyze unstructured data such as contracts and evaluate risks of material misstatement resulting from fraud (Reuters, 2024).
- PwC: Utilizes AI-powered software for tasks like data synthesis, code review, and documentation generation, resulting in significant productivity gains. They also provide access to an enterprise version of ChatGPT-4 for internal use and client solutions (Reuters, 2024).
- KPMG: While (Reuters, 2024) doesn't detail KPMG's specific AI applications, it mentions them as leaders in AI adoption within the accounting industry. Hasan, (2022) provides further insights into how the Big 4 firms are using AI, including KPMG.

Industry AI software demand

Several accounting software solutions that make use of the potential of AI to automate more tasks, as well as provide value-added functions, will include but not be limited to:

- QuickBooks: This employs AI in cash flow forecasting, smart match reconciliations, and payroll, among others (Liao, 2023).
- Oracle: Cloud-based solution with integrated AI and Machine Learning for Enterprise Resource Planning and Financial Planning (Liao, 2023).
- FreshBooks: This cloud system uses AI to automate accounts payable and other tasks in business (Liao 2023).
- Zoho Books: It ranges from banking, inventory, invoicing, and billing since it makes use of AI for better effectiveness (Liao 2023).
- Oracle NetSuite: Specializes in accounts receivable and payable using AI software automation, thus simplifying complicated tasks (Bichachi, 2024).
- Sage Intacct: Sage Intacct combines subscription management, revenue recognition, and SaaS metrics. To augment Sage Intacct, you can integrate Salesforce CRM for customer relationship management (Cook, 2024).
- Xero: Xero is small business software in the same category as QuickBooks Online that uses third-party SaaS software integration to add accounting functionality, AP automation, SaaS billing, and revenue recognition (Cook, 2024)
- Acumatica: Acumatica is a real-time, modern cloud ERP for growing small businesses and midmarket companies (Cook, 2024).

While these are a few examples, many more accounting software vendors are making AI part of the package. Accountants Practice Management Software (2024) lists CA office automation software that helps manage workflow and accountability and enhances client relationships.

AI IN EDUCATION

Considering the new opportunities

Considering the new opportunities, the IT Faculty (2018), Zhang et al. (2020), and Burney et al. (2023) discuss the outlook for the accountancy profession and accounting education in light of AI and ChatGPT, emphasizing both opportunities and challenges. Key points include:

- *AI as a Tool for Enhancement, Not Replacement:* While acknowledging AI's potential to automate tasks, The IT Faculty emphasizes that it does not replicate human intelligence. Instead, it is positioned as a tool to enhance accountants' capabilities, enabling them to focus on higher-value activities like analysis, strategic decision-making, and client interaction. Also, it clarifies that repetitive tasks are more susceptible to automation, while higher-value tasks requiring expertise will remain the domain of accountants.
- *Need for Adaptation and Upskilling:* In addition, the IT Faculty stresses the importance of the profession adapting to AI and developing relevant skills. Accountants must understand how AI can solve business problems and acquire the skills to work alongside intelligent systems. Furthermore, it highlights the need for a deep understanding of AI's capabilities and limitations.
- *Focus on Fundamental Business Problems:* Moreover, it encourages the profession to focus on the core business problems it aims to solve and explore how AI can transform its approach.
- *Collaboration between Humans and AI:* The IT Faculty also envisions a future where humans and AI work collaboratively. This requires accountants to understand AI's strengths and limitations and develop the skills to utilize AI tools effectively.
- *Early Stages of Adoption and the Need for Understanding:* While simultaneously acknowledging that the widespread adoption of AI in accounting is still in its early stages. Therefore, developing a deep understanding of AI's potential, practical challenges, and the skills required for effective human-AI collaboration is crucial. Zhang et al. (2020) echoes this sentiment, discussing the dramatic changes brought about by AI and the need for accounting graduates to adapt to these changes.
- *Educators need to be aware of ChatGPT and AI tools:* Burney et al. (2023) discuss the need for educators to be aware of AI and to be ahead of the curve in understanding how to leverage emerging technologies such as ChatGPT. The article emphasizes educators' responsibility in preparing students as evolving professionals to use these tools responsibly and ethically.
- *Accounting education has evolved:* AI in the classroom, particularly the application of ChatGPT, signals what feels like a seismic change. ChatGPT's advanced capabilities allow educators to enhance teaching methodologies, promote interactive learning, and foster students' critical thinking skills (Burney et al., 2023).

The necessity for AI competencies in accounting education

The need to update AI competencies within accounting education. The new opportunities with the AI transformation have imposed the requirement for colleges and universities to consider the integration of AI within their business curricula due to several corresponding reasons:

Table 2. Requirements and considerations

AI Requirements	Considerations
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Meeting industry demand	AI's unparalleled adaptation to industries has created an unprecedented demand for professionals skilled in AI technologies. Businesses look forward to graduates who can use AI technology to increase efficiency, gain insight into new data, and create innovation (Chen et al., 2021). Offering AI Education enables universities to equip students with the in-demand skills required to secure competitive positions in the ever-evolving job market. Spier (2023) and Amirul et al. (2017) suggest the importance of IT competency among accounting graduates, highlighting the growing need for technological skills in the field.
Preparing students for the future of work	AI is transforming work across various sectors, including business. Automating routine tasks allows professionals to focus on higher-level strategic thinking and problem-solving (AccountancyAge, 2023). Universities must prepare students for this shift by equipping them with the knowledge and skills to work alongside AI and adapt and adjust as obs change. Garfinkle (2023) discusses the fundamental changes AI is making in work and the attendant responsibility of universities to develop appropriate graduate attributes.
Drive towards innovation and entrepreneurship	AI has tremendous potential for driving innovation and creating business opportunities. Learning about AI will equip students to develop AI-driven solutions, start their own businesses, and contribute to the economy's growth. Chen et al. (2021) suggest teaching AI through gamified social entrepreneurship and driving innovation in an introductory MIS course.
Improve business decision making	AI is a potent tool for data analysis, predictive modeling, and forecasting. Integrating AI into the curriculum will also provide students with the necessary competencies to use data-driven insights to make informed decisions and achieve better business performance. In fact, Garfinkle (2023) presented how business schools bridge the gap in AI skills through special courses they offer.
Ethical considerations and responsible AI	As AI increasingly integrates into business practices, ethical considerations become important. Universities are responsible for educating students about ethical considerations such as bias, fairness, transparency, and data privacy. Garfinkle (2023) discusses the roles that a business school plays in shaping the thinking and reasoning of students regarding AI and the stakeholders involved. Chen et al. (2021) also cite embedding AI education in diverse disciplines, stressing its importance beyond the realm of technology.

Curriculum reforms for future accountants

Chen (2022) discusses the current and future AI curriculum in business schools, while Salchenberger (1989) outlines a strategy for integrating AI technology into a graduate business curriculum. Elhajjar et al. (2020) focuses on AI in marketing education programs, and Asgrahani & Shankararaman (2014) discusses IT higher education reform skills frameworks. While the integration of AI and other emerging technologies in education holds immense promise, it also presents a unique set of challenges that need to be addressed. One such challenge is the potential for academic dishonesty, as AI-generated content can be difficult to distinguish from genuine student work. Staff (2024) mentions the use of AI-powered tutoring systems for personalized instruction, and Coffey (2023) survey indicates that students primarily use AI for writing tasks and less often for STEM subjects. Idroes et al. (2023) suggest that students generally perceive AI positively in education but also acknowledge potential drawbacks.

Institutions administration adapting curriculum reform

AI has created the need for curriculum reform. As a result, faculty and administrators are joining forces to accommodate the changes required by the demand. For example, educational institutions provide educators with resources to aid in the reform. Take, for example, what the City University of New York (CUNY) provides to its faculty. Among the resources provided are AI training courses, Q&A (see Appendix C), sample syllabus statements (see Appendix B), publication materials, faulty guides, committees, and updates to policies and documents, including scope, definitions, plagiarism, and academic integrity.

EXAMPLE

Plagiarism in the age of AI

“With the advances in artificial intelligence (AI) and the availability of a variety of AI tools or applications that facilitate authorship by AI of text there is now a form of plagiarism (using the work of another and claiming it as your own) whereby an AI creates the text or does the work and some human claims it as the work of that human alone. In light of this new situation this section is added as preface to what came before AI arrived and was made so available. As instructors consider revising written assignments going forward and the need to discourage use of AI forms of assistance and detect them when used they need to know that some AI detectors can be defeated” (Pecorino, 2025).

Furthermore, international educational institutions are making changes as well. For instance, the UK Quality Assurance Agency for Higher Education (QAA) published a range of guidance in the year 2023 on maintaining quality and standards in the ChatGPT era.

However, there is more to be done. According to a survey conducted by the Association to Advance Collegiate Schools of Business (AACSB) in the fall of 2024 titled GenAI Adoption in Business Schools: Deans and Faculty Respond, most deans exhibited great optimism about GenAI adoption and acceptance within their institutions, while faculty often expressed more caution and skepticism. The survey also found that both generally agree on the importance of preparing for and integrating GenAI across curriculum, research, and teaching. The main concerns found were plagiarism, data privacy, and academic integrity. In addition to that, both view GenAI's impact on creativity, critical thinking, and problem-solving as both a promising opportunity and a notable risk. As a result, educational institutions are prioritizing curriculum reform, embedding AI into teaching as a key focus. The survey found that 84% of deans embrace the idea of using GenAI, and 80% for faculty. Also, 60% of senior administrators fully embrace the idea of using GenAI. The three key Takeaways:

- A Double-Edged Sword: Both deans and faculty see GenAI as an opportunity and a significant risk.
- Ethics is Top of Mind: The ethical, privacy, and integrity implications of GenAI in education and research are a major concern for both deans and faculty.
- Efficiency and Agility: While respondents expressed enthusiasm about the possibility of efficiency and agility, some also highlighted the need for higher education institutions to overcome bureaucratic hurdles and evolve to be able to support such dynamic and fast-changing environments.

The good news is that the deans surveyed are optimistic about GenAI's transformative potential. They identified key goals that align with enhancing the quality and outcomes of business education. Their response reflects a strong focus on using GenAI to improve educational impact and prepare students for the evolving workforce (GenAI Adoption in Business Schools: Deans and Faculty Respond, 2024).

Preparing Business Students for the AI Revolution

The increasing adoption of artificial intelligence technologies by businesses across various industries has led to a growing demand for employees with AI-related skills and knowledge (Bughin et al., 2017). However, many business executives must be aware of the specific AI capabilities required across different disciplines, from data science to knowledge representation and system engineering. This poses a challenge for educators in preparing business students to engage with AI technologies effectively. Because of the described challenges, it is necessary to estimate the status quo of preparedness among business students, including those specializing in accounting, and the necessary developments in AI skills and knowledge among them. Student preparedness for the AI age has, in fact, been a long-standing learning objective in technology-relevant education

since the 21st-century knowledge economy requires students to develop knowledge, attitudes, and abilities that are congruent with their future professional lives (Dai et al., 2020).

One approach to better-preparing students is to begin integrating AI-related courses and projects into the business curriculum. These learning opportunities should provide students with content knowledge about AI.

However, more importantly, they should empower the students and help them feel confident and comfortable participating in an AI-infused future. With Artificial Intelligence continuously changing the business world, it becomes very important for business schools to take proactive steps to develop their students' required skills and knowledge to succeed in the AI age (Abdulwahid & Abdullah, 2024).

Integrating AI into Accounting Education

Integrating Artificial Intelligence into the accounting profession necessitates a shift in accounting education. As AI automates routine tasks like data entry and bookkeeping, the demand for professionals with advanced AI-related skills increases (Eziefule et al., 2024). This creates a need for accounting programs to equip students with the competencies required to thrive in this evolving landscape. Several key themes emerge regarding the necessity of AI competencies in accounting education:

- 1. *Curriculum Reform:* Traditional accounting curricula primarily focus on content knowledge (Irafahmi et al., 2021). However, the rise of AI requires a shift towards incorporating AI-related courses and projects that provide both theoretical understanding and practical application of AI tools and techniques. This includes topics like data analytics, machine learning, and AI auditing (Tandiono, 2023).
- 2. *Competency Development:* Going beyond technical skill development, there is a set of wider competencies relevant for accounting graduates in an AI-driven world (See Table 3).

Table 3. Relevant competencies

Relevant Competencies	
<i>Digital Acumen:</i> Understanding digital tools and technologies, including AI and their applications in accounting (Toscza, 2023).	<i>Data Analysis and Interpretation:</i> The ability to analyze large datasets, draw insights, and make data-driven decisions (Tysiac, 2018).
<i>Critical Thinking and Problem-Solving:</i> AI can assist with analysis, but professionals still need to interpret results and solve complex problems (Tysiac, 2023).	<i>Communications and Collaboration:</i> Effectively communicating insights derived from AI analysis to both technical and non-technical audiences (Li et al., 2023).
<i>Adaptability and Lifelong Learning:</i> AI is one of the fastest-moving fields, and professionals need to adapt to new technologies while continuously updating their skills (Ballantine, 2024).	

- 3. *Bridging the Skills Gap:* The increasing demand for AI skills in accounting has created a skills gap. Accounting programs need to address this gap by see Table 4:

Table 4. Bridging the gap

Bridging the Gap	
<i>Integrating AI across the curriculum:</i> Not just in specialized courses but also within core accounting subjects (Andre & Smith, 2014; Mohamed et al., 2024)	<i>Providing hands-on experience:</i> Expose students to real data and AI tools through internships and projects (Mohamed, 2024).

<i>Collaborating with industry:</i> Partnering with businesses to understand their AI needs and develop relevant curricula (Andre & Smith, 2014).	<i>Promoting awareness:</i> Educate students and faculty about the importance of AI in accounting and career opportunities (Andre & Smith, 2014 ; Mohamed et al., 2024)
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By incorporating these elements, accounting education can effectively prepare students for the challenges and opportunities of the AI age, ensuring they possess the necessary skills and knowledge to thrive in the future of the accounting profession (Andre & Smith, 2014; Mohamed et al., 2024).

Aligning education with Industry demands

Successfully meeting the demand between education and industry requires collaboration, adjustments in curriculum, and emphasis on transferable skills. The following are some of the key strategies to help attain this alignment:

Dialogue and continuous collaboration

Educational institutions and industry partners must maintain the ongoing dialogue provided by collaborating with educational institutions for seamless workforce development (Mukerjee, 2024). Examples are periodic consultations, common projects, and participation in advisory boards. Such collaboration will ensure that educators are aware of the workforce's ever-changing needs and that the industry has its say in shaping educational programs. For instance, direct contact with industry representatives may reveal discrepancies between academic and practical skills, as Lazaro-Mojica Fernández (2020) highlighted, which will help form curriculum adjustments.

Development of industry-specific curricula

According to O'Brien (2023), the curriculum should be developed considering existing and future industrial requirements. This includes pragmatic, hands-on experience and case studies that effectively mimic real-life scenarios. Another effective method for Project-based learning, Şenay (2015), effectively prepares the students for the eventual challenges at their workplaces. Integrating emerging technologies O'Heir, 2023, especially those being recognized in Industry 4.0, into the mainstream curriculum will definitely be helpful in preparing students for future job requirements.

Strong emphasis on transferable skills

While technical skills are essential, employers also value transferable skills (Creaform, 2023). These include communication, collaboration, problem-solving, critical thinking, and adaptability. Educational programs should emphasize the development of these skills, as they are applicable across various industries and roles. For instance, incorporating activities promoting communication and collaboration (Creaform, 2023), such as presentations and team projects, can enhance these skills.

Addressing challenges and resistance

Aligning education with industry demands can face challenges. Faculty may be resistant to change or lack the resources to adapt their teaching methods (Leigh, 2022). There can also be a disconnect between the perceived mission of higher education and the immediate needs of industry (Riggs & Hughey, 2011). Overcoming these challenges requires strong leadership, faculty development, and a shared vision between educational institutions and industry partners.

Standardization and skills frameworks

Setting up standardized skills frameworks (Asgrahani & Shankararaman, 2014) can clarify the need for industry needs, thus making the development of relevant educational programs easier. The frameworks give a common language and understanding of the skill expectations for certain

roles; therefore, educators can better target their curriculum. Such standardization could also help address inconsistent requirements across different curricular programs (Riggs & Hughey, 2011).

These strategies will thus help the educational institution produce graduates who would easily adapt to the demands of the workforce, laying a smooth transition from education to employment and consequently contributing to a more robust, more resilient economy.

Preparing students for an AI-driven workforce

The use of AI in the accounting field calls for serious reforms within the curriculum to help in training future accountants. To keep up with the changing landscape in accounting, universities/colleges need to change the accounting curriculum. Areas that need reform are include in the following table:

Table 5. Foundational knowledge in AI and related technologies

Data Analytics	Machine Learning	AI Auditing
Introduce fundamental concepts in data analytics, such as data mining, statistical modeling, and predictive analytics. Training in the usage of relevant software and tools shall be provided (Zhang et al., 2020)	Coverage of basic machine learning algorithms and applications in accounting, such as fraud detection and risk assessment (Zhang et al., 2020; Kasztelnik, & Jermakowicz, 2024)	To educate students on how AI applies in audit processes such as data analysis, anomaly detection, and continuous monitoring (Kasztelnik, & Jermakowicz, 2024).
Blockchain Technology	Use of Real-World Examples	Use digital resources
Introduce the basic concepts of blockchain and how it may affect accounting and financial reporting (Zhang et al., 2020).	Educators should use real-world examples, case studies, and hands-on experiences to show students see how accounting works in actual practice (Kasztelnik & Campbell, (2024).	Universities/colleges can use online courses, interactive platforms, and other digital resources to help students learn (Kasztelnik & Campbell, (2024).
Work with the profession	Use adaptive learning	Teach soft skills
Universities and colleges can partner with companies and organizations to expose students to the latest technologies and practices in accounting (Kasztelnik & Campbell, 2024).	Instructors can use technology that adapts to each student's learning style (Kasztelnik & Campbell, 2024).	CPAs need to be effective at communicating, thinking critically, and solving problems, so students need to learn these skills, too (Kasztelnik, 2023).

Table 6. Emphasis on higher-order skills

Critical Thinking and Problem-Solving	Professional Skepticism	Communication and Collaboration	Business Acumen
Students should be developed with the ability to analyze complex situations, evaluate AI-generated insights, and make informed decisions (Chabus, 2021).	Develop a questioning mindset and the ability to critically assess AI systems' output (Chabus, 2021).	Enhance students' ability to explain complex technical information to technical and non-technical audiences (Chabus, 2021).	This gives a wider perspective on business operations and strategy, allowing the accountant to apply AI to provide business insight (Carter Jr., 2023).

Table 7. Practical application and hands-on experience

Case Studies and Simulation	Internship and Industry Project	Hackathons and Competitions
Integrate case studies and simulations in which students will apply AI techniques and tools to real-world scenarios (Odonkor et al., 2024).	Integrate opportunities for students to go into the industry and work practically on the operation of AI in accounting (Kasztelnik & Jermakowicz, 2024).	Introduce competitions for data analysis and AI concentration that promote innovation and practical skill development (Baldwin, 1995).

Table 8. Adaptability and lifelong learning

Emerging Technologies	Continuous Learning
Expose students to various forms of emerging technologies besides AI, like robotic process automation and cloud computing.	Inculcate the essence of continuous learning and professional development to keep pace with changes in AI and other related areas.

Table 9. Ethical considerations and responsible AI

AI Ethics	Data Privacy and Security
It would consider the ethical dimension of using AI in accounting at individual and team levels, such as bias, non-discrimination, and transparency (Reuters, 2024).	Instruct students on data privacy and security issues surrounding AI applications. These curriculum reforms will finally equip future professional accountants for the challenges and opportunities arising in an AI-driven workforce and provide them with the appropriate skills and knowledge to take part in the profession's reshaping landscape (Reuters, 2024).

Student preparedness: essential ai skills and knowledge for business accounting students

To thrive in an AI-driven accounting landscape, business accounting students should acquire a blend of technical skills, analytical abilities, and professional competencies. Here's a breakdown of essential areas:

Table 10. Foundational technical skills

Foundational Technical Skills	
<i>Data Management and Manipulation:</i> Proficiency in data manipulation techniques using tools like spreadsheets and databases is crucial for preparing data for AI applications.	<i>AI and Machine Learning Concepts:</i> A foundational understanding of AI concepts, including machine learning algorithms, neural networks, and natural language processing, is essential.
<i>Programming Fundamentals:</i> Basic programming knowledge, particularly in languages like Python or R, is beneficial for understanding and interacting with AI algorithms.	<i>AI-Specific Accounting Software:</i> Familiarity with AI-powered accounting software and tools used in areas like fraud detection, risk assessment, and auditing.

Table 11. Analytical and interpretive skills

Analytical and Interpretive Skills	
<i>Data Analysis and Interpretation:</i> The ability to analyze large datasets, identify trends, draw insights, and communicate findings effectively.	<i>Predictive Analytics:</i> Utilizing data and statistical techniques to forecast future outcomes and support decision-making.

<i>Statistical Modeling:</i> Understanding statistical concepts and applying statistical models to interpret data and make predictions.	<i>AI Output Evaluation:</i> Critically evaluate the output of AI systems, identify potential biases, and ensure the accuracy and reliability of results.
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Table 12. Professional and soft skills

Professional and Soft Skills	
<i>Communication and Collaboration:</i> Effectively communicating complex technical information to both technical and non-technical stakeholders.	<i>Critical Thinking and Problem-Solving:</i> Applying critical thinking skills to analyze complex situations, evaluate AI-generated insights, and solve problems.
<i>Professional Skepticism:</i> Maintaining a questioning mindset and critically assessing the output of AI systems.	<i>Business Acumen:</i> Understanding business operations, strategy, and the application of AI to achieve business objectives.
<i>Adaptability and Lifelong Learning:</i> Embracing a mindset of continuous learning to stay updated with advancements in AI and related technologies.	<i>Ethical Awareness:</i> Understanding the ethical implications of AI in accounting, including bias, fairness, transparency, and data privacy.

Kasztelnik & Campbell (2024) propose that by developing these skills and knowledge, business accounting students can position themselves for success in the evolving accounting profession, leveraging AI to enhance their capabilities and contribute meaningfully to organizations.

Students' benefits of continuous learning AI technology

Accounting students should continue learning about AI for several crucial reasons:

- **Career Advancement:** The accounting field is rapidly transforming with the integration of AI. Professionals skilled in AI and data analytics are in high demand, commanding higher salaries and better career opportunities (Kasztelnik & Campbell, 2024).
- **Relevance and Adaptability:** AI is becoming increasingly integral to accounting processes, from automating routine tasks to providing real-time insights and enhancing decision-making. AccountancyAge (2023) discusses how AI is a critical component for growth in many organizations, including accounting firms. Luo et al., (2018) further emphasizes the inevitable trend of AI application in accounting and its potential to bring tremendous changes to the industry. Continuous learning in AI ensures that accounting professionals remain relevant and adaptable in this evolving landscape.
- **Enhanced Skillset and Value Proposition:** AI skills complement traditional accounting knowledge, creating a well-rounded professional profile. Leckrone (2024) highlights how business schools are bridging the AI skills gap by incorporating AI education into their curricula. Zhang et al. (2020) discusses the impact of AI on the accounting profession and the need for accounting graduates to adapt to the changing job market requirements. By mastering AI tools and techniques, accountants can enhance their value proposition to employers and clients.
- **Improved Efficiency and Productivity:** AI-powered tools automate repetitive tasks, freeing accountants to focus on higher-value activities like analysis, strategic planning, and client interaction. As Lazanis (2024) mentions the benefits of AI in automating accounting processes and improving efficiency and further discusses how AI can automate tasks like financial reporting, audit, compliance, and data analysis, leading to improved accuracy and cost reduction.
- **Innovation and Future-Proofing:** AI constantly evolves, and continuous learning is essential for staying ahead of the curve. Hasan (2022) argues that AI fundamentally changes work, and universities must respond by equipping students with the necessary skills. By embracing AI education, accounting faculty can improve their careers in the future and contribute to the innovation and advancement of the profession.

Recommendations to business faculty

AI is an educator ally, not a replacement. Educators must learn AI to teach as it is becoming increasingly relevant in education. The benefits of AI can be several, including but not limited to personalizing learning for the students, providing real-time feedback, and enhancing learning. Learning about AI can benefit faculty by improving teaching effectiveness. AI can generate customized learning materials, providing immediate student feedback and enhancing student engagement by allowing AI-powered tools such as interactive simulations. These virtual assistants can make learning more engaging and accessible, and streamlining administrative tasks such as grading simple assignments frees up time for faculty to focus more on complex aspects of teaching. Also, as AI becomes more integrated into education, faculty who are more familiar with its capabilities will be better able to navigate the ever-changing landscape. Faculty must consider the importance of focusing on relevant applications and understanding the limitations and ethical implications when learning about AI technology.

CONCLUSION

Integrating artificial intelligence into the accounting profession necessitates a fundamental shift in educational approaches. This paper has outlined key curriculum reforms essential for equipping future accountants with the skills and knowledge to thrive in this evolving landscape. By emphasizing a blend of technical proficiency in AI and data analytics, higher-order critical thinking skills, and practical hands-on experience, accounting programs can empower graduates to leverage AI effectively and ethically. Cultivating adaptability and a commitment to lifelong learning will further enable them to navigate the ongoing advancements in AI and related technologies. Ultimately, these reforms will ensure that future accountants are proficient users of AI tools and possess the judgment, skepticism, and ethical awareness to navigate the complexities of an AI-driven world, contributing meaningfully to the profession and the broader business landscape. Baldwin (1995) suggests that college accounting programs need to update their curricula, while Andre & Smith (2014) discuss enhancing the undergraduate accounting curriculum to augment core competencies.

Moreover, Tandiono (2023) explores the impact of AI on accounting education and practice and concludes that continuous advancements in AI are impacting the accounting industry. Despite this finding, accounting education has not kept up with the pace of the change in the industry. IT Faculty (2018), Zhang et al. (2020) and Burney et al. (2023) paint a picture of a future where AI augments the capabilities of accountants, requiring them to adapt, upskill, and focus on higher-value activities. The report emphasizes the importance of understanding AI's potential and limitations to navigate this evolving landscape effectively.

As a result, it is strongly recommended that curriculum reform is necessary and that students continue to learn about AI as it constantly evolves. Continuous learning is essential for students and faculty to stay ahead of the curve. In addition, instructors should make sure they keep up with the changes in emerging technologies, especially artificial intelligence. Hopefully, the information in this paper will help push much-needed changes in educational institutions' future curriculum accounting business degrees. Integrating AI into the accounting curriculum would benefit from further inquiry to measure its lasting effect and help others develop more effective programs.

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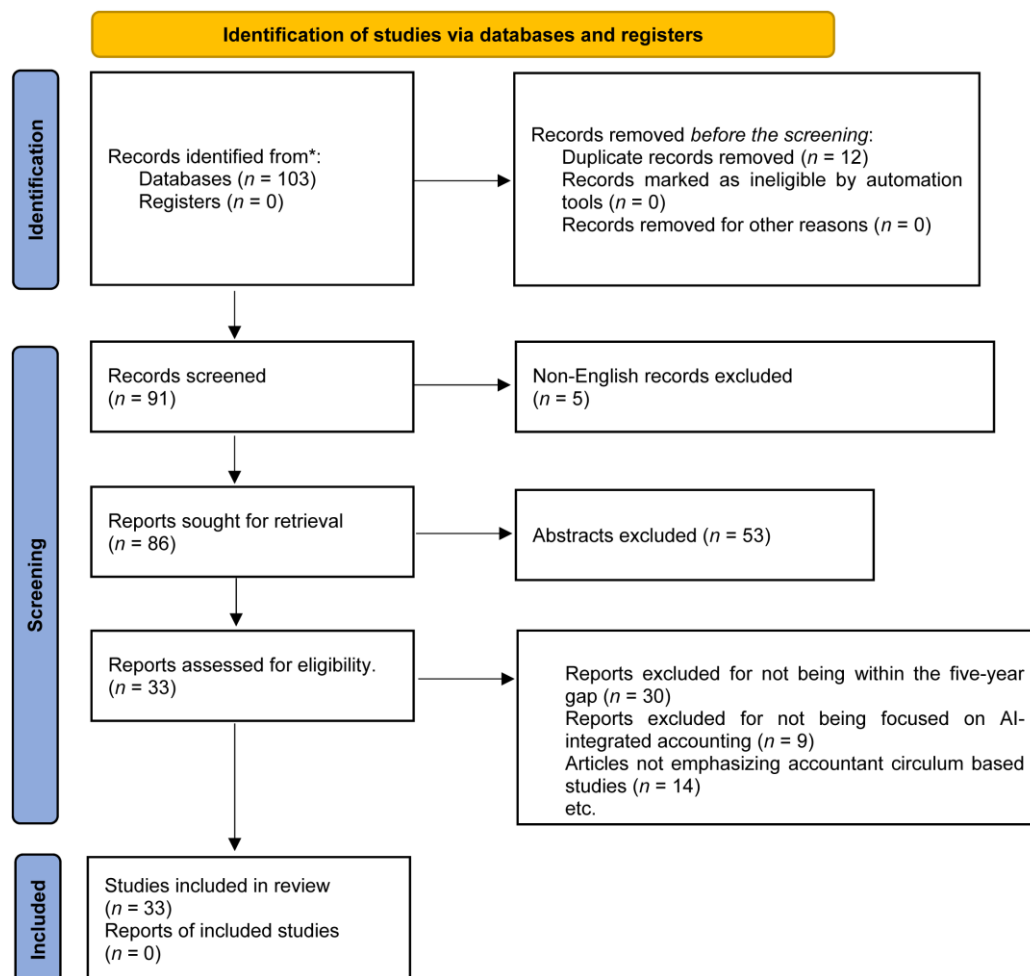
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APPENDIX A

Figure 1. Study selection through the PRISMA framework



Source(s): Author

APPENDIX B

Syllabus Statement on the Responsible Use of AI

Artificial Intelligence (AI) presents both exciting opportunities and significant ethical considerations, and, thus, must adhere to a set of guidelines that align with our commitment to academic integrity and ethical practice.

AI in Our Course

[course number, name, and section]

Permitted Uses of AI

AI tools are permitted in this course as a means to facilitate and enrich your learning process. They can be used for preliminary research, concept exploration, and as an aid in the creation of drafts or study materials. However, the core of your academic submissions must be authentically yours, crafted with your critical thought and reflective of your insights. Suggested Tools [to be listed by faculty for their own courses]:

- Grammarly
- ChatGPT
- Gamma presentations
- Google Translate
- Bard
- Canva
- Adobe Express

Guidelines for AI-Generated Content

AI may be used to support and supplement your learning, not to replace your original work. You are encouraged to use AI for tasks such as structuring outlines, generating study questions, isolating facts, or identifying and comparing concepts. However, the final work you submit must be your own, reflecting your understanding and analysis, expressed in your own words.

Any content generated by AI that is submitted for academic credit must be explicitly approved by me. You are required to disclose the use of AI and provide proper attribution, as per the revised CUNY Academic Integrity policy. Upon request, you must be prepared to provide me with your interactions with AI, so be sure to save your chatlog.

Critically engage with AI outputs, interrogating their accuracy and relevance to our course, and understand their limitations. AI should serve as a starting point for your analysis, not the endpoint.

Be aware of biases in AI algorithms and consider the broader societal implications of these technologies.

Protect your privacy and the confidentiality of others (including your classmates and instructor) while using AI tools. Ensure that no personal data is entered into AI systems, and familiarize yourself with the privacy policies of each tool we employ.

APPENDIX C

On Plagiarism and Cheating and Academic Integrity

Compiled by

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Contents of this Webpage

I. Plagiarism Facilitation Sites

II. Detecting Plagiarism

III. Avoiding or Reducing or Mitigating Against Plagiarism

IV. Academic Integrity

V. Detecting and Preventing Cheating in Online Classes

PLAGIARISM in the age of AI

With the advances in artificial intelligence (AI) and the availability of a variety of AI tools or applications that facilitate authorship by AI of text there is now a form of plagiarism (using the work of another and claiming it as your own) whereby an AI creates the text or does the work and some human claims it as the work of that human alone. In light of this new situation this section is added as preface to what came before AI arrived and was made so available.

As instructors consider revising written assignments going forward and the need to discourage use of AI forms of assistance and detect them when used they need to know that some AI detectors can be defeated. The task as posed to Chat GPT provided this result to one attempt:

ATTEMPT 1:

ChatGPT

Q: How best to construct essay assignments to discourage use of AI by students?

AI REPLY:

One way to construct essay assignments to discourage the use of AI by students is to assign topics that require the use of critical thinking, analysis, and synthesis of information, rather than simply recalling facts. Additionally, incorporating open-ended questions that require students to form their own arguments and perspectives can make it more difficult for AI to generate a relevant response. Another approach can be to have students work on group projects where participation and contribution can be easily monitored. Additionally, having students submit a rough draft, a final draft and then also conduct plagiarism checks using software tools can also discourage the use of AI generated essays.

Q: What if students were to submit the results of an AI check of their own assignment to be submitted as part of the assignment?

AI REPLY:

If students were to submit the results of an AI check of their own assignment as part of the assignment, it could potentially serve as a way to demonstrate that their work is original and not generated by AI. However, it would be important for the instructor to verify the authenticity of the results, as it is possible for students to use AI to generate essays and then use a different AI tool to check for plagiarism and provide a false "clean" report. Additionally, it would be important to keep in mind that the AI check is not a foolproof way to ensure originality, as AI models can be trained on specific datasets and may not be able to detect plagiarism from sources outside of the dataset. It is always recommended to use multiple plagiarism checking tools and also check for originality of ideas and concepts.

ATTEMPT 2 in same line of "conversation":

ChatGPT

Q: How best to construct essay assignments to discourage use of AI by students or make them readily detectable?

AI REPLY:

There are several ways to construct essay assignments to discourage the use of AI by students or make them more readily detectable:

Assign topics that require critical thinking, analysis, and synthesis of information, rather than simply recalling facts. This makes it more difficult for AI to generate a relevant response.

Incorporate open-ended questions that require students to form their own arguments and perspectives.

Use plagiarism detection software to check for similarities between student submissions and existing sources.

Have students submit a rough draft, a final draft, and then conduct plagiarism checks using software tools.

Have students submit the results of an AI check of their own assignment as part of the assignment, but verify the authenticity of the results.

Use multiple plagiarism checking tools and also check for originality of ideas and concepts.

Incorporate peer-review or self-review process where students are required to evaluate the work of their peers or themselves and report any plagiarism or AI generated content.

Assign group projects where participation and contribution can be easily monitored and evaluated.

It's important to note that no single method is foolproof, so a combination of these techniques may be more effective in detecting AI-generated essays and discouraging their use.

Here are AI Generators:

- ChatGPT
- Bramework
- Chatsonic
- Copyai
- Creator
- Quillbot
- Scalnut
- Wordhero
- Writesonic

Using AI to alter Text to evade detection

There are several steps a person might use to evade having their text detected as AI generate. Here is one example:

- Step 1: Create text with AI such as with ChatGPT <https://chat.openai.com/chat>
- Step 2: Rewrite with AI generator with instructions to use synonyms
- Step 3: Paraphrase entire work using another AI: e.g., [free-artcile-spinner.com](https://free-article-spinner.com/)
<https://free-article-spinner.com/>
- Step 4: Paraphrase again Rewrite using wordtune.com <https://www.wordtune.com/>

AI Detectors:

- ZERO GPT one of the best available at start of 2023 being updated regularly.
- Originality.ai Costs minimum of \$20 to start and then with monthly fee
- AI Content Detector - Detect ChatGPT Plagiarism
- TURNITIN : The plagiarism detection service Turnitin said it would incorporate more features for identifying A.I., including ChatGPT, later in 2023.
- AI-Writer-Content-Detector
- Falsely Accused of AI Cheating? Tips & Easy Tutorial to Defend Yourself
- AI Detection: Falsely Accused of Using ChatGPT for Academic Writing An infographic providing tips on how to effectively protect yourself and prove that you have maintained academic integrity.