

Exploring The Intersection Between Technology And Public Sector Accounting Education - A Systematic Literature Review

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Abstract. This systematic literature review explores the intersection of technology and public sector accounting education (PSAE). Despite the growing importance of PSAE for preparing competent public servants and implementing public sector reforms, research in this area remains limited compared to private sector accounting education. This study aims to address this gap by examining the evolution of technology trends in PSAE and identifying future research directions. The findings reveal a significant focus on the urgency to acquire technological skills, integrating technology into teaching, and developing conceptual frameworks. This highlights the need for continual adaptation of PSAE curricula to incorporate modern tools and respond to global challenges. Future research should explore the integration of advanced technologies, such as artificial intelligence and blockchain, into PSAE to enhance public sector reforms and educational practices. Comparative studies across different countries are also necessary to understand cultural and systemic factors influencing PSAE. Addressing these gaps will ensure that PSAE remains relevant and effective in preparing graduates for the evolving demands of the public sector.

Keywords: Public Sector Accounting Education (PSAE), Public Sector Accountability, Technology Integration, Digitalization

1. Introduction

Accounting education is a fundamental pillar of accounting practice (Karatzimas et al., 2022). Therefore, research and scholarly attention should be equally devoted to accounting education as it is to accounting practice research. When discussing private sector accounting education, this balance is more evident. In contrast, public sector accounting education receives significantly less focus (Heiling, 2020; Karatzimas et al., 2022).

In recent decades, research on public sector accounting education has indeed started to increase.

This growth is primarily driven by the implementation of the International Public Sector Accounting Standards (IPSAS), which promotes the adoption of accrual-based accounting in the public sector (Pauluzzo et al., 2024). Additionally, various symposiums and conferences have begun to take place, such as the biennial CIGAR conferences in 2019 and 2021 and the 20th annual OECD Senior Financial Management and Reporting Officials Symposium (Karatzimas et al., 2022). Nonetheless, compared to research in private sector accounting education, public sector accounting education research still lags significantly behind.

The importance of this issue lies in the fact that public sector accounting involves the management of public funds. Therefore, the focus on public sector accounting education (PSAE) extends beyond financial reporting to encompass the efficient use of public resources, the preparation of competent public servants, and the implementation of public sector reforms (Nelson, 1951; Novin et al., 1997; Campbell et al., 2000; Sciulli & Sims, 2007).

A key factor in public sector reform is digitalization (Karatzimas et al., 2022). Digitalization is closely linked with technology, making it relevant and important to examine published PSAE research and conduct a structured literature review on technology and digitalization. Moreover, the slower adoption of technology in the public sector compared to the private sector (West, 2005; Hinkley, 2023) further underscores the need for research in this area to address the lag in public sector accounting practices.

This study aims to address several research questions through a systematic literature review (Massaro et al., 2016):

RQ1: How have the technology trends in public sector accounting education research evolved over time?

RQ2: What are the future directions in the research on technology and public sector accounting education?

2. Research Background

2.1. Technology in Accounting

Technology has dramatically impacted our world and changed our daily lives. Some of these changes were gradual improvements, and some were revolutionaries. Some entities could adapt and evolve to stay relevant, while others eventually failed or were absorbed by competitors. Those that succumbed were not typically small or mid-size enterprises but were more often former market leaders (Christensen, 1997).

The accounting industry is no exception. In fact, it is prone to disruption since the accounting profession has long been stigmatised (Jeacle, 2008) in popular culture as boring, rigid, and monotonous. Gould (2017) indicated that these professions encounter significant opportunities and challenges with disruptive technologies. Accountants constantly worry that their jobs will be replaced by emerging technologies such as artificial intelligence and automation (Krumwiede, 2017), and catching up with digital change is one of the “biggest nightmares” (Hood, 2015).

Accounting has seen expansion alongside technological advancement, particularly concerning data processing technology (Kee, 1993). Accounting records can be traced back to as early as 3600 BC through Babylonian clay tablets (Langer, 1958), marking the epochs of humanity's earliest encounters with writing and civilization. While the method utilised using clay tokens and jars might be considered basic and primitive, it effectively encompassed the fundamental

elements of an accounting system: organising, storing, retrieving, and reporting economic activities (Kee, 1993).

A subsequent significant advancement occurred when Luca Pacioli introduced double-entry bookkeeping, earning him the title of the "Patriarch of Accounting" (Langer, 1958). Driven by the escalating demands of businesses in Northern Italy, which were becoming increasingly intricate due to the property rights and contractual obligations of merchants, a new requirement for record-keeping emerged (Luzzatto, 1961; Roover, 1956; Brown and Johnston, 1963). This gave rise to the concepts of assets, capital, and profit. The foundation laid by Pacioli continues to serve as the backbone of the modern accounting system, where double-entry plays a dual role in recording and controlling economic activities.

Nonetheless, for centuries following the Pacioli era, accounting operations remained labour-intensive tasks, involving the use of pencils or paper, and even abacuses, to record and calculate financial transactions (Kee, 1993). In addition to being costly and time-consuming, human labour is also susceptible to errors (Brown and Johnston, 1963). Therefore, a new necessity arose for the mechanisation of accounting (Coleman, 1949). Commencing with Herman Hollerith's invention of the punched card in 1884, which was subsequently advanced by International Business Machines (IBM) into an electric accounting machine (EAM) dominating 80-90% of the market share throughout the 1930s (Campbell-Kelly, 2003).

The era of accounting digitization naturally coincided with IBM's introduction of computers in the 1950s, famously recognized as the management information system (Kee, 1993). The increasing accessibility of personal computers, particularly for business purposes, led to the emergence of spreadsheets as an application that could be seen as disrupting the previous mechanical tabulation tools. Spreadsheets offer instant calculation and manipulation capabilities without requiring coding (Zynda, 2013). Spreadsheet applications like VisiCalc, Lotus 1-2-3, and later Excel have paved the way for further advancements in accounting technology. This progression led to the development of accounting software that relies more on graphical interfaces, such as MYOB, Quickbooks, Peachtree, and others (Cohn and Bellone, 1997). Many contemporary accounting software platforms, including industry leaders like SAP and Oracle, now offer cloud versions. This advancement allows companies and organisations, especially those with constrained resources, to leverage advanced functionalities without heavy investments (Wolf, 2015; Senarathna et al., 2018).

Accounting, a dynamic field continually evolving, has seen significant changes over time in its methods, techniques, and practices, leading to noticeable differences between the recent practice of accounting and that of the past (Napier, 2006). The accounting profession has demonstrated its ability to remain relevant throughout various advancements in accounting technology, spanning from the era of mechanisation to the present era of digitization. Nevertheless, the disruption brought about by emerging technologies is perceived to differ from previous developments in accounting technology, posing distinct challenges for accountants.

The latest technological advancements, often referred to as digital disruption or technological revolution, will undoubtedly impact how the accounting industry carries out its role. The phrase "digital disruption" refers to how recent advancements in technology are transforming traditional industries (Marrone and Hazelton, 2019). It is characterised by a fusion and interaction of these technologies, breaking the limit between the physical, digital, and biological spheres (Schwab, 2016). Disruptive accounting technology refers to modern innovations that

can significantly transform the accounting profession, requiring a paradigm shift among accountants in their mindset, operational approach, and focus to maintain relevance in the evolving landscape.

Fundamental transformation is happening in the accounting industry, with internet-related technologies, such as cloud, big data, artificial intelligence (AI), and blockchain (Moll & Yigitbasioglu, 2019), quickly changing how accounting functions within organisations. In this era of disruptive accounting changes, those who fail to adapt or adopt will lose relevance (Christensen, 1997).

It is clear that disruptive technology, such as blockchain and Internet of Things (IoT), has an impact and implications on how accountants will work in the future. Digital transformation applied to accounting provides high transparency (Izzo et al., 2022). As a distributed ledger, blockchain can guarantee transparency to all network members (Treleaven et al., 2017), so there is no need for intermediaries (Frizzo-Barker et al., 2020). Furthermore, the possible utilisation of smart contracts presents the opportunity to disrupt the payment system by virtue of their automated execution capability (Zemankova, 2019), potentially eliminating the need for accountants to manage receivables or payables. Internet of Things (IoT) presents opportunities and practical concerns for developing future advances in digitising accounting information (Valentinetti & Munoz, 2021). AI-driven technologies like smart robots, automated feature tools, and business intelligence (BI) tools possess the capability to substitute human involvement and transform accounting processes (Leitner-Hanetseder et al, 2021).

Adapting to disruptive technology poses challenges that are far from straightforward. Regulations and accounting standards often lag behind prevailing developments. According to Ramassa and Leoni (2021), IASB is defensive of its position in regulating accounting for cryptocurrency through existing standards despite pressure for new solutions, highlighting the importance of agenda decisions in the IFRS environment and the limits of the IASB's long regulatory process in emerging accounting issues. Furthermore, it is essential to incorporate these transformations into accounting education, both in content and delivery methods, to ensure that graduates possess knowledge that is relevant to their future workplaces and remain updated with international accreditation standards and professional qualifications (Al-Htaybat et al., 2018).

2.2. Accounting Education

Accounting education has responded to the changes occurring in the accounting industry due to emerging technologies by recognizing a range of supplementary competencies that are essential for accounting graduates. Beyond mastering traditional technical accounting skills, there's an increasing emphasis on broader competencies. For instance, the International Federation of Accountants (IFAC) highlights in its International Education Standard (IES) 2 that graduates should not only possess technical accounting proficiency but also be adept in areas like information and communications technologies (ICT). This includes understanding the implications of ICT on an organisation's environment and using ICT tools to effectively analyse data. This shift underscores the importance of aligning accounting education with the current technological landscape.

However, the issue at hand is that the accounting industry itself is still in the process of determining the most suitable approach to adapt to disruptive technology. Hence, the field of

education finds itself somewhat uncertain about how to adequately prepare the next generation of accountants.

Numerous studies have demonstrated that accounting education institutions have strived to equip their students with a spectrum of skills, or at the very least, unveil the key areas that need to be emphasised in preparing accounting students to adapt to the latest technology. These encompass both general technological competencies, such as proficiency in spreadsheets and other accounting software, as well as transferable skills that empower accounting graduates to stay updated with disruptive technology advancements, such as big data or blockchain.

For example, Wulandari and Ali (2019) investigated how Indonesian accounting lecturers' perceptions of the usefulness and ease of adopting technology influenced their intentions to integrate eXtensible Business Reporting Language (XBRL) into the accounting curriculum. The findings reveal that 19% of programs have integrated XBRL into the curriculum, with a primary focus in accounting information systems courses. The curriculum changes at large public institutions (enhance existing AIS course) and small private institutions (introduce new degree/MS in Accounting Analytics) were beneficial for the students, providing valuable insights for faculty and accounting departments interested in making similar changes to address big data (Sarkar et al., 2021). Zekany (2020) identified innovative and newly required courses in the US accounting programs, such as accounting analytics and information systems security. Experts have extensively undertaken and advised various initiatives to incorporate data analytics content into accounting (Blix et al, 2021; Mesa, 2019; Dow et al, 2021).

Felski and Empey (2020) examined the advantages of including blockchain in the curriculum of accounting information system; the primary benefits identified were that it provided both graduate and undergraduate students an edge in the workplace, whether their blockchain knowledge was basic or advanced. The feasibility and educational value of employing a scaffolded approach to teach blockchain coding to graduate accounting students were demonstrated by Kaden et al (2021).

Andiola et al (2020) concluded that Standard A7 AACSB, related to information technology skills and knowledge for accounting graduates, significantly helped promote change in the accounting curriculum related to the integration of technology and data analytics. The incorporation of Standard A7 is designed to help students be better prepared for the changing environment. Apostolou et al (2020) argued that the evolution of the CPA exam, with a shift towards technology, data analytics, and automation, is a current topic of interest for accounting educators.

Regarding transferable skills, Suarta et al (2023) found that employers highly value communication, interpersonal, self-management, and analytical skills in accounting graduates, alongside advanced Microsoft Excel abilities and proficiency in accounting software such as SAP, Xero, Zahir, and Quickbooks, thus emphasising the necessity of integrating these employability and digital technology skills into the accounting curriculum to establish strong links between theory and practice. While Tsiligiris and Bowyer (2021) identified two crucial personality traits for accountants: (1) adaptability and (2) continuous personal and professional development.

Several approaches have been implemented to equip accounting graduates with the required

skills. Twyford and Dean (2023) suggested to integrate employability skills into authentic assessments in collaboration with industry partners, an approach which, according to findings, significantly enhances students' perception of their employability based on their Work-Integrated Learning (WIL) experiences, in the form of work placement or internships (Stanley and Xu, 2019). Other WIL methods such as digital game-based learning, mentorship programs, and hackathons, could be improved by including enhanced institutional support, innovative teaching methods, professional organisations' involvement, and improved student preparation for job recruitment (Jackson and Meek, 2021). An experiment to enhance student readiness for professional careers, focusing on data analytics and visualisation, through an Interactive Professional Learning Experience (IPLE) improved test score for graduate accounting students (Riley et al., 2021). The project-based assessment for learning was successful in providing accounting students with an opportunity to develop their team innovation competence (Venter et al., 2022).

The public sector does not adopt emerging technologies at the same pace as the private sector. Consequently, some technologies that are relatively established in the private sector are still considered emerging in public sector accounting. Despite the undeniable and growing importance of Public Sector Accounting Education (PSAE) for efficient public servants and public sector reforms, research in this area remains scarce. Factors contributing to PSAE being relatively left behind include demand (Sciulli & Sim, 2008; Hoque, 2023; Adam et al., 2019) and a bias towards the private sector (Reichard et al., 2023).

In some countries, such as New Zealand and Germany, the emphasis on public services within accounting education is considered weak (Cordery, 2013; Reichard et al., 2023). This issue occurs because Higher Education Institutions (HEIs) do not primarily focus on directly preparing students for specific job roles. As a result, the intricacies of Public Sector Accounting (PSA) frequently lie beyond the research and teaching priorities of academic staff at universities. Despite this, Heiling (2020) and Pericolo et al. (2023) conclude that the increasing complexity and inherent interdisciplinary nature of Public Sector Accounting (PSA) necessitate the establishment of a dedicated degree course in public sector accounting.

3. Methodological Approach

A systematic literature review (SLR) is conducted using a specific and rigorous methodology (Massaro et al., 2016). This approach is suitable for both qualitative and quantitative research (Pauluzzo et al., 2024). In the field of accounting, SLRs are commonly used, as seen in studies by Santis et al. (2018) examining public sector consolidated financial statements, and Iacuzzi (2022) researching financial indicators for local government. This study employs three major phases to retrieve relevant data: planning the literature review, conducting the literature review, and reporting and dissemination (Massaro et al., 2016; Santis et al., 2018; Karatzimas et al., 2022).

The planning phase includes developing the study protocol, which ensures the study's objectivity and replicability by other researchers (Massaro et al., 2016; Santis et al., 2018). The complete protocol, which follows the design by Pauluzzo et al. (2024), is presented in Table 1. Additionally, two research questions were formulated during this planning phase.

The second phase, conducting the literature review, begins with searching journal databases.

This method is more efficient than direct journal searches and accommodates the cross-disciplinary nature of PSAE, which may appear in journals from various academic fields (Garlatti et al., 2020). Scopus was chosen for its extensive and rigorously quality-controlled database, ensuring comprehensive and diverse collections of research across specific fields (Bakkalbasi et al., 2006; Franceschini et al., 2016). The keywords and search strings used were ("public sector accounting" OR "government accounting" OR "public accounting") AND ("education" OR "teaching" OR "curriculum"). This search yielded 234 documents.

Further filtering was applied by selecting only journal articles, reducing the results to 176. When limiting to English-language articles, the results were narrowed down to 153 journals. To ensure relevance to public sector accounting education, titles, abstracts, and keywords were reviewed, and duplicates were eliminated, resulting in 28 relevant papers. To address potential omissions, additional papers were included through residual searches on Google Scholar (Englund and Gerdin, 2014) based on the dataset used by Karatzimas et al. (2022) and Pauluzzo et al. (2024), adding a total of 40 papers. The final step was a quality filter to ensure the journals' standards. The criteria used were a minimum of Q4 Scopus ranking or inclusion in the ABDC journal list. The ABDC list was chosen due to its recognition as one of the best, especially in the field of accounting (Black et al., 2017; Grossman et al., 2019). This process yielded a list of 48 papers.

The final phase, reporting and dissemination, involves reviewing and analysing the selected papers. Besides the primary analysis related to technology in PSAE, the analysis includes publication year, paper citations, journal quality, countries analysed in the studies, and methodological approaches.

Table 1. The Literature Review Protocol

What is known	There is potential for a systematic literature review (SLR) on the intersection of technology and public sector accounting education (PSAE) to identify key technological trends and their implications for enhancing the competencies of graduates and public servants in accounting, ensuring they remain relevant in the era of emerging technologies.
Proposal detail	In recent years, PSAE has garnered increasing attention from both scholars and practitioners. However, many aspects remain unexplored, including how PSAE should embrace technological advancements. This review aims to be one of the first to investigate early studies in this area, specifically the intersection of technology and PSAE.
Research Topic	The plan is to conduct an SLR on the intersection of technology and PSAE to analyse how PSAE prepares public sector accountants to embrace technologies that support public sector reform, particularly in relation to digitalization.
Motivation	There is a perceived gap between education and practice

	that undermines graduates' ability to navigate the complexities of the current working environment, particularly in integrating technology into PSAE.
Method	The plan is to conduct an SLR on the intersection of technology and PSAE to analyse how PSAE prepares public sector accountants to embrace technologies that support public sector reform, particularly in relation to digitalization.
Analytical Framework	The analysis will adopt categories used in several SLRs in the accounting field (Massaro et al., 2016; Santis et al., 2018; Karatzimas et al., 2022; Pauluzzo et al., 2024), with a particular focus on technology integration.

4. Result And Discussion

From the 48 papers analysed, the first step taken by the authors was to examine whether the terms "technology" or "digitalization" were discussed in the papers. The categorization modified from Pauluzzo et al. (2024) was as follows:

1. Specific reference to technology in PSAE;
2. Generic mention of technology in PSAE; and
3. No reference to technology in PSAE.

Based on this classification, we identified 7 papers that fall into the first category and 16 papers that fall into the second category, so in total 23 relevant papers. Papers in the third category were excluded from further in-depth analysis.

4.1. Descriptive Statistics

The PSAE publications over time indicate significant peaks in recent years. A single publication was noted in 1982, followed by two in 2005 and two in 2007. Subsequent years saw sporadic publications, with one in 2009, one in 2011, and another peak in 2013 with a single publication. The interest in PSAE surged notably in the last decade, with increased activity starting from 2018 (one publication) and continuing through 2019 (two publications), 2020 (two publications), and a substantial rise in 2022 (three publications). The most remarkable peak occurred in 2023 with five publications, and this trend continued into 2024 with two publications. This recent surge suggests growing interest and engagement with PSAE topics, particularly in the last five years as illustrated in the graph below.

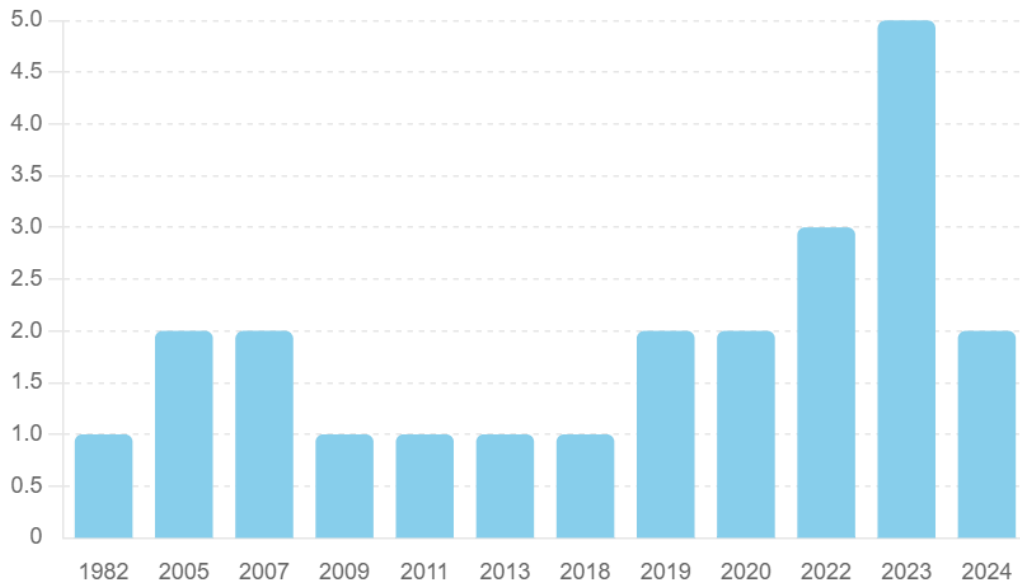


Figure 1. Number of Publications per Year

An analysis of the most cited articles based on Google Scholar as of July 2024 (Table 1) showed that the ten most cited papers cover various aspects of PSAE. Murphy (2005) explores enhancing student learning with governmental accounting Jeopardy!, presenting adaptations of the TV game Jeopardy! as a computer-based, active-learning tool that caters to the learning preferences of modern students, cited 42 times. Adam Berit et al. (2019) discuss whether higher education institutions in Europe are preparing students for IPSAS, emphasising the necessity of understanding accounting information systems, technologies, and standards in public sector entities, cited 35 times. Sellami & Gafsi (2020) examine public management systems and accounting education in sub-Saharan Africa, highlighting challenges such as regulatory inconsistencies, inadequate training programs, and resistance to change, cited 25 times.

Table 2. Most Cited PSAE Articles

Authors	Year	Title	Journal	Citations
Murphy, E. A.	2005	Enhancing Student Learning With Governmental Accounting Jeopardy!	Journal of Public Budgeting, Accounting & Financial Management	42

Adam, B., Brusca, I., Caperchione, E., Heiling, J., Jorge, S. M. F., Manes, R. F.	2019	Are Higher Education Institutions In Europe Preparing Students For IPSAS?	International Journal of Public Sector Management	35
Sellami, Y. M., & Gafsi, Y.	2020	Public Management Systems, Accounting Education, And Compliance With International Public Sector Accounting Standards In Sub-Saharan Africa	International Journal of Public Sector Management	25
Moody, M., & Marlowe, J.	2009	Recent Iterations In The Public Financial Management Curriculum: Is What Practitioners Need Being Taught?	Journal of Public Affairs Education	24
Thom, M.	2019	Teaching Public Financial Management: An Integrated Approach To A Critical Subject	Teaching Public Administration	24
Wilson, E.	2013	An Historical Perspective On Governmental Accounting Education	Journal of Accounting Education	23
Lowensohn, S. H., & Reck, J. L.	2005	Methods And Resources To Increase Student Interest In Governmental Accounting	Journal of Public Budgeting, Accounting & Financial Management	20
Heiling, J.	2020	Time To Rethink Public Sector Accounting Education? A Practitioners' Perspective	Journal of Public Budgeting, Accounting & Financial Management	20

Karatzimas, S., Heiling, J., & Aggestam-Pontoppidan, C.	2022	Public Sector Accounting Education: A Structured Literature Review	Public Money and Management	19
Cohen Karatzimas, S.	2022	New Development: Public Sector Accounting Education for Users-Embedding e-Learning and Technology in Teaching	Public Money and Management	15

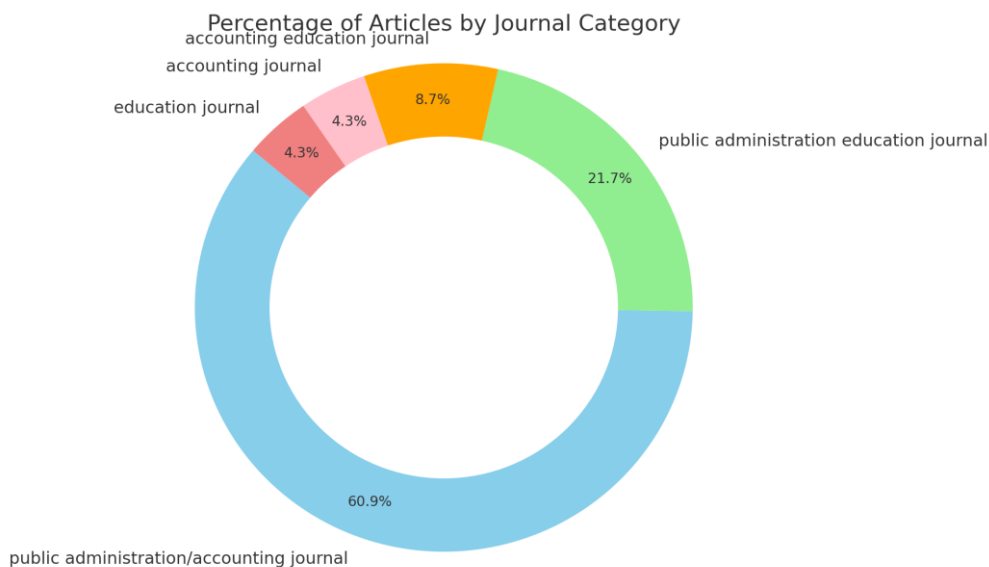


Figure 2. Journal Category

The majority of studies are published in public administration/accounting journals, which make up 60.9% of the total with 14 papers. This is followed by public administration education journals, accounting for 21.7% with 5 papers. The remaining categories include accounting education journals (8.7% with 2 papers), accounting journals (4.3% with 1 paper), and education journals (4.3% with 1 paper), each contributing smaller percentages to the overall distribution.

Most study authors included in this analysis (25.7%) were affiliated with a US university (Table 3). Germany ranked second with six publications (17.1%), followed by Italy and Greece, each with four publications (11.4%). Other contributing countries included Portugal with two publications (5.7%). Additionally, Spain, the UK, Denmark, the Netherlands, Romania, Switzerland, Sweden, Norway, and Tunisia each contributed to the overall distribution with one publication (2.9%) each.

Table 3. Analysis of Authors' Affiliation Country

Affiliation Country of Authors	No. of Publications	%
USA	9	25.71
Germany	6	17.14
Italy	4	11.43
Greece	4	11.43
Portugal	2	5.71
UK	2	5.71
Spain	1	2.86
Denmark	1	2.86
Netherlands	1	2.86
Romania	1	2.86
Switzerland	1	2.86
Sweden	1	2.86
Norway	1	2.86
Tunisia	1	2.86
Total	35	100

*the number 35 is explained by authors from different countries jointly publishing a paper

The methodological approach used by most studies (Table 4) predominantly involved a conceptual approach, accounting for 36.4% of the total. Case studies were the second most common method, representing 22.7% of the studies. Empirical questionnaire-based surveys and content analysis were each employed in 18.2% of the studies. Literature reviews were the least common, used in only 9.1% of the studies.

These findings indicate that while empirical and analytical methods such as questionnaires and content analysis are significant, a substantial proportion of studies prefer a conceptual framework. This trend highlights the importance of theoretical development in public sector accounting education research. Only a few studies utilized literature reviews, pointing to a potential area for further exploration. The diversity in methodological approaches reflects a comprehensive effort to understand various aspects of public sector accounting education from multiple perspectives.

4.2. Evolution and Focus of Technology Related Issue in the PSAE Literature

To answer RQ1: How have the technology trends in public sector accounting education research evolved over time, our analysis showed that the papers could be classified into three categories based on their focus: urgency (56%), technology in teaching (32%), and framework (4%). In cases where papers could be classified into more than one category, we identified the main focus to assign it to the most appropriate category. This classification highlights the predominance of urgency-related topics, reflecting the pressing nature of issues addressed in the research, while technology in teaching also represents a significant portion, indicating a strong interest in integrating modern tools into education. Framework-related studies are less common, suggesting a potential area for further exploration.

4.2.1. The urgency to acquire technological/digital skills

Most of the selected papers focused on the evolution and integration of public sector accounting (PSA) within various educational curricula, emphasizing the need to adapt to technological advancements and changing educational demands. Notable contributions in the early 1980s highlighted the importance of off-campus training for local government finance employees to meet the needs of newly educated personnel (Nowotny, Razek, & Hosch, 1982).

A significant shift was observed in the 2000s, with studies like Moody and Marlowe (2009) examining whether the public financial management curriculum had adapted to changes in public organization life brought about by advancements in communication and information technology. Peddle and Thurmaier (2011) also emphasized the continuous updates in public administration programs in response to technological advancements, highlighting key components such as human resources, budgeting, financial processes, and technology applications.

Recent studies have focused on the integration of PSA within undergraduate programs and the necessary competencies required for graduates. Pitulice et al. (2018) discussed the critical milestones in accounting education, emphasizing the need for curricula to be open, relevant, and technology-focused to prepare students for the economic environment.

The growing importance of International Public Sector Accounting Standards (IPSAS) in higher education institutions was addressed by Adam et al. (2019), who explored whether European institutions are preparing students adequately for these standards. They highlighted the unique features of PSA and the essential knowledge required for accounting information systems and technologies in public sector entities.

Sellami and Gafsi (2020) examined the challenges faced in sub-Saharan Africa in complying with international public sector accounting standards, citing issues such as regulatory inconsistencies, lack of training programs, and political support. Heiling (2020) further emphasized the need for a comprehensive education in PSA, incorporating digitalized, open, and smart government paradigms, and the importance of ERP competencies for accountants.

The literature also reveals a trend towards digital adaptation in PSA education, with Karatzimas et al. (2022) calling for more studies on the role of digitalization in teaching PSA. They stressed the importance of integrating recent developments, such as non-financial reporting and public-private partnerships, into the curricula.

Recent research by Falivena et al. (2023) proposed a framework to assess the coverage of financial management topics in MPA/MPM programs, highlighting the significance of digitalization and sustainability. Pericolo et al. (2023) discussed the impact of public sector reforms, e-government, and digitalization on PSA education, stressing the need for new skills and competencies to address these changes.

Reichard et al. (2023) analyzed the education of public sector accounting in Germany, noting that the relevance of accounting content is influenced by the rise of trendy topics like digitalization and sustainability. Pauluzzo et al. (2024) emphasized the increasing reliance on digitalization and ICTs in delivering public services and its implications for PSA education.

Finally, Baylis et al. (2024) highlighted the technical expertise shortages in the public and non-profit sector, identifying audit, accounting, tax, and technology as critical skill areas. This underscores the importance of continuous updates and advancements in PSA curricula to meet the evolving needs of the public sector.

In summary, the evolution of PSA education reflects a dynamic interplay between traditional accounting principles and modern technological advancements. The continuous adaptation of curricula to include new competencies and respond to global challenges is crucial for preparing graduates for the future demands of public sector accounting.

4.2.2. Technology in teaching accounting

The integration of technology in teaching accounting has transformed educational practices, making learning more interactive and effective. The use of digital tools and platforms not only enhances the learning experience but also prepares students for the evolving demands of the accounting profession.

Murphy (2005) describes the adaptation of the TV game Jeopardy! as a computer-based, active-learning, and self-assessment tool for governmental accounting, emphasizing how technology can cater to modern students' learning preferences.

Lowensohn and Reck (2005) highlight the internet's role as a supplementary resource for textbook material in the rapidly changing governmental accounting and auditing arena.

Beckett-Camarata (2007) examines the use of critical thinking in a web-based public budgeting course. The study finds that online discussion boards, combined with case assignments and examinations, offer a forum for developing critical thinking skills by allowing students more time to reflect on their responses compared to traditional classroom settings.

Daniels, Gupta, and Pridgen (2007) provide insights into faculty perspectives on the integration of computer technology within governmental and nonprofit accounting courses. They suggest that future research should explore the extent and types of technology used in classrooms.

Wilson (2013) provides a historical perspective on governmental accounting education, noting significant changes over the past 35 years due to technological advancements. The paper discusses the evolution from traditional classroom tools like chalkboards to modern technology such as computer projectors, smart boards, and Internet-connected devices, which have made courses more effective and engaging for students.

Thom (2019) presents an integrated approach to teaching a graduate-level public financial management course, which includes the use of case studies and interactive simulation assignments. This method links financial management with broader public administration issues, utilizing technology to enhance learning outcomes.

Cohen and Karatzimas (2022) discuss the benefits of active learning techniques and eLearning in teaching public sector accounting. They emphasize the importance of using user-friendly and realistic financial tools to enhance comprehension among public administration students who may lack accounting backgrounds.

Pazzi and Svetlova (2023) focus on the role of digital platforms and educational initiatives in

making accounting information more accessible and relevant. They highlight how NGOs use online explanations and direct education to reduce informational inequality and empower accountability holders.

4.2.2. Conceptual Framework in the PSA Reform Related to Technology

Schuler, Grossi, and Fuchs (2023) is the only paper that propose a conceptual framework in this field. Their analysis of past reforms in emerging economies reveals a significant misalignment: the educational development of public sector accountants often lags behind the technical advancements intended by the reforms. This misalignment underscores the necessity of a balanced approach that values both human and technological capacity.

The authors introduce a conceptual distinction between initial and continuous accounting education. They argue that continuous professional development is essential for the success of PSA reforms. This perspective highlights that accounting change requires not only technological advancements but also a sustained effort in developing the competencies of public sector accountants. This conceptual framework underscores the importance of education as a central element in achieving effective and sustainable PSA reforms.

4.3. Future Research Directions

To answer RQ 2: What are the future directions in the research on technology and public sector accounting education, given the limited research on the intersection of technology and public sector accounting education (PSAE), there is substantial opportunity for future studies in this area.

First, driven by public sector reform and digitalization, as noted by Karatzimas et al. (2022) and Cohen and Karatzimas (2022), future studies should examine how PSAE can be adapted to better support these reforms. This research should not only focus on teaching technologies and digital tools to enhance the learning experience but also on understanding how technology can support public sector reform, particularly in government accounting.

Heiling (2020) and Pauluzzo et al. (2024) highlighted the necessity for public sector practitioners to be adept with advanced digital technologies like artificial intelligence, robotic process automation, blockchain, open data, and smart government. Future research should explore how these technologies can be effectively integrated into PSAE curricula to enhance the skills and capabilities of future public sector accountants.

Additionally, Reichard et al. (2023) emphasized the need for comparative studies that analyze the state of PSAE across different countries. Existing research tends to focus on the USA and Europe. Future studies should aim to understand the cultural and systemic differences that influence the development of PSAE technologies, recognizing that each setting has its unique characteristics.

5. Conclusion

In conclusion, the analysis of technology trends in public sector accounting education (PSAE) literature reveals a predominant focus on the urgency to acquire technological skills, with a significant portion dedicated to integrating technology into teaching and a smaller emphasis on developing conceptual frameworks. This highlights the critical need for continual adaptation

and enhancement of PSAE curricula to incorporate modern tools and respond to global challenges. Studies from the early 1980s to recent times demonstrate a consistent evolution towards embracing digital competencies, reflecting the dynamic interplay between traditional accounting principles and technological advancements essential for preparing future public sector accountants.

Moreover, the literature underscores the importance of continuous professional development and the integration of advanced technologies, such as artificial intelligence and blockchain, into PSAE. Future research should focus on how these emerging technologies can support public sector reforms and enhance educational practices. Comparative studies across different countries are also necessary to understand the cultural and systemic factors influencing PSAE. Addressing these gaps will ensure that public sector accounting education remains relevant and effective in preparing graduates to meet the evolving demands of the public sector.

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