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Integration of Information and Communications Technology in Curriculum Practices: A Case of Preservice Accounting Teachers

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Abstract

This empirical paper explores South African preservice accounting teachers' perceptions of ICT integration in secondary schools' accounting curriculum practices. Since 2020, curriculum practices have been characterised by disruptions to traditional teaching and learning methods, including those brought on by the COVID-19 pandemic. Curriculum practices in accounting were not unnoticed. These sparked discussions about pedagogical changes, academic continuity, and the future of accounting curriculum practices. The theoretical framework used to guide the research process is connectivism. The theory is about forming connections between people and technology and teaching and learning in a connectivist learning environment. Connectivism promotes a lifelong learning perspective by training teachers and students how to adapt to a fast-changing environment. An interpretive paradigm underpins this qualitative research paper. The data was collected from semi-structured interviews with five preservice accounting teachers about how they navigated pedagogy while switching to digital curriculum practices. Thematic analysis was used. The findings revealed that preservice accounting teachers faced challenges in ICT integration during school-based training, including limited resources, inadequate infrastructure, and insufficient hands-on training. While ICT tools enhanced learner engagement, barriers such as low digital skills and lack of technical support hindered effective use. Participants highlighted a disconnect between theoretical training and classroom practice, prompting self-directed learning to bridge skill gaps. The study underscores the need for teacher education programs to provide practical, immersive ICT training to equip future educators for technology-driven classrooms.

Keywords: integration; technology; accounting; curriculum practices; preservice teachers

Introduction

Accounting teachers' readiness to incorporate Information and Communication Technology (ICT) in education is more significant now than ever. Skhephe et al. (2020) stated that in the modern era, where technology has a universal impact on every aspect of life, e-learning in the classroom provides an unwavering substitute for traditional methods of instruction, especially in developed nations, where it is quickly taking over as the standard approach to teaching and learning in educational institutions. Akcil and Bastas (2020) added by stipulating that every area of our life is impacted by technology, which is also completely changing the way we believe and approach teaching and learning.

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In accounting classrooms, ICT has been recognised as a crucial component and a creative means of delivering quality education through web-based collaboration, communication, multimedia, knowledge transfer, and training to enable active learning without being constrained by time or location (Krasodomska & Godawska, 2021). Wilson et al. (2020) mentioned that a crucial component of any teacher preparation course is providing preservice teachers with the knowledge and skills to integrate technology. These days, one of the qualifications for hiring new teachers is their ability to use ICT in teaching and learning (Onyema, 2020). Onorato (2024) shows concern that the demands of the media-savvy generation of learners, whose perspective is different from that of learners in the past, are not being met by the traditional method of writing on chalkboards. It can be assumed that preservice accounting teachers who have mastered ICT integration can introduce students to the technological know-how that employers in the twenty-first century require, either in their teaching practice or when they start their careers as teachers.

Preservice teachers' training is one area where ICT integration has become a central theme in today's pedagogical debate. The swift progression of technology has demanded a paradigm change in approaches to teaching and learning, with a growing focus on preparing upcoming teachers to integrate digital resources into their curriculum. This is particularly true in the realm of accounting education, where software and digital platforms intended to accelerate the above processes have replaced the conventional emphasis on manual computations and record-keeping (Oviya et al., 2024).

Various studies have emphasised the importance of incorporating ICT into teacher preparation courses (Abedi, 2023; Koenig et al., 2024; Ngao et al., 2022; Masoumi, 2021; Vieira & Pedro, 2023). In the study conducted by Samantray et al. (2024) on the role of ICT in preservice teacher education, particularly its impact on pedagogical effectiveness. The study addressed the issue of insufficient ICT training in teacher education programs, emphasising that many preservice teachers enter the classroom without the necessary skills to integrate digital tools into their teaching. Findings revealed that preservice teachers who received structured ICT training demonstrated greater confidence in using technology in their teaching. However, the study also highlighted that many teacher training institutions fail to provide practical exposure, leading to a gap between theoretical knowledge and practical implementation. The researcher argued that ICT integration in teacher education should go beyond theory and include real-world applications where preservice teachers actively use digital tools in lesson planning and classroom instruction. Similarly, Xie et al. (2023) explored ICT integration in teacher education, focusing on the institutional barriers that hinder effective implementation. The study identified a lack of institutional support, including limited technological resources, inadequate funding, and insufficient educator professional development. The findings revealed that even when teachers were willing to incorporate ICT into their teaching, systemic obstacles such as outdated infrastructure and a lack of technical support limited their ability. The study argued that successful ICT integration requires a comprehensive institutional approach, with sufficient funding, regular teacher training, and strong policy frameworks to ensure sustainability. Ahmad et al. (2024) examined how ICT affects teaching methodologies and teacher attitudes in preservice education. Their study focused on the gap between teachers' willingness to use ICT and their ability to integrate it effectively. They found that teachers who received structured ICT training as part of their coursework displayed increased confidence in using digital tools.

Additionally, those with prior exposure to technology outside formal education were more likely to integrate ICT into their teaching. The researchers argued that teacher education programs should include ICT literacy courses as a core component. They recommended hands-on workshops, peer learning, and mentorship programs to bridge the gap between theory and practice.

Another study worth mentioning was done by Gumbi et al. (2024), which investigated the impact of ICT on student engagement in preservice teacher education. Their study addressed the issue of student disengagement in teacher training programs and how ICT could be used to enhance learning experiences. The findings showed that using ICT tools such as interactive simulations, online discussion forums, and digital assessments significantly improved student engagement. Additionally, preservice teachers who utilised ICT in their lessons were likelier to incorporate

 doi:10.20944/preprints202507.1620.v1

innovative teaching strategies in their future classrooms. The researchers argued that ICT should be embedded throughout teacher training programs rather than limited to isolated courses. They recommended blended learning models that combine face-to-face instruction with digital platforms to enhance student participation and learning outcomes. Similarly, Calleros et al. (2024) studied the digital divide in teacher education, focusing on how socioeconomic factors influence access to ICT. Their research highlighted the issue of unequal access to digital tools among preservice teachers, particularly those from disadvantaged backgrounds. The findings revealed that students from higher-income backgrounds had greater access to ICT and were more proficient in using digital tools.

In contrast, those from lower-income backgrounds faced significant challenges due to financial constraints and limited internet access. The researchers argued that bridging the digital divide in teacher education requires targeted interventions, such as subsidised digital resources and specialised training programs for teachers in underprivileged areas. Without these measures, they warned, disparities in ICT access would continue to widen, exacerbating educational inequalities.

The studies mentioned above highlight the significance of ICT in teacher education, primarily focusing on institutional barriers, digital access inequalities, and general pedagogical integration, with limited attention to subject-specific readiness. Despite the increasing digitalisation of accounting education, there remains a gap in understanding how preservice accounting teachers perceive their preparedness to integrate ICT into their curriculum practices. In light of this, this study explores preservice accounting teachers' perceptions regarding their readiness to use ICTs in their curriculum practices, providing insights into the alignment between teacher training and the technological demands of modern accounting education.

The qualitative study intends to explore the following research questions:

RQ1: What challenges and opportunities do preservice accounting teachers encounter when integrating ICT into their teaching practices during school-based training?

RQ2: How do preservice accounting teachers critically evaluate the effectiveness of ICT tools in enhancing their pedagogical approaches for accounting instruction?

RQ3: In what ways do preservice accounting teachers perceive their teacher training program as preparing them to integrate ICT effectively in accounting curriculum practices?

This paper is arranged as follows: theoretical framework, methodology, findings & discussions, and conclusion.

Theoretical Framework

The theoretical framework for this study is connectivism, a theory developed by George Siemens and Stephen Downes (2004) to address the learning processes of the digital age. Connectivism challenges traditional learning theories such as constructivism, cognitivism, and behaviourism by emphasising networked social learning (Siemens & Downes, 2009). According to Downes (2007), learning is a process of creating and navigating networks of connections, as knowledge is distributed across these networks. This perspective aligns with the evolving nature of society, where technology enhances interconnectivity and complexity on both global and social levels. Connectivism underscores the importance of diverse perspectives, as knowledge is constructed through interactions within a web of digital and human connections.

This theory is relevant to this study since it provides a framework for understanding how preservice teachers engage with ICT and integrate digital tools into their teaching practices. In a networked world where learning is about establishing, navigating, and maintaining connections (Siemens, 2005), the role of technology in education is crucial. Siemens (2005) argues that in the digital age, the ability to acquire and apply information from networked sources is more important than simply possessing knowledge. This notion is particularly significant for preservice accounting teachers, who must develop technical ICT skills and learn how to engage with various digital resources in meaningful ways (Marais, 2023).

Connectivism addresses the main problem of this study by offering insights into how preservice accounting teachers can effectively integrate ICT into their teaching. Given the growing importance

 doi:10.20944/preprints202507.1620.v1

of digital tools in accounting for data analysis, financial reporting, and decision-making, preservice teachers must become proficient in using these technologies to enhance their instructional methods. Alenezi et al. (2023) highlight the necessity of ICT integration in teacher education to equip future teachers with the skills to navigate an increasingly digitalised profession. Additionally, the theory supports lifelong learning, adaptability, and the continuous pursuit of new knowledge, all essential for preservice teachers as they encounter evolving educational technologies (Camargo Mosquera, 2022).

Moreover, connectivism emphasises collaboration and networking among learners and teachers facilitated by ICT. In a connectivist learning environment, preservice teachers are encouraged to form professional networks with peers, mentors, and experts to exchange resources, ideas, and best practices (Al-Maawali, 2022). This collaborative approach is particularly valuable in accounting education, where complex concepts such as bank reconciliations and financial statement analysis benefit from shared experiences and discussions. By leveraging ICT for networking and knowledge-sharing, preservice teachers can enhance their pedagogical effectiveness.

This study employs connectivism as its guiding theoretical framework to explore how South African preservice accounting teachers perceive and implement ICT integration in their teaching practices. The framework allows for examining the relationships between digital resources, pedagogical knowledge, and classroom application. Ultimately, the study aims to contribute to the discourse on ICT integration in accounting education, fostering improved teaching and learning practices in this critical discipline.

Methodology

The qualitative research methodology used in this study is an excellent fit for delving into individuals' complex and varied experiences in educational environments. Qualitative research makes an in-depth understanding of participants' viewpoints, actions, and operating environment possible (Bazen et al., 2021). Shoufan (2023) stipulates that this made it easier for researchers to describe and analyse participant perceptions of their readiness to incorporate ICTs into their teaching methods. Additionally, using a qualitative research approach, the researchers could fully comprehend how participants perceived the phenomena they were investigating based on their own lived experiences (Alhazmi & Kaufmann, 2022). The interpretive paradigm, which is founded on the assumptions that reality is socially created and that individual experiences and interpretations are crucial to comprehending phenomena, serves as the basis for the study (Cuthbertson et al., 2020). This paradigm is suitable for the study since it aims to understand how preservice accounting teachers use ICT in their curriculum practices and how they perceive and manage it.

Five preservice accounting teachers enrolled in a South African university's teacher education program served as the study's participants. Perceptions from these participants can enlighten advances in teacher education programs, particularly in accounting, to better prepare future teachers, aligning with broader goals of enhancing the quality and sustainability of accounting education in South Africa. The participants' representation of a particular subset of future accounting teachers enables a thorough examination of their viewpoints. Despite their small size, this group may offer diverse insights on the training process and how well it prepares them for teaching issues in the real world. Purposive sampling, which is frequently employed in qualitative research to find and choose people who are especially informed or experienced with the issue of interest, was used to pick them (Campbell et al., 2020). Their use of ICT in their teaching methods and their readiness to share their experiences were among the selection criteria. The participants were chosen for the sample based on the following criteria: they are in their final year of study (4th year), they are majoring in accounting, they are enrolled in a 4-year Bachelor of Education program, and they attended and participated in work-integrated learning or school-based teaching practice as part of their training. All the participants were identified by pseudonyms in this study. Table 1 presents the profile of the study participants.

 doi:10.20944/preprints202507.1620.v1

Table 1. Participants profile.

Participants pseudonym	Year of Study	Major Subject	Program Enrolled	Teaching Practice Experience	ICT Integration Readiness	Eligibility Criteria
S1	4th Year	Accounting	Bachelor of Education (B.Ed.)	Completed Work-Integrated Learning (WIL)	Intermediate proficiency in ICT	Demonstrated ability to integrate ICT during lesson delivery
S2	4th Year	Accounting	Bachelor of Education (B.Ed.)	Completed Work-Integrated Learning (WIL)	Advanced ICT proficiency	Developed and implemented ICT-based instructional materials
S3	4th Year	Accounting	Bachelor of Education (B.Ed.)	Completed Work-Integrated Learning (WIL)	Beginner-level ICT skills	Expressed challenges in adopting ICT for curriculum implementation
S4	4th Year	Accounting	Bachelor of Education (B.Ed.)	Completed Work-Integrated Learning (WIL)	Intermediate proficiency in ICT	Participated in school-led ICT initiatives during teaching practice

 doi:10.20944/preprints202507.1620.v1

S5	4th Year	Accounting	Bachelor of Education (B.Ed.)	Completed Work-Integrated Learning (WIL)	Advanced ICT proficiency	Led peer workshops on ICT integration for subject-specific teaching

Data were collected through semi-structured interviews. While guaranteeing that critical issues pertaining to the research questions were covered, the semi-structured interviews allowed freedom to examine the participants' experiences with ICT integration. Questions about the participants' experiences with ICT tools, the challenges they encountered switching to digital curricular practices, and their opinions on the usefulness of these practices in the accounting curriculum were all included in the interview guide.

The study employed multiple strategies, including data triangulation, peer debriefing, and maintaining an audit trail of research decisions to ensure quality assurance. Data triangulation was achieved by comparing participants' responses to identify patterns and inconsistencies, enhancing the trustworthiness of the findings. Peer debriefing involved engaging fellow researchers to review and provide feedback on the data collection and analysis process, ensuring rigour and reducing researcher bias.

Ethical considerations were carefully observed throughout the study. Institutional ethical clearance was obtained before data collection commenced, ensuring compliance with research ethics guidelines. Participants provided informed consent, acknowledging their voluntary participation and the right to withdraw at any stage. Confidentiality and anonymity were maintained by using pseudonyms and securely storing data to prevent unauthorised access.

Data were analysed thematically using Braun and Clarke's (2006) six-phase approach, which involved familiarising the data, initial coding, identifying themes, refining themes, defining themes, and producing the final report. This systematic approach ensured that the data were thoroughly examined and accurately interpreted in alignment with the study's objectives.

Member checking was conducted, allowing participants to review and verify the accuracy of transcribed interviews and interpretations to enhance the validity and credibility of the study. This process ensured that their perspectives were authentically represented.

Findings and Discussions

In this section, we will present and discuss the findings from the data from five preservice accounting teachers' semi-structured interviews regarding their perspectives and experiences using ICT in accounting curriculum practices. For ethical purposes, we use S1, S2, S3, S4 and S5 to refer to the participants. The three main themes we agreed to reflect on are challenges and Opportunities in ICT Integration during School-Based Training, evaluating the effectiveness of ICT tools in pedagogical approaches and perceived preparedness from teacher training programs.

Challenges and Opportunities in ICT Integration During School-Based Training

ICT integration can transform teaching and learning by enhancing instructional delivery, fostering engagement, and promoting collaborative learning. While challenges persist, ICT presents significant opportunities for innovation, personalised learning, and skill development. This theme

 doi:10.20944/preprints202507.1620.v1

explores the challenges and opportunities preservice teachers encounter during their school-based training. However, its success largely depends on the availability of resources, adequate training, and institutional support. This theme explores how challenges in ICT integration impacted preservice teachers during their school-based training.

Limited Resources, Infrastructure, and Emerging Opportunities

Participants highlighted the lack of access to adequate ICT resources as a significant barrier. S1 noted:

> "*During my teaching practice, the school only had one functional computer lab, and it was mostly reserved for computer classes*."

This observation aligns with Helsper (2021), who argues that unequal access to digital resources perpetuates educational disparities, disadvantaging teachers and learners.

S2 added:

> *"Sometimes, I had to rely on my own mobile data because the school's Wi-Fi was unreliable."*

This quote reflects the financial burden placed on preservice teachers to compensate for institutional shortcomings, consistent with Alam's (2022) findings on resource inequity in integrating ICT in classrooms. Connectivist theory, as proposed by Siemens (2005), states that access to diverse digital resources is central to effective learning networks.

Despite these challenges, participants identified opportunities where ICT enhanced their teaching experiences.

S4 indicated:

> *"Although resources were limited when I had access to software like Excel, I could create interactive accounting exercises that engaged learners more effectively."*

The above reflects how even limited access to ICT can encourage innovation and improve teaching outcomes when used creatively. Without reliable ICT infrastructure, preservice teachers struggle to form the connections necessary for knowledge construction, leaving them unable to integrate technology into their pedagogical practices.

Inadequate Teacher Training and Opportunities for Self-Directed Learning

Many participants expressed dissatisfaction with the level of ICT training received during their teacher education programs.

S3 said:

> *"We were told to use ICT but never shown how to integrate it effectively into accounting lessons."*

This highlights the gap between theoretical instruction and practical application, as noted by Akintayo et al. (2024), who stress that teacher training should bridge this divide.

S5 reinforced this concern:

> *"The training focused on showing us ICT tools, but not how to apply them effectively in a real classroom setting."*

However, some participants viewed this challenge as an opportunity for self-directed learning.

S3 explained:

> *"Because our training was limited, I took it upon myself to explore free online platforms, like YouTube tutorials and educational blogs, to learn how to incorporate ICT into my teaching."*

This highlights how gaps in formal training can foster independent learning and resilience among preservice teachers, which aligns with Pozas and Letzel (2023), who found that preservice teachers often receive fragmented ICT instruction without clear pedagogical guidance.

These findings reveal a disconnect between policy and practice in teacher education. While ICT integration is promoted at the institutional level, inadequate resources and limited hands-on training undermine its implementation. From a connectivist lens, this gap prevents preservice teachers from

 doi:10.20944/preprints202507.1620.v1

participating in dynamic knowledge networks, reinforcing the need for continuous professional development and immersive ICT experiences.

Evaluating the Effectiveness of ICT Tools in Pedagogical Approaches

In educational practice, ICT tools are expected to enrich pedagogy by making learning more interactive, personalised, and reflective of real-world experiences. Enhancing student engagement and barriers to effective use emerged as sub-themes. They explore how preservice teachers evaluated the effectiveness of ICT in enhancing their teaching approaches.

Enhancing Student Engagement

ICT tools were perceived to improve learner engagement and facilitate understanding of complex accounting concepts.

S4 indicated:

"Using accounting simulation software made it easier for learners to grasp complex concepts, like journal entries and trial balances."

Ruzive et al. (2021) support this as they indicate that interactive technology enhances conceptual clarity and learner retention. However, engagement was not universal.

S5 noted:

"While ICT made lessons more engaging, it sometimes distracted students, especially when they accessed non-educational content."

This reflects Pratolo and Solikhati's (2021) concerns about the need for digital literacy and classroom management alongside ICT adoption.

Barriers to Effective Use

Although ICT provided opportunities for pedagogical innovation, participants also reported challenges, such as limited student digital skills and inadequate technical support. S1 explained:

"Some students struggled with basic ICT tasks, which slowed down the lesson and shifted focus away from teaching."

This finding aligns with Helsper (2021), who stresses that technology can hinder rather than enhance learning without foundational digital skills. In a connectivist learning environment, the effectiveness of ICT hinges on the ability to form and navigate learning networks. While ICT has the potential to create dynamic educational experiences, the lack of digital readiness among both teachers and learners disrupts these networks, compromising pedagogical outcomes.

These findings underscore the need for holistic ICT training that equips teachers with technical skills and classroom management strategies. As Al-Maawali (2022) suggests, effective ICT integration requires a balanced approach considering technological and pedagogical competencies.

Perceived Preparedness from Teacher Training Programs

Teacher education programs are pivotal in preparing preservice teachers for real-world challenges, including ICT integration. This theme explores participants' perceptions of how well their training equipped them to use technology effectively in their teaching practices. Gaps in practical ICT training and a disconnect between theory and practice emerged as sub-themes.

Gaps in Practical ICT Training

Participants reported limited hands-on experience with ICT during their training.

S2 explained:

"We had theoretical training on using ICT, but there was little opportunity to practice in real classroom settings."

 doi:10.20944/preprints202507.1620.v1

This finding aligns with Pozas and Letzel (2023), who found that teacher training often emphasises theory at the expense of practical skill development.

S3 added:

> *"I felt somewhat prepared, but when I faced real classroom challenges like troubleshooting software problems, I realised how underprepared I was."*

This reflects the training limitations prioritising knowledge over practical application, confirming Francom et al.'s (2021) call for experiential learning in teacher education.

Disconnect Between Theory and Practice

Participants also noted a disconnect between theoretical ICT instruction and classroom realities. S4 stated:

> *"We learned about innovative teaching strategies, but when I tried to implement them, the lack of resources and technical support made it almost impossible."*

One of the assumptions of connectivism is that teacher training should facilitate the formation of robust knowledge networks that connect theoretical concepts to real-world applications. Without experiential learning opportunities, preservice teachers are left navigating fragmented networks, unable to translate their theoretical understanding into practice.

These findings highlight a structural gap in teacher education programs, where ICT training remains superficial and disconnected from classroom realities. Effective learning occurs when learners can navigate complex knowledge systems (Singh et al., 2022). Thus, teacher training institutions must adopt a more integrated approach, embedding ICT practice into all elements of teacher preparation.

Across all themes, the findings highlight the complexities of ICT integration in teacher education. Challenges persist while ICT holds immense potential to transform teaching and learning, infrastructure, training, and digital readiness. From a connectivist standpoint, successful ICT integration requires access to resources and the ability to navigate digital networks effectively.

The participants' experiences reveal that current teacher training programs fall short of equipping preservice teachers with the skills needed for effective ICT use, calling for a paradigm shift in teacher education and emphasising hands-on ICT training, continuous professional development, and equitable access to technological resources. Without these reforms, the potential of ICT to revolutionise education will remain unrealised, prolonging existing disparities while undermining educational equality and equity.

Conclusions, Limitations and Recommendations

ICT integration in teaching and learning is essential for subjects like accounting since accounting teachers are expected to give students the skills they need to thrive in the technologically advanced corporate environment of the 21st century. As a result, in accounting classrooms, preservice teachers ought to be sufficiently prepared with ICT integration abilities. This study highlighted the theory-practice gap in ICT integration among preservice accounting teachers, revealing challenges like insufficient training, resource constraints, and institutional barriers. While participants showed enthusiasm for digital tools, the lack of subject-specific professional development hindered effective integration. Participants also reported inconsistent mentorship during school-based teaching practice and limited access to digital accounting platforms, further complicating ICT adoption. The findings align with UNESCO's 2023 Global Education Monitoring Report, which shows that over 60% of teachers worldwide lack adequate ICT training.

Limitations of the study include its small sample size and context-specific focus, which may limit generalisability. Future research should explore longitudinal studies across multiple institutions, integrating student outcomes to assess ICT's impact on learning. Studies examining teacher resilience and adaptive strategies in ICT integration can further inform teacher education programs.

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Addressing these areas can empower preservice accounting teachers to integrate ICT, effectively enhancing teaching quality, student outcomes, and workforce readiness.

Declarations: All authors declare that they have no conflicts of interest.

Participants provided a written informed consent, which was signed by the participants.

Ethics Approval Statements: This study was approved by the University of the Free State's General/Human Research Ethics Committee (approval no: UFS-HSD2022/1644/22) on November 07, 2022.

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