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# Integrating a digital pedagogy approach into online teaching: are academic librarians at Universities of Technology in South Africa prepared?

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## Abstract

**Purpose** – This paper aims to explore whether academic librarians at the Universities of Technology (UoTs) in South Africa have the pedagogy and digital skills to implement a digital pedagogy approach for online teaching.

**Design/methodology/approach** – A mixed-method approach in the form of a sequential explanatory design was selected to explore the topic in which the quantitative was followed by the qualitative phase. Instruments used included an online questionnaire and semi-structured interviews to explore the pedagogy and digital skills of academic librarians at UoTs in South Africa.

**Findings** – The quantitative results and findings revealed that academic librarians lacked the pedagogy and digital skills for online teaching. Similarly, results and findings in the qualitative phase also showed academic librarians lacking these skills for online teaching. Consequently, the results and findings derived from both phases were triangulated and the cohesive nature of the data was absolute.

**Research limitations/implications** – (i) Library schools include an elective module covering pedagogy and teaching with technology for librarians; (ii) library professional bodies create opportunities for academic librarians to develop pedagogy and digital skills; and (iii) higher education libraries need to create knowledge-sharing opportunities to improve the pedagogy and digital skills of academic librarians with teaching portfolios.

**Practical implications** – Higher education libraries and library schools must promote the teaching identity of academic librarians by helping them improve their pedagogical and digital skills for online teaching.

**Social implications** – This topic requires further exploration as academic librarians are fast becoming integrated into the teaching and learning agenda of institutions globally.

**Originality/value** – The current study is novel in that it explores the pedagogical and digital skills of academic librarians at UoTs in South Africa for online teaching.

**Keywords** Higher education, Pedagogy, Academic librarians, Digital skills, Online teaching

**Paper type** Research paper



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## Introduction

Pedagogy, as the science of teaching and learning, is essential for individuals such as teachers, facilitators and lecturers (Beetham and Sharpe, 2019). Constituents of pedagogy include learning theories, curriculum design, teaching methods, learning activities, as well as social and cultural norms (Engeness, 2021: 109). Furthermore, technology can be endorsed as a support mechanism that seamlessly interlocks with pedagogical principles to enhance teaching and learning in multimodal environments. Although technology is a support mechanism for pedagogy in multimodal environments, knowledge of how to effectively synchronize both elements in an online environment allows educationalists to stimulate active learning activities with students (Sadiku *et al.*, 2019). However, this requires educationalists to constantly keep abreast of the latest pedagogical practices and educational technologies to ensure that online teaching methods do not become obsolete. Borup *et al.* (2020) agree that knowledge of appropriate educational technologies and teaching principles is key when teaching in an online environment.

These technologies include digital creation tools such as presentation software, digital workspace services, content management software and gamification. However, Bond *et al.* (2020) posit that educational technologies are merely tools used to augment online teaching and learning. Nonetheless, it is key that educationalists involved in online instruction understand the role technology plays in pedagogical underpinnings for online teaching (Blau *et al.*, 2020; Stone and Springer, 2019). Hence, the term "digital pedagogy" is succinctly described as using technology to improve teaching and learning through philosophies of education (Nanjundaswamy *et al.*, 2021).

At higher education institutions worldwide, librarians, like educationalists, have an online teaching identity (Nichols Hess, 2020). Academic librarians teach library-related content online, either as once-off training, workshops, standalone crediting-bearing modules or integrated within a specific course (Amegashie and Ankamah, 2020). However, every higher education institution is unique in terms of its online library instruction. Fernández-Ramos (2019) concurs that, globally, it is difficult to determine the implementation levels of online library instruction as every institution is unique. Although not ubiquitous and unique on a global scale, online library instruction is designed to meet specific learning outcomes. Before the COVID-19 pandemic, pockets of online library instruction were being offered, but face-to-face was the preferred medium for teaching and learning (Martzoukou, 2021). However, as higher education institutions adjusted due to the COVID-19 pandemic, the digital environment gained prominence, resulting in library instruction being offered online (Mehta and Wang, 2020).

In the case of Universities in South Africa, whether preceding, during or at the endemic stage, the literature related to online library instruction is limited (Mashiyane *et al.*, 2020). Therefore, it was important to ascertain whether academic librarians who are custodians of library instruction at UoTs in South Africa are prepared for online teaching. Consequently, this study aimed to explore, probe and ascertain whether academic librarians at UoTs in South Africa had foundational knowledge as educationalists for online teaching. The purpose was to determine whether academic librarians at UoTs in South Africa had pedagogical and digital skills for online teaching. Therefore, the objectives of the study were:

- to explore whether academic librarians at UoTs in South Africa have the pedagogical skills for online teaching; and
- to ascertain whether academic librarians at UoTs in South Africa have the digital skills for online teaching.

## Literature review

Historically, spanning decades, the pedagogical skills of academic librarians have been challenged in the literature (Hensley, 2015; Hays and Studebaker, 2019; Withorn and Willenborg, 2020). Recently, the digital environment and the influence of technology on pedagogy have further complicated matters for academic librarians with teaching responsibilities (Carroll and Mallon, 2021: 1–6). However, while the digital environment has placed technology as a requirement for online teaching, Raju (2017) states that the literature is clear in terms of academic librarians and pedagogy, as academic librarians lack the pedagogical skills to create lesson plans; design formative or summative assessments; use diverse teaching methods; manage classrooms; and most importantly, align educational theories to stimulate learning. This is a concern since knowledge of pedagogy is key to direct teaching and learning not limited to the online environment.

At the University of South Australia, Ciccone and Hounslow (2019) used a reflective case study over 18 months to ascertain their pedagogical and digital skills as embedded librarians. The authors discovered that content knowledge was present. However, there was a lack of formal pedagogical and digital skills, resulting in barriers to facilitating online teaching. There was also a distinct absence of cognitive understanding to stimulate deep learning in a digital environment. This made it difficult to design synchronous or asynchronous activities that were engaging, interactive, constructive, intuitive, authentic and self-paced. The recommendations included formal training in pedagogy and technology to create stimulating content for online teaching.

Similarly, in Canada, McTavish (2019) explored the emerging role of academic librarians as online teachers. The study used a quantitative and qualitative approach through an online survey and document analysis to determine the changing role of academic librarians in a digital environment. The findings from the online survey revealed that academic librarians grappled with content creation skills to stimulate critical thinking, foster meaningful online discussions and actively engage students when teaching in a digital environment. Yet, when job advertisements were analyzed through a process of document analysis, competencies for working at Canadian universities included pedagogical and digital skills for online teaching. These skills prominently appeared in more than 50% of job advertisements. However, in Canada, while the job advertisements revealed pedagogical knowledge and digital skills as a prerequisite, academic librarians lacked these competencies as indicated in the online survey. Consequently, the study recommended that academic librarians should develop pedagogical and digital competencies for online teaching.

In the Philippines, during the COVID-19 pandemic, Ramos Eclevia (2022) examined the competencies of academic librarians for online teaching via an online survey in the form of two scales, to scrutinize the teaching efficacies of academic librarians in a digital environment. The findings revealed that academic librarians need to develop pedagogical and technological skills for online teaching. These include skills in online curriculum design, online learning activities and online assessments. Furthermore, the transition from face-to-face to online instruction through the acceleration of COVID-19 revealed that academic librarians had limited knowledge of using technology to actively engage students when teaching in a digital environment. Moreover, the study found that academic librarians had inadequate digital skills to teach library content and concepts in an online environment. Thus, one can also assume that before the pandemic in the Philippines, online teaching was not prevalent for academic librarians. Therefore, academic librarians had limited pedagogical and digital skills for online teaching during the COVID-19 pandemic.

A systematic review related to academic librarians and digital pedagogies was conducted in South Africa (Omarsaib *et al.*, 2022). The study probed literature spanning seven

continents to establish a global perspective of digital pedagogies connected to academic librarians and online teaching. The objectives were to ascertain whether academic librarians had the pedagogical and digital skills for online teaching. Findings in the literature addressed pedagogy and technology as two different topics, with limited discussions related to online teaching. Globally, in the study, experts challenged the pedagogical grounding of academic librarians in isolation from technology. Moreover, researchers placed less emphasis on combining pedagogy with technology to create a digital pedagogy approach for online teaching in the literature. On the other hand, in developing economies, academic librarians were contending with technology and issues relating to infrastructure, including soft skills such as using Microsoft Office applications rather than pedagogy. Surprisingly, in developed economies, the emphasis on digital pedagogy and online teaching was met with scarcity. Consequently, digital pedagogy and the online teaching identity of academic librarians are topical, current and relevant to the field of Library and Information Science (LIS) worldwide.

In South Africa, the literature resonates toward a unique educational and technological context aligned to library instruction, even though a digital pedagogy approach seems novel. Lockhart (2021) explored embedding library content into a learning management system at the Cape Peninsula University of Technology. The study expounded how a blended learning approach stimulated learning design, digital tools and open educational resources into the learning management system to teach library instruction using Information Literacy. Findings revealed that students felt positive about accessing and engaging with the embedded Information Literacy content in the learning management system. In another South African study, Mohamed (2020) at the University of Western Cape used a qualitative approach to decode challenges and enhance students' Information Literacy skills. Findings showed that student learning can improve if Information Literacy skills and teaching methods are rectified at the University of Western Cape. Furthermore, Molepo and Blose (2023) reviewed the literature intending to create a conceptual framework to communicate library training for South African University Libraries. Interestingly, the review unearthed that academic librarians perceive pedagogy as a competency exclusive to lecturers at South African higher education institutions. Recently, in South Africa, there have been numerous studies hinting at pedagogy to transfer Information Literacy skills, juxtaposed with limited discussions on technology underpinned in pedagogy and online teaching (Khumalo, 2022; Mashiyane *et al.*, 2020; Moyo and Okemwa, 2022; Ndou, 2023).

## Material and methods

### *Overview of the methodology*

A sequential explanatory mixed-method design underpinned the study. The sequential mixed-method design is a two-phased approach in which the quantitative precedes the qualitative phase. This design was deemed appropriate since it provided insight into the topic through two approaches that exist within opposing paradigms. It also opened a window to view how research instruments that existed in opposing paradigms are used in unison to explore a topic. The themes that emerged from the quantitative method via an online survey were used to structure the interview schedule for the qualitative phase. These themes included pedagogy, technology and digital skills. Consequently, a combination of two opposing research approaches worked harmoniously and provided a transparent picture of academic librarians as online teachers at UoTs in South Africa. It also eliminated the use of a single research approach, thereby creating an opportunity for pedagogy and digital skills to be explored from varying perspectives.

Although the topic had a sequential explanatory design underpinning, both research instruments were shaped through the Technology Pedagogy Content (TPACK) framework,

which is characterized by knowledge constructs that merge and integrate technology into pedagogy for multimodal learning environments. The main knowledge constructs in the TPACK framework are pedagogy, technology and content. However, these overlap with each other to form an additional three knowledge constructs, namely Pedagogical Content Knowledge, Technological Content Knowledge and Technological Pedagogical Knowledge (Koehler and Mishra, 2009).

Within this context, the author selected certain knowledge constructs from TPACK to design the online questionnaire and semistructured interview schedule. The selected knowledge constructs were pedagogy, technology and technological pedagogical knowledge as the purpose was to explore whether academic librarians at UoTs in South Africa had pedagogical and digital skills for online teaching. Schmidt *et al.* (2009) concur that TPACK can be used to determine the pedagogical and technological competencies of online facilitators. Thus, these constructs were used to set questions on pedagogy and digital skills through an online survey questionnaire using a five-point Likert scale and an interview schedule to collect data on the topic from academic librarians at UoTs in South Africa.

Likert scales are popular instruments used to determine how participants feel about a specific issue in a particular field through a series of questions, either using nominal, ordinal or numerical response options for participants. Story and Tait (2019) explain that Likert scales can be used to measure participants' knowledge on a specific topic. In this study, ordinal response options were used to explore the pedagogy and digital skills of academic librarians through a five-point Likert scale. Besides making it easy to quantify, Likert scales also make the analysis and categorization of findings seamless and less complicated. However, a limitation of closed-ended questions in Likert scales is that one cannot explore the attitude, feelings and behavior patterns of participants in real-time. Therefore, the second qualitative phase was imperative since it provided a microscopic view of participants' lived experiences within the context of digital pedagogy and online teaching. Additionally, the design of the interview schedule was supported by findings emerging from the first quantitative phase.

Cronbach's alpha coefficient was used to measure the reliability and internal consistency of the online survey. According to Sin and Rosli (2020), values between 0.70 and 0.80 are acceptable, whilst any other value closer to the number one is good. In this study, the reliability of the multipoint scale using ordinal questions through a five-point Likert scale in the online survey had an overall value of 0.967. Questions under the sections on pedagogical skills had a value of 0.864 and digital skills 0.792. Furthermore, pretesting the instruments addressed ambiguity, duplication of questions and issues of bias, making the instruments valid and reliable to administer. Moreover, although both the quantitative and qualitative approaches have strengths and weaknesses, combining both using a sequential explanatory mixed-method design in this study increased the reliability, validity and overall confidence of results and findings. Ngulube (2010) agrees that the use of a sequential explanatory mixed-method design intensifies and presents inclusive findings in a study.

*Data collection procedure*

At the onset of the COVID-19 pandemic, there was panic in businesses, education and social circles as physical interaction between employees became limited. However, society gradually embraced the "new norm," and started using virtual spaces for business, education and communication (Parker, 2020). This resulted in employees learning specialized online skillsets for work-related matters. Subsequently, society entered the endemic phase of COVID-19 and returned to face-to-face engagements. Nonetheless, the transition into virtual

spaces has become a norm and is useful as and when needed in the physical workplace, even after the pandemic (Abu Bakar *et al.*, 2023).

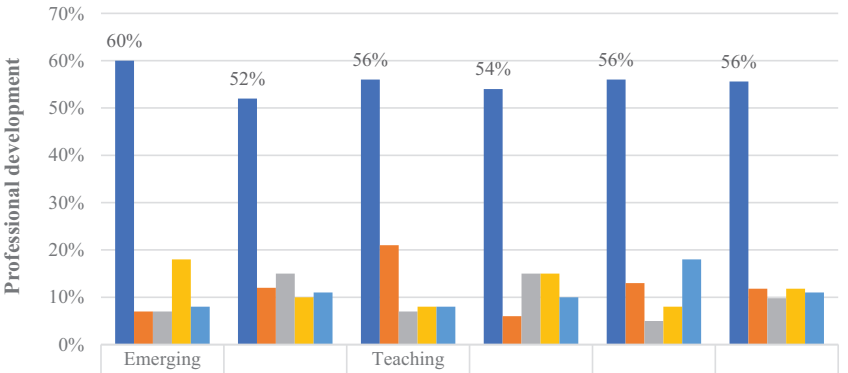
Researchers also repositioned themselves during the pandemic and embraced data collection procedures using video-conferencing tools such as MS Teams, Zoom and Skype (Keen *et al.*, 2022). These tools provided an alternative to face-to-face or telephonic interviews during the pandemic (Chen and Neo, 2019). Noor *et al.* (2020) agree that researchers were able to facilitate interviews using video-conferencing tools with participants during the COVID-19 pandemic. This saved time, cost and limited physical interactions with participants. Moreover, researchers needed to be cautious of physical interactions even in the endemic stage of COVID-19 as society held varying opinions on engagements in social spaces. Despite the numerous benefits of using video-conferencing tools, one should be cautious when selecting a virtual environment to engage participants when collecting data for research. In a study by Irani (2019), potential biases were identified as challenges when using video-conferencing tools for research interviews. Challenges included the potential limitations for researchers in scanning the virtual environment, body language and nonverbal communication patterns of participants during the online interview process. Other problematic challenges when using video-conferencing tools are unstable internet connectivity, inadequate computers and participants not knowing how to use video setting tools such as audio or camera (Labinjo, 2021). The author considered the benefits and challenges, including technological barriers, health and travel costs, and a decision was made to use virtual platforms to administer the survey and facilitate semi-structured interviews. QuestionPro, a software tool, was adopted to administer the survey, whilst Microsoft Teams was used for the semi-structured interviews.

*Participant recruitment*

Academic librarians with an online teaching profile at UoTs in South Africa are identified as "Subject Librarians," "Faculty Librarians," "Information Librarians," "Postgraduate Librarians" and "Research Librarians". Therefore, these academic librarians were selected since the purpose was to determine whether academic librarians at UoTs in South Africa had pedagogical and digital skills for online teaching. These academic librarians shared their lived experiences as online teachers at UoTs in South Africa. In this study, the population size of academic librarians who taught online library instruction at UoTs was approximately 77. The link to the online survey on QuestionPro was sent to all participants via email. Attached to the email was also a *Statement of Agreement for Consent to Participate* that included a section on *Confidentiality, Gatekeeper permission letters from the participant's institution and permission from the researcher's institution to conduct the research*. Of the 77 potential participants from various UoTs in South Africa, 72 responded to the online survey. Similar information was sent via email inviting participants for the online semi-structured interviews. The only difference was that these participants were asked about preferred dates and times that suited their work schedules. Of the 77 participants, 11 responded to the email and agreed to participate in the online semi-structured interview.

*Data analysis*

Quantitative data for the study was analyzed using the Statistical Package for the Social Sciences (SPSS), which prepares, analyzes and manages data in research. In this study, the analyzed data is presented through descriptive statistics. The descriptive statistics from the quantitative phase showed that academic librarians lacked pedagogical and digital skills related to online teaching, as presented in Figures 1 and 2 and Tables 1 and 2. For the qualitative data, the NVivo software program was used to transcribe data and thematically




| | Emerging technologies and learning theories for online teaching | Designing online curriculum for teaching | Teaching with technology using diagnostic tools | Integrating online assessments | Digital skills and teaching | Average |
|---|---|---|---|---|---|---|
| 1 - Not a priority | 60% | 52% | 56% | 54% | 56% | 56% |
| 2- Low priority | 7% | 12% | 21% | 6% | 13% | 12% |
| 3 - Medium priority | 7% | 15% | 7% | 15% | 5% | 10% |
| 4 - High priority | 18% | 10% | 8% | 15% | 8% | 12% |
| 5- Essential | 8% | 11% | 8% | 10% | 18% | 11% |

**Note:** *N = 72*
**Source:** Figure by author

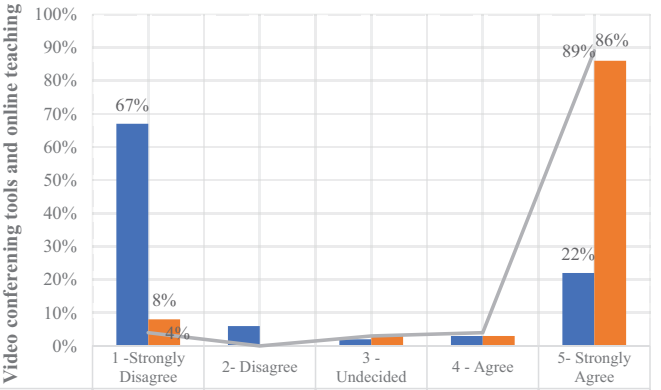
**Figure 1.** Academic librarians and professional development for online teaching

code narratives from participants into nodes, which are containers in which relevant themes related to a study are housed (Feng and Behar-Horenstein, 2019). There are instances when transcribed data can lead to several nodes (themes) resulting in more than one theme originating in a study, as shown in Table 3. Within the context of this study, themes that originated from the transcribed data are presented in Table 3 and through concise narratives. Narratives provide an inherent perception of respondents' *lived experiences or shared meaning.*

## Results and findings

### *Descriptive analysis*

A five-point Likert scale was used to ascertain whether academic librarians at UoTs in South Africa considered professional development *Essential* for online teaching, as shown in Figure 1. The average percentage indicated that the majority 56% of academic librarians found topics integrated with pedagogy and technology as *not a priority* for online teaching. When the results are examined per topic in Figure 1, more than 50% of academic librarians considered these topics as *not a priority* for online teaching. This was surprising since topics of such nature are directly aligned with an individual's professional development for online teaching. Ramos Eclevia (2022) concurs that such topics are important to the development of academic librarians involved in online teaching. It was also interesting to note from the findings that the majority 56% of academic librarians perceived digital skills and teaching as *not a priority* for online teaching.




| | 1 -Strongly Disagree | 2- Disagree | 3 - Undecided | 4 - Agree | 5- Strongly Agree |
|---|---|---|---|---|---|
| Online library instruction using videoconferencing tools such as MS Teams and Zoom before the Covid 19 pandemic | 67% | 6% | 2% | 3% | 22% |
| My first exposure to using videoconferencing tools such as MS Teams and Zoom was during the Covid 19 pandemic | 8% | 0% | 3% | 3% | 86% |
| My online library instruction videoconferencing tools such as MS Teams and Zoom increased during the Covid 19 pandemic | 4% | 0% | 3% | 4% | 89% |

**Note:** *N = 72*
**Source:** Figure by author

**Figure 2.** Online library instruction and video-conferencing applications

Table 1 illustrates how academic librarians acquired pedagogical skills for online teaching. A combined 53% of academic librarians *strongly disagree or disagree* that pedagogical skills were acquired from LIS schools in South Africa (highlight − green). A similar pattern emerged when a combined 55% of academic librarians *strongly disagreed or disagreed* that pedagogical skills for online teaching were acquired through a formal teaching certificate, diploma or degree (highlight − blue). However, it was noteworthy that a combined 66% of academic librarians *agree or strongly agree* that pedagogical skills for online teaching were acquired through work colleagues (highlight − yellow). Consequently, although pedagogical skills were hardly ever acquired through a formal teaching certificate, diploma or degree, academic librarians gained knowledge of how to teach online from work colleagues within UoTs in South Africa. According to Greenwood (2023), peer-to-peer support is a trusted method for gaining knowledge and experience. It can also be used to evaluate and receive feedback to improve pedagogical skills from more experienced work colleagues.

Central to online teaching is the use of video-conferencing applications such as MS Teams and Zoom (Camilleri and Camilleri, 2022). Therefore, it was important to ascertain for how long video-conferencing applications were being used for online teaching as this provided insight into academic librarians' familiarity with online teaching. It is also directly aligned with the purposeful integration of a digital pedagogy approach to stimulate learning through active engagements, activities and assessments in an online environment. A combined majority of 73% *strongly disagree or disagree* that video-conferencing

**Table 1.** Pedagogical skills and academic librarians

| Pedagogical skills and academic librarians | 1 – Strongly disagree (%) | 2 – Disagree (%) | 3 – Undecided (%) | 4 – Agree (%) | 5 –Strongly agree (%) |
|---|---|---|---|---|---|
| I acquired knowledge for online teaching through a Library and Information Science qualification | 48 | 5 | 4 | 8 | 7 |
| I acquired knowledge for online teaching through work-related development | 30 | 2 | 1 | 13 | 26 |
| I acquired knowledge for online teaching through independent professional development (personally funded) | 42 | 6 | 10 | 6 | 8 |
| I acquired knowledge for online teaching through a previous library position in practice | 44 | 1 | 7 | 8 | 12 |
| I acquired knowledge for online teaching through a formal teaching certificate, diploma or degree | 52 | 3 | 6 | 5 | 6 |
| I acquired knowledge for online teaching through work colleagues | 0 | 2 | 4 | 27 | 39 |

**Note:** [$N = 72$]
**Source:** Table by author

applications were used for online library instruction before the COVID-19 pandemic. On the other hand, a combined 89% of academic librarians *strongly agree or agree* that exposure to video-conferencing applications for online library instruction only occurred during the pandemic. Furthermore, a combined 93% also *strongly agree or agree* that the use of video-conferencing applications for online library instruction increased due to the COVID-19 pandemic. Thus, within the context of UoTs and academic librarians in South Africa, online teaching became a reality due to the pandemic. Juxtaposed, even in the global north, similar patterns existed as online teaching became the mechanism for academic librarians to engage students in learning during the COVID-19 pandemic (Martzoukou, 2021). However, according to Omarsaib *et al.* (2022), the preparedness of academic librarians to not only use such applications for online teaching but rather meaningfully stimulate patterns of learning using a digital pedagogy approach needs to be addressed.

The focus of a digital pedagogy approach is to effectively use technology with a pedagogical underpinning to stimulate learning (Omarsaib *et al.*, 2023). Therefore, it was important to ascertain which digital creation tools academic librarians at these UoTs selected

**Table 2.** Digital skills and online teaching

| Digital skills and online teaching | 1 – Never (%) | 2 – Rarely (%) | 3 – Sometimes | 4 – Very often (%) | 5 – Always (%) |
|---|---|---|---|---|---|
| Presentation software e.g. Sway and WhiteBoard | 60 | 5 | 14 | 8 | 13 |
| Video production software e.g. Wondershare Flimora and Doodly | 65 | 11 | 11 | 3 | 10 |
| Screen capturing software e.g. Camtasia and Droplr | 66 | 11 | 5 | 5 | 13 |
| Online author tools e.g. Storyline and Adobe Captivate | 73 | 9 | 11 | 2 | 5 |
| Web authoring tools e.g. Content management systems and library online guides | 5 | 3 | 8 | 21 | 63 |
| Learning management systems e.g. Blackboard and Moodle | 25 | 6 | 6 | 18 | 45 |
| Educational/learning technologies e.g. EdPuzzle and Peardeck | 58 | 8 | 11 | 10 | 13 |
| Gamification e.g. Kahoots | 73 | 10 | 8 | 3 | 6 |

**Note:** [*N* = 72]
**Source:** Table by author

and used to stimulate learning guided by a grounding in pedagogy. Presentation, video production and screen-capturing software are tools that provide students with opportunities to collaborate asynchronously or actively engage in online classrooms to complete activities whilst engaging in the learning process. The same can be said of game-based learning, educational technologies, web authoring and online author tools. However, Table 2 illustrates that academic librarians at UoTs in South Africa only used learning management systems and web authoring tools to engage students when teaching online. However, this is also questionable since Figure 2 revealed that 89% of academic librarians *strongly agree or agree* that exposure to video-conferencing applications only occurred during the pandemic. Thus, it seemed that learning management systems and web authoring tools were only used as access points to information resources because of the pandemic and not to stimulate online learning, since academic librarians were novices.

*Thematic analysis*

Findings from the qualitative analysis were grouped as themes in NVivo after being transcribed, revealing that academic librarians lacked pedagogical and digital skills related to

**Table 3.** Digital pedagogies and themes at UoTs in South Africa

| Clustering | Theme/s |
|---|---|
| Technological knowledge | Digital pedagogies and challenges |
| pedagogical knowledge and digital environment | |
| teaching and technology | |
| Learning management systems | Digital skills |
| Online curriculum design | |
| Interactive learning | |
| Time management | Face-to-face versus online teaching |
| concise lessons | |
| student engagement | |
| MS Teams – digital classroom | Online social presence |
| Interactive lessons | Online cognitive presence |
| active engagements | |
| reflective activities | |
| critical thinking activities | |
| problem-based learning | |
| COVID-19 | Online teaching experience |
| PowerPoint presentation | Online teaching methods |
| recorded videos | |
| video tutorials | |
| practical demonstration | |
| MS Teams – digital classroom | Online teaching presence |
| Learning theories | Pedagogical skills |
| qualifications | |
| classroom management | |
| assessments | |
| teaching methods | |
| Formal training | Qualifications |
| teaching with technology | |

**Note:** [$N = 11$]
**Source:** Table by author

online teaching, as shown in Table 3. Transcriptions indicated that academic librarians had limited skills in designing activities for asynchronous platforms (learning management systems); designing online curricula; and had limited knowledge in learning approaches such as problem-based learning, project-based learning, self-paced learning or interactive lessons to stimulate learning in a digital environment. There was also an absence of social, cognitive and teaching presence when facilitating online activities, as illustrated in Table 3. Furthermore, these findings in the qualitative phase are in sync with Figure 1 and Table 1 from the quantitative phase.

Additionally, in the qualitative phase, interviews proved to be engaging and robust. Participants discussed issues related to pedagogy, digital skills, technology and its interconnectedness. The data from the interviews were transcribed and coded through a process of thematic analysis, with ten themes emerging as illustrated in Table 3. Themes included *digital pedagogies and challenges*, *digital skills*, *face-to-face* versus *online teaching*, *online social presence*, *online cognitive presence*, *online teaching experience*, *online teaching methods*, *online teaching presence and pedagogical skills*. In certain instances, themes from the qualitative data proved to be interrelated. Hence, their interdependence became apparent in a similar manner to the quantitative phase, as illustrated

in Figures 1 and 2, and Tables 1 and 2. Thus, patterns that emanated in themes from Table 3 began aligning with a lack of pedagogical skills (Figures 1 and 2) and digital skills (Tables 1 and 2) from the quantitative phase.

Some of the narratives related to the pedagogical skills of academic librarians at UoTs in South Africa included:

> No, I lack in having a teaching background and theory that governs the foundation of education. In addition, the use of technology to teach has further complicated matters.

> I do not have the foundational knowledge of learning theories and principles. I also do not have the technological knowledge to teach in the digital environment.

> Pedagogy and how to teach were not taught to us in library school when we were studying for our qualifications. However, experience has been my biggest teacher.

> I believe there needs to be a module added at the third-year level of library school e.g. teaching with technology including teaching methods. This will prepare librarians for industry should they be placed in a position to teach library instruction.

> Regular workshops and seminars on topics such as teaching with technology, pedagogies, and digital tools will be useful, especially for those academic librarians who are afraid to use technology to teach e.g. the older staff.

Currently, academic librarians with an online teaching profile at UoTs in South Africa seem to be on the periphery. Moreover, there is a lack of support from LIS schools and industry to develop pedagogical skills, thus compromising academic librarians with teaching responsibilities at UoTs in South Africa. Furthermore, academic librarians are apprehensive about engaging with technology when teaching in a digital environment. The issue of teaching with technology is not only limited to South Africa but is ubiquitous amongst academic librarians worldwide (McTavish and Robertson, 2020; Raju, 2017; Ramos Eclevia, 2022; Trembach and Deng, 2018).

Within the context of online teaching, findings in the qualitative phase revealed that academic librarians also learned either from work colleagues or their own mistakes. Therefore, experience has been the biggest teacher for academic librarians involved in online teaching at UoTs in South Africa. These findings corroborate with empirical data from the quantitative phase, as shown in Table 1. However, academic librarians can also develop pedagogical skills for online teaching should opportunities arise through workshops, seminars, short courses and mentorship programs. Library schools in South Africa also have an integral role to play in facilitating the development of academic librarians for online teaching. The introduction of a module covering digital pedagogies and online teaching can be key to unlocking the potential of future academic librarians as instructors in a digital environment at UoTs in South Africa.

Moreover, clusters and themes that emerged in the qualitative analysis of the coded data in Table 3, along with the narratives below, point to a lack of digital pedagogy for online teaching. This was revealed as an absence of knowing how to effectively mix pedagogy and digital skills to facilitate online teaching, which became apparent during the semi-structured interviews. Similarities of this nature also existed in the descriptive statistics related to the quantitative phase (Tables 1 and 2). However, findings in the qualitative study endorsed and strengthened the empirical results from the quantitative phase. This reinforced the rationale concerning academic librarians and digital pedagogy at UoTs in South Africa. Therefore, findings triangulated across both phases established that academic librarians at UoTs in South Africa lacked pedagogical and digital skills for online teaching. Some of the narratives related to digital skills and pedagogy included:

> There was no support at my institution when we transitioned to online teaching with technology during the COVID-19 pandemic. I did not know how to integrate pedagogy with technology to facilitate online information literacy.

> I was very apprehensive as I had a lack of technological knowledge to teach in the digital environment. The support for us as academic librarians at my institution on how to integrate technology with pedagogy was limited.

> The digital skills we as academic librarians need include designing online library instruction courses, creating innovative course content, interactive learning activities for students, and designing videos to captivate students in online presentation skills as teachers of library instruction.

> No, I do not have digital skills aligned with online teaching for the digital environment. I have not been taught to create online content to teach library instruction in the digital environment.

Academic librarians at UoTs in South Africa also indicated having limited digital skills for online teaching. This included the *inability to design content; ineffective use of emerging technologies to actively engage students in a digital classroom; and the inability to identify and select germane digital tools to augment teaching methods, activities and assessments* for the delivery of online teaching. Furthermore, there was also a lack of technological support from UoTs when attempting to integrate digital tools and teaching methods to improve online library instruction.

## Discussion

In this section, the reviewed literature, results and findings are deliberated. Discussions are centered around correlations from the results and findings across different research approaches. This is in keeping with the sequential explanatory mixed-method research design, whereby data is integrated to gain a richer understanding of a research problem. Leech and Onwuegbuzie (2009: 268) agree that the mixed-method design involves mixing results across one or more stages of a research process when exploring a phenomenon. Within the context of this study, results from both phases are *fully mixed and sequentially equal*, weighted as the empirical and interpretive evidence, were both evenly and unbiasedly integrated to reach conclusive findings.

*Pedagogical skills of academic librarians within a digital environment at UoTs in South Africa.*

In the quantitative phase, results indicated that academic librarians at UoTs in South Africa lacked pedagogical and digital skills. These skills included designing assessments, and understanding how pedagogy and learning theories can underpin the use of digital tools for online teaching. Thematic analysis of the semi-structured interviews in the qualitative phase revealed that there is currently no module at LIS schools in South Africa covering pedagogy, learning theories, classroom management, learning activities, teaching methods, assessments, analysis and curriculum design related to online teaching for academic librarians. Similarly, in America, Australia and Canada, the lines of disparity in integrating a digital pedagogy approach for online teaching by academic librarians are also prevalent due to limited learning opportunities (Ciccone and Hounslow, 2019; Nichols Hess, 2020; McTavish, 2019). Thus, these findings are significant for LIS schools and library management at academic libraries that are key role-players within the sector, as they are not limited to UoTs in South Africa but also apply on a global scale.

The issue of being able to teach was raised previously for academic librarians within the South African context (Raju, 2017). The data was scrutinized through content analysis using job advertisements and statistics from a national online survey. However, the gap widened as

technology rapidly became a fundamental support mechanism when teaching in multimodal environments (Omarsaib, 2023). Moreover, the problem is deeper and more multilayered than just technology. First, LIS schools in South Africa do not have a module covering *pedagogy and teaching for academic librarians*, which is corroborated by the results and findings from both the quantitative and qualitative phases. Data indicates that LIS schools have not adequately prepared academic librarians in South Africa for teaching library instruction, let alone in an online environment (Tables 1 and 3). Furthermore, in the qualitative findings, participants explicitly mentioned, "*I believe there needs to be a module added at the third-year level of library school e.g. teaching with technology including teaching methods. This will prepare librarians for industry should they be placed in a position to teach library instruction*," or "*Pedagogy and how to teach were not taught to us in library school when we were studying for our qualifications. However, experience has been my biggest teacher.*" From the quantitative (deductive) and (qualitative) inductive reasoning, it can be argued that LIS schools in South Africa must plug the pedagogical and technological gap for library instruction in the higher education sector within the context of multimodal environments, not just an online setting.

Second, library professional bodies in South Africa have not created opportunities for academic librarians to develop pedagogical skills. Findings revealed that there are no workshops, mentorship programs, coaching clinics or scholarships for teaching and learning to develop academic librarians for online teaching being offered by LIS professional bodies in South Africa (Tables 1 and 3). Continuous developmental opportunities of this nature have the potential to liberate academic librarians, allowing them to develop the necessary skills for on-the-job competencies, which can improve their pedagogical skills and provide much-needed capacity to design stimulating online modules. This can be achieved against the backdrop of developing knowledge on how to align learning theories such as constructivism with online teaching (Budhai and Williams, 2021). In the qualitative findings, academic librarians asserted that there is practically no support to develop pedagogical skills for academic librarians at UoTs in South Africa. Participants directly addressed this issue by stating, "*I was very apprehensive as I had a lack of technological knowledge to teach in the digital environment. The support for us as academic librarians at my institution on how to integrate technology with pedagogy was limited*," or "*There was no support at my institution when we transitioned to online teaching with technology during the COVID-19 pandemic. I did not know how to integrate pedagogy with technology to facilitate online information literacy.*"

Third, *pockets of brilliance* exist amongst academic librarians within certain institutions in South Africa in relation to pedagogy and online teaching. However, a lack of knowledge-sharing platforms such as interinstitutional collaborations, communities of practice or benchmarking initiatives suppresses learning between colleagues. These knowledge-sharing practices can develop academic librarians and improve their pedagogical skills for the digital environment (Lewitzky, 2020). Library management from higher education institutions in South Africa must drive such collaborations as this provides the platforms and opportunities to lift academic librarians' teaching profiles in the digital environment (O'Neil and Pegrum, 2018). At the Oakland University Libraries in America, Nichols Hess (2020) argued this point as well, indicating that library administrators and managers have a pivotal role to play in supporting library-based teaching development of novice and seasoned academic librarians with a teaching identity through Scholarship of Teaching and Learning programs. Equally, in the Philippines, Ramos Eclevia (2022) suggested that librarians need to develop pedagogical and technological skills through professional development opportunities. Furthermore, the study posited that pedagogical and technology skills must be integrated into

the LIS curriculum at universities. Corrall and Jolly (2019) also conducted a study across a wide array of higher education institution libraries in America and the UK. The findings impress upon academic librarians to develop pedagogy and technological skills as there is diversification in skills set related to library instruction. There seems to be a golden thread running through the veins of LIS practitioners with a teaching identity at higher education institutions across the globe. This study also identifies with this need, as mentioned by participants, *"I believe there needs to be a module added at the third-year level of library school e.g. teaching with technology including teaching methods. This will prepare librarians for industry should they be placed in a position to teach library instruction." "Regular workshops and seminars on topics such as teaching with technology, pedagogies, and digital tools will be useful, especially for those academic librarians who are afraid to use technology to teach e.g. the older staff."*

Globally, whenever job advertisements highlight teaching competencies, there is an emphasis on pedagogical knowledge as a prerequisite for academic librarians (McTavish and Robertson, 2020). However, in many instances, library management requesting these on-the-job teaching competencies have limited or no grounding in pedagogical skills themselves (Julien *et al.*, 2018). The stark reality is that most librarians in management roles are also products of LIS schools. Thus, the pedagogical skills gap is multilayered within the LIS profession in South Africa and globally. Additionally, the age-old argument of academic librarians is that library instruction is either not ubiquitous or credit-bearing within universities (Baer, 2021; Omarsaib *et al.*, 2023). However, if academic libraries strongly believe in the value that library instruction adds and want to stake a claim within academia, then the LIS sector needs to holistically reflect upon their roles to drive such change, thus making it a reality. Therefore, as a start to initiating such change, academic librarians must take ownership of their teaching identity by developing pedagogical and digital skills.

The opportunity exists in South Africa and globally for credit-bearing library instruction modules in higher education institutions. However, first, LIS schools in South Africa need to introduce a module that prepares academic librarians with a deeper level of pedagogical knowledge. Library professional bodies must also provide opportunities to develop academic librarians toward a teaching identity in the higher education sector. Furthermore, academic libraries should create knowledge-sharing workshops through benchmarking initiatives (Schachter, 2020). Should these suggestions to develop pedagogical skills be adopted and implemented in the South African context, the next step is to design a national generic credit-bearing online library instruction module that can be made compulsory for first-year students at South African universities. However, before the rollout of such a module, there must be a pilot study with a few selected universities in South Africa. A team must be identified through the library professional bodies in South Africa to design the online curriculum, activities and assessments with the support of educational experts. Thereafter, the library module must then be piloted to assess the level of interactivity and engagement when learning skills to meet the desired learning outcomes as students. Other factors that should be considered when planning and designing include connectivity and accessibility issues related to devices such as mobiles and computers in South African higher education institutions. Additionally, the module must be designed to transfer relevant skills to students that they can apply in their daily lives when finding, accessing, evaluating and using information. For example, students will become cognizant of the ethical use of information in South Africa because of their exposure to the online library instruction module at universities. Nationally, this has the potential to reshape educational practices at the undergraduate and postgraduate levels as students will embrace a more human-centered approach to building intellectual

capacity when learning, even with generative artificial intelligence tools such as ChatGPT and Gemini. This implies that students will evaluate information and ensure their credibility in studies, work-related matters or in their private lives. Consequently, higher education libraries will become key stakeholders in establishing South African citizens who are accountable, responsible and who reflect value-laden principles in society when accessing and using information. For continuity, the online module must be regularly modified and made sustainable as this will solidify the position of academic libraries in South Africa in supporting teaching, learning and research. However, such a recommendation needs to be pitched at the highest level, that being policymakers from the Department of Higher Education and Training in South Africa, together with key role-players from library professional bodies. Ultimately, policies can drive change for higher education libraries and online library instruction in South Africa.

Moreover, this must not be just an institutional effort to showcase *pockets of brilliance* related to online library instruction that may exist at a particular university, although there is value in such a program. Rather, key stakeholders from the LIS sector must drive change to rubber-stamp a generic online library instruction module. Eventually, if there is *buy-in* at the national level in South Africa, academic librarians will no longer be chasing academic departments at their respective institutions to add library instruction as a once-off training for first-year students. There will also be no need to underscore attendance to demonstrate value, validity or credibility as a credit-bearing generic module will provide the impetus for the automatic recognition of online library instruction at higher education institutions in South Africa.

However, the LIS sector in South Africa must not *place the cart before the horse* and pursue standardizing a generic credit-bearing online library instruction at higher education institutions without practitioners having the required knowledge and skills. The first step toward a goal of this nature requires academic librarians to develop pedagogical and digital skills as online facilitators. These skills will groom them to design interactive content for online teaching, leading to content that is ingeniously constructed to stimulate participation in a digital classroom. Furthermore, knowledge in classroom management skills, assessments, learning activities, feedback and analysis is articulated through a grounding in pedagogy. Ideally, academic librarians meeting at conferences, workshops and seminars can then engage in thought-provoking conversations to improve content, share assessments, teaching practices, activities, resources and varying designs of curricula related to online teaching. This change must originate from within the LIS sector in South Africa, and will result in the image of academic librarians as online teachers gaining prominence and recognition. Importantly, it will also prepare academic librarians to teach in not only the online environment, but also in multimodal settings.

*Digital skills of academic librarians when teaching within a digital environment at Universities of Technology (UoTs) in South Africa.*

Digital skills and their association with pedagogy for online teaching are limited in the literature (Khan, 2020; Withorn and Willenborg, 2020). Therefore, this study is novel and germane in understanding the digital pedagogy of academic librarians at UoTs for online teaching. Items analyzed from the online survey revealed the following related to technology, pedagogy and digital skills of academic librarians as teachers:

- academic librarians lacked digital skills for online teaching;
- the importance of using digital educational tools for stimulating learning was not probed as academic librarians did not understand how to fuse pedagogy with emerging technologies;

- the usage of video-conferencing applications such as Zoom and MS Teams first became a mode of instruction only during the COVID-19 pandemic. Prior to the COVID-19 pandemic, the use of video-conferencing applications to teach was nonexistent at UoTs in South Africa (Dongwe and Zulu, 2022);
- although learning management systems such as Blackboard and Moodle illustrated high usage patterns, academic librarians mainly used the eLearning platform for uploading recorded library lectures during the pandemic;
- web-authoring tools in the form of online libguides were used to direct students to information resources, and included e-journals, eBooks, databases and institutional repositories. However, these types of tools were not translated to be used in class activities for online teaching and learning;
- passive rather than active learning approaches were prioritized as academic librarians did not know how to stimulate synchronous or asynchronous teaching and learning activities in the digital environment through learning management systems, video-conferencing applications, digital educational tools or web-authoring tools; and
- MS PowerPoint was the primary instructional tool for online teaching. Academic librarians grappled with knowing how to integrate online learning objects such as movie-makers or podcasting applications into the digital classroom.

The qualitative findings also revealed that online teaching was not pervasive before the COVID-19 pandemic at UoTs in South Africa. Although video-conferencing applications such as MS Teams and Zoom were available, these tools were used minimally. However, over the past two years, online teaching and learning became the buzzwords in academia. The use of video-conferencing applications to teach increased at an exponential rate to accommodate learning. Globally, the term *emergency remote online* teaching was coined because of the pandemic (Ezra *et al.*, 2021). Emergency remote online teaching was not limited to developed and developing knowledge higher education economies as the pandemic justifiably created panic worldwide.

Ibacache *et al.* (2021) posit that hundreds of academic librarians in America busied themselves with learning how to use video-conferencing applications at the onset of the pandemic. It can therefore be assumed that online teaching was rarely facilitated in America through the digital environment before the COVID-19 pandemic, even as one of the forerunners of LIS and academic libraries in the world. Globally, in terms of online teaching, one can also presume that although it existed before the pandemic, it was not ubiquitous. Undoubtedly, due to the COVID-19 pandemic, video-conferencing tools became the primary mode of instruction for academic librarians globally. Therefore, it is imperative for academic librarians to deeply reflect on their digital pedagogy post pandemic. There is an urgent need for academic librarians to learn how to meaningfully integrate pedagogical and digital skills through a digital pedagogy approach, which will prepare academic librarians as online facilitators and underpin their teaching practices to stimulate learning either through synchronous or asynchronous activities.

Furthermore, the digital environment is vastly different from a face-to-face environment as one cannot use direct instruction in a digital environment with PowerPoint presentations or a *sage-on-the-stage* approach while students listen through a device. The lessons need to engage, stimulate and provide students with digital tools to construct an understanding of concepts whilst in a virtual setting. Likewise, students must socially and cognitively connect to the content for learning to be appreciated in the digital environment. Hence, there needs to

be a so-called *virtual human interaction* that cognitively awakens students to participate in online learning (de Souza Lopes and da Silva Vieira, 2020). Therefore, academic librarians must have the ability to merge pedagogy with technology, assimilating digital pedagogies to stimulate learning in a digital environment. In the qualitative findings, participants indicated that stimulating students in a digital environment is a real challenge (Table 3). There is a lack of active engagement between librarians as teachers and students, as well as a disconnect on how to assimilate educational digital tools and teaching methods for online library instruction.

Moreover, academic librarians emphasized having inadequate skills when teaching with technology in an online environment. These inadequacies included contextualizing lessons using relevant digital educational tools; unable to design online content or activities; and not applying relevant teaching methods for the digital environment. These were definitive impediments to teaching and learning in a digital environment. Similar patterns existed in the quantitative findings. Table 2 indicates unsatisfactory knowledge of using technological tools for teaching in an online environment. Hence, it is apparent that a lack of digital and pedagogical skills is an issue for participants when compared to the online environment. Since digital pedagogy is an emerging topic, academic librarians need a grounding in digital pedagogy to transition as online facilitators.

## Limitations

This study was limited to UoTs because of their historical heritage, cultural similarities, political inequalities, teaching, learning and research comparability as institutions of higher learning in South Africa. Additionally, UoTs have commonalities in their student populations, curricula, infrastructure and research outputs in South Africa. Notwithstanding, it would be intriguing to expand this study not only to academic librarians at traditional universities, but also to educationalists at all higher education institutions in South Africa. This will provide a better understanding of digital pedagogies and online teaching across the higher education spectrum in South Africa.

## Conclusions

The purpose of the study was to ascertain, probe and establish the digital pedagogies of academic librarians with an online teaching profile at UoTs in South Africa. The paper presented quantitative and qualitative results and findings using a sequential explanatory mixed-method design. Worldwide, digital pedagogy is an emerging topic within the LIS sector (Omarsaib *et al.*, 2022). Therefore, LIS schools and professional bodies must chart a path to improve the pedagogical and digital skills of academic librarians. This will enrich and enhance the delivery of library instruction in the digital environment. Worldwide, knowledge in digital pedagogy can provide academic librarians with limitless options in higher education institutions as society keeps abreast of the Fourth Industrial Revolution and the ever-changing landscape of teaching and learning.

One of the key lessons learned from the pandemic is that teaching and learning can occur in an online environment. A deeper understanding of pedagogy and how it is incorporated with relevant digital skills can create opportunities for academic librarians to expand their knowledge in design, instruction, activities and assessments related to online teaching. Ultimately, academic librarians must reflect upon their practice and make the necessary adjustments, to close the gap or risk being left behind.

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