Chapter 15
Digital Pedagogies of Academic Librarians in the Fourth Industrial Revolution

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ABSTRACT

Globally, the role of academic librarians as online teachers at higher education institutions is experiencing a tsunami of change. This is due to the Fourth Industrial Revolution and the influence of technology on pedagogy. The 21st-century academic librarian is challenged to adopt innovative teaching methods using technology in a digital environment. The purpose of this study was to explore the pedagogical and technological preparedness of academic librarians at University of Technologies in South Africa for online teaching. The technology pedagogy content knowledge framework guided the methodology in exploring the pedagogical and technological preparedness of academic librarians. A pragmatic approach using quantitative techniques was used in the data collection process. The data collected from the findings were analyzed and validated resulting in emerging themes. The results show a lack of pedagogical and technological skills among academic librarians at UOT in South Africa.

BACKGROUND AND INTRODUCTION

The 4IR is not limited to technology. It is also powered through the internet positively influencing core sectors in the digital age. Chiles et al., (2021) elucidate the impact of the internet in creating digital infra-

structure in the field of cellular agriculture. The internet using web crawlers created datasets for scientific literature in cellular agriculture which is vital in understanding food production. Similarly, the internet has been central in shifting academia specifically within the context of higher education institutions into the digital environment (Davidson-Shivers *et al*., 2018). This is mainly due to the growth, development and accessibility of the internet in digital learning spaces. Globally higher education institutions have used the internet to accelerate their integration into the digital environment (Sappington and Bedford, 2017) through multimodal methods of teaching, learning and research.

The influence of the 4IR, internet and technology also extend beyond the physical boundaries of academic libraries at higher education institutions. Academic libraries in the 21st century is developing and transforming in the digital age. Jolly and Corrall (2019) provide evidence substantiating this shift terming it 'social innovation'. Some examples of using social innovations within academic libraries include artificial intelligence, virtual library assistant and research data management. Academic libraries are changing into forward-thinking research environments for digital humanities, data curation, evolving integrated library systems, learning analytics, open access, research data services, digital pedagogies, machine learning, and artificial intelligence in a digital world (Uzwyshyn, 2018). According to Lewitzky (2020), academic libraries have evolved from being resource-based to an active and integrated digital role within higher education. This is the result of the internet and rapid technological advancements. Hence, the 4IR, the internet and technology have been drivers of 'disruptive innovations' for academic libraries in higher education. Chisita et al., (2022) study reveals and identifies disruptive innovations in academic libraries accelerated through the recent Covid 19 pandemic simultaneously recognizing the importance of the 4IR. Disruptive innovation "creates an entirely new market by introducing new products and services and that eventually disrupts an existing market by drawing away customers from that market" (Christensen, 2013).

Disruptive innovations have been key in identifying and influencing the online teaching role of the academic librarian. Bell and Shank (2011) used the concept of disruptive innovations to discover the online teaching role of the academic librarian resulting in a framework of blended librarianship. The blended librarianship framework combined digital and pedagogical knowledge in the teaching-learning process. However, a recent study by Beer (2022) established the blended librarianship approach needs to be repositioned to include core competencies in pedagogical knowledge and digital skills. Julien and Latham (2018) also posit academic librarians need pedagogical and digital skills. O'Neil and Pegrum (2018) agree academic librarians at higher education institutions need a grounding of pedagogical knowledge mixed with technological skills such as the use of digital learning tools for online teaching. Historically, the literature has continuously challenged the pedagogical knowledge of academic librarians and their role as a teacher at higher education institutions (Ciccone & Hounslow, 2019). However, the current influence of technology on pedagogy has added a new dimension for academic librarians who teach in a digital environment.

PROBLEM STATEMENT

Globally, there has been a tsunami of change in the teaching role of the academic librarian. The teaching role of the academic librarian has been synchronized in relation to the understanding of pedagogies and technologies. The challenging nature of higher education institutions in the 21st century intersecting with the influence of technology on pedagogy demands academic librarians to engage seamlessly within

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