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THE INDEPENDENT JOURNAL OF TEACHING AND LEARNING

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The Independent Journal of Teaching and Learning

The Independent Journal of Teaching and Learning (IJTL) is an education-focused journal, published twice a year, online and open access [ISSN 2519-5670 (Online)] by The Independent Institute of Education. The aim of the journal is to make a difference to educators at the primary, secondary and tertiary levels, providing a scholarly forum for academics and education practitioners to share research on teaching and learning. The journal as well as all submission and publication information can be found at https://ijtl.iie.ac.za/ .

The IJTL is intended to be a resource for education practitioners and researchers as it aims to provide useful, research-based resources and to provide a scholarly forum for academics and education practitioners to share in research on educational practices and teaching and learning at various levels.

The following contributions are considered for publication:
• Theoretical articles
• Research-based empirical, reflective or synoptic articles that would be of interest to education practitioners
• Review articles that critically examine research carried out in a specific field
• Discussion or advocacy papers
• Book reviews that comprise a clear and concise evaluation of recently published books.

The journal accepts Doctoral Abstracts, which include the link to the full text thesis, from researchers that have graduated with a PhD/Doctorate in Education in the last two years. These are not peer reviewed and are published in a separate section of the journal. Authors whose articles are published in the IJTL may only publish preprint versions thereof on platforms other than the IJTL.

Contents

2

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

3

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5

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Editorial

Dolina Dowling

The Fourth Industrial Revolution continues at pace with changes taking place in technology, economy, and societies. All aspects of our lives are affected albeit at different speeds and ways. However, the exponential innovations in technology in particular in Artificial Intelligence (AI) have yet to impact education, (although the advent of Microsoft-backed OpenAI ChatGTP is causing consternation about what this means for assessment and the curriculum in higher education).

The COVID-19 pandemic with its concomitant lockdowns necessitated the move to online learning. Virtual classrooms, Zoom lectures and seminars, and the importance of the full use of Learning Management Systems (LMS) by academics and students alike, assumed a priority. This move had varying degrees of success. The World Economic Forum (WEF) stated that while learning outcomes were compromised due to the move to online learning, it has provided the impetus for policymakers and institutions to undertake a 're-examination of the concepts of time and space in the education world'.[1] The mantra that online learning allows 'anywhere anytime' learning is often used to show that education is becoming more inclusive and accessible. However, there is still a disjuncture between access and success.

Another aspect of technological advances is that it allows access to knowledge on any subject. This has the potential to render lectures redundant as a method to transmit knowledge. In any case, it has long since been established that for learning to take place and for success in achieving learning outcomes, it needs to be active rather than passive. For deep learning to take place it needs to include the application of knowledge. While the implementation of Work Integrated Learning (WIL) in higher education programmes sought to address this, it does not go far enough. Students need to be prepared for the future workplace. As noted in previous editions of this journal, they need to be flexible and agile learners. They need to be taught 'skills that remain relevant in changing and unknown contexts'.[2] Hence the importance of ensuring students are critical and creative thinkers, problem solvers, can engage with AI, and use big data. Students need to be prepared for a future in which by 2030, 85% of jobs have not been invented yet.[3] 'The pace of change will be so rapid that people will learn "in the moment" using new technologies such as augmented reality and virtual reality. The ability to gain new knowledge will be more valuable than the knowledge itself'(ibid).

For a country to prosper in the global economy in this increasingly technological world, it needs a highly educated and ICT sophisticated citizenry. Given the inequalities that continue to exist between the Global North and the Global South, this is a challenge that will be difficult to meet. In all three education sectors in

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[1] www.weforum.org/agenda/2022/02/four-trends-that-will-shape-the-future of-higher education/

[2] www.werforum.org/events/the-growth-summit-jobs-and-opportunity-for-all-2023

[3] www.linkedin.com/pulse/85-jobs-exist-2030-havent-been-invented-yet-leo-salemi/

South Africa, the gross inequalities between the populations of rural and urban areas; those with wealth and those living in poverty, became more apparent than ever during the pandemic. All the articles in this 18th edition of the journal, reflect the challenges that South Africa is facing.

This is evident in the first article in which experiences of students at a rural university during lockdown clearly exposed the lack of technology, infrastructure basics like electricity, Internet access, mobile devices, and quiet places to study at home. The authors recommend a number of actions to address this situation both at the level of rural infrastructure and institutional student support. In the second article, the response of a university at the start of the pandemic lockdowns was explored along with students' perceptions of their online learning experience. The unequal access to technology and associated resources was evident in student responses to their online learning experience and academic performance. The institution developed new policies to address these. Again, this problem highlighted the inequality of access with success to education.

Advances in AI and cloud-based learning platforms make it inevitable that higher education institutions (HEIs) will continue to increase their programme offer in hybrid and online learning. (In South Africa, most had already engaged in these prior to the pandemic.) This means that academic staff need to be highly technological literate. Continuing professional development is of importance as is ensuring academic staff retention. The authors, in the next article, report on a case study conducted at an open and distance learning HEI to identify risk factors which contribute to academics deciding whether or not to leave the institution. They developed a human resource risk management conceptual framework for use in encouraging academic staff retention.

The next four articles are concerned with teaching and learning and how to enhance student learning. The first of these is concerned with the challenges of teaching computer programming to postgraduate Computer Science students, which is a much-needed skill. The authors' study showed that the use of explicit instruction enhances the quality of programme delivery. In the following article, a case study was used to investigate the conceptual errors that students make in the learning of a linear function. This was followed by an article investigating the type of strategies used in teaching mathematics. The authors found that most lecturers used traditional non-interactive teaching approaches, which encourages surface learning at best. In the last article in this cluster, the author argues that using critical pedagogy in postgraduate psychological education enables students to understand how external influences impact selfhood, which is important for their clinical practice.

Employability of learners through Recognition of Prior Learning (RPL) is the topic of the next article. A study in Botswana found that RPL not only benefits the participants, but it also has the potential to develop a country's human resources.

In the following article, the author provides a much-needed bibliometric analysis of the first 15 years of the publication of *The Independent Journal of Teaching and Learning* (2008-2014), an open access journal in South Africa. He found that the journal has been impactful on South African education.

It is a *sine qua non* that learners need access to books and other reading material to develop literacy and to be able to fully participate in the school curriculum and beyond. In Practitioners' Corner, the authors using a qualitative approach investigated the extent to which classroom had libraries for English First Additional Language learners in the Intermediate Phase in a rural province in South Africa. Sadly, the findings showed that there was a lack of space, and insufficient teacher knowledge on developing and operating a classroom library. The authors make a number of recommendations to address these.

Paragons of inequality: Challenges associated with online learning at a selected rural university in South Africa[1]

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ABSTRACT

In the wake of the COVID-19 pandemic, higher education institutions (HEIs) globally were forced to abruptly transition from traditional face-to-face classrooms to online classrooms in order to salvage teaching and learning. This was especially tougher for HEIs in the Global South where little to no infrastructure and technologies had been rolled-out prior to the pandemic. Navigating this 'new normal' was even tougher for poor rural institutions and students who were already grappling with several inequalities. Against this background, this study explored the challenges associated with online learning at a rural university in South Africa. The study was grounded in the connectivism learning theory and was underpinned by a qualitative approach. To this end, data were collected using in-depth interviews and analysed thematically. The findings revealed that students and staff were grappling with connectivity problems, lack of technological skills, academic dishonesty, and poor attendance, among other things. Because online learning will remain a feature of HEIs for the foreseeable future, the study thus recommended that governments and non-government actors work together to ensure that learning technologies filter to students in least technologically accessible areas to create a genuinely inclusive pedagogy. The study also recommended that additional support be provided for students and teachers to ensure effective participation, and that universities actively promote the creation of online communities where students can connect so as to avoid isolation and solitude that have been known to be features of online learning.

Keywords: Fourth Industrial Revolution (4IR), higher education institutions, learning challenges, online learning, technology

INTRODUCTION AND BACKGROUND

With the rapid emergence of the Fourth Industrial Revolution (4IR), developing countries are increasingly being challenged to exploit the exponential potential for growth and development that comes with this transition (Aboagye, 2020; Sutherland, 2020). The place of digital technologies in Africa was especially magnified by the emergence of the COVID-19 pandemic which caught most institutions and governments in Africa unprepared (Dhawan, 2020; Olawale & Mutongoza, 2021). This revived the argument that although developing countries are earmarked to benefit from the 4IR, most governments continue to play catch-up with the fast-moving pace of the digital revolution (Ayentimi & Burgess, 2018; Kayembe & Nel, 2019). In short, the developing world has had to continually react to the widening inequalities between the haves and have nots, as opposed to being proactive. The lack of regulation policies and laws in the digital domain has been a critical weakness of governments and education institutions in the developing world (Ayentimi & Burgess, 2018; Sutherland, 2020). In addition, it has also been argued that the lack of funding to finance the transition into the 4IR has also resulted in a somewhat failed capitalisation on the prospects

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

8

presented by the digital revolution – this was especially brought to the fore in the wake of the COVID-19 pandemic which emphasised the place of digital technologies in all sectors of society (Korkmaz & Toraman, 2020; Olawale & Mutongoza, 2021).

Reeling from inequalities and endemic poverty that are extant in most African communities, the sudden requirement for non-contact learning modes that were necessitated by the COVID-19 pandemic threw most institutions into a state of panic, forcing them to urgently transform their methods of teaching, learning and assessment. This meant that several institutions had to adopt online technologies, forcing staff and students to use digital technologies on the go (Mutongoza, 2021). Inevitably, this rushed adoption of online learning was fraught with challenges which widened inequalities in learning, particularly for the rural and poor communities that had almost nothing to fall back on (Ro'fah et al., 2020; Rahman, 2021). Unlike their richer and more urban counterparts, the poor and rural communities in South Africa were battling with poor or no internet signal which had the consequence of isolating and discriminating these communities from the new mode of learning necessitated by the 'new normal' (Fernandez & Shaw, 2020; Motala & Menon, 2020). The adoption of online technologies also had the effect of systemically excluding students from low-income homes who lacked access to technologically advanced gadgets and the funds to purchase Wi-Fi or mobile internet data (Adarkwah, 2020; Dube, 2020). Over and above these issues, HEIs were faced with academic dishonesty, lack of training for this online pedagogy, low participation and attendance rates, the digital divide, psychosocial challenges, disruptive learning environments, and lower student outputs, among others.

Academic dishonesty

Studies reveal that the rushed adoption of online learning raised questions about academic integrity in the wake of remote assessments that did not have the traditional invigilation procedures that were being used during contact-based assessments (Gamage et al., 2020). Reported instances of academic dishonesty include plagiarism, utilisation of ghost-writers, and contract cheating among others (Fontaine et al., 2020; Nguyen et al., 2020; Chala, 2021). Compounding the lack of invigilation was the lack of training for faculty on how to conduct remote examinations in a manner that upheld academic integrity (Raaheim, et al., 2019; Mutongoza & Olawale, 2022). In revealing the motivations behind the surge of academic dishonesty in South Africa, studies reveal that principal factors included the desire to get high marks, the lack of thorough teaching leading to examinations, poor assessment security measures, among other factors (Daniels et al., 2021; Khan, et al., 2021; Reedy et al., 2021). Opportunities for academic dishonesty were increased because the pandemic found the university communities lacking in competencies necessary to navigate the digital landscape (Korkmaz & Toraman, 2020).

Limited training

Although implemented as an alternative to the disruption to learning necessitated by COVID-19 pandemic, the effectiveness of this new form of delivering learning content was greatly affected by the lack of training for both students and staff (Mayer, 2019; Moralista & Oducado, 2020). Studies conducted on the efficacy of emergency online learning reveal that during the pandemic, education institutions failed to harness the potential of this new pedagogy because faculty members and students were not ready for online classes owing to lack of digital skills and computer illiteracy in some instances (Ogunkola, et al., 2020; Zahra et al., 2020; Mutongoza, 2021). This lack of the requisite skills led to a lot of scrutiny of universities in the Global South as they were blamed for implementing measures that did not consider the grim reality and condition of their universities (Gamage et al., 2020; Ngari & Ndung'u, 2020). The reality on the ground was that some students (especially those from poor rural communities), were suddenly required to learn how to use technology-enabled devices simultaneously with course content (Žižek, 2020; Mutongoza, 2021). Further, the resources to finance efficient support services were simply not at the disposal of poorer institutions in the global South whose finance reserves and funding partners were already significantly more limited than their counterparts in the developed world, even prior to the pandemic (Belay, 2020; Mncube et al., 2021).

Low participation and attendance

Studies have demonstrated that in times of transitions, university populations are at a higher risk of failing to cope owing to heightened anxieties, fears, and losses in social aspects of university lifestyles (Poalses & Bezuidenhout, 2018; Cvetkovski et al., 2019). Research done in this regard also reveals that low participation and attendance rates in classes have been the inevitable result of students' failure to understand non-interactive classes (Laher et al., 2021), poor time management strategies, and disruptive home dynamics which meant that students would regularly be disrupted due to their responsibilities at home and limitedness of working space, especially in poorer households (Mpungose, 2020; Laher et al., 2021). In the same breath, studies revealed that the attempt to transition from face-to-face learning modes to online ones would inevitably result in burnout among students and staff owing to the increases in workloads (Makhubela, 2021; Ntshwarang et al., 2021). The failure to connect and participate in classes thus affected students and lecturers alike – lecturers were left lecturing to screens with minimal interaction with students, while students were restricted to being passive participants who often only attended classes asynchronously through recordings (Adeyon & Soykan, 2020; Mukuna & Aloka, 2020; Ro'fah et al., 2020). Low participation and attendance rates were thus reported as significantly impacting on the quality of online learning delivery across universities in the developing world.

The digital divide

E-learning has brought to the fore the high level of inequality that still exists in Africa compared to other parts of the world. Czerniewicz et al., (2020) express that South Africa is the most unequal country worldwide, these inequalities were highlighted through the pre-existing digital divide caused by income and wealth inequalities. Students from rural/marginalised backgrounds were mostly affected by the migration to online learning as their digital expertise are not at the same level as their peers from affluent/urban backgrounds who had no trouble adapting to e-learning. The emergence of e-learning prompted inequalities, geographical location, socioeconomic factors, race and income level as the major causes of the digital divide amongst students in South African universities (Hasan & Bao, 2020).

The digital divide amongst students centre on access to several features of information communication technology (ICT) comprising physical access, enthusiasm, technology proficiencies, and the institutional training available on digital technologies. When conceptualizing the digital gap, the emphasis is primarily placed on the lack of impartiality in accessing online technologies (Belay, 2020; Mutongoza & Olawale, 2022). The difference also highlights the disparity between the affluent and the underprivileged in terms of resources and access to online learning platforms (Gamage et al., 2020; Barrot et al. 2021). Thus, access to online technologies and inequality are at the centre of e-learning success/failure rates. Azionya and Nhedzi (2021) state that related inequalities can take three forms, namely: unequal access to technologies (first-level digital divide); unequal development of the necessary internet navigational skills and information literacy skills (second-level digital divide); and unequal socioeconomic benefits of technology use (third-level digital divide).

Some challenges identified by researchers on the digital divide include: digital infrastructure, affordability of gadgets to access online learning management systems, constant price increases for internet cost, and skills accessible to students (Hasan & Bao, 2020). Students in rural HEIs on the African continent have been gravely disadvantaged by the adoption of e-learning. Some of the challenges they face are power outages (load shedding), cost of data/Wi-Fi, connectivity issues in rural areas, and lack of proper training on online learning management systems.

Isolation and solitude

Institutions of higher learning foster a culture of interconnectedness and socialising amongst staff and students. The inability to connect and interact with peers during the pandemic brought about feelings of isolation and solitude for the majority of students and staff. Psychosocial wellness of students took a plunge

upon commencement of online learning. Students and staff grappled with navigating their way through understanding online learning technologies and stringent deadlines for assessment submissions. Mental health challenges amongst students intensified during the pandemic, specifically the attention and expression of problems (i.e., mood swings and ambiguous responses), these resulted from remoteness, financial constraints, escalation of health problems, and uncertainties (Barrot et al., 2021). Further student concerns were overwhelming workload, technical constraints, and quarantine. The transition to e-learning came with a loss sense of community resulting from isolated learning environments which lead to increased levels of anxiety and depression in students (Mutongoza, 2021).

Disruptive learning settings

Students reported acute anxiety, depression, poor connectivity, and unfavourable home environment as some of the challenges faced by students from poorer backgrounds (Barrot et al., 2021). Despite efforts to aid students in accessing online learning management systems there is little that can be done regarding issues such as insufficient electricity supply and poor network coverage. Rural universities have limited resources to support their staff and students, the pandemic exposed challenges with infrastructural resources in well-resourced HEIs like the University of South Africa (Unisa). Unisa as a remote university providing distance learning for years battled to provide their staff with laptops that have the Intelligent Transport System (ITS) for capturing of students marks which led to the institution offering all modules as annual modules and removing semester modules (Hedding et al., 2020).

Compromised student output

Many universities changed an array of modules from traditional examinations to continuous assessment creating a new range of administrative problems. These include marking the work of large classes in a short frame of time, experimental laboratory assessments, limited to no practicum placements and less comprehensive assessments which were provided to students just to make throughputs to submit to the Council for Higher Education (CHE) (Hedding et al., 2020). Whilst focussing on moving teaching and learning online the neglected 'elephant in the room' that was highly affected by the pandemic is research supervision and outputs. Research supervision of postgraduate students, departmental research outputs, applying and acquiring research grants, and meeting deliverables for research funding were also majorly affected by the sudden switch to online platforms due to poor network and connectivity, and limited training on how to use e-resources. Many research projects were compromised by lockdown social distancing regulations. Final year students complained that online research supervision was inefficient, and they had to do most of the work without guidance and received minimal marks for their research projects. Some data on final year student research marks captured by Hedding et al. (2020) revealed very minimal scores for research projects especially in rural HEIs. While those in Science-related disciplines were affected by limited laboratory work, those in the Humanities and Social Science disciplines grappled with limited access to collect data and conduct qualitative research studies using interviews, participant observations, and focus group discussions. Such staff and students complained that online data collection did not espouse rich information compared to face-to-face data collection methods (Hedding et al., 2020).

Theoretical perspective: A case for the connectivism learning theory

In order to understand the foundational aspects of online learning, it is important for one to consider the lenses provided by connectivism learning theory. Connectivism is a learning theory that was developed by George Siemens in 2004 specifically for the digital age/4IR (Siemens, 2017). The theory of connectivism advanced from the concept 'situated learning', which recognized the command of technology for the purpose of learning and the social networking process consisting of online information sharing and creation of knowledge. In the digital era, information and knowledge is disbursed through networks where connection informs learning (Utecht & Keller, 2019; Corbett & Spinello, 2020). Connectivism includes learning through "information databases, social media platforms, online networks, blogs, podcasts and online learning management systems" (Siemens, 2017:17). This theory is very prominent and most befitting to the online learning environment that most institutions of higher learning adopted since the

11

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

commencement of the COVID-19 pandemic. Knowledge forms a major part of problem solving, intellect, enthusiasm, attentiveness, and reasoning rather than tasks, that is what the concept connectivism is constructed on (Zgraggen, 2021; Sousa et al., 2022). Over the past 30 years technology has improved the learning environment both formally and informally. Thus, 'connectivism describes the interconnection between human learning and the universal access to knowledge enabled by the current technological environment' (Siemens, 2017: 16). Finally, connectivism yields a technological examination on recent trends, the evolution of e-learning, the source of information and knowledge production, and changes in institutions (Corbett & Spinello, 2020; Owolabi, 2020).

METHODOLOGY

To unearth the challenges associated with the abrupt transition to online learning at a rural university in South Africa, the study employed a qualitative research approach because this approach allowed the researchers to get a rounded understanding of the diverse experiences (Leavy, 2017). At the selected university, the sample consisted of students and lecturers who were selected using purposive sampling because it allowed us to get rich information from a small sample and reach valuable outcomes (Creswell & Creswell, 2018). Having distributed invitations in the Department of Social Work to 40 final-year students and 10 lecturers that were selected based on their self-proclaimed acute challenges with online learning, only 10 students and three lecturers consented to participate in the study. Data were collected from the consenting participants using in-depth interviews in English which lasted approximately 20 minutes and were recorded with the consent of the participants. After the interviews, the recordings were transcribed by a professional naturalized transcriber who captured the whole sentences with as many details as possible as prescribed by Nascimento and Steinbruch (2019). After transcription, data were analysed using the six steps of qualitative thematic analysis namely: becoming familiar with the data; generating initial codes; searching for themes; reviewing and revising themes; defining themes; and writing-up themes from those responses (Braun & Clarke, 2014). The researchers obtained ethical clearance and gatekeeper permission to conduct the study at the university, and embarked on data collection in a manner that ensured that no harm was done to the participants.

PRESENTATION AND DISCUSSION OF FINDINGS

The findings from our study suggest that the inception of online learning was fraught with several challenges such as low participation and attendance rates, the systematic exclusion of poorly networked communities, isolation and solitude, and disruptive home environments that made it difficult to learn. Below is a detailed analysis of the responses offered by the participants when they were asked: What challenges affected the transition from face-to-face classes to online learning?

Low participation and attendance rates

The participants revealed that although online learning had been introduced to bridge the learning gaps instituted by the onset of the COVID-19 pandemic, the abrupt adoption of online learning platforms resulted in lower participation and attendance rates in online classrooms when compared to traditional ones. An example can be drawn from a student who noted,

> Online learning comes with costs of data, which is something that has been very challenging, at some point you may find that some of the works you do online need you to have a good network connection and if not, then there will be some complications or unfinished work. Data expenses are high and sometimes not having data have made me miss some of schoolwork, and because poor network connectivity it wasn't easy to check daily announcement made by lectures and I missed a lot of classes and failure to submit schoolwork in time. (Student 25)

Some participants also believed that when initially introduced, the online learning intervention was nongermane to the university population and members of the university community were finding it difficult to accept it. This can be captured in the sentiments of a lecturer who contended,

12

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

> Look, the very same skills transfer in so far as being taught how to do these things is Webinar driven. One is alone in his/ her own corner trying to deal with this foreign intervention. Students avoiding online classes by blaming non availability of data and network challenges. In my first online class I had only 5 attendees from a class of 42 students. (Lecturer 10)

Students were generally of the view that online learning was causing challenges for those in areas without network connectivity. One can consider the view of a student who noted,

> Network connectivity and data where the major problems I had encountered during online learning reason being, my house is in the villages, and you have to stand in a certain area for you to be connected. In terms of data the institution has struggled for a very long time to provide for data and that lead to the classes taking a long time to commence that time the work is piling up. (Student 19)

The findings revealed that while online learning was meant to rescue education projects, its rushed adoption resulted in the widening of learning inequalities. It is imperative for one to reiterate that the differentiated access to the internet meant that online learning systematically discriminated against those from rural areas. This position is confirmed by the connectivism learning theory which predicates that without connection in the digital age, no learning can take place (Corbett & Spinello, 2020). The consequence was that students were absent from online classes and often playing catch-up, especially during the periods where the universities were closed and both students and staff were working from home. Siemens' connectivism learning theory is helpful in this regard because it demonstrates that for online environments to thrive, students need to be actively engaged and participate for them to develop connections and acquire knowledge (Utecht & Keller, 2019; Sousa et al., 2022). The connectivism learning theory can be used to explain how challenges such as lack of motivation, feedback inadequacies, technical difficulties, distractions, and isolation, among others hinder the active learning process (Owolabi, 2020; Zgraggen, 2021). These findings are validated by studies that conclude that some students resorted to not participating in online classes because of the non-interactive outlook of online classes (Laher et al., 2021). Studies by Mpungose (2020) and Mutongoza (2021) further attest that students from poorer households often grappled with untenable workspaces, inability to manage time owing to chores and disruptions, and failure to access dependable internet services, among other factors. This in essence had the unintended consequence of sidelining these students from the much-lauded mode of learning. As such, HEIs are therefore called to create an engaging and interactive learning environment to motivate students to participate and attend online classes regularly because the post-COVID-19 pandemic classrooms have demonstrated the necessity of fusing digital technologies into learning systems.

Exclusion of poorly networked communities

Although the integration of online learning is generally viewed as the way forward for education, most of the students that participated in the study were of the view that it was an unfair means of teaching and assessing. This was because most students in areas that had limited internet access were being unfairly taught and assessed based on their ability to access the internet, rather than merit – thus, the adoption of online learning was viewed as unfair and exclusionary. A student lamented,

> I think it's not really knowing how to use it and to find certain features and network problems are the worst sometimes in our respective areas that we come from. The challenge that affected me the most at times is the network, it throws a person totally out of learning, especially if you were already logged and you lose network. I have learnt to use online learning and no longer a problem, especially with receiving a laptop. (Student 10)

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

13

This was also evident in the perspective offered by a lecturer who opined that although they were recording online classes to circumvent the loss of learning, some students would still find it difficult to access these recordings. This was because of network challenges or exorbitant data costs associated with online learning. The lecturer said,

> Connection issues and access to Wi-Fi/data are the two main problems. Without proper coverage and funds to buy data it is impossible for students/lecturers to participate when using online teaching and learning technologies. I had to work with my students to find a cheaper platform that they can all access for teaching. However, due to connection issues, I record every class and email them the clip. This was done to accommodate those that lose connection during class. For communication and exchange of teaching and learning material, we decided that blackboard and emails were still the best options. (Lecturer 2)

Other participants also gave an unfavourable outlook of online learning based on their experiences in rural communities. Poor network sometimes meant that some of the participants had to struggle to connect and work on assessments and this was impacting on their scores. One can consider the views of a student who noted,

> As I have mentioned living in the rural areas and having to login on blackboard for a class has been one of my biggest challenges as a result, I wasn't able to attend any online class in all my modules because of network problems…Most of the schoolwork I had to catch up when I got to school because of the above reasons. I submitted most of my work late, I was at the verge of deregistering because I saw no point of studying this year at all. (Student 18)

The findings above revealed that inaccessibility of online learning platforms greatly disadvantaged students from rural areas. The findings suggest that seclusion became synonymous with rurality, and this was causing a lot of distress and frustration for rural-based students who felt that online learning was not geared to take their rurality into consideration. Although proponents of online learning praised it for being a panacea to the COVID-19-induced learning crisis (Dhawan, 2020; Thompson & Copeland, 2020), experiences of participants in our study suggest that this was not true for all students. These findings become clearer when looked at in light of connectivism learning theory which argues that the technological environment is central to the access and quality of learning that happens at an institution of learning (Siemens, 2017; Corbett & Spinello, 2020). The connectivism learning theory argues that maintaining connections is a prerequisite for effective learning (Utecht & Keller, 2019; Sousa et al., 2022) – this means that in the absence of stable internet connection, the potential to learn and remain connected is heavily compromised. The findings of this research can be substantiated by studies that contend that students from poorer backgrounds were often faced with insurmountable challenges with regards to access to the internet for learning purposes (Mpungose, 2020; Laher et al., 2021). As such, the abrupt adoption of online pedagogy had the consequence of widening inequalities in learning, particularly for the rural and poor communities that had almost nothing to fall back on (Ro'fah et al., 2020; Rahman, 2021). Unlike their richer and more urban counterparts, the poor and rural communities in South Africa were largely battling with poor or no internet signal which had the consequence of isolating and discriminating these communities from the new mode of learning necessitated by the 'new normal' (Fernandez & Shaw, 2020; Motala & Menon, 2020). One can thus contend that the adoption of online learning inexorably widened the gap between the haves and have-nots owing to poor network connectivity. To reduce the digital divide, universities will therefore need to create synergies with government and non-state actors to help tackle the problems of poverty, low education level, and poor infrastructure (Sutherland, 2020; Olawale & Mutongoza, 2021). This may take the form of increasing affordability, empowering users, and infrastructure development, among other strategies.

14

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Isolation and solitude

The findings of the study also revealed that the abrupt transition to online learning resulted in invisible costs as evidenced by comments about mental health. Students and staff reported feeling overwhelmed and unable to cope with the stresses associated with the 'new normal'. A student said,

> I get overwhelmed when I have to write a test online, afraid not to finish on time and not able to submit the test, even the submission of assignments online got me scared. My level of passing has dropped, the interaction that I use to have with my lecturers has been affect negatively, the participation in class also have been affected because sometimes there would a problem with mike so you ended up just listening without an input in class. (Student 34)

One can consider the perspective of a student who spoke about the effects of isolation, arguing that learning is meant to be interactive. The student noted,

> Unfortunately, I have no success story as to using the online way of learning. They had affected me tremendously and negatively because I felt like a failure. Not being able to engage in a class session when everyone else was very stressful. I'm one person very afraid of failing so it taken a lot of strain on me psychologically and emotionally. I couldn't cope especially when I was at home during the lockdown. (Student 11)

Participants also revealed that lack of interaction between students and staff was hampering the effectiveness of learning. Being physically away from one another meant that the university community was suddenly left to grapple with minimal socialising and classes were reported as being mechanical and often not delivering as expected. A lecturer added,

> The attendance and the impersonal nature of online learning was a challenge because the interaction is limited and sometimes hindered because of connectivity issues. (Lecturer 3)

The findings of the study revealed that online learning resulted in the isolation of students from poorer communities as they were left isolated from their peers. This was because the transition to online learning, particularly during the period of the hard lockdown in South Africa, relegated socialisation to being internet-based thus only available to a few that had access to resources to fund this (Adarkwah, 2020; Dube, 2020). While the connectivism learning theory argues for the importance of connectivity as being an essential pillar of learning (Zgraggen, 2021; Sousa et al., 2022), the experiences of our participants revealed that the COVID-19 pandemic led to broken bonds and ultimately resulted in isolation and solitude. In essence, the move to online learning fractured the existing social networking process that is critical to knowledge creation and information sharing as contained in the connectivism learning theory (Siemens, 2017). Due to the financial costs associated with web-based communities, poorer students were often left grappling with isolation (Motala & Menon, 2020). It was also reported that owing to the lack of human contact, online learning was often associated with the invisible cost to mental wellness (Mpungose, 2020). On the one hand, some had to grapple with the pressure associated with learning online technologies on the go, and on the other, they had to do this under stringent deadlines owing to losses of learning time during the initial lockdown period. If anything, the COVID-19 pandemic has taught us that online classrooms are here to stay in one way or the other, as such, HEIs need to be intentional in their efforts to reduce isolation and solitude. Such efforts may take the form of encouraging collaborative work and increasing the interactive elements of online classrooms (Dhawan, 2020; Moralista & Oducado, 2020). It will also be essential for lecturers and teachers to connect with their students in smaller groups, or even in the form of one-on-one meetings to discuss progress and challenges (Dube, 2020; Mncube et al., 2021).

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

15

Disruptive learning settings

The findings of the study also revealed that online learning was found to be tough for students as they had to grapple with constant disruptions that were absent from the traditional classrooms. Those learning from home reported that in some instances, family members disrupted the learning process by designating chores during learning time. This was captured in the views of a student who noted,

> During the day studying was impossible one had to wait till everyone sleeps for some peace, sometimes I would end up too tired and couldn't study sometimes I would be successful and study till the early hours of the morning but would wake up late and miss all the morning classes. Being at home doing assignments means you don't have any access to the library which means work was very limited and I could not elaborate more on my given topics, that made my research to be very limited. (Student 5)

Other students also revealed that daily routines at home were proving to be invasive to online learning, especially in poorer crowded home environments. An appropriate example can be drawn from a student who lamented,

> House chores, as much as parents understand but at the same time, they expect things to be done in their house as they wish and if it's your turn it's your turn. So many times, I have been asked to go to town and I always end up missing some classes, lack of privacy sharing a room with your siblings when you want to study the want to sleep vise-versa and kids running around playing others playing loud music all of this made it very hard to fully concentrate because there is just so much going on. (Student 29)

This was also corroborated by another student who argued that even in the wake of controlled campus reopening, it was still difficult to participate in online classes owing to the disruptive setting abounding in university student residences. The student contended,

> … the disturbance by parents and the sibling, here in the campus the noise from the roommate whilst I am in class, so I lose concentration. Not seeing the lecturer when presenting. I am used to be taught in an auditorium now that I am at home, they are so many things that disturbs me like when I am in class my mother would call so that I can make her cup of coffee. (Student 32)

Unlike the traditional classrooms that were being used by the institution before the onset of the pandemic, the virtual classrooms were found to be prone to disruptions that made for unequal learning opportunities. At the heart of equitable access to quality education is the equalising of learning opportunities and ridding the learning space of any features that threaten learning (Ayentimi & Burgess, 2018; Belay, 2020). Yet, online learning was found to be lacking in this regard, with challenges reported by students in poorer communities that are often associated with larger families sharing very limited resources and spaces, and often associated with several household chores (Korkmaz & Toraman, 2020; Ntshwarang et al., 2021). While the connectivism learning theory argues that for learning to happen, there is need for connections and networks that are facilitated through the use of technology (Owolabi, 2020; Zgraggen, 2021), the multiple sources of distractions in the home environment were found to compete for the students' attention and made it difficult for some to focus on learning. This position is supported by Barrot et al. (2021) who argue that one of the greatest challenges confronting higher education students is the learning environment at home where they face multiple distractions. As we emerge from the COVID-19 pandemic, it will be essential for students to reduce the effects of such challenges because globally, online learning will be part of HEIs' learning modes for the foreseeable future (Mutongoza, 2021; Ntshwarang et al., 2021). It is incumbent upon students to set clear boundaries by communicating with family members and negotiating times when they can study without interruption (Adarkwah, 2020; Hedding et al., 2020). Students will also need to prioritise and manage their time more effectively – this may involve the utilisation of downtime and seeking support from family, peers, or lecturers (Motala & Menon, 2020; Rahman, 2021).

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

16

CONCLUSIONS AND RECOMMENDATIONS

While the COVID-19 pandemic has demonstrated the centrality of digital technologies and online learning in education, there has been a lot of debates and arguments on how this new pedagogy's deeply entrenched challenges militate against its potential to rescue education. We set out to explore the challenges faced by Social Work students and staff at a rural university in South Africa, and by extension, sought to proffer solutions to these prevailing challenges in order to rescue the education agenda. Our findings revealed four broad clusters of challenges that affected the adoption of online learning, namely: low participation and attendance rates, systematic exclusion of poorly networked communities, isolation and solitude, and disruptive home environments that made it difficult to learn. To ensure that online learning is more accessible, engaging, and effective for all students, there is an urgent need for these challenges to be addressed in a sustainable manner.

At the heart of the challenges unearthed in this study was the lack of access to technology and connectivity. To remedy this, we recommend that governments and non-government actors need to work together to ensure that learning technologies filter to students in least technologically accessible areas to create a genuinely inclusive learning platform. A case can also be made for universities to incorporate models that have been known to work at institutions like UNISA where study packs are either collected at designated places nationwide or are sent through courier or post to student addresses. The researchers further recommend that additional support be provided for students and teachers to ensure effective participation – this can be achieved through tutorials, peer mentoring, or dedicated support staff to provide technical assistance in native languages. Because online learning will remain a feature in academic institutions for the foreseeable future, it will also be essential for HEIs to foster the creation of online communities where students can connect with one another so as to avoid isolation and solitude that have been known to be features of online learning. Finally, assessments will also need to be adjusted to engender fairness and reliability – this is because traditional classroom-based assessments are vastly different from the online assessments that are often done remotely.

Although our study was able to pinpoint some of the difficulties that Social Work faculty and students had when implementing online learning, it is crucial to remember that the size of our sample makes it difficult to generalise these findings. Our research can be considered as an exploration of this subject and as a starting point for other academics to look into it further. By disseminating our research, we add to the corpus of knowledge on this subject by providing the unique challenges faced by students and faculty at a rural university. Additional research can build on these by conducting more extensive and representative studies, utilizing various research designs and methodologies to validate our findings, and developing evidence-based interventions to address the issues that students and staff face when implementing online learning.

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17

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18

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20

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21

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Key indicators informing students' perceptions of online learning and academic performance during the COVID-19 pandemic[1]

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ABSTRACT

The purpose of this paper is to examine students' perceptions of their online learning experience during the first wave of COVID-19. The paper highlights the actions taken by the institution in transitioning to online learning and key indicators which influenced students' perceived online learning and academic performance during the pandemic. The study was conducted at a university and reports on quantitative and qualitative data collected from an online survey of 3257 students. Tinto and Pusser's (2006) model of institutional actions was used as a framework to guide the study. The study's findings forced the university to re-look at student support through new lenses. The findings from the data provided the basis for the institution to re-invent three academic policies to include a more holistic approach to learning, teaching, and student success. The policies developed were: Flexible Learning and Teaching Provision (FLTP), Assessment, and Curriculum Transformation and Renewal, which placed the student at the centre of university actions.

Keywords: online learning, student perceptions, COVID-19, higher education, key indicators

INTRODUCTION

The outbreak of the coronavirus in 2020 disrupted life around the globe. The education sector was affected in many ways. Teaching and learning in higher education institutions, which were predominantly face-to-face, had to grapple with moving their academic programmes onto the online/virtual platform due to the unforeseen global lockdown. The lockdown announced by the South African President in March 2020 resulted in all universities suspending tuition. Each institution had to re-imagine its academic programme taking into account its own university context and that of its student population. The lack of homogeny in the disparities with resources, financial status, readiness, and infrastructure of institutions in South Africa resulted in different start and end dates of the academic year and varying modes of delivery of teaching, learning, assessments, and examinations. South African institutions and students from all spheres of society were severely impacted by the country's stark digital divide, which is characterised by uneven network penetration (urban versus rural areas) and a relatively high cost of online communication (Pather, Booi & Pather, 2020).

Muthuprasad et al. (2021) outline that technical constraints such as the suitability of devices and bandwidth availability pose a serious challenge, particularly for developing countries, which brings into question the clarity in understanding preparedness, and the designing and effectiveness of e-learning. As part of the university leadership, it was important to understand staff and students' preparedness for moving learning and teaching online. Gaining a better understanding was key to firstly informing the institution's design of

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

22

the novice virtual online academic engagement, and secondly, to ensure that the institution did not take for granted the resource disparities that exist among the staff and student population. Figure 1 below outlines the initial actions taken by the university leadership during the first wave of the COVID-19 pandemic in supporting staff and student transition to emergency remote teaching and learning during semester one.

The actions indicated in Figure 1 did not follow a sequential process but were actions taken to move the academic project online while ensuring no student was left behind. Action one in Figure 1 highlights the first online survey (Student Readiness for Online Learning Survey) administered within 48 hours of the announcement of the national lockdown. The immediate response by university leadership was to determine students' resource readiness for online engagement and how best the university could support its diverse student population. The survey was administered online to the entire student population (N = 23,788). The following indicators were probed in the survey: device ownership (laptop, smartphone, computer, and tablet); device preference for learning; access to the internet; affordable access to the internet on a daily basis; conducive learning environment; and finally, confidence in online learning.

Figure 1:
Actions Taken during the First Wave of COVID-19
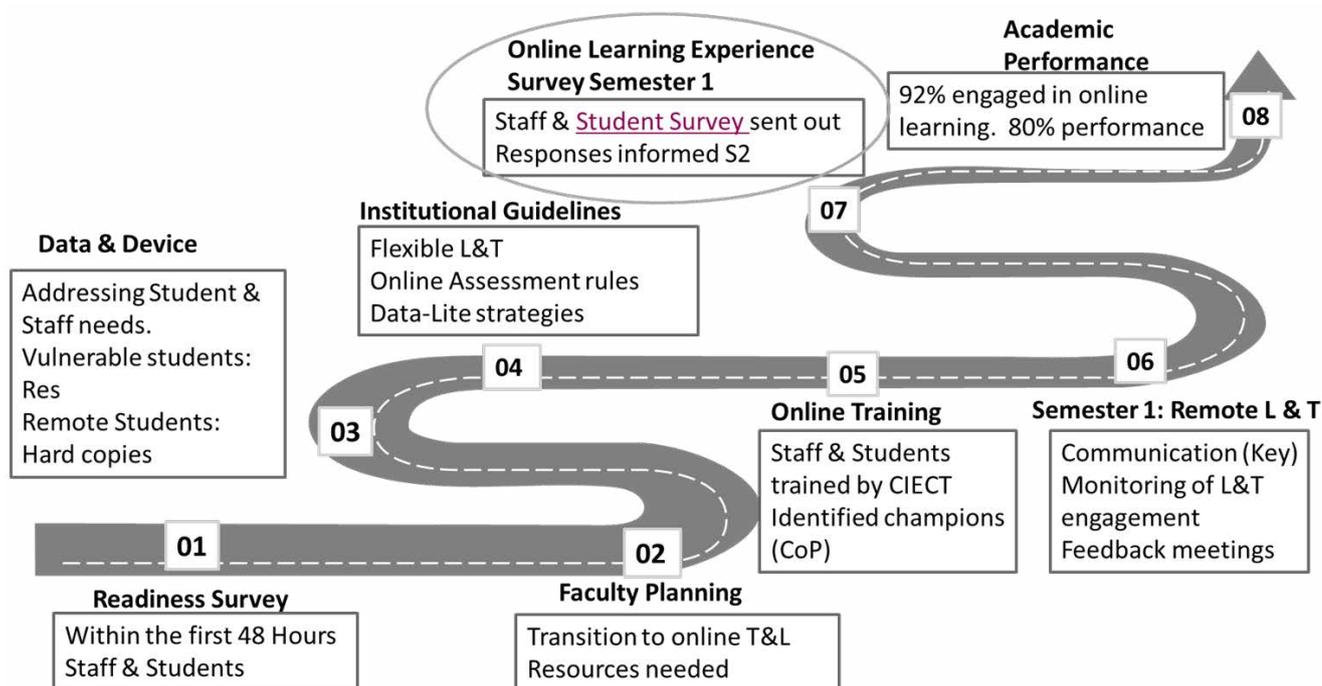
Pather, Lawack & Brown, 2022

The readiness survey (Table 1 below) assisted us in probing whether the average student was prepared for the dramatic shift from face-to-face tuition to that of remote online learning. The results in Table 1 show the data for the following indicators: device ownership (laptop, smartphone, computer, tablet) 98% of respondents indicated they either owned a device or had access to a device; device preference for learning, 70% preferred to use laptops; access to the internet, 56% indicated they had access; affordable access to the internet on a daily basis, only 51% indicated daily affordable access; conducive learning environment, 74% regarded their remote learning environment as conducive; and finally confidence in online learning, a small percentage of 36% of respondents indicated they were confident to continue to learn online during the crisis. However, among the respondents that indicated they were not confident with learning online, 23% indicated that if they received appropriate training on skills to engage with online learning they would continue, and an additional 41% indicated that with the appropriate resources provided to them, they will be willing to engage in online learning. These results brought to the fore several issues that were pivotal in

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

23

how the university organized itself during the initial period of the lockdown, but more importantly, it provided a basis on which the university leadership was able to frame a business continuity response which is illustrated in Figure 1 above, from action two to seven.

Table 1:
Response from Student Readiness for Online Learning Survey

Student Responses: 11902 (51% - response rate) Year Level: Y1 -29%, Y2 – 28%, Y3 26% - UG Level (83%)	Positive Response	Negative Response
Device ownership (Laptop, desktop, tablet, smart phone)	98.6%	1.4%
Device ability to connect to the internet	84.3%	15.7%
Preferred device for online learning: Laptops (70% owned device),	69%	39%
Ownership of Smartphones preference for online learning (92.9% owned device)	23%	77%
Access to internet at home for online learning	55.8%	44.2%
Availability of affordable daily access to the internet with preferred device	49.2%	50.8%
Conducive learning environment off campus	73.4%	26.6%
Confidence to engage in online learning	36.07%	41.25% (Need Resources)
		22.68% (Need additional help)

The evidence from the survey informed the following actions to ensure a smooth transition and continuity with the academic project: action 2 refers to the actions taken by faculties in planning for the delivery of their modules and assessments; action 3 refers to faculties identifying vulnerable students. Vulnerable students were identified as students who required data, devices, and accommodation at residences if connectivity or unsuitable living conditions were an issue; action 4 saw the institution readjust academic policies and provide guidelines to support online learning, teaching, and assessment during the pandemic; action 5 addressed the need for online training of lecturers and students with the appropriate skills so as to engage in the online platform effectively; action 6 highlights the importance of university communication to staff and students to ensure a sense of connectedness while working remotely. These immediate actions taken by the university leadership took into consideration the realities of the pandemic, and staff and students' work/home environments, while also being cognisant of planning actions from a place of care and compassion. Action 7, which was conducted at the end of semester one, was key to getting a more informed perspective on staff and students' online learning and teaching experiences, which informed plans for semester two. Action 8 in Figure 1 indicates that all actions taken by the institution resulted in 92% of students engaging in online learning and an increased average academic performance result of 80% for the 2020 academic year.

STUDY'S AIM AND PURPOSE

Given the above backdrop, this study's focus is on action 7 with particular attention to students' viewpoints during the pandemic. The aim of this study is to gain a better understanding of students' transition to online learning by investigating their perceptions of their online learning experience and academic performance as they transitioned to emergency remote online engagement during the COVID-19 pandemic. The study highlights the key indicators that influenced students' positive and challenging perceptions of their online learning experience and academic performance during the first wave. This study is framed by Tinto and Pusser's (2006) model on institutional actions, which shifts the focus away from the students and onto the institutions' system, actions, and commitment to supporting student success. By association, it is also framed by Tinto's (1995) integration theory to investigate students' integration into

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

24

their new online learning environment. The purpose of the study is to understand students' online learning transitions with the objective of informing university policy in respect of how digital learning spaces may become more conducive.

STUDY CONTRIBUTION

This study provides valuable insights into students' adaptation to learning online with limited resources and interventions. An empirical analysis is performed with a total participation of 3257 students at a university in the Western Cape, South Africa. The study revealed that the impact of students' perceptions of their online learning experience and academic performance was strongly mediated by their levels of satisfaction with the university services; support provided; engagement with lecturers and peers; and learning environments created. The following key indicators identified from the study could be influential in determining students' successful engagement in the digital learning space:

- Intentional support offered by the institution
- Creating a sense of connectedness to the institution
- Resource provisioning by the institution
- Institutional academic and psychosocial support
- Home environment.

LITERATURE REVIEW

Singh and Thurman (2019) define online learning as learning experiences that occur in synchronous, asynchronous, and hybrid learning environments using different devices that require internet access. The synchronous learning environment offers a platform for students to attend lectures live and is believed to be a space where there is a lot of interaction between the students and lecturers (Dhawan, 2020). This learning environment is collaborative in nature and makes use of e-activities and they require the presence of both the student and a lecturer (Perveen, 2016). While the asynchronous learning environment provides no live lectures or classes, students receive learning content using different learning systems and forums (Littlefield, 2018). According to Perveen (2016) asynchronous learning environment is not time bound and students can be able to work on their e-activities at their own pace and time. The type of online learning environment created can influence student satisfaction and motivation to learn. Barber, (2020) supports the notion that the online learning environment created is the single most important factor that could influence student satisfaction and motivation to learn. Barber believes that factors such as student online classroom engagement; course structure; lecturers' knowledge; and facilitation style positively influence student motivation, satisfaction, and students' perceived learning outcome. Bolliger, Supanakorn & Boggs (2010) also acknowledge that the learning environment created is an important factor to keep students satisfied in an online classroom, which influences student motivation. They add that students with high motivation will be more successful in the online learning environment than students with low motivation. Nguyen et al. (2021) study on students' online learning experience, the authors conclude that active-learning methods, which are known to increase motivation, engagement, and learning in traditional classrooms were found to also have a positive impact in the remote online learning environment. In a study conducted by Yan et al. (2021: 2046) students perceived online learning to be more beneficial on the grounds that it was 'more convenient to review course content', students 'can learn anytime and anywhere', 'access to courses delivered by famous teachers' and most importantly it is 'helpful to develop self-regulation and autonomy'. Therefore, flexibility has been highlighted as an essential component of online learning, which has increased the learning potential of students in institutions of higher learning (Dhawan, 2020).

In addition to a conducive learning environment being an important factor to influence student learning and motivation, student agency was considered to be influential in the learning experience. According to Code (2020), a student's effectiveness in adapting their cognitive, affective, and behavioural processes as they interact within a particular learning environment is critical to their academic success and in this regard, student agency becomes an essential component in the student's ability to regulate, control, and monitor

their own learning. Therefore, nurturing student agency benefits students' self-efficacy, motivation, engagement, and learning. In a study conducted by Mukhtar et al. (2020: 108), it has been evident online learning has enhanced a 'student-centred approach', where Self-Directed learning (SDL) has resulted in students managing their activities independently. On the other hand, Mahlaba (2020) discovered that SDL is the strongest predictor of academic performance on the online learning platform. Al-Jarf (2020) describes student agency as a component of student engagement, which enables students to act on their own learning by utilizing the resources and affordances in the learning environment. Although student agency plays a key role in the learning process and in students' academic performance, Al-Jarf's study on student agency in transitional distant learning (DL) during the COVID-19 pandemic, indicates low student agency which influenced student engagement, motivation, and performance.

Another important component that could influence students' online learning experience, motivation, and satisfaction relates to resources available to the student to engage meaningfully in online learning. The COVID-19 pandemic has brought into focus once again the disparities amongst students' preparedness for learning and in this circumstance, emergency remote online learning. Accessibility to course content and materials, and convenience in terms of time and place have a very strong effect on a student's perception of online learning and are highlighted as an advantage (Bączek et al., 2021). Disparities include students' readiness with regard to online learning skills, resources available for online engagement, and the many uncertainties added to students' perceptions of their online learning experience. The uncertainties also relate to technical IT problems that are prevalent among first- and second-year students that are enrolled during the COVID-19 pandemic (Bączek et al., 2021). The study revealed that students that are new to higher education (tertiary institutions) were having challenges related to IT, particularly those using smartphones where screen displays and pop-up media were distracting them from focusing on class. In a study conducted by Agung et al. (2020) a proportion of students reportedly 76% had incompatible devices for online learning; 15% of students who participated in the study used laptops for online learning, whereas 85% used smartphones to participate in online learning. The study results revealed accessibility to online devices was an issue for that cohort of students as they were dependent on their parents to gain access to online learning devices.

Muthuprasad et al. (2021) added that technical constraints such as the suitability of devices and bandwidth availability pose a serious challenge to an online learning experience, which impacts students' learning outcomes and is more visible in developing countries. Accessibility to appropriate technological devices such as a laptop or a desktop for online learning is one of the most influential components for student success (Barbour et al., 2018). The following section provides the conceptual framework that guided this study's investigation on identifying key indicators influencing students' perception of their online learning experience and academic performance.

CONCEPTUAL FRAMEWORK

Tinto and Pusser's (2006) model of institutional actions underpinned this investigation. However, the study by association refers to Tinto's (1995) theory on student integration. Tinto's theory on student integration is underpinned by the social constructivist paradigm of understanding student learning and commitment. Tinto asserts that, for a student to be successfully integrated into university life, integration must take place formally and informally in both the social and academic domains. The student's level of integration can be influenced by factors internal and external to the university environment. Internal refers to the university support services, resources, and environment created, while external refers to students' pre-university characteristics such as family background, prior schooling, skills, and abilities. Such assimilation, in turn, often decides the student's level of engagement, commitment, and success, which re-examines their commitment to their personal goals and that of the university (Pather & Chetty, 2016).

In Tinto and Pusser's (2006) model of institutional actions, they shift the focus away from the students and to the institution and its system. They argue that institutional commitments provide the overarching context

for institutional action and highlight that institutions that are more committed to student success are more likely to generate success. Institutional commitment to student success in turn creates an environment conducive to success that students encounter in their everyday interactions with the institution, lecturers, administrators, peers, and the institutions' policies and practices. Tinto and Pusser's (2006) model acknowledges that learning is central to student success, and by extension that without learning, students are not successful regardless of whether or not they persist. They further outline the commitment of the institution to set the tone for a conducive learning environment that supports student learning. Tinto and Pusser add that the earlier students start to engage in learning and value their learning, the more likely they are to stay and graduate. They identify four conditions within the institution that could hinder or support student learning environments and success. These conditions are: students' expectations, support, feedback, and involvement. This article makes use of these four concepts to examine the students' experiences with their online learning environment and their perceived academic performance.

METHODOLOGY

The study is positioned in the interpretivist phenomenology approach. Interpretive phenomenology is referred to as a study of the 'life-world' or 'lived experience' and describes the phenomena as they appear to the person experiencing it (Dowling, 2007). An interpretive phenomenological approach is suitable for research that aims to understand and interpret participants' experiences, to determine the meaning of the experiences (Tuohy et al., 2013). In this regard, this research approach provided the researchers in this study with a descriptive, interpretive, and engaging mode of inquiry from which the fundamental nature of the student's university online learning experience, engagement, and the transition was elicited. The study was designed within the pragmatic research paradigm, which allowed for a flexible approach to solving research problems and acknowledges that there can be single or multiple realities that are open to empirical inquiry (Creswell & Plano Clark 2011). This approach was appropriate for investigating students' online learning experiences in times of uncertainty in higher education during the COVID-19 pandemic. The pragmatic approach allowed the researchers to make use of the methodological approach that worked best for investigating the particular research phenomenon at hand (Teddlie & Tashakkori, 2009).

This study made use of a quantitative and qualitative survey design. Data were collected using a survey questionnaire that was administered online via Qualtrics, which is an online survey software tool that allows the user to conduct survey research, evaluations, and other data collection activities. The design of the survey instrument consisted of a quantitative and qualitative type of data collection methods, having both numerically rated items and open-ended questions. The qualitative type of questions provided a further in-depth understanding of the numerical data collected. The questionnaire designed by the research team explored students' experiences and engagement with online learning. The survey instrument was built with reference to the prior surveys conducted at the start of the first wave of the COVID-19 pandemic. The survey was sent out to the university community at the end of semester one. A total of 3257 students participated in the online survey, with 90% of the respondents being undergraduate students and 10% postgraduate students. A total of 68% of the respondents identified as female and 32% as male respondents. The majority of the respondents resided in the Western Cape with less than 30% being located out of the province. Questions on the survey addressed issues on students' perceptions and experience with online learning and teaching; online transition; engagement; institutional support; connectedness; and resource provisioning. The three research questions that guided the study were:

1. What are the enabling and challenging factors influencing students' online learning experience?
2. What are the key indicators identified by students as influential to their online learning experience and perceived academic performance during COVID-19?
3. To what extent did the institutional actions taken during the COVID-19 pandemic influence students' online learning experience and perceived academic performance?

27

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Descriptive statistics were used to analyse the quantitative data, which was presented in tables and graphs to statistically describe, aggregate and present the findings. Tableau Software is a data analytical tool that was also used to create interactive dashboards and visualisation of the quantitative data. The qualitative data was analysed to gain an in-depth understanding of the participants' lived experience of online learning during the pandemic. In this regard, the open-ended questions on the online survey allowed for the collection of rich data, and the use of words provided more in-depth descriptive information on the students' experiences (Cohen, et al, 2011). The Atlas ti9 software was used for data organisation of codes and thematic groupings. According to Braun and Clarke (2006), thematic analysis is a qualitative analytic method for identifying, analysing, and reporting patterns or themes within data. It was important to recognise that students' realities which were affected by the COVID-19 pandemic and the national lockdown were also influenced by their social, economic, and cultural contexts and the extent to which support from the institution was perceived. Students' viewpoints and their interpretations of their own perceptions and experience were the medium explored to comprehend realities embedded in their transition to online learning during the first wave of the COVID-19 pandemic.

The following sections provide an analysis of the findings under the following categories:
- students' positive experience
- students' challenging experiences
- students' perceptions of online learning versus face-to-face learning
- students' perceptions of their academic performance.

RESULTS

The qualitative data collected from the open-ended questions were classified into themes and sub-themes in the first two sections below relating to the participants' positive and challenging experiences with online learning.

Positive online learning experiences

In the open-ended question on the online survey, participants were asked to describe their online learning experience during the first semester and the first wave of the pandemic in 2020. The institution resumed its academic programme online on 20 April 2020 and concluded the semester on 26 June 2020. Participants' responses to this question were grouped into positive and challenging experiences as a first step. In the second step, the positive and challenging responses were categorised into main and sub-themes. Table 2 below highlights the three main themes identified: institutional support, flexibility, and resilience. The sub-themes in the table developed around the broad theme of how institutional support contributed to the learning experience; how the flexibility of learning was positively perceived; and developing and strengthening resilience.

Table 2:
Participants' positive online learning experience during COVID-19

3 Main Themes	Sub-Themes
Institutional Support	Data & devices provided
	Multiple changes to engage with learning (catch-up programme)
	Regular communications from the university – kept updated
	Support from tutors & lecturers
	Online training workshops (e-learning centre)
	Resources available for online learning
Flexibility	Could work at my own pace & time
	Lockdown allowed for more focused engagement with studies
	Build communities of practice
	Allowed for creatively

28

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Resilience	Increased motivation to work harder
	Support from family & friends
	Knowledge of working online
	Learned new skills

Institutional support

The positive responses relating to institutional actions taken during the first wave of the pandemic that was appreciated by the students included the institution providing data and devices to students who requested these resources:

> It was really helpful when the university made resources available for most students to continue learning, during a global pandemic.

The inclusion of other types of resources relating to the delivery of hard copies to students with no internet access or electricity, resources on the Learning Management System (LMS) and library sites were also helpful and supported students in their learning. This was acknowledged by a respondent:

> My university has done a lot to accommodate us as students and being a student, I benefited a lot from the online learning and resources. Although there are many things that can make the online experience better, however with the limited budget, the transition to online overall has been well managed.

Regular communication that was received from the university, faculties, departments and lecturers made the students feel connected to the university as indicated by a respondent:

> Departmental and work updates were constantly sent out to students, which kept us informed and up to date.

Another similar comment indicated the lecturer's commitment:

> I am so proud of my lecture[r]s and how they availed themselves to us online during the pandemic. Hopefully the second semester will be the same.

Flexibility

The flexibility of the university to adjust to and accommodate the new challenges during the pandemic was noted by students. The university ensured that no student was left behind and multiple opportunities were given for students to engage in their learning and 'catch-up' programmes which were beneficial to struggling students. This was acknowledged in the following response:

> This is new grounds for students, there is a need to adapt and while some students can adapt quickly others can't, and for me, it was important to know that there are measures in place that make you feel safe and guarantee that even if a student fails to do well, they will not be crucified because of it but will be given other chances to make up – that makes me feel better.

Working from home and online also brought other benefits that allowed for flexibility in the way students engaged in their online learning. This was noted in the following comment:

> I feel better prepared this time, as I am focused full-time. The rush to campus is eliminated and I am dedicating more time to my work.

and

29

> Working from home at my own pace and going over the lessons in my own time and relooking at it is good for me.

Resilience

The following comments that supported resilience and independence are identified by two respondents. The first respondent shows resilience in trying to be positive and overcome her challenge with the transition to online learning:

> The hard work from my lectures is appreciated and I know they try their best. My experience for me is kind of challenging because I now need to get myself to actually do the work on my own. So my challenge of discipline is what I need to succeed in. I realize that I just need to work harder and I will succeed with my online work.

The second student commented on his/her prior knowledge of working online and the acquired skills which were beneficial to online learning:

> My knowledge and experience with online learning greatly assisted me with working online and I enjoyed the independence.

The majority of the participants recognized the following components as positive contributors to their online learning experiences: resource provisioning; prior online skills; flexibility and autonomy; reduced commuting time and more focused study time; and support from the institution, lecturers, tutors, peers and family.

Challenging online learning experiences

The responses to the open-ended question that contributed to the themes and sub-themes that were identified as challenging are presented in Table 3 below. Participants' negative experiences were related to the challenges they experienced with online learning. The three broad themes identified included: infrastructure and resources; readiness for online learning; and curriculum-related issues.

Table 3:
Participants challenging online learning experience during COVID-19

3 Main Themes	Sub-Themes
Infrastructure and Resources	Lack of resources (costs of mobile data, suitable devices and electricity)
	Lack of adequate infrastructure (load-shedding and unstable connectivity)
	Absence of a multifaceted support ecosystem provided by 'campus life'
	Lack of conducive 'home' environments
	Lack of family support and pressure from multiple obligations
Readiness for Online	Lack of technical know-how (lack of digital literacy; unfamiliarity with the Learning Management System and other platforms)
	Unfamiliarity with online learning environment
	Unfamiliarity with online learning styles suited to engage online (self-directed learning, time management, etc)
	Reliance on physical presence of lecturers; tutors and peers for consultations & support
Curriculum Related Issues	Lack of timeous communication and adequate feedback from lecturers and tutors

	Inadequate online provision, explanations of content, etc
	An escalation in workload, lack of coordination in faculties around assessment due dates
	Inconsistent use by lecturers and tutors of 'data-lite' approaches

Infrastructure and resources

Much of the challenges under infrastructure and resources are related to financial constraints in purchasing data, devices, and electricity. Participants struggled with connectivity and the unstable supply of electricity resulted in scheduled load-shedding that interrupted online learning and teaching.

As indicated by a respondent:

> I could not always login during an online class during the day because of my poor connectivity and no unlimited data so I missed out if I had questions I wanted to ask.

The absence of support from the campus ecosystem was also felt by the participants:

> Not having the use of the library and tutors not available to assist in all modules was difficult to cope with learning.

and

> Being away from res (student residence) and having a lack of resources available from the institution made working online from home difficult for me.

Participants also indicated home environment and lack of family support as factors contributing to their challenging online learning experience.

Readiness for online

Under the broad theme of readiness for online learning in Table 3, four sub-themes are presented. These sub-themes related to students being unfamiliar with technical skills; online environments; and learning skills to engage in online learning. The last sub-theme highlighted students' reliance on the physical learning space and pointed out that they had been accustomed to relying on the physical presence of lecturers, tutors, and peers for consultation and advice. Below are participants' responses to the theme of readiness for online learning:

> I can't cope with online learning I am failing as there isn't anything keeping me motivated, I am thinking of deregistering;

> Being on campus and working with hard copy is better than e-learning;

and

> That online learning is very difficult to adjust to and it feels like I'm teaching myself for my own degree now.

Curriculum-related Issues

The last broad theme under student challenges is related to curriculum issues. Due to the rush in moving online and the lack of coordination between lecturers and departments, students highlighted issues with balancing workload and assessments. They pointed to the unevenness in the skill levels of lecturers and tutors and their ability to conduct teaching and tutoring within the online environment. The following responses offered by participants support the sub-themes under curriculum issues:

31

It is really hard working from home. There's not enough time to complete the heavy workload given during online classes;

There needs to be uniformity in the presentation of the lectures. For me just posting information on Ikamva (learning management system) is not always helpful as one has questions in order to better understand the writing material;

and

Managing to use multiple online communication methods (zoom, google Meet, and Hangouts) was annoying, confusing and it would be better to stick to one software instead of each lecturer insisting on using a different one.

The participants' challenging experiences related to circumstances that were internal and external to the institution and in some instances beyond the control of students and the university.

Students' perceptions of online versus face-to-face learning experiences

The quantitative data collected from this question drew on a comparison of the participant's perceptions of their online and face-to-face learning experiences. Participants were provided with six statements, from which they had three possible answers to choose from. For each statement, they had to select whether their experience was: *better online; worse online; or the same/no difference*. Figure 2 below shows the results from the data analysed for this section of questions.

The study indicates that when comparing the experience of online with face-to-face learning experiences, the majority of the participants' overall perception of online and face-to-face learning experiences was regarded as the same/no difference. In five of the six statements, participants indicated that there was no difference in their learning experience between online and face-to-face. The statement with the highest percentage of *no difference* responses was shown for the statement '*You are feeling included as a member of the class*' with 50% of the respondents choosing no difference, 34% worst online, and 16% better online. Statement one, which referred to the opportunity to collaborate with other students on coursework, was the only statement to have a lower response rate for *no difference* with 41% of the respondents saying it was worse online, while 40% felt it was the same in both learning environments.

Students' Perceptions of Online & Face-to Face Learning Experiences
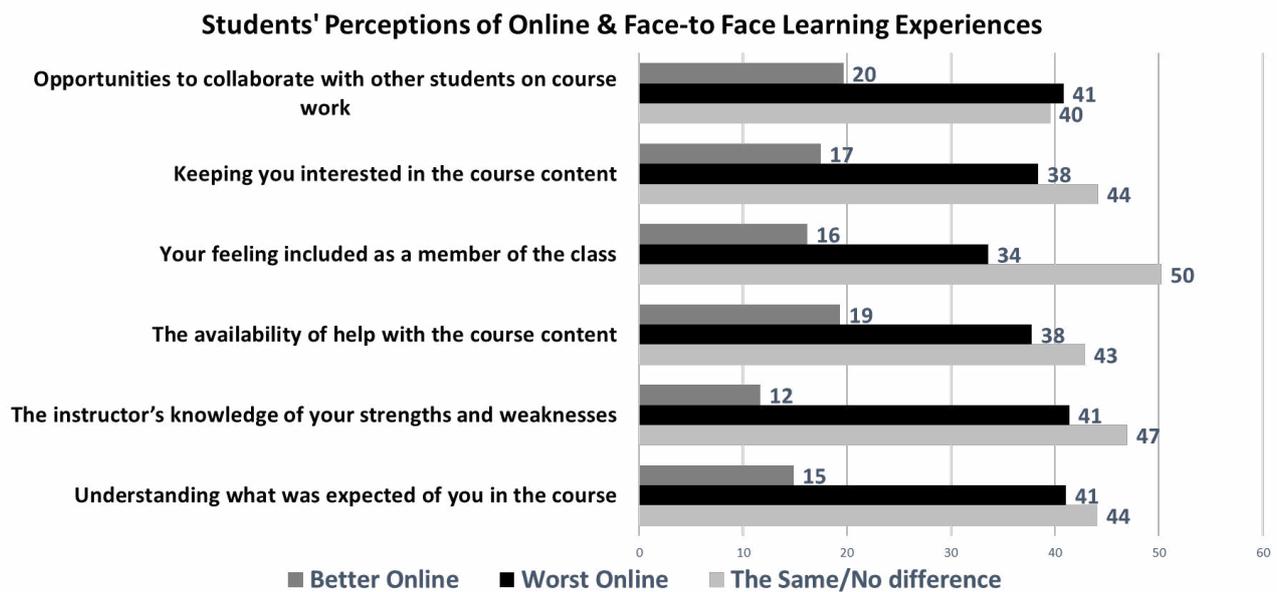
Statement one also had the highest percentage of 20% of the respondents indicating that the online environment provided a better opportunity to collaborate with other students on coursework.

Students perceived academic performance in online learning

Quantitative data were collected from the survey questions that consisted of statements relating to students' perceptions of their academic performance during the first wave of the COVID-19 pandemic. Table 4 below refers to the four statements in this category in which participants had to agree or disagree with the statements. The table shows only the agreement percentages for the statements.

Table 4:
Respondents' perceived academic performance

I believe that I have successfully completed Semester 1, even though we faced many challenges during the pandemic.	79,3%
I am confident that I will be able to sustain my online learning activity for semester 2.	74,7%
I see myself as having a positive attitude and contributing to the success of my 2020 academic year.	77,0%
During this pandemic, I felt motivated to work harder than what is required of me.	63,1%

Three of the statements show that participants had a positive perception of their academic performance with 79% of the respondents indicating that they believed that they had successfully completed semester one even though they experienced many challenges. The lowest agreement statement was 63%, where the respondents indicated that during the pandemic they felt motivated to work harder than what was required of them. The second and third statements reveal that 75% and 77% of the respondents felt positive about the upcoming semester and successfully completing the academic year, respectively.

33

DISCUSSION

Positive factors

The purpose of the study was to explore key factors influencing students' perceptions of online learning and their academic performance. The study also aimed to examine students' perceptions of online learning versus face-to-face. The findings of the study highlighted positive factors under the three themes of institutional support, flexibility, and resilience that played an important role in enhancing the online learning experience, which increased student satisfaction and motivation to engage online. Support offered by the institution has an influence on how students engage with their online learning. Providing resources, support, and regular communication made students feel connected to the university, which motivated their online engagement and learning. As stated by Al-Jarf (2020) students act on their own learning by utilising resources and affordances offered by the institution, which not only increases students' motivation to learn but increases student agency. The findings highlight students' resilience and the online environment affording them the flexibility to take ownership of their own learning, time, and space. In Almahasees, Mohsen and Amin's (2021) study, students expressed that online learning helped them to acquire new experiences and skills; it reduced the cost of traveling to universities and related expenses; and more importantly, the sample expressed the opportunity and advantage of self-paced learning within the online environment. These positive factors were also indicated as recurring themes in other studies on students' perceptions of online experience. Other studies that identified similar benefits that led to student satisfaction with online engagement included: comfort and accessibility, economy (saving time and money), and psychological and medical safety, which led to an increase in students' sense of belonging and connectedness to the university during the COVID-19 pandemic (Muthuprasad et al, 2021; Carrillo & Flores, 2021; Swan & Shih, 2005).

Challenging factors

The findings from the study identified the following perceptions of online learning as challenging experiences: infrastructure and resources; students' readiness for online learning; and curriculum-related issues. Some of the challenges experienced by students during the pandemic included miscommunication and cross-communication between the university and faculty; access to the internet; affordable data; finding a quiet space to work from home; lack of digital competence skills; increase in workload; managing work hours; and balancing personal and study life. Much of the challenges that stem from access to the internet and affordable data can be attributed to the digital divide that has not only negatively influenced students' participation in online learning but also the academic staff. Pather et al. (2020) maintain that one of the primary challenges that exist in South African universities' plight to transform the programme delivery is that of the resource readiness of the average South African university student. This is also supported in Reddy Moonasamy and Naidoo's (2022) study, which exposed that the major challenges encountered by students in transitioning to online learning were technical issues such as lack of network connectivity and high data costs with the majority of students residing in rural areas, thus the inequalities of the education system have been further exacerbated. Higher education institutions need to be mindful of such challenges and institutional support in ensuring that all students have an equitable chance of successfully engaging in online learning should be part of their responsibility. The main themes extracted from Curelaru, Curelaru and Cristea's (2022) findings refer to two key areas that play a role in influencing participants' negative aspects of online learning. One is health and psychosocial problems (e.g. stress, anxiety, decreased motivation, isolation/loneliness, and apathy) and the second is the learning process problems (e.g. misunderstandings, a lack of feedback, additional academic requirements, a lack of challenge, and disengagement). Transitioning to online learning and teaching needs to be carefully planned and intentional about the resources, support and training of students and staff to have a successful experience. Motivational speakers, institutional counsellors and the e-learning team need to work collaboratively to build student agency and motivation to engage in online learning. However, during the pandemic, this important intentional action was not possible and it must be acknowledged that the online learning experience for university students during the pandemic was not an option freely adopted by students but something that was forced upon them. Higher education institutions planning to transition to

hybrid or e-learning need to be cognisant of students' personal and socio-economic stress together with their readiness for online engagement.

Online compared to face-to-face

The findings of this study revealed that approximately 45% of students responded that their experiences with online learning compared to their face-to-face learning were similar. Indicating that there was no major difference in their learning experience with course content or engagement with peers or lecturers. In Bali and Liu's (2018) study on students' perceptions of online learning compared with face-to-face, they note that face-to-face learning perception was higher than online learning in terms of social presence, social interaction, and satisfaction. However, Liu's research discovered that there was no statistically significant difference in learning preference among the students. In this study, the findings revealed that close to 51% of students indicated that they felt comfortable in the online learning space as it provided them with an opportunity to be innovative by using computer technology. Curelaru, Curelaru and Cristea (2022) remark that the online learning space can be regarded as a different way of delivering learning material and content to students. But add that it is also a completely different social space in which students interact with each other and their lecturers. They caution that the online learning environment needs to be similar to the face-to-face learning space so as to avoid any potential limitations to the communication and interaction between lecturer and students. The latter was also a consideration in this study as the opportunities to collaborate with peers were found to be worse online.

Key indicators informing student perceptions during online learning

From the quantitative and qualitative data analyses the study identified several key indicators that impacted on students' online learning experience. These indicators, as seen in Figure 3 below are:
1.   academic support offered by the institution to students
2.   students' sense of connectedness to the institution
3.   resources provided by the institution to support online learning, such as data, and laptops; provision of training to engage online
4.   the influence of home environments to support online learning.

Figure 3:
Key indicators informing participants' perceptions of academic performance
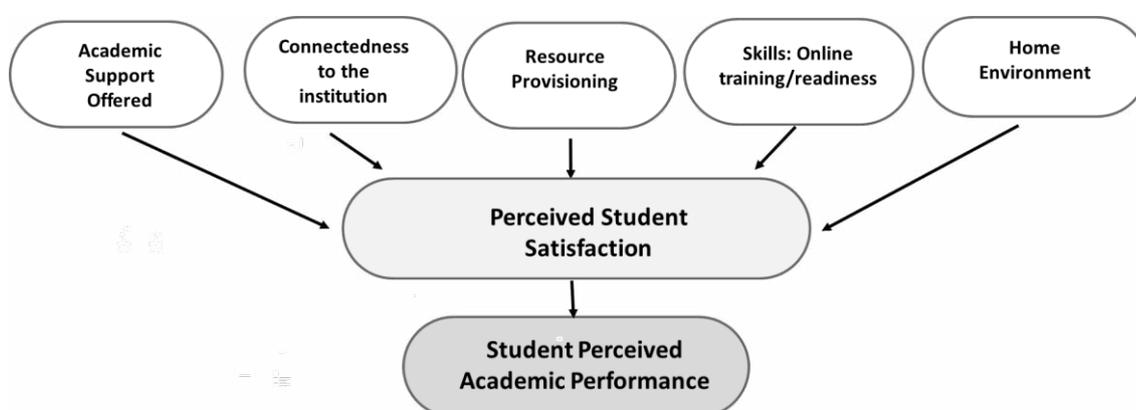
A student's positive or negative online experience had an influence on their perceived satisfaction, which influenced motivation and academic performance. Motivation and self-discipline are extremely important, as students must be able to efficiently manage their time and engagement in the online learning environment. As indicated earlier, factors within the online learning environment can influence student satisfaction which will determine students' motivation to engage in online learning and students with high motivation will be more successful in the online learning environment than students with low motivation.

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

35

CONCLUDING REMARKS

This research has provided an opportunity to consider students' viewpoints on responses and responsiveness to online learning during the pandemic. The disruption of the assumed role of students and academic staff gave rise to embracing new learning opportunities, skills, and ways of engaging within the online learning space. The data on students' perceived learning experiences has brought into focus the need to ensure student connectedness to the institution, the need for resources to enhance learning, and intentional skills development to ensure a successful transition to online learning. Student motivation and student agency are also key indicators to ensuring successful online learning. The findings of this study provided insight into the future positioning of flexible learning and teaching at the institution. The data allowed the institution to drive sustainability by nurturing future possibilities in online and remote teaching and learning contexts. Using these insights, the institution followed an inclusive process to develop three new academic policies to include a more holistic approach to learning, teaching, and student success, which placed student success at the centre of the university focus. The three policies developed and adopted during the pandemic included: the Flexible, Learning, Teaching Provisioning (FLTP) Policy, Curriculum Renewal & Transformation (CRT) Policy and Assessment Policy, which was approved by Senate in 2021. Finally, the students' viewpoints brought into focus the need to consider strategies to be flexible and drive sustainable learning and teaching during challenging times and beyond.

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36

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37

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38

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Enhancing academic staff retention in an open distance e-Learning higher education institution in South Africa[1]

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ABSTRACT

This paper reports on a Human Resource risk management conceptual framework for enhancing academic staff retention in an open-distance e-learning higher education institution in South Africa. The study utilised an interpretative phenomenological analysis research design. Data were collected from academics by means of semi-structured individual interviews and focus group interviews guided by an interview schedule. Three superordinate themes emerged from the data analysis, namely: determinants of academic staff retention; human resource risk assessment; and human resource risk management. The findings of this study resulted in the development of a conceptual framework that has practical utility for promoting academic staff retention in an open-distance e-learning higher education institution. Herzberg's Two-Factor Theory and it's promoting and hindering factors underpin the study and enabled the development of the Human Resource risk management conceptual framework. The identified risk factors are intrinsically and extrinsically instrumental in influencing and determining academics' decisions to leave or remain at their respective open-distance e-learning higher education institutions as their place of employment.

Keywords: academic staff retention, Herzberg's Two-Factor theory, human resource risk management, open distance e-learning institution.

INTRODUCTION

The paper focuses on the development of a Human Resource (HR) risk management conceptual framework for the retention of academic staff in an open distance e-learning (ODeL) higher education institution in South Africa. The term, 'academic staff' refers to ODeL higher education employees with specific roles and responsibilities of teaching, research, scholarly citizenship, and community engagement (Bezuidenthout, 2015; Van Eeden, Eloff & Dippenaar, 2021). Both the existing body of literature and outcomes of the study have eclectically shown the compelling need for an increased understanding of HR risk management and academic staff retention in ODeL higher education institutions in South Africa (Amushila & Bussin, 2021; Huang et al., 2017; Mitrofanova et al., 2018). Responding to this need, this study aims to propose a conceptual framework that is intended to enhance academic staff retention guidelines in ODeL higher education institutions in South Africa.

Globally, ODeL higher education institutions have experienced numerous challenges in respect of the recruitment and retention of qualified, capable and appropriately skilled and knowledgeable academic staff (Amushila & Bussin, 2021; Musakuro & de Klerk, 2021). In Africa, the above-cited situation has become even more precarious and urgent. The main duty of an academic is to provide quality education to students in respect of their acquisition of relevant knowledge and skills (Blau, 2021; Leisyte & Wilkesmann,

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

39

2016). However, Cross, Maluleke and Matsepe (2019), Khoza (2017); Magiledzhi (2022) and Ntuli (2017) suggest that the challenge of retaining existing academic staff is induced by the fact that most ODeL higher education institutions do not have adequate staff to give effect to the required academic functions. This state of affairs has exacerbated institutional risks as described by Renn (2017), and could potentially become a severe event whose occurrence, if ignored, could prevent affected universities from achieving their goals and objectives. Such recruitment and retention challenges constitute institutional risks and threats whose manifestation, magnitude and predictability are only understood to a limited degree (Hillson, 2017).

Despite several approaches and attempts to address the risk of academic staff retention in the past, this concern is still a growing problem in ODeL higher education institutions in South Africa (Altbach, Reisberg & Rumbley, 2019; Letseka, Letseka & Pitsoe, 2018). Examples in this regard include mentorship and supervision programmes, professional development opportunities and competitive salaries (Kuuyelleh, Alqahtani & Akanpaadgi, 2022; Selesho & Naile, 2014; Towns, 2019). Despite these attempts, academic staff retention remains a high-risk factor in ODeL higher education institutions in South Africa (Molotsi, 2021). Recently, Stone (2019) reported a high prevalence of academic staff attrition in ODeL higher education institutions. The latter is probably the result of limited understanding concerning factors that could influence academic staff retention and approaches for enhancing such retention in this population. Hence, this study seeks to develop a risk management conceptual framework for enhancing academic staff retention in an ODeL higher education institution. This framework could be of practical utility for similar higher education institutions in South Africa and other parts of the African continent and other developing countries experiencing similar challenges.

THEORETICAL PERSPECTIVE

Herzberg's Two-Factor Theory is one of the seminal motivational theories that provide explanations for the implementation and management of change, which in this case, relates to enhancing academic staff retention in ODeL higher education institutions in South Africa (Lee et al., 2022). Despite its generalistic focus, some foundational aspects or principles of this theory are applied in this paper to guide the theoretical grounding and development of a context-specific understanding of the seminal concepts within the study's developed HR risk management framework. Furthermore, the aforecited theory is viewed as relevant in this paper because of its practical utility in respect of change and change management in several disciplines (Chiat & Panatik, 2019; Hammargren & Hendricks, 2022; Katanga, Parimoo & Dixit, 2020). Accordingly, Figure 1 below depicts Herzberg's Two-Factor Theory and its foundational principles.

Herzberg's two-factor principles

Job dissatisfaction

Job satisfaction

Influenced by *hygiene* factors

- Working conditions
- Co-Worker relations
- Policies and rules
- Supervisor quality
- Basic wage, salary

Improving the satisfier (motivator) factors increases job satisfaction

Influenced by satisfier (*motivator*) factors

- Achievement
- Recognition
- Responsibility
- Work itself
- Advancement
- Personal Growth

Improving the hygiene factors decreases job dissatisfaction

Adapted from Herzberg, Mausner & Snyderman (1959)

Figure 1 explains the link between job satisfaction and dissatisfaction factors as core interdependent principles or variables. According to Chien et al., (2020) and Heyns and Kerr (2018) and Herzberg, Mausner and Snyderman (1959) most employees are motivated by internal values, rather than values which are external to their work and workplace. Thus, employees are more willing to work due to their internal motivation. Examples of intrinsic or internal factors that galvanise employees to work satisfactorily include (but are not limited to): their involvement in decision-making, responsibility, recognition, advancement and personal growth (Azeez, 2017; Wright, Gerhart & Hollenbeck, 2018). Employees with a higher level of intrinsic motivators tend to be more satisfied with their work (Molinaro, 2019). Contrastingly, employees are often not satisfied by external factors, which include hygiene, conditions of employment and basic salary. Examples of extrinsic factors include policies, salary and supervisory or management styles (Vasantham & Swarnalatha, 2016). In the context of this paper, Herzberg's Two-Factor Theory implies that the improvement of academic staff retention is contingent on (amongst other considerations or factors), HR managers addressing both intrinsic and extrinsic factors to avoid dissatisfaction. Therefore, if HR managers plan to increase academic staff retention and decrease attrition, they need to focus emphatically on job environments through policies, procedures, supervision and working conditions (Irabor & Okolie, 2019). It is in this regard that Herzberg's Two-Factor Theory and its practical application informed the researchers' development of the HR risk management conceptual framework, which is viewed as relevant for enhancing academic staff retention in an ODeL higher education institution.

41

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

METHODOLOGY

The interpretative phenomenological analysis (IPA) approach was used to develop the HR risk management conceptual framework for staff retention in an ODeL higher education institution in South Africa. The study was conducted at an ODeL higher education institution in South Africa, and the participants were academic staff members working at the Pretoria (Muckleneuk) and Johannesburg (Florida) campuses. The sample size was 20 permanently employed academic staff members with a minimum of three years of working experience in the same ODeL higher education institution. According to Alase (2017), such a small sample size is not uncommon in IPA contexts. Criterion-referenced purposive sampling was employed in the selection and recruitment of participants since they were highly knowledgeable about the investigated phenomenon (Alase, 2017; Noon, 2018) of academic staff retention in an ODeL setting.

Data were collected from 20 individual interviews and four focus group discussions, which were all conducted with the guidance of the IPA semi-structured interview schedule. Participants were asked five questions during the individual interviews and focus group discussions. Each interview lasted approximately 45 minutes, during which participants were allowed to express their experiences, feelings and views with respect to the principal subject matter under investigation as proposed by Polit and Beck (2017). The participants also consented to be audio-recorded. Data saturation was reached by the 20th semi-structured individual interview, as well as during the fourth focus group discussion.

The researcher ensured participants' confidentiality, privacy, anonymity and their right to withdraw their participation at any point during the study (Cassel, 2015). All participants signed their respective consent forms, after which individual interviews and focus group discussion sessions were scheduled with those who expressed their willingness to participate in these two initiatives. A follow-up letter was sent to each eligible participant to schedule and confirm the dates, times and venues of the interviews for the duration of the data-collection phase of the study (Sileyew, 2019).

A moderator's assistance was sought in the focus group discussions to capture data aspects such as the non-verbal behaviour and actions of the participants, as well as for assistance with monitoring the overall proceedings during the discussions as outlined in the IPA (Mavhandu-Mudzusi, 2018). Table 1 below is indicative of the interview schedule from which the audio-recorded participant responses were generated and transcribed verbatim from conversion to pertinent data (Cho, 2018).

Table 1:
Interview schedule – sample of questions and prompts

1. Please tell me about your experiences concerning academic staff retention in an ODeL higher education institution.
   Prompt: Please tell me more about these experiences and perceptions.
2. Please tell me about your perceptions (views/opinions/observations) of academic staff retention in an ODeL higher education institution.
   Prompt: Please elaborate on these perceptions and the feelings they engender.
3. In your view, what are the barriers (obstacles) to academic staff retention in this ODeL higher education institution?
   Prompt: Do you view these barriers as causing stress to academic staff?
4. In your view, how can academic staff retention be promoted in this ODeL higher education institution?
   Prompt: Please tell me more about your relationships with your colleagues. What else can you add in this regard?
5. Can you please tell me about the 'best practices' for retaining academic staff members in an ODeL higher education institution?
   Prompt: In your view, is there anything else that can be done to improve academic staff retention? Please elaborate on that point.

42

DATA ANALYSIS

The IPA technique of data analysis was opted for, based on the study's primary focus on understanding the meaning of participants' experiences as integrated aspects of two symbiotically linked phenomena (Smith, 2019; Noon, 2018); that is, HR risk management and academic staff retention in an ODeL institution. For this study, the researcher adopted both insider (the knowledgeable 'other') and outsider (a detached observer) perspectives to maximise her understanding of the participants' authentic perspectives (Jeong & Othman, 2016). This dualistic hermeneutic approach of the IPA fitted well in this study because it provided comprehensive insights (Smith, 2019; Noon, 2018) into the researcher's envisaged HR risk management conceptual framework for academic staff retention in an ODeL higher education institution.

All interviews were fully transcribed and analysed manually according to the principles of the IPA research design. The services of a co-coder were utilised for independent analysis of both the individual interviews and focus group discussions, as well as to ensure the study's credibility, dependability and confirmability (Regoniel, 2015).

FINDINGS

Table 2 is a representation of the data generated from the three superordinate themes that emerged from the analysed data. These three superordinate themes include determinants of academic staff retention, HR risk assessment and HR risk management.

Superordinate Themes	Sub-themes	Keywords/ Phrases	Number of references: Individual Interviews	Number of references: Focus Group Interviews
1. Determinants of academic staff retention	*Promotional factors* ● Intrinsic promoting factors ● Extrinsic promoting factors *Hindering factors* ● Intrinsic hindering factors ● Extrinsic promoting factors	-Stress is part of work -Collaboration with other colleagues -We are paid less, and salary attracts us -Opportunities for promotions -Anger, anxiety, frustration, inadequate resources -Work overload -Unfair promotions	1,1 1,6 3,2 2,3 2,5 1,5 3,6	1,3 4,3 2,2 1,5 1,5 3,2 2,1
2. Human resource risk assessment	*Principles of risk assessment* ● A dynamic process -Eclectic approach -Uncertainty	-Workplace risk -Lack of communication -Contract employees do not get permanent positions	4,2 8,5 3,4	3,6 4,2 4,3
	The practice of risk assessment -Subjectivity -Actual principles -Mixed/ Multiple principles	-Sense of uncertainty -Lack of uniformity within colleges -Policies are implemented differently	10,1 9,6 12,4	3,6 2,7 4,6

44

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

3. Human resource risk management	Risk management approaches			
	-Promotion of employee wellness	-Academia is a demanding profession, difficult to balance work and health	5,2	2,2
	-Orientation and induction programme	-First impression counts, mentors to be assigned	8,4	1,4
	-Academic staff training and development	-Fantastic training and development opportunities	3,1	2,4
	-Mentorship and coaching	-Felt appreciated	1,1	2,1

45

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Each of the three global themes shown in Table 2 also comprises several sub-themes (indicated in bold or italics), and a few narrative statements that support discussions based on the applicable or corresponding themes. Further extrapolated from Table 2 is that, concerning the **determinants of academic staff retention,** participants referred to *deciding whether to continue or discontinue their employment at an ODeL* higher education institution as being both a **promoting and hindering factor**. Noticeably, this theme consists of a set of *intrinsic and extrinsic promoting factors* that influence academic staff decisions to work in an ODeL higher education institution. Participants reported that *intrinsic promoting factors* are internally situated values embraced by an academic staff member, and may have a motivating effect on the choice between remaining, or not remaining at an ODeL higher education institution as a place of employment. Therefore, the influence of job satisfaction on academic staff retention varies among academics, as further endorsed by Korantwi-Barimah (2017).

The participants further acknowledged that the link between job satisfaction and self-fulfilment could enhance academic staff retention strategies, as expressed in the following extract:

> Working in an ODeL higher education institution can be stressful, and the stressful experiences can be exacerbated if academics do not derive satisfaction from their day-to-day teaching and learning activities. (Interview)

The participants also reported that extrinsic promoting factors may positively influence strategies for attracting and retaining academic staff members. They cited travel opportunities and collaboration with others as examples of these critical external factors. This view is exemplified further in the following excerpt:

> Even though academia is a stressful profession, most of us enter it because it offers opportunities to travel to a wide range of destinations to attend local and international conferences and other academic-related meetings. (Interview)

Bonuses and travelling opportunities are considered by some participants as attractive factors for academic staff retention, while others associate academic staff retention with an increase in salaries. Some participants also reported that they were influenced to remain employed at an ODeL higher education institution by the fair availability of promotion opportunities as demonstrated in the following excerpts:

> We are paid less compared to what we are doing. But the annual increase in salaries attracts us to this profession. (Focus Group)

> I must tell you that I am here because I have been promoted to the position of Associate Professor. (Interview)

The aspect of ***hindering factors*** is similar to that of promoting factors and consists of intrinsic and extrinsic hindering factors that may or may not influence academic staff decisions to leave or remain in ODeL higher education institutions. This view is captured in the following focus group discussion and interview-based excerpts:

> Anger, anxiety and frustration always made us not effectively carry out our duties as academics. (Focus Group)

> I do agree with my colleague that we are always frustrated and angry here. We do not have adequate resources (such as ICT support) to perform our duties. (Interview)

In addition to the intrinsic hindering factors, participants repeatedly referred to externally driven factors which could potentially influence their continued loyalty to the ODeL higher education institution for which they are working.

Extrinsic factors may also influence academics to leave the ODeL higher education institution. Examples of these hindering factors include work overload and unfair promotions, amongst other considerations. In particular, work overload was cited as a stress factor due to the onerous and long working hours induced by increased student-staff ratios, as well as the marking of teaching assignments and student examination scripts. The following excerpts attest:

> When I started my job, I was promised a low teaching load so that I can focus on my studies. Now I am overloaded with my work, and they have added another module to my workload. (Interview)

> I possess the appropriate qualifications and experience required for promotion. Added to this, the institution favours external academics. This approach frustrates internal academics, and their repeated quest to leave the institution. (Focus Group)

> Promotions are not done fairly…. just a few academics are promoted each year in my department and the process is extremely biased. It was better at my previous employment where they had annual comprehensive promotions for all the academics. (Interview)

The **HR risk assessment** theme pertains to factors associated with the retention of academic staff in an ODeL higher education institution. Participants highlighted mechanisms to promote academic staff retention. Examples of such mechanisms, in the participants' view, include the awareness of risk assessment as a dynamic process, and the adoption of an eclectic approach as mentioned below:

> Risk assessment is guided by a range of principles (an eclectic approach and a team approach) that we must follow in order to mitigate academic staff attrition in an ODeL higher education institution. (Focus Group)

Participants claimed that risk assessment is a dynamic and fluid process that should involve multiple stakeholders. They stressed that the involvement of multiple stakeholders from different professional backgrounds, departments and ranks within the workplace could lead to a comprehensive risk assessment and risk management intended to thwart academic attrition trends. This view was expressed by the participants thus:

> Most academics with qualifications have been on contract for many years. Some academics may have the required qualifications for advertised permanent positions, yet they continue to get contract appointments. (Interview)

The following excerpts reflect the uncertainty, poor decision-making, inability to predict future events, lack of partnership and team approach to problem-solving when addressing workplace risk assessment, which was emphasised by participants in their respective focus group discussions and individual interview sessions.

> In my department, we have permanent vacant positions, but most of my colleagues are on contract and they don't get reasons why they cannot be permanently employed. (Focus Group)

Subjectivity was also mentioned as a constraint to the implementation of risk management strategies, as depicted below:

> Opportunities for promotions are awarded based on favouritisms. This is done irrespective of how well we perform. (Interview)

Participants further mentioned that actuarial principles should be employed in the implementation of risk assessment to enhance the retention of academic staff members.

> There is a lack of uniformity in different colleges. For example, the College of Economic and Management Sciences should operate the same as the College of Science, Engineering and

Technology. But it looks like management has given colleges different mandates, policies, rules and regulations that must be followed. (Interview)

Participants expressed the view that **mixed or multiple** risk assessment policies should be employed as part of mitigating academic attrition.

I do agree that the university has good policies, but the problem is a lack of consistency when implementing them. That is why the operational running of the university is different from one college to the other. (Focus Group)

Various risk assessment factors are critically linked to the principles and practices of risk assessment aimed at ultimately advancing the goal of academic staff retention. The management of these factors is entailed in the third theme that relates to the sub-theme of **HR risk management approaches** as it pertains to the enhancement of productivity and the retention of academic staff members in an ODeL higher education institution. To that effect, most participants recommended the promotion of a **wellness programme** to address risk factors associated with academic staff retention, as expressed below:

Oooops … academia is a demanding profession. I always find it difficult to balance my work and my health. (Focus Group)

Furthermore, participants were of the view that a good **orientation and induction** programme positively influences the attitudes of academic staff members insofar as remaining in the institution. They iterated that such a programme should include the welcoming and introduction of new members to the institution, their colleagues and to other staff members, as reflected below:

Phew……the first impression counts. New employees must be well-inducted and be given the welcome packs on their first day of employment. (Focus Group)

This theme resonates with some of the participants who advocated for a fully functional training and development programme based on sound career advancement opportunities for the retention of academic staff members. There was also mention of equitable access to training and development opportunities for all academics.

We have fantastic training and development opportunities … I have learnt and gained a lot since I started working here. (Focus Group)

Participants emphasised the need for professional development and career progression through the provision of **mentorship and coaching** programmes, particularly for young and female academics. The programme would help the institution to retain talented and skilled academics. This is corroborated in the following extract:

I had an opportunity to participate in the university's mentorship and coaching programme that was organised for young academics. (Interview)

DISCUSSION

The study aimed at developing an HR risk management conceptual framework to enhance academic staff retention in the context of an ODeL higher education institution in South Africa. Three major themes emerged in this regard, namely: determinants of academic staff retention (promoting and hindering factors), HR risk assessment, and HR risk management. Herzberg et al.'s (1959) Two-Factor Theory refer to promoting factors as job satisfiers while hindering factors are referred to as job dissatisfiers. The study revealed that many participants viewed promoting and hindering factors as influential in academic staff retention. In this regard, personal development, recognition and accomplishment are promoting factors that could influence academic staff retention. Drawing on the

HR risk management framework, hindering factors refer to those aspects that are inimical to academic staff retention, and are exemplified by factors such as low morale and high staff turnover. Such factors could contribute to academic staff leaving an institution, a view that is resonant with Herzberg et al.'s (1959) Two-Factor Theory. This theory is concerned with factors that may influence employee choices and decisions to stay or leave the workplace.

The participants are of the view that the risk assessment of academic retention and attrition in an ODeL higher education institution is an ongoing process that requires teamwork and collaborative information sharing. This view aligns with that of Bailey et al. (2018). Human resource risk management in an institution commences at the risk assessment stage (Lussier & Hendon, 2019). Thus, failure to conduct a comprehensive and appropriate risk assessment could result in poor risk management generally. Poor risk management is fundamentally premised on the failure to mitigate factors that contribute to the incidence of specific risks, such as academic staff attrition (Becker & Smidt, 2016). In this study, participants identified a range of HR risk management strategies which include orientation and induction, training and development, mentorship and coaching, and the promotion of employee wellness. It is largely from these participant-centric perspectives that the researcher developed an evidenced-based HR risk management conceptual framework (see Figure 2), which is supported by the reviewed literature, the researcher's practical experience as an HR specialist (Molotsi, 2021); as well as the opinions of other experts such as Bezuidenhout (2015) and Erasmus, Grobler and Van Niekerk (2015) in the field of HR risk management and academic staff retention.

The developed HR risk management conceptual framework also draws from the three-way framework proposed by Walker and Avant (2019). The framework itself entails three different but interrelated aspects, namely: derivation, synthesis, and analysis. In turn, each of these aspects is characterised by three interrelated framework development components, namely: concepts, statements, and theories. The researcher opted for Walker's and Avant's (2019) framework due to its synthesis-focused approach and appropriateness for concept development in settings where possibilities for such development are sparse or virtually non-existent. Researchers and other subject experts can apply their practical or professional experience and relevant subject information to develop new concepts and statements; and subsequently a new theory or framework in situations or contexts of conceptual paucity (Bloom et al., 1956). The framework development strategies are discussed hereafter in the context of concept synthesis, statement synthesis and theory synthesis.

Concept synthesis

Concept synthesis can be described as an inductive and mechanical framework development strategy that is exemplified in mental constructs, images, ideas or symbolic representations of an object, process, or action (Polit & Beck, 2017). In this study, the identified concepts relate to the constructs, images and ideas which enabled the researcher's identification and categorisation of participants' experiences, the researcher's practical and professional experiences, as well as her immersion in the wider body of existing literature in the field being studied (Gray, Grove & Sutherland, 2017). The researcher's practical experience in HR risk management and academic staff retention enabled her identification and clustering of similar concepts, with each cluster subsequently assigned a name following the constant reorganisation of concepts from one cluster to another. Each concept was appropriately placed under a cluster that best reflected its meaning. This process was applied repeatedly to the point of theoretical saturation; that is, the point at which no new concepts emerged concerning the aim of the study (Smith, 2019). Examples of the identified concepts include hygiene factors, motivators, work-life balance, talent management, psychologically safe work environments, mentor-mentee relationships, academic support strategies, training and development, retention strategies, as well as recruitment and selection strategies. These concepts were clustered according to their similarities and differences, and thereafter assigned names that reflected the meanings of the concepts to which they referred (Walker & Avant, 2019).

49

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Since the naming of the clusters was a repetitive process, it required the researcher's patience, creativity and imaginative acumen (Bloom et al., 1956). The repetitive process itself resulted in assigning names to the clusters of concepts that were consistent with the HR risk management conceptual framework. Examples of clusters and the concepts to which they referred include positive factors such as recognition, job satisfaction, benefits and salary increase; as well as negative factors such as low morale, loss of benefits, work overload, and discrimination. The clusters and their respective concepts are useful in explaining HR risk management and the factors that might influence academic staff retention. The interrelatedness of these clusters of concepts was examined and discussed in prosaically synthesised statements.

Statement synthesis

Statement synthesis shows the relationships between the building blocks used for the development of the conceptual framework (Walker & Avant, 2019). In essence, the synthesis of statements aims to highlight the relationship between two or more concepts based on existing evidence gathered through observation. In this study, the theoretical statements concerning the investigated phenomenon studied (i.e., HR risk management and academic staff retention) were obtained from the reviewed literature, the research findings, and the researcher's observations in HR practice. This stage is regarded as both an inductive and deductive process of conceptual framework development. The following are examples of theoretical statements obtained from the reviewed literature.

Statement 1: Every academic staff member has an internal motivational energy that enables them to decide whether or not to stay or leave a university as a place of employment. Accordingly, internal motivational energy is referred to as a factor.

Statement 2: Every academic staff member has external motivational energy that may enable them to stay or leave a university as a place of employment. Accordingly, external motivational energy is referred to as a factor.

Theoretical statements are often rephrased to clarify their meanings. Given that the theoretical statements derived from the literature described two sets of concepts about academic staff retention and attrition, the statements were then restructured to clarify their meanings. Statement 1 was rephrased into two theoretical sub-statements as follows:

- Academic staff are influenced by internal factors (such as job satisfaction and recognition) that may enable them to stay in ODeL higher education institutions
- Academic staff are influenced by internal factors (such as low morale and academic jealousy) that may enable them to leave ODeL higher education institutions.

Statement 2 was also rephrased into two theoretical sub-statements as follows:

- Academic staff are influenced by external factors (such as salary increases and bonuses) that may enable them to stay in ODeL higher education institutions.
- Academic staff are influenced by external factors (such as discrimination and work overload) that may enable them to leave ODeL higher education institutions.

Both the study findings and the researcher's empirical observations in HR practice informed the statements concerning the academic staff's decision to stay or leave an ODeL higher education institution. The decision was dependent on concrete and abstract factors which the participants

50

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

described as both external and internally motivated factors. Accordingly, the researcher formulated the following statements:

- Academic staff in an ODeL higher education institution are influenced by two main factors, namely: internally and externally motivated factors.

Each of the internal (intrinsic) and external (extrinsic) motivating factors may enable academic staff to either leave or stay in an ODeL higher education institution. Therefore:

- The magnitude of the intrinsic or extrinsic force determines whether an academic staff member will stay or leave an ODeL higher education institution.

There are two concepts common to these theoretical statements (both derived from the observation of HR practice), namely: motivational factors and motivational force. The researcher then rephrased the theoretical statement based on these commonalities:

- Academic staff in an ODeL higher education institution is influenced by internal motivating factors that have intrinsic forces which may enable them to either leave or stay in an ODeL higher education institution.
- Academic staff in an ODeL higher education institution are influenced by externally motivating factors that have extrinsic forces which may enable them to either leave or stay in an ODeL higher education institution.

It is the magnitude or degree of influence of the force of the factors, not the factors themselves, that may influence an academic to either stay or leave an ODeL higher education institution.

The theoretical statements derived from the reviewed literature, study findings and the researcher's empirical observations are not unexpected discoveries, but authentic patterns of reality that exist in the field of HR risk management (Walker & Avant, 2019). While the developed theoretical statements are grounded in the findings of this study, they also serve as a bridge to theory synthesis, which is the next and final stage of the framework development process.

Theory synthesis

Theory synthesis is the stage of conceptualisation that allows the researcher to develop and merge concepts and theoretical statements into an integrated and meaningful whole (Walker & Avant, 2019). Thus, theory synthesis involves a careful and detailed examination of the relationships between, and among the study's concepts and clusters of concepts (Walker & Avant, 2019). In addition, theory synthesis also involves a careful examination of the developed theoretical statements, including their interrelatedness with the concept clusters. This stage, therefore, is considered inductive on account of its development of a conceptual formulation (i.e., integrated whole) from statements and concepts (Gray et al., 2017).

Furthermore, concepts are inherently characterised by distinctive features that are unique and different from each other (Regoniel, 2015; Smith & Osborn, 2015). Most importantly, understanding these different conceptual features and their interrelatedness enhances the researcher's insight into the phenomena being investigated. In this study, the researcher examined each cluster and its respective concepts and identified the influence that the clusters might have on one another. This was a thorough exercise that involved frequent repositioning of the clusters and their respective concepts to match the effects and direction of influence, which is a deductive process (Bimenyimana et al., 2016).

51

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

This stage is largely credited with the development of this study's conceptual framework entitled, 'HR Risk Management Conceptual Framework', which is a graphical representation of factors that may potentially influence an academic staff member to either remain or leave an ODeL higher education institution. Figure 2 is a depiction of this synthesised framework, followed by a description of its associated risk factors.

Figure 2:
HR Risk Management Conceptual Framework

HR RISK FACTORS

Positive Factors

Intrinsic factors

-Personal development

-Recognition

-Accomplishment

-Knowledge & skills

-Job satisfaction

Extrinsic factors

-Salary increases

-Bonuses

-Benefits

-Interpersonal -relationship

-Promotions

ODeL higher education

Academic Staff Retention

Negative factors

Intrinsic factors

-Negative emotions

-Low morale

-Academic jealousy

-High staff turnover

-Organisational culture

Extrinsic factors

-Loss of benefits

-Wastage of resources

-Austerity measures

-Work overload

-Lack/Limited support

Promoting force

Hindering force

Researcher's compilation from various sources

Extrapolated from Figure 2 above, is that the rectangular and spherical shapes include different themes, which are essentially clusters of similar concepts. It is important to note that the arrows on both sides of the spherical shapes (pointing to an ODeL higher education institution and academic staff retention) indicate the direction of influence, and not the relationships among the various HR risk factors. This suggests that the framework is not a statistically predictive, quantitative tool, but comprises factors that may influence academic staff retention in ODeL higher education institutions.

The framework contains HR risk factors that may influence an academic staff member to leave or remain in an ODeL higher education institution. These factors are categorised into two thematic variables, namely, positive factors and negative factors (Walker & Avant, 2019). Positive factors are those that may entice academic staff to remain in an ODeL higher education institution, while negative factors refer to those HR risk factors that may encourage academic staff to leave an ODeL higher education institution. Both the negative and positive factors are further categorised into intrinsic and

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

52

extrinsic factors. Syllogistically, the intrinsic factors related to HR risk factors may emanate from within an academic staff member and may enable the particular academic staff member to either remain or leave an ODeL higher education institution. The extrinsic factors, on the other hand, are those factors that have an external influence on an academic staff member's decision to either remain or leave the institution.

The framework refers to the hindering force that may enable academic staff to leave an ODeL higher education institution. Accordingly, if the cumulative strength or magnitude of influence of the positive factors is greater than the cumulative strength or magnitude of influence of the negative factors, an academic staff member would most likely be motivated to remain in the institution. Conversely, an academic staff member could leave an institution on account of the cumulative strength or magnitude of influence of the negative factors becoming greater than the cumulative strength or magnitude of influence of the positive factors. The degree of influence of the HR risk factors may vary from one academic staff member to another, based on factors such as the particular academic's personal and academia-related experiences and coping abilities. This demonstrates that a certain factor may have more influence on one academic staff member, as compared to another (Chaacha & Botha, 2021). However, it should be emphasised here that an academic's decision to remain or leave an ODeL higher education institution is not influenced by the factors *per se*, but by the degree of influence of the impact or force of the factors on the individual. For instance, an academic may leave an institution irrespective of the high income earned when they consider, for example, regular exposure to a perceived autocratic style of management at the institution. In contrast, another academic may continue to work at the same institution regardless of its perceived autocratic style of management.

A factor with a greater strength of force can enable academic staff to either remain at or leave an institution. Therefore, the framework emphasises HR risk management strategies as enhancing the strength or force of positive factors. In this regard, the rationale should premise on encouraging the retention of academic staff in an ODeL higher education institution. Examples of HR risk management strategies include performance appraisals, conflict management, training and development, reward and recognition and employee motivation (Bussin, 2014).

EVALUATION OF THE FRAMEWORK

The rationale is situated in the necessity to identify and justify the purpose for which the framework was developed and its utilitarian value. Among the range of available framework evaluation tools are examples of those developed by Chinn, Kramer and Sitzman (2021), Fawcett (2005), Hardy (1974), and Kirkpatrick and Kirkpatrick (2006). This study adopted Chinn et al.'s (2021) critical reflection tool to guide the evaluation process for the developed framework. The critical reflection tool itself entails five criteria, namely **(i) Clarity:** This relates to how well a framework can be understood, including the consistency with which it is being conceptualised (Chinn et al., 2021). Therefore, the framework is structurally consistent, since its constituent elements interconnect with the positive and negative factors, while their respective sub-categories are used consistently in explaining the phenomenon of academic staff retention in an ODeL higher education institution. **(ii) Simplicity:** To achieve simplicity in the evaluation of the HR risk management conceptual framework, the researcher only has two conceptual categories; that is, being simple and less complex. In that regard, it is easy to understand and apply in HR practice (Chinn et al., 2021). **(iii) Generality:** The HR Risk Management conceptual framework does not only encompass an understanding of academic staff retention but also includes factors that may influence such understanding in the ODeL higher education institution. **(iv) Accessibility:** This is the degree to which the purpose of the framework can be attained through the influence of a range of factors, such as clarity of concepts and their interrelatedness and the clarity of the HR empirical indicators associated with these concepts (Chinn et al., 2021). **(v) Importance:** The developed HR risk management conceptual framework is expected to bridge the gap induced by the absence of a framework to promote understanding of academic staff retention in Africa (Kissoonduth, 2017), as well

as the scarcity of research in this area of HR practice in the continent. The researcher used the criteria to establish the suitability and appropriateness of the developed framework and to enhance the understanding of HR risk management and academic staff retention in ODeL higher education institutions.

CONCLUSION

The objective of the study was to compile a clear explanation of an HR risk management conceptual framework development and its evaluation. This conceptual framework was developed largely from empirical data and existing literature guided by the principles of Walker and Avant (2019). The study found that promoting and hindering factors were influential in determining academic staff retention and attrition. Based on these findings, the developed HR risk management conceptual framework is viewed as contributing significantly to the body of knowledge on academic staff retention and attrition.

The limitations of this study are grounded principally in the review of existing literature, the researcher's practical experience as an HR specialist (Molotsi, 2021), as well as opinions from experts such as Bezuidenhout (2015) and Erasmus et al. (2015). The acquired data were used to synthesise the developed HR risk management conceptual framework, according to which ODeL higher education institutions should endeavour to emphasise the competency development of academic staff members in order to enhance their performance and induce positive attitudinal outcomes. The researcher proposes that the developed HR risk management conceptual framework should be tested on a sample of experienced academic staff members. Accordingly, such a proposition advocates for an increased emphasis on the promoting factors that advance and enhance academic staff retention. However, a future study may add to this stream by incorporating other enablers, such as learning organisations and learning contexts.

The main strength of the study is premised on its mixed methods approach to data collection. In this regard, the study recommends the inclusion of a large sample of participants to obtain and accommodate discordant views. Further research is also recommended to strengthen the poorly researched subject of HR risk management in other non-ODeL higher education institutions in South Africa. Adopting mixed-methods research with a larger sample would help to enrich the knowledge base of HR risk management. It is recommended further that future researchers should test the framework's predictive validity, possibly using the quantitative methodology.

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54

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56

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57

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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58

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Understanding elements, strengths and challenges of explicit instruction for the teaching of computer programming (to post-graduate students)[1]

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ABSTRACT

Computer programming continues to be challenging despite numerous strategies and skills that researchers and instructors have shared over four decades. Using explicit instruction (EI) to help students learn and better understand computer programming presents a promising avenue for tackling this challenge. The aim of this study was twofold. Firstly, to identify elements to consider in an instructional strategy for teaching using the EI principles. Secondly, to identify strengths and challenges presented by the EI interventions in teaching computer programming to postgraduate Computer Science students. Collected data were analyzed through thematic analysis, and the results reveal nine major strengths and five main challenges related to EI. The study followed an integrated methodological approach where narrative data was collected through observations and asking questions. This study informs how improvements can be made in the future teaching of computer programming to enhance the quality of teaching using the principles of EI.

Keywords: computer programming, explicit instruction, explicit instruction steps, teaching strategies, computer science education

INTRODUCTION

Despite 40 years of research into how teaching computer programming can be improved, programming continues to be a challenge to students (Ko et al., 2019; Qian & Lehman, 2017). Over this period, computer programming researchers and instructors have suggested several strategies and specific skills that could be used to address this challenge. The teaching and learning strategies include explicit step-by-step strategies (Ko et al., 2019; LaToza et al., 2020; Xie et al., 2018), peer instruction (Porter et al., 2013), modelling (Middendorf & Pace, 2004; Wood et al., 1976), pair programming (Porter et al., 2013; Williams et al., 2000), and use of worked examples (Griffin, 2015; Sweller et al., 2011). The specific skills include doodling, walkthroughs, pattern recognition (Fitzgerald, Simon & Thomas, 2005), the teaching of strategic skills (O'Dell, 2017), the teaching of cognitive skills (Ko & Uttl, 2003; Von Mayrhauser & Vans, 1996), and the teaching of (meta)cognitive processes/strategies (Khomokhoana & Nel, 2020; Preece et al., 2015).

Of these strategies, explicit instruction (EI) – pioneered by Rosenshine and Stevens (1986) – is one of the set of promising strategies in helping students learn and understand (Guilmois et al., 2020) computer programming better. EI is described as 'a systematic method of teaching with emphasis on proceeding in small steps, checking for understanding, and achieving active and successful participation by all students' (Rosenshine, 1987: 34). The effectiveness of EI has been confirmed many times (Hughes et al., 2017; Rastle et al., 2021). The underlying principle of EI is that the transfer of

knowledge is dealt with in a structured, systematic and planned way, and concepts are treated in the order from simple to complex and from easy to difficult. Any teaching strategy employing EI follows sequenced and strongly integrated steps. Literature suggests that in using EI, it is equally important to clarify the learning objectives and intended outcomes, identify key ideas, and determine students' prior knowledge (Guilmois et al., 2020). Greene (2022) summarises steps of EI as follows:

- Step 1 - Identify clear and specific objective(s)
- Step 2 - Break the information into chunks
- Step 3 - Model with clear explanations
- Step 4 - Verbalize the thinking process
- Step 5 - Provide opportunities to practice
- Step 6 - Give feedback.

All activities performed as part of EI aim to create some form of cognitive scaffolds for the student (Archer & Hughes, 2011), and to reduce working memory overload (Hughes et al., 2017). According to Bocquillon et al. (2020: 12), students taught using this strategy can learn 'without conscious effort' and 'without taking up the memory working space'. Tshukudu and Jensen (2020) found that EI interventions deepen understanding of programming concepts, hence concluding that these interventions are effective. Notwithstanding the effectiveness of EI, some studies have also reported on the following inherent limitations: encouraging students to sit passively and engage in rote learning (Hammond, 2019); encouraging students to over-rely on memorisation; encouraging students to lose interest (boredom); and limiting students creativity (Brainscape Academy, 2023; Iain, 2023). However, there seems to be little prior work investigating learning strengths and challenges presented by EI classroom interventions, specifically from the viewpoint of both students and the instructor. As such, this study aims to address the following research questions:

- What are the elements to consider in an instructional strategy for teaching using EI?
- What are the strengths and challenges presented by EI in teaching computer programming to postgraduate CS students (as experienced by both students and the instructor)?

In the remainder of this paper, the review of computer programming-related aspects and discussion of a conceptual framework guiding this study are presented in Section 2. The pedagogical intervention activities, research design and methods are presented in Section 3. The results and interpretation are presented in Section 4, followed by the discussion of findings in Section 5. The conclusion is presented in Section 6, followed by the limitations and recommendations for future research in Section 7.

LITERATURE REVIEW

This section is divided into two sub-sections that respectively provide the review of relevant literature related to computer programming aspects and the conceptual framework of the study.

Computer programming related aspects

In relation to the aspects of EI alluded to in the introduction, literature shows that when learning to program, students are highly likely to fail to learn when their memory is overloaded (Sweller et al., 2019). The use of explicit instruction, thus, helps to alleviate the impact of this failure as steps are given in small amounts (e.g., scaffolds) that are not overwhelming to students (Greene, 2022; Rosenshine & Stevens, 1995). Several studies have been conducted to show the influence that self-efficacy and motivation have on the success of programming students (Fang, 2012; Kovari & Katona, 2023; Korkmaz & Altun, 2014). In learning situations, students are likely to set high goals, choose more challenging tasks, and use constructive learning strategies when their self-efficacy is high (Rosenberg-Kima et al., 2022). As programming requires a lot of mental effort (Maalej et al., 2014), high

interactivity (Rosenberg-Kima et al., 2022), and high level of abstraction (Gomes & Mendes, 2007), students are encouraged to apply exploratory programming for their effective learning. In this type of programming, students are encouraged to experiment with different possibilities in trying to understand concepts, develop plans to tackle problems, convert these plans into executable instructions, think and reason algorithmically, create/modify/implement code, evaluate the results, solve problems, etc. (Kery & Myers, 2017; Sheil, 1986).

In performing exploratory programming activities, students have to integrate a lot of aspects. For example, on investigating a whole-task instructional approach compared with a part-task instructional approach for students learning to program, Rosenberg-Kima et al. (2022) indicate that in programming, students should not only master the separate coding elements, but they should also master how to integrate such elements in solving a problem. Furthermore, in learning computer programming, mental models (e.g., frameworks that help students to understand how their minds work and why they think the way they do) are useful and enhance programming ability (Danao, 2022; Mayer, 1981). Moreover, in computer programming, students can be allowed to use learning styles that suit them, and this has been found to help students learn effectively (Gomes & Mendes, 2014; Kumar, 2017). Besides the learning styles, all concepts taught in the computer programming classroom should be as real as possible and relevant to the real world. This, in turn, helps students to develop skills necessary for the world of work (Cronjé & Brittz, 2005; Sentance & Csizmadia, 2017). In addition to the aspects discussed in this section, further literature is provided within the conceptual framework section of this study.

Conceptual framework
The framework guiding this study is based on the six steps of EI as presented in Section 1.

Step 1 - Identify a clear and specific objective
In planning a lesson, instructors will typically regard it as key to ensure that its purpose is clearly spelled out. They also ensure that they have looked into prior knowledge that students have acquired in the previous modules (Greene, 2022; Rosenshine & Stevens, 1995). This helps instructors ensure that the new knowledge students will acquire from the lesson, builds on the knowledge that students already possess (Barkley, 2010). Research in Computer Science (CS) cannot overemphasize the importance of prior computer programming knowledge in helping students to perform better in their studies (Iv et al., 2019; Veerasamy et al., 2018). According to Greene (2022), a clear and precise objective facilitates easy planning of the instructor`s EI interventions and unclear objectives may hinder the implementation of the subsequent steps of EI.

Step 2 - Break the information into chunks
Instructors are encouraged to holistically look at the content to convey to students, then break it down into small and meaningful segments that students can easily grasp and understand (Greene, 2023). These segments should also be presented separately (Archer & Hughes, 2011; Doabler et al., 2012), and   sequentially to students (Guilmois et al., 2020; Rosenshine & Stevens, 1986). Inherently, students are likely to better recall information if organized in chunks (McKeithen et al., 1981). Furthermore, it is worth noting that when learning new content, human beings should only be stretched to an optimal level because their working memory capacity is limited (Constantinidis & Klingberg, 2016).

Step 3 - Model with clear explanations
Students learn better when they have examples to follow (Atkinson et al., 2000). Therefore, it is essential for instructors to explicitly explain/demonstrate a skill students should acquire in the same way that they will practise it. In demonstrating the concepts, instructors should try to be as natural and straightforward as possible so that it becomes easier for students to understand rather than for them to

61

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

try to do the guesswork (Greene, 2023). Students could also be asked to model what was modelled to them earlier to confirm their understanding (Nilson, 2013). With close reference to Step 2 outcomes, instructors typically apply various modelling principles such as metaphors and physical demonstrations (LaRiviere, 2012; Middendorf, 2014). These principles help to explicitly model to students how to understand the learning content presented to them successfully. In applying these modelling techniques, the crucial skills are constantly highlighted (Middendorf, 2014).

Step 4 - Verbalize the thinking process

Instructors will typically perform a think-aloud of what is going on in their minds as they model explanations made and skills that need to be fostered with students (Middendorf & Pace, 2004; Pace, 2017). At this stage, instructors can also pose questions, recite affirmations and identify more valuable resources (Ellis, Denton & Bond, 2014). The thought process(es) of an instructor help(s) students to see how the thinking unveils as instructors might even have to refine their thinking at some stage (Greene, 2023). The questioning helps students engage and interact with the learning content and the instructor. During this engagement, instructors can identify students' level of understanding from the strengths and deficiencies portrayed by students. This helps instructors monitor the teaching and learning progress and reflect whether their current approach is working or not. Verbalizing the thinking process helps students learn and think in the same way they are taught. In this way, students can know how to begin with the task and what to do when they get stuck (Greene, 2023).

Step 5 - Provide opportunities to practise

According to Fenton (2015), practice in the learning process plays a vital role in student's acquisition of long-term knowledge and necessary skills. The element of practice may not be implanted in students if an instructor does not provide them with opportunities to practise independently (Lahtinen, Ala-Mutka & Järvinen, 2005). Practice opportunities can be presented as either guided or independent. During guided practice, an instructor might work together with the students through several problems and either pre-correct or correct errors as they occur. During independent practice, students are given a manageable problem to solve independently. This problem should align with the skills already modelled/verbalized. Instructors can re-model/verbalise the necessary skills if it becomes apparent from the given problem that students have still not mastered the skill (Fletcher et al., 2019). Inherently, the practice opportunities discussed above are forms of scaffolding, a concept defined as the 'process by which instructors provide students with cognitive supports early in their learning, and then gradually remove them as students develop greater mastery and sophistication' (Ambrose et al., 2010: 146). Various authors (Davis, 2014; Feyzi-Behnagh et al., 2014) have identified scaffolding as essential in ensuring that student learning occurs.

Step 6 - Give feedback

Providing immediate, continuous, relevant and actionable/descriptive feedback to students is a vital part of the learning process (Campos et al., 2012; Wlodkowski & Ginsberg, 2010). Feedback indicates and do not know relative to the required knowledge of the subject matter (Brookhart, 2008). Similarly, if an instructor does not return students' feedback in time and with constructive comments (Ertmer & Newby, 2013), that may negatively influence students' learning, hence affecting their ability to comprehend the necessary skills. Furthermore, students may practise such a skill with errors (Greene, 2023). There are several forms of feedback that computer programming students can receive. For example, most Integrated Development Environments (IDEs) provide feedback to programmers through everyday tools integrated into them, such as compilers, interpreters and run-time environments (Jerše & Lokar, 2018). Some authors argue that feedback should be provided immediately to students; otherwise it significantly slows down a student's progress (Hattie & Timperley, 2007; Jerše & Lokar, 2018). As such, systems for automated assessment of programming tasks are developed (Lokar & Pretnar, 2015). Some of these systems provide a range of feedback options from no feedback, simple

62

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

verification feedback, correct response feedback, elaborated feedback and try again feedback (Vasilyeva et al., 2007). In other instances, instructors provide feedback while grading students' programs - focusing on program aspects such as functionality, design, programming style, syntax, semantics, use of best practices, efficiency, programming errors and software metrics (Ihantola, 2011; Koyya et al., 2013).

Conclusion

The aspects that can be considered in helping students better learn computer programming have been presented in Section 2.1. The discussion of the conceptual framework of this study provides answers to the first research question. These answers inform how the constituent components of the second research question can be empirically addressed.

METHODOLOGY

This section is divided into three sub-sections that respectively provide the pedagogical intervention activities of the study, the research design and methods, as well as how data were analysed.

Pedagogical intervention

Various pedagogical activities were carried out from inception throughout the intervention. Initially, all the instructional goals of the module for which this intervention was made were investigated. Due to time limitations, the research focused on the main objective (ability to design, code and implement mobile applications) when discussing three concepts: animation, Google maps, and SQLite Database. For the animation concept, all content was presented to students in a traditional face-to-face class using lecture slides and making the necessary demonstrations. For both the Google maps and SQLite Database concepts, audio-visual lectures were shared with students well before class, and summaries of the discussion of these concepts were presented to students in class and they asked questions where they needed help understanding. In discussing these three concepts, all the explicit steps necessary to achieve the learning goals were elaborated on and demonstrated to students.

To prepare the learning environment, all the necessary resources that students would need were made available to them. For instance, the installation of Android Studio and the essential software packages on computers in the venue that students used. This installation was also tested before students could start using it to ensure they would not experience problems in using the software. A module guide detailing all the meeting times and venues was also made available to students upfront, and all content in the module guide was discussed with the students.

An instructional strategy helping to achieve the selected instructional goal was also devised. This involved creating various learning components such as preparing further lecture notes; designing instructional activities that students would complete; documenting strategies to use to ensure that students would get engaged in the learning content presented to them (i.e., allowing students to practise a task and provide them with timely and descriptive feedback); as well as how students would be assessed on the skills acquired. In the main, students were kept motivated by praising and valuing their outstanding solutions when giving feedback.

Two assessments that tested whether students could master the instructional goal specified earlier were designed. In preparing the assessments, careful consideration was made to ensure that they specifically assessed the design, coding and implementation skills linked to various features of the three concepts specified earlier. The questions included in the assessments were straightforward and worded with correct punctuation and grammar. The lectures were presented in a computer lab where students had access to computers installed with the software.

Research design

Within the scope of an EI-based research design, an approach based on Plowright's Frameworks for an Integrated Methodology (FraIM) (Plowright, 2011) was followed. FraIM advocates that there is no philosophical position that needs to be taken before commencing the study. Such a position can, however, be taken as the study evolves or even with the interpretation of results. Thereby, the focus was on collecting narrative data using observations and asking questions. The study population consisted of postgraduate Honours CS students (referred to as postgraduate students in this paper) from a South African university. The study sample consisted of 14 students registered for an Honours Advanced Programming module. The reason for this sample size is that most of the time, it is normally a few students who enrol for the postgraduate studies in Computer Science at the selected university. The selection of this sample was both 'purposeful' and 'convenient' (Patton, 2015). The sample was purposeful because the instructor wanted to improve the teaching and learning strategies for the current and upcoming students for the module. The sample was also convenient since the instructor had easy access to the participants because a few minutes of the scheduled class sessions for students could be used to complete a one-minute paper (Angelo & Cross, 1993). Furthermore, observations throughout all activities carried out as part of the teaching and learning in the module were recorded. For the individual interviews at the end of the semester, students were invited to participate during their leisure time as it was not completed during the regular class sessions. According to Plowright (2011), a data collection strategy using one-minute papers and individual interviews can be regarded as a means of 'asking questions', and the strategy for making observations can be considered as a means of 'observations'.

Students were asked to complete a one-minute paper three times in the semester anonymously. These covered only the three concepts discussed, namely: Animation, Google maps, and SQLite Database. Nine students participated in the one-minute paper for both the Animation and Google Maps concepts, while 10 students participated in the SQLite Database concept. For each of these concepts on the one-minute papers, participants had to write down three key things they learned in the previous lecture, and share what they understood by the concept discussed. They were further asked to share what was most confusing with the concept discussed, and how helpful the relevant activity they did covering the concept was. The questions were adapted from various examples (Angelo & Cross, 1993; Suskie, 2018) of one-minute papers.

For the individual interviews, all the students were invited. However, only eight of them agreed to participate. In these interviews, students were asked to share their experiences with the EI interventions that were implemented in the classes for the selected module. Probing questions were asked where necessary. All the proceedings of the interviews were recorded after permission for audio recording was obtained from the corresponding participant. The interview sessions were each scheduled for 60 minutes.

Data analysis

To transcribe and analyze the audio recordings from the interviews, Creswell and Creswell's (2017) approach was followed. After transcribing the recorded interviews, the data was cleansed by searching for faults and repairing them accordingly (Chu et al., 2016). Since the questions were open-ended, the transcripts contained numerous illogical and repeated statements. As such, 'fuzzy validation' (instead of strict validation, which requires complete removal of invalid/undesired responses) was used (Parcell & Rafferty, 2017). In fuzzy validation, researchers are allowed to correct some data if there is a reasonably 'close match' to a known correct answer. Thereafter, familiarization with the data (Marshall & Rossman, 2016), by listening and re-listening to the audio records numerous times and by intensively and repeatedly reading the transcripts was done. This helped in devising a coding plan in which the analysis would be guided by the data related to the research questions. The eight validated transcripts

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

64

were imported into the Nvivo tool at this stage. After that, codes were developed for each strength and challenge identified in the data. For coding, Klenke (2016) recommends the use of 'units of analysis' (e.g., words, sentences, or paragraphs). Accordingly, the data was coded by highlighting and/or underlining text (from which strengths and challenges of EI could be extracted) within the domain of the stated units of analysis. Then the created codes were populated by associating the corresponding texts with them. During this refinement process, the codes' names were continuously revised until relevant themes began to emerge. For each emerging theme, its Nvivo-generated frequency of occurrence was considered.

Results and interpretation

The discussion in this section addresses the rest of this study's research questions. The elements to consider in an instructional strategy for EI have already been presented in Section 2. The strengths and challenges identified are presented in the sub-sections that follow.

Strengths

This study's data revealed nine significant strengths related to the EI interventions. These are presented in Figure 1 below showing the percentage distribution of their occurrence from the data.

Figure 1:
A pie chart of strengths related to the EI interventions
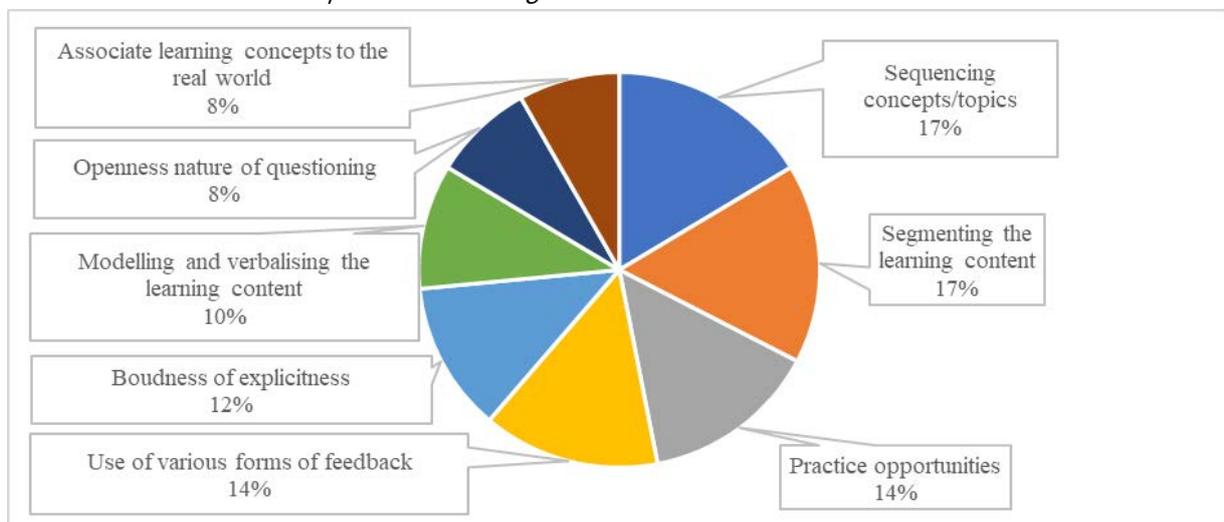
Sequencing concepts/topics — This refers to presenting concepts/topics in a manner that makes logical sense, and concepts/topics offered at a later stage build on the ones discussed previously (Doabler et al., 2012; Rosenshine & Stevens, 1986). All the participants, with a total of 17 occurrences, indicated that they witnessed this sequencing (Guilmois et al., 2020) in the presentation of the learning content. P1 specifically remarked:

> There was never a point in the course where we were taught something, and we were told that we could just forget about it, and we'll learn more about it later. Everything was introduced, and it depended on something that we had already done in the past, except when we reached the point where we now needed to implement independent types of Google Maps functionalities.

The reason why P1 noted not necessarily seeing the sequencing in dealing with the Google Maps concept might have been that the concept typically requires students to integrate most of the skills learned with the other concepts (Rosenberg-Kima et al., 2022).

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

65

Segmenting the learning content — This refers to breaking down the learning content into small chunks for easy student consumption (Archer & Hughes, 2011; Greene, 2022). Students find this helpful for their better understanding of the learning content. All participants, with a total of 14 occurrences, provided evidence for this assertion. Pieces of evidence include:

> Yes, I feel like the learning content was broken down in a very nice way and given the fact that we only dealt with one concept at a time. (P1)

P2 remarked:

> I believe the [learning content] was given to us in pieces. So, we understood each component, of basically how to put Apps on your phone.

Moreover, P4 said:

> I think it [learning content] was given to me in manageable sizes because each week I'd have time from maybe Wednesday night until another Wednesday night, to [work on] an entire functionality ... I think the content was reasonably sized.

This also shows that students enjoyed the fact that the module was taught once a week, giving them an excellent chance to effectively engage with the learning content without feeling any pressure (Bocquillon et al., 2020).

Practice opportunities — These refer to any type of activity that students are given with the objective to practise, and not necessarily for grading. These activities could be completed before, during, and after the lecture. Greene (2022) emphasizes the importance of practice opportunities, and this is supported by the data collected which demonstrate the critical role of practice opportunities in the student learning process. Seven participants, with a total of 11 occurrences, provided evidence for this assertion. Typical examples include:

> For every concept, there was a practice opportunity (P1)

and

> The practicals and presentations, I found them very useful because they force you to engage. (P2)

On the question of practice opportunities, P8 wanted to confirm whether assignments also formed part of these opportunities by asking:

> Are the assignments part of those opportunities?

and upon receiving positive confirmation, he remarked:

> Yeah, it was beneficial, like for instance, the Calculator App will teach you how to create a method, link buttons, and display in the TextView.

The Calculator App was discussed in class, and since various ways of achieving the calculator functionalities exist, students were asked to re-develop the App using one of the other ways. The

66

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Calculator App discussed in class was already an example helping students to further learn in re-developing it, reflecting the approach advocated by Atkinson et al. (2000).

Use of various forms of feedback — This involves using more than one form to provide beneficial feedback to students. In this intervention, two forms of feedback, written and verbal, were used. In the former, students received written comments, while in the latter, the instructor gave oral comments during the lecture in front of all the students. Seven participants, with a total of 11 occurrences, indicated that they benefited from using various forms of feedback (Fleming & Levie, 1993), but specifically from the verbal one. In addition to having identified various forms of feedback, P1 expressed how useful these were to him:

> The feedback was very useful, more so, given the fact that we received different types of feedback.

Participants also appreciated the principled and thoughtful way in which they received feedback. P4 remarked:

> It was the first time this year that an instructor gave feedback in class. Usually, we just receive an email to say, 'hey guys, your results are out' and that's it … it was a great strategy.

This was an overwhelming revelation because most of the instructors seem not to treat student feedback with the consideration it deserves. Peer learning (Porter et al., 2013) and networking, which are promising methods of effective learning, also surfaced in how feedback was given to students. P4 remarked:

> So even now 'I know [Student X] and [Student Y] because of you mentioning them in class', saying that [Student X] presented this so well … I was impressed about that … I started asking him questions.

This feedback-triggered a relationship that could last long-term among the students.

Use of various assessment techniques — This involves using more than one technique to comprehensively assess students. In this study, three assessment techniques namely, pure practical, recorded and verbal presentation, were used. In all the assessments, students were asked to read about a certain concept, and implement how it works. For the first technique, students submitted a practical solution for grading. For the second technique, instead of handing in a practical solution, students were asked to prepare a recorded presentation of their understanding of the concept and how they implemented it. Students submitted a comprehensive presentation for grading. For the third technique, students verbally presented their work in front of their classmates and were each graded throughout their presentation. Seven participants, with a total of 10 occurrences, indicated that they benefitted from the various assessment techniques used. However, all participants, with a total of 12 occurrences, quoted verbal presentation as the technique in which they learned the most. Examples include:

> When I was presenting something, I could tell that there was a level of understanding for how this thing works because you are forced to go also learn how this class works, what is it dependent on, to how it takes these data inputs. (P1)

P4 appeared like he did not prefer verbal presentations; however, he seemed to be enjoying its benefits as he remarked:

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

67

So that's why I prefer being prompted to present in class because most of the things that I've presented, I know very well now … you also promote question-asking in class. So, when you present, there's an incentive for the students to ask you questions.

During the verbal presentations, students were encouraged to ask the presenter questions. The instructor informed them that anyone who asked would receive an extra point on their final mark for the presented assignment. From the observations made, feedback was better because of the promised reward.

The notion of peer learning (Porter et al., 2013) also surfaced in the verbal presentations, as P1 remarked:

It gave us a chance also to get feedback from other people [fellow students].

This pivotal revelation indicates how verbal presentations stand out from the other two assessment techniques. P1 further emphasised this point:

Everyone came out of that class understanding how the Google Maps class works.

This was the lecture in which students had to present their work in front of everyone in class. Highlighting what goes on in the preparation of the verbal presentation, P3 remarked:

It challenges you to go beyond what was required

while P8 said:

Presenting in front of your peers, you're forced to learn to work and also to answer questions from your peers as well. So basically, that puts my peers and I under pressure because now they have to understand the work to ask a question.

These excerpts show that students need more preparation for verbal presentations than for the other types of assessment. This preparation, consequently, helps students engage more with the learning content and gain more understanding.

Boundness of explicitness — This means that explicitness is only helpful up to a certain extent. Six participants, with a total of nine occurrences, provided evidence for this finding. P1 indicated that he would prefer the application of EI for passing and not necessarily for genuinely understanding the learning content:

I would have loved that for marks, but it wouldn't have worked well for me gaining a skill and knowledge and learning how to use the different environments and everything.

On being emphatic about the boundness of EI, he further remarked:

But obviously, we can't stick to explicit instructions forever, that we have established.

From the given examples, it can be deduced that scaffolding (Ambrose et al., 2010; Vygotsky, 1978) surfaces in the EI intervention and that students seem to learn best when they are guided up to a particular stage and are left to exercise their elementary skills to learn other advanced content by themselves.

Modelling and verbalising the learning content — Modelling is when instructors explicitly explain/demonstrate a skill that students should acquire in the same way that they will practise it. Verbalising is when instructors perform a think-aloud of what is going on in their minds as they model explanations made and skills that need to be fostered with students (Greene, 2022; Pace, 2017). These techniques were found to encourage student engagement and stimulated student learning from their implementation. Five participants, with a total of eight occurrences, indicated that they benefitted from these techniques. P2 stated:

> If the emulator doesn't work, you could explicitly see that he [the instructor] first tries to disconnect. Second, he tries to do this, then if that doesn't work, he does that.

Although he benefitted, P1 raised a vital aspect: towards the end of the semester, the responsibility was more on the students to integrate the techniques, especially modelling. He remarked:

> You [the instructor] did it in such a way that you had an error and intentionally so, so that we could also pick up the reason why this thing was happening this way … towards the end of the course, the modelling was difficult, because it felt as if the modelling responsibility was handed over to us.

Openness nature of questioning — This involves asking students, in assessments, to make their own choice on which functionalities they want to implement. This motivates and engages students in more profound and richer learning (Anderson, 2016). Four participants, with a total of six occurrences, provided evidence of this revelation. P4 expressly indicated that this type of questioning did not only help him be creative but kept him engaged with the learning content as well. He said:

> I don't have so many modules where I'm given that kind of leeway, where I can be creative, and then decide what I would like to do … so it kept me engaged.

According to the self-efficacy theory (Bandura, 1997), in such instances, students increase their self-motivation as well. This implies that they engage and learn more when they work on learning activities that they choose for themselves. This liberty of choice encourages students to learn using their preferred learning style(s) (Gomes & Mendes, 2014; Kumar, 2017).

Associate learning concepts to the real world — This means discussing the learning content in a manner that allows students see how what they are learning can be applied to the outside world. This can be achieved by using as many real-world examples as possible in teaching, and using artefacts that students can touch and play around with. This, in turn, fosters student engagement and learning content retention thereof (Ambrose et al., 2010). Four participants, with a total of five occurrences, supported this finding. P2 remarked:

> It would also be nice to, maybe, have practical Apps that we can build, let's say, a Chat App.

As seen in the excerpt, P2 would be interested in learning content that relates to one of the contemporary issues that might be of interest or a challenge to him at the moment. This also suggests that instructors should try to strike a balance by using examples/artefacts that may not be far-fetched from the audience. For example, cartoons could be used for school children, while movies could be used for teenagers and upwards. When discussing the animation concept, the instructor designed and implemented a mobile application and told students that the concept is also used in making movies, and the instructor could see the excitement and curiosity that arose in them. This was emphasizing the

concept of being relevant to the real world in a computer programming classroom as recommended by some authors (e.g., Cronjé & Brittz, 2005; Sentance & Csizmadia, 2017).

Challenges

Analysis of collected data revealed five main challenges related to the EI interventions. These are presented in Figure 2 below showing the percentage distribution of their occurrence from the data.

Figure 2:
A pie chart of challenges related to the EI interventions
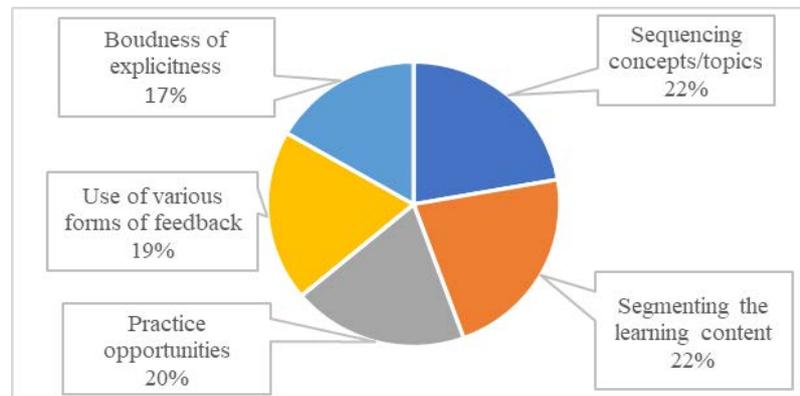
Difficulty understanding theoretical concepts — To comprehend the practical implementation of any concept and how it works, it is also crucial to understand its theoretical foundations (Wrenn & Wrenn, 2009). The intervention module is based on both practical and theoretical aspects. As such, collected data revealed that theoretical concepts are not easy to understand before seeing their implementation and results. Six participants, with a total of seven occurrences, provided evidence of this revelation. P5 indicated that:

> It was challenging to try and conceptualise how and where I will actually use animations in my future Android Studio endeavours.

However, after the instructor mentioned that animation is normally used in making movies, the participant became more curious as reference to movies sounded a contemporary issue and was encouraged to explore more on the concept. P5 was actually applying the 'exploratory programming' concept where programmers are encouraged to experiment with different possibilities in trying to further understand concepts and in solving problems (Kery & Myers, 2017; Sheil, 1986). This implies that more prospects of learning occurred with the student.

Limited assessment techniques — As the use of various assessment techniques is an strength (see Section 4.1), it becomes a problem when only one assessment technique is used, a case in point being pure practicals that are handed in for grading. Four participants, with a total of seven occurrences, indicated this challenge. P1 was specifically concerned about whether the instructor can read a student's thought process (Archer & Hughes, 2011) through grading a practical assignment. He remarked:

> I only offer you the solution that I have; **you don't know the thought process that I was having when I was doing this** … and I might have also done something that **I also didn't understand.**

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

70

This is a genuine concern primarily because students usually work in collaboration, and copying each other's work is inevitable. One common pedagogical strategy in computer programming called pair programming (Porter et al., 2013; Williams et al., 2000) encourages this type of collaboration. Therefore, this suggests that using more than one assessment technique could be recommended as a viable solution.

Explicit steps may be tedious — Although the instructor has to strike a balance between using explicit and implicit steps in delivering the learning content to students, he/she also has to ensure that some students are not bored by the explicit steps (Rosenshine & Stevens, 1986) if they are already mastering concept(s) under discussion. Five participants, with a total of five occurrences, raised this challenge. In this respect, P7 remarked:

> When is it the time for you [the instructor] to start introducing implicit instruction?... In this case, I feel like the timing was perfect because we had learned all the necessary skills.

It, usually, is not difficult for the instructor to determine when explicit and implicit instruction should be used. This is normally done when students have developed the mental models (Danao, 2022; Mayer, 1981), and at this stage the instructor can observe student behaviours such as being bored by the explicit instructions and react accordingly going forward.

Integration of various concepts — This entails taking most of the skills already learned and putting them together to solve a given problem. Collected data revealed that this integration is not easy for students. Four participants, with a total of five occurrences, provided evidence to this revelation. P1 remarked:

> What complicated things for me was, if I saw a feature being [implemented] in a particular way, step-by-step and I saw another feature being [implemented] in a particular way, step-by-step, me coming to integrate all those features into one thing, which was something that is not presented in the step-by-step. It usually created problems regarding how I adapt that and that together.

This implies that the student did not have a problem understanding individual concepts when they were discussed, but the problem came at the time of integration (Rosenberg-Kima et al., 2022). However, P1 would use his intuition to integrate all concepts together if he had understood the individual concepts (Rosenberg-Kima et al., 2022). He said:

> It was imperative for us to get the explicit step-by-step instructions for implementing just the basic things from the get-go. That served a significant role in terms of us learning how to have intuition with using different tools that are handed to us later on to learn the concept.

Limited learning — The data revealed that EI can potentially limit students' learning (Brainscape Academy, 2023; Hammond, 2019; Iain, 2023). Four participants, with a total of four occurrences, provided evidence to this finding. P1 regards EI as 'spoon feeding', which may create problems when it is taken away:

> Being explicit only means that 'I will learn only what you are telling me', the step-by-step details. But if I have to shift to an environment where I've never seen a concept being implemented, it would create problems for me.

DISCUSSION OF FINDINGS

This study has revealed several important findings in relation to applying the principles of EI in teaching. Overall, it is key for instructors to apply these principles in their teaching, both at undergraduate and post-graduate levels. At postgraduate level, the EI principles are specifically relevant for modules that are as dynamic as Mobile Development as the way of doing things changes all the time. For example, Google can release four versions of the Android Operating System in one year (Google Developers, 2023). This means that students would have to learn using two or more versions in a semester. A typical case is where most of the time the latest versions or Application Programming Interfaces (APIs) are not compatible with the old functions (a concept called deprecation). Furthermore, for any type of teaching intervention in computer programming, students should learn the concepts as individual elements, after which they should also be taught how to put those elements together in solving various programming problems (Rosenberg-Kima et al., 2022).

It was also key to realise the small things that the instructor did with the students as part of the interventions that ultimately triggered the motivation of students and encouraged them to engage and learn. For example, asking students to do the oral presentations and encouraging other classmates to ask questions triggered considerable interactivity (Rosenberg-Kima et al., 2022) within the students, and they were able to learn a lot. Apart from the data findings, even the instructor observed an overwhelming interactivity and excitement during this activity such that the allotted time proved not enough. Furthermore, by virtue of the instructor making reference to other students in giving feedback, some students were able to create relationships that helped them to engage, work together and achieve in the selected module. It was also key to realise that students would prefer to be given feedback (Greene, 2023) in a manner that is principled and thoughtful. Inherently, this practice is not seen with many instructors. As such, it would be recommended that they re-consider the manner in which they give feedback to their students. Moreover, it was key to note the cognitive aspect of the learning process (Ertmer & Newby, 2013) surfacing from the students that, it may not be easy for instructors to decipher the thought process of the students from the work that gets graded. However, if students were to discuss their work with the instructor, more insights into the thought processes of students could be better understood.

There is other several aspects that instructors should observe throughout the process so that the EI interventions will not have an influence that could make the students, not only to develop negative attitude toward the interventions, but the module content as well. From the observational perspective, the instructor noted that students learn more if they are given problems to tackle, and ways of solving such problems are discussed in a class setting where the instructor and students are able to engage openly. Furthermore, students may not be aware of some learning techniques applied in their teaching; hence instructors are encouraged to discuss such techniques with students. Students may also not figure out additional resources by themselves; hence instructors are encouraged not to '*assume the obvious*', instead, should inform students of such resources (Ellis et al., 2014) if they are available. The instructor further observed that student learning difficulties might go unnoticed if the EI steps are not followed in the teaching process. It was additionally overwhelming to see elements such as excitement, engagement, interest and curiosity that students displayed when presenting verbally in class. Moreover, the EI steps look common and straightforward, however, instructors are encouraged not to overlook the simple activities within the main steps. Lastly, notwithstanding the benefits of EI, activities inherent within this intervention are time-consuming from the perspective of both students and the instructor.

72

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

CONCLUSION

Computer programming continues to be a challenge to CS students. Employing EI can be crucial in helping students to overcome related challenges. By focusing on the six steps of EI, this study aimed to identify elements to consider in an instructional strategy for teaching using EI principles, as well as strengths and challenges presented by EI interventions in teaching computer programming to postgraduate CS students as experienced by both students and the instructor. The literature review revealed key elements that need to be considered in an instructional strategy that uses the EI principles. These range from identifying clear and specific objectives of the module throughout the other steps of EI to giving feedback to students (Greene, 2023). Thematic analysis of collected data revealed nine major strengths and five main challenges related to the EI interventions. From the identified strengths and challenges, instructors can make improvements that could help students better grasp the subject's learning content. Through this paper, improvements on how to enhance the quality of the future teaching of computer programming have also been identified.

Limitations and future research

Some limitations of this study should be noted. The study was conducted within a specific context (a selected South African university) for students enrolled for a specific module. The study was also focused on identifying the strengths and challenges experienced by a very specific population (senior CS students). Due to the exploratory nature of this research study, no claims can therefore be made to the generalisability of the study findings. Natural extensions of this work could be conducted in a different setting, perhaps with participants from another CS module (undergraduate or post-graduate), and with a different instructor. The objective would be to ascertain whether there would be variations in the findings when a different group of students is used as participants, and a different instructor is the one implementing the interventions. Moreover, another limitation was the small sample as this type of intervention may be challenging to implement with a large class as it involves a lot of activities that, in turn, may attract considerable administration in which other instructors might not want to engage.

73

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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74

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75

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77

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79

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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80

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Mathematics conceptual errors in the learning of a linear function- a case of a Technical and Vocational Education and Training college in South Africa[1]

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ABSTRACT

In this case study, we explored the conceptual errors that National Certificate (Vocational) Level 2 mathematics students at a Technical and Vocational Education and Training (TVET) College in South Africa experience in learning functions. Qualitative data were sourced from a sample of Level 2 (L2) mathematics students (n=17) from a TVET college through test responses and interviews. The findings revealed that the students find it difficult to: recognise a linear function, translate between different representations of a linear function, and identify particular components of a linear function. The findings generally indicated that the students lack conceptual understanding of the linear function. From the interviews, the students pointed to the teachers' instructional practices as a major contributory factor to the identified difficulties they experienced. Specifically, a lack of exposure to instruction and assessment tasks that involved all representations of functions hindered a deep conceptual understanding of functions.

Keywords: National Curriculum (Vocational) L2, mathematics students, linear function, conceptual knowledge, conceptual errors

INTRODUCTION

The concept of function is inarguably one of the most important concepts in school mathematics and beyond. As a building block of calculus, the concept plays a fundamental role in creating a pathway for related concepts in calculus such as the limit, differentiation, and integration. Also, the function concept contextualises mathematics in the real world (Bardini et al., 2014). For this reason, a firm grasp of this concept is essential. Sound understanding of function includes being able to: identify a function in its various representations and flexibly move between the representations. This knowledge facilitates students' ability to view the different representations of a function as a uniform object (Doorman et al., 2012), i.e., it is being understood conceptually.

One of the students' first encounters with the function concept is through the linear function. Although linear function might come across as the most uncomplicated compared to other algebraic functions, our view is that students tend to struggle to understand it conceptually. Assessing the depth of students' knowledge and understanding of linear function requires instructional tasks that strategically target conceptual understanding. Situational tasks that depict real life and involve elements familiar to the students are ranked highly in this regard. Such tasks can precede instruction on functions as a means to institute sound knowledge of the components where students will be relying solely on intuition and informal functional knowledge (Brendefur et al., 2015). The tasks can also be utilised in formal

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

81

assessment, such as summative assessment, to evaluate the extent to which the concept has been grasped. This study forms part of a larger study which explored the difficulties that [4]NC(V) L2 students (n=17) from a TVET college in South Africa encounter with regard to the conceptual knowledge of *functions*. With the current study, we sought to investigate students' conceptual knowledge difficulties regarding the linear function. We further explored the possible sources of these difficulties.

Problem statement

NC(V) L2-L4 is a vocational programme which offers an alternative pathway to mainstream high school Grades 10-12. Hence the entry requirement is Grade 9 (DHET 2014). This being the case, most, if not all, NC(V) Level 2 classes house a combination of students who passed Grade 9 from the mainstream schooling system and those who come from ELSEN[5] schools. In addition, students who completed Grade 12 enrol for the programme due to two factors: (i) the level at which these students pass disqualifies them from university entry, and (ii) the limited number of universities in South Africa cannot handle a large influx of these students. In fact, in relation to the students who come from Grade 9 and/or ELSEN schools, they are likely to present knowledge gabs in certain mathematics concepts. One of these gaps is the students' insufficient knowledge of the linear f*unction* – the first function they were introduced to in Grade 8*.* Although linear function appears to be the easiest to understand, some parts of this concept are problematic for students (Rakhudu, 2017). Legrande and Psycharis (2014) attest that such gaps exist due to imbalanced emphasis on procedural knowledge at the expense of conceptual understanding and the compromised foundation of mathematics concepts.

Purpose and research questions

In this paper, we explored the conceptual knowledge difficulties, and the sources experienced by NC(V) L2 students with the linear function in one TVET college in Gauteng province, South Africa. To gain insight into the students' conceptual knowledge difficulties and the sources thereof, we were guided by the following two research questions:

* What conceptual errors are experienced by NC(V) L2 mathematics students in the learning of a linear *function*?
* What are the possible sources of the conceptual errors that NC(V) L2 mathematics students experience in the learning of a linear *function*?

THE THEORETICAL FRAMEWORK

We used Sfard's (1991) 'Dual nature of mathematical conceptions' as a theoretical lens to explore the students' conceptual difficulties when learning linear functions. The theory outlines the cognitive processes through which knowledge and understanding of mathematical concepts such as functions develop. For Sfard (1991), a concept develops through two complementary stages: *operationally* as a process or *structurally* as an object. The two processes, both significant for the concept to be fully developed, occur through three stages: *Interiorization, Condensation* and *Reification. Interiorization* (operational): Learning procedures through which the new concept is constructed. For instance, the student is able to generate a graph using a set of ordered pairs or use a contextual/algebraic formula to generate a table of values. *Condensation* (moving from operational, working towards structural): The student can condense steps and use shortcuts to arrive at a solution. For instance, the student can identify the y-intercept and the gradient from an algebraic or contextual representation without first substituting x by zero. *Reification* (structural): The student perceives various representations as a unified object. The student can identify a *function* using any of its representations and can compare and contrast *functions*.

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[4] NC(V) L2-L4: National Curriculum (Vocational), a three-year programme offered at TVET colleges in South Africa as an alternative pathway to high school Grade 10-12.
[5] ELSEN: Education for Learners with Special Educational Needs.

The process view of a *function* is associated with a *function* as a machine which changes input values into corresponding output values, while the structural view is aligned to the *function* as a set of ordered pairs. Whether a representation of a *function* evokes a process view, a structural view, or both, depends on the type of teaching that the student receives and his/her understanding (Septyawan et al., 2019). Therefore, for students to be fully competent in working with functions and have a deep conceptual knowledge of the concept, they must have reached the reification stage. Notwithstanding the framing of our paper on Sfard's work on the nature of mathematical conceptions, we have also invoked constructivist views to gain insights into how conceptual errors are likely to arise when students learn linear functions. We support the Piagetian view that learning is characterised by construction of new knowledge in authentic contexts (Alanazi, 2016; Major & Mangope, 2012) through the twin constructs of assimilation and accommodation (Taber, 2019). Essentially, in the process of constructing knowledge, there exist two possibilities of making connections with the existing knowledge: (i) the newly-acquired knowledge can be connected with and fit into the relevant already-existing knowledge thereby enhancing conception, or (ii) the newly-acquired knowledge can erroneously be connected with and fit into the discordant already-existing knowledge thereby creating a misconception. Clearly, in the process of constructing knowledge, therefore, misconceptions are likely to be the product of knowledge construction; however, they should be viewed as an opportunity to learn (Mulungye et al., 2016).

LITERATURE REVIEW

The importance of teaching and learning functions for conceptual understanding is widely documented. Most of the available research highlights the difficulties experienced in teaching and learning this concept at the school and university levels (Zandieh et al., 2017; Chimhande et al., 2017). We acknowledge a few studies focusing on the teaching and learning of functions at TVET Colleges in South Africa (Mofolo-Mbokane, 2011; Rakhudu, 2017). We have noted the scarcity of similar studies which draw attention to the linear function, specifically at TVET colleges in the NC(V) programme. The study seeks to highlight conceptual errors that mathematics students experience when learning the concept of functions. In the next sections we discuss the conceptual understanding and common conceptual errors committed by students when working on mathematical tasks involving functions.

Representations of the linear function

Exposure to all representations of functions encourages structural conception, which results in a conceptual understanding of functions (Septyawan et al., 2019). We scanned the NC(V) L2 mathematics curriculum document (Subject Guidelines, henceforth referred to as SG) together with three prescribed textbooks to find out how they present a linear function different representation. The discoveries we made are discussed in the next two paragraphs.

The types of representations displayed in the three textbooks are now indicated, with the number in brackets indicating the number of texts from which a particular representation is found: a mapping (2), a graph (3), an equation (3), and a table (3). The absence of contextual representations in three of the four documents was found to be peculiar. By contextual representations, we are referring to what is commonly known as word problems. Only one of the textbooks (Daniels et al., 2010) contains one contextual representation of a linear function as an assessment task. We also found it odd that a few more of these contextual representations appear in another chapter, which is simultaneous equations. Secondly, instead of the two closely related topics being taught in succession, they are separated by another topic. This separation makes integrating the two topics difficult and denies students the opportunity to make formidable links between the two.

Daniels et al. (2010) address conceptual knowledge in two of the six tasks on graphical representations in their textbook, while the other tasks address students' knowledge of procedures to draw a graph using various options. The other two textbooks (van Rensburg & Mapaling, 2017; Hurjunlal et al.,

2012) address only the knowledge of procedures as far as graphical representations are concerned. This analysis reveals that the prescribed textbooks mainly address procedural knowledge of a linear function, promoting the process conception while neglecting structural conception.

Students' errors in representation of a function
Undoubtedly, contextual representations are significant in developing a deep knowledge of functions. These are, however, marred by interpretation errors. Students who are not first-language English speakers face the dual hurdle of interpreting the English language and the mathematical language in the problem (Sepeng & Madzorera, 2014; Martin, Suryadi & Juandi, 2019). Early exposure becomes important to promote familiarity with the representations. Powell and Fusch (2014) suggest screening students for difficulties with contextual problems as early as second grade to assist them in reasoning algebraically.

Converting from one representation of a function to another is termed translation (Nitsch et al., 2015). Brendefur et al. (2015) established that students tend to struggle with some translations, particularly when working with contextual representations. For example, students might write correct algebraic and descriptive rules from a contextual representation and yet present incorrect graphs for the same task (Brendefur et al., 2015). Similarly, Wilkie and Ayalon (2018) also observed that students could determine the correct gradient value from a real-life tabular representation yet could not identify the value of the same gradient from graphical and algebraic representations. The students' fixation on situational dynamics might have possibly led them to lose the mathematics embedded in the task (Brendefur et al., 2015). A lack of exposure to contextual representations might also make it difficult for students to transfer knowledge of the same concept across different formats (Wilkie & Ayalon, 2018).

One of the requisite mathematical skills for learners to solve context-rich or unstructured problems is conceptual understanding (Ogilvie, 2009). Conversely, context-rich problems have been linked to improving learners' conceptual understanding (Gijsbers, 2020). It can, therefore, be concluded that translating functions represented in context-rich formats to other representations such as numeric, graphical and/or algebraic/equation representations requires students to be well grounded in conceptual understanding of the concept of function, including linear function.

Components of a linear function and their conceptual errors
In order to understand a function as a coordinated, intact structure, the components involved in its construction should first be known. For a linear function, such fundamental components are the gradient (slope) and the y-intercept, which can be easily identified from the linear equation $y = mx + c$ or $y = ax + b$ or $y = ax + q$. Since these components are abstract mathematical constructs (Sfard, 1991), same as the linear function, it becomes difficult to teach or even assess them conceptually (Ackakin, 2018). Nitsch et al. (2012) contend that there are errors that are associated with the students' understanding of the purpose of the different components of the graphs in the context of understanding of a function. There are errors that relate to the understanding of the gradient, such as failure to interpret the meaning of the gradient of a line graph in real-life contexts (Roux et al., 2015).

Understanding and conceptual errors of the gradient
Moore-Russo et al. (2011) state that the gradient can be perceived as an algebraic ratio $\left(\frac{change\ in\ y}{change\ in\ x} \text{ or } \frac{\Delta y}{\Delta x} \text{ or } \frac{y_2 - y_1}{x_2 - x_1} \right)$; a physical property (property of line often described using expressions like incline, pitch, steepness, slant, and tilt), or a functional property (rate of change between variables). In the school mathematics curriculum in South Africa, students are introduced to the gradient at Grade 9 as an algebraic ratio of the vertical distance to the horizontal distance or 'rise over run', using a right-angled triangle (Department of Basic Education [DBE], 2011). Crawford and Scott (2000) lament that this introduction makes it difficult for students to understand the gradient as the rate of change of

two related quantities. Instead, the suggestion is for this introduction to be taught through practical examples that depict students' real-life contexts. For example, pricing a particular item from a local grocery store could serve as the rate of change, which is the cost per unit item. The task can be based on one item, with students noticing the constant increase in the cost as the number of the same item increases. Different translations can be performed within the task, with the gradient being interpreted in each case to benefit students' understanding. The rise-over-run formula (algebraic representation) can be brought into the lesson after completing the task, as an understanding of the gradient would have been established.

One of the indicators of conceptual understanding is the ability to recognise the same concept in different contexts. Such competence was found to be lacking among high school students who participated in a Croatian study (Planinic et al., 2012). The students were presented with a pair of questions on the positive gradient of a line and another pair on the negative gradient. In each pair, one question was asked from a mathematical context, while the other was asked from a physics context. The findings revealed that the students performed better in the mathematics questions in comparison with the physics questions. It is assumed that using the word 'slope' (synonym of gradient) assisted the students in responding correctly to the mathematics questions (Planinic et al., 2012).

Conversely, the physics question required students' understanding of acceleration as the rate of change of velocity, which students could not interpret as the gradient. Also, the students could identify the graphs with positive and negative gradients in the physics question but could not motivate their answers. This might indicate that the students memorised the relationship between the gradient and the shape of the line without real understanding (Birgin, 2012).

Using tasks familiar to students' contexts appears to be an effective strategy to enhance understanding of the gradient. It is, however, equally important to facilitate the ability to apply this knowledge in all functional representations. Stump (2001) used situational problems in words, pictures, and graphs to investigate high school students' understanding of gradients. The pictures presented a gradient as a measure of steepness, while the word problems and graphical representations focused on a gradient as a measure of the rate of change. The students presented a better understanding of the gradient as a measure of the rate of change than as a measure of steepness. It was further observed that the students provided more accurate descriptions of rates of change from the problems compared to graphical representations. Bannerjee (2016) also reported that students found it difficult to interpret the rate of change of variables from practical problems in graphical and tabular form. This discussion highlights the difficulties that students seem to have with interpreting the gradient in different representations.

Understanding and conceptual errors of the y-intercept

The y-intercept is not usually emphasised much during teaching a linear function (Hattikudur et al., 2012). Teachers seem not expect students to struggle with the concept of y-intercept since it can be easily identified from the equation $y = mx + c$ as the value of c when $x = 0$. Difficulties with this component, if present, might go unnoticed due to the type of tasks used to assess it. Students are usually given simple tasks to identify the y-intercept from a graph or an equation. It has, however, emerged from some studies (Crawford & Scott, 2000; Hattikudur et al., 2012; Thomson, 2015) that assessing knowledge of the y-intercept in other means, such as verbal situations, might reveal gaps in students' understanding of the y-intercept.

Most of the increasing linear functions at the introductory level have a y-intercept at zero, leading students to believe that all linear graphs must start at the origin (Hattikudur et al., 2012). This practice handicaps students because they struggle to position the y-intercept on a graph if it is elsewhere except the origin. Another observation was that the students could view qualitative graphs as objects while working with quantitative graphs evoked a process conception. Once data are presented in numerical

form, students become fixated on discrete points and hence lose the object conception (Hattikudur et al., 2012). Crawford and Scott (2000) suggest that the power of visualisation might assist students in understanding the y-intercept. Tasks, where students have to draw and compare several graphs while verbalising their observations might help establish knowledge of the *y*-intercept (Crawford & Scott, 2000). In other words, visualisation and verbalisation should precede the definition, description and computation of the *y*-intercept instead of the order being reversed as is usually the case.

Acquiring a sound knowledge of functions requires a teacher who is knowledgeable of the content and pedagogy. Such a teacher will demonstrate a complete conception of a function (Septyawan et al., 2019) in the planning, pacing and presentations of the lessons. Concerns are raised that some teachers' content knowledge of functions is inadequate due to the type of preparation programmes they have undergone (Adler 2017; Makonye, 2011). These limitations make it difficult for the teachers to recognise the students' misconceptions and to design assessments that elicit students' thinking (Ibeawuchi 2010; Makonye, 2011).

RESEARCH METHODOLOGY

Seventeen (17) NC(V) L2 students were conveniently sampled to participate in this case study. Qualitative data were collected through an achievement test and interviews. The self-designed achievement test, first used in a larger study, originally consisted of three (3) questions. For this study, we focused on question 1.3 of the original test, as it focused solely on the linear function. For this study, the question (original 1.3) will be referred to as question 1. The question, a contextual representation of a linear function followed by five (5) sub-questions, was meant to assess students' knowledge of a linear function in its different representations (see Table 1).

Table 1
Questions focusing on linear function

Question 1: Mmabatho is a third-year student at a TVET college and works as a plumber during weekends. She charges call-out fee of R150.00 and an additional R60.00 per hour for the work she does for a client.	1.1. Complete the table below indicating the relationship between the number of hours and the amount of money Mmabatho will earn.
	Number of hours 0 1 2 3 / **Amount earned**
	1.2. Write down an expression (in words or symbols) that can be used to represent the amount of money that Mmabatho charges the client for a plumbing job.
	1.3. If this scenario has to be represented as a graph, what type of graph will be produced?
	1.4. Which component/feature of that graph represents Mmabatho's call-out fee?
	1.5. Which component/feature of that graph does the R60,00 that Mmabatho charges per hour represent?

Students were required to demonstrate their competence in performing the three different translations (switching between three different representations) of a linear function as a prominent indication of conceptual understanding, which may lead to conceptual errors when not acquired. Sfard's (1991) stage (that each translation represents is indicated next to each question.

- contextual-numeric: translation between a contextual representation and a numeric table (question 1.1) – *interiorisation*. Interiorisation, demonstrated by a student's ability to find the output values by means of substituting the input values into the formula in the learning of linear function concept.
- contextual-algebraic: translation between a contextual representation and an algebraic expression (question 1.2) – *condensation*. In the context of linear functions problem solving, this stage is characterised by activities such as generating a graph from its algebraic formula, as well as combining various *functions* and see the relationship between them.
- contextual-graphical: translation between a contextual representation and a graph (questions 1.3, 1.4 and 1.5) – *reification*. The student who has reached this stage is able to identify a *function* by means of any of its representations, provide an accurate, correct definition of a *function*, and determine the values of unknown parameters in the equation of a *function*, among other competencies.

After marking the test, six (6) students were purposively sampled for the subsequent interviews as they responded to almost all the questions in the test. The semi-structured, open-ended interviews assisted us in gaining an in-depth understanding of students' misconceptions about the linear function and corroborated the data obtained from the analysis of written responses (Wahyuni, 2012). The students were interviewed in pairs due to time constraints while preparing for the mid-year examinations. The pairs were as follows: Student **E** with Student **K**, Student **D** with Student **G**, and Student **H** with Student **L**. The videotaped interviews, which were later transcribed, took place over two consecutive days.

Data analysis took the form of thematic analysis of the students' test scripts. Thematic codes (Gibbs, 2013) were created from the students' responses and aligned with Sfard's levels of concept development which were considered helpful in answering the research questions. Drawing from the work of Braun and Clarke (2006) on conducting thematic analysis, our analysis was characterised by both the inductive and deductive analysis; however, gravitated more towards the latter due to our understanding of Sfard's levels of conceptualisation which include interiorisation, condensation and reification. The three (3) stages of conception, aligned to the codes and sub-questions of the test are presented in Table 2 as follows:

Table 2:
Levels of concept development used for the analysis of data and the findings of the study

Level	Description	Test item(s)
Identification and recognition of *functions* (Condensation)	Relates to the students' difficulties in identifying *functions*.	Sub-question 1.3
Knowledge of different representations (Interiorisation, Condensation, Reification)	Relates to the difficulties students have in translating between different representations of *functions*.	Sub-question 1.1, 1.2, and 1.3
Knowledge of the components and behaviour of a *function* (Reification)	Relates to students' knowledge difficulties with regard to the components of *functions* and the meaning they hold.	Sub-questions 1.4 and 1.5

87

This section discusses the findings based on the three categories used to analyse the data. Snapshots of some of the students' work from the test and extracts from the interviews are used as illustrations to contextualise the findings. The findings revealed some conceptual errors, indicating that most of the sampled students found it difficult, if not impossible, to link the different representations of a linear function.

Firstly, we present a summary of the students' responses to the test items in Table 3.

Table 3:
Summary of students' responses to question 1

Sub-question	Number of students and their responses		
	Correct response	Erroneous responses	No response
1.1	6	11	0
1.2	3	14	0
1.3	6	4	7
1.4	0	4	13
1.5	0	0	17

None of the students responded correctly to all four sub-questions. Sub-question 1.5 was not responded to by all 17 students. Dissemination of the findings, according to Sfard's levels of conceptualisation the three categories which were used for data analysis, follows.

Condensation Levels - Identification and recognition of functions
Sub-question *1.3* required the students to write down the graph type that best represents the scenario. Six of the 17 students correctly identified a linear graph as the best scenario representation.

Oddly, turning to sub-question 1.1, four of the six students who presented correct table values could not recognise that the table represented a linear graph. The students were asked during the interviews whether they attempted to draw the graph in response to the sub-question. All four of the six students who presented the correct table values in sub-question 1.1 said the idea did not occur because the question did not ask them to sketch the graph. They also indicated that they wrote the first name they remembered because they got confused and did not understand what the question actually required. Although all four of the six students who presented correct tables in sub-question 1.1 recognised the table as representing a linear function, they were unable to justify their responses. The students committed a conceptual error in the manner in which they linked the numeric table to a linear graph.

Combination of Interiorisation, Condensation and Reification Levels - Knowledge of different representations (translations)
Conceptual knowledge of *functions* is characterised by students' flexibility to relate different representations of a concept (Kilpatrick, Swafford & Findell, 2001; Nitsch et al., 2015; Sfard, 1991). The study focused on three translations: *contextual-numeric, contextual-algebraic,* and *contextual-graphical.*

Contextual-numeric translation

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

88

Sub-question *1.1* required the students to complete a table by determining output values (amount earned) for the given input values (number of hours) using the scenario (contextual representation of a linear function). Some of the responses are presented in Figure 1.

Figure 1:
Students' table of values (sub-question 1.1)

Student E

Student O

Student A

Six of the 17 students presented correct output values, while 11 students presented a variety of conceptual errors. Two of the six students were among those who were interviewed, and they explained their calculations this way:

> *Student E*: Well...the plumber charges a 150 call-out fee plus 60 rands neh? This means if she works for one hour she will be paid 150+60 which is 210. For two hours it will be double that amount, and so on and so on.

> *Student O*: For one hour, Mmabatho charges 60 rands...but there is an additional charge of 150 rands which means you have to pay her 210. When she works for two hours she will charge double, which is 420. For three hours it become (sic) three times the previous charge.

Both Student E and student O did not understand that the call out fee was separate from the charge-per-hour fee.

Contextual-algebraic translation

Sub-question *1.2* required the students to write the expression that best represented the scenario. Some of the students' conceptual errors are shown in **Figure 2.** It would be a contextual-algebraic translation for students who used the scenario to respond to this ques*tion*. On the other hand, for those students who could have used the table (item 1.2) in their response, it would be a *numeric-algebraic translation*.

Figure 2:
Students' conceptual errors in their responses to sub-question 1.2

Student H

Student D

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

89

Correct expressions were presented by three of the seventeen students, two of them in words, while the third student used symbols. For two of these three students, the expression correlated with their table of values (sub-question 1.1), while the third student could not link the correct expression with the calculated values.

The interviewer asked for Student D's understanding of the link between the numeric table and the equation she presented.

> *Interviewer*: How did you use the information in the table to help you with the equation?
>
> *Student D*: I just filled the table using the given information. For 1.2 I used the T_n formula, and substituted a by 210, because it is the first term.
>
> *Interviewer*: What about the other 210 you used to substitute d?
>
> *Student D*: I said 420 minus 210, that's how I got 210. The common difference.
>
> *Interviewer*: Did you get the same 210 when using the last two amounts (for 2 hours and 3 hours) from your table to obtain the common difference?
>
> *Student D*: I didn't check.

Student H also said that he did not verify whether the table of values matched the expression he wrote.

Both Student D and Student H demonstrated that they lacked the competence of linking a contextual linear function with the algebraic representation. Of the same function. The two students therefore displayed conceptual errors through their workings and explanations.

Contextual-graphical translation

Sub-question *1.3* addressed the first category (recognition of functions) and the *contextual-graphical translation* since it required students to match the scenario to a relevant graph. Other students could have possibly used the algebraic expression (sub-question 1.2) in their response, meaning they instead performed an *algebraic-graphical translation.* For students who used the table of values (sub-question 1.1) to respond to sub-question 1.3, they performed a *numeric-graphical translation.* The findings regarding responses to sub-question 1.3 have already been presented under category 1.

Condensation Level- Knowledge of components and behaviour of a function

Sub-questions 1.4 and 1.5 were about the components of the function, namely the gradient and y-intercept. The students were required to state what components were represented by the call-out fee and the hourly rate, respectively. No correct response was recorded for both sub-questions. While four students responded incorrectly to sub-question 1.4, all seventeen did not respond to sub-question 1.5.

The interviewer was curious about Student K's response that the call-out fee charged by the plumber represents the y-axis. She asked him what he meant, and his response was:

> *Student K*: The 150 call-out fee is charged to all clients for transport, I guess. So, if the job takes less than one hour, she will charge you 150 anyway. So, I used the table to draw the straight-line graph, and it cross on 150.

When asked to point to the y-axis on a graph with the y-intercept at (0;2), Student K pointed to the y-intercept and said:

Here, where the graph cuts.

The interviewer then handed Student K his script and asked him to calculate the gradient he correctly referred to in sub-question 1.3 using the numeric table. The student used the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ with two pairs of points to arrive at 60 as the gradient.

Interviewer: What is that which you have just calculated?

Student K: The gradient of the straight line.

Interviewer: What does that represent in terms of the plumber scenario?

Student K: How much she charges per hour, err…her rate.

Interviewer: So why did you not give that correct answer in the test?

Student K: I didn't know at that time that it was the gradient, it just occurred to me now when you asked. They don't teach us the gradient like that, only the formula to find it, and that it is positive when and negative when…that sort of thing.

Students K's verbal response revealed a lack deep knowledge of the gradient and the y-intercept. The students' inability to identify the gradient and the y-intercept from the contextual linear function shows fragmented knowledge, which led to the conceptual error that the student committed.

DISCUSSION

Knowledge and understanding of a concept occur through three cognitive stages: interiorisation, condensation, and reification (Sfard, 1991). Students must go through all three stages to achieve both the process and structural views of concepts such as functions. It is only then that it can be established that the concept is fully developed and is being understood conceptually. Students' flexibility characterises this full development with all representations in terms of identification and behaviour of the function itself and its components.

The test's highest number of correct responses was 6/17 (35,3%), achieved in sub-questions 1 and 3. In sub-question 1, the students had to construct a table of values using the information from the word problem, a low cognitively demanding task. The interviewed students revealed that the correct responses in sub-question 3 were mostly coincidental because the linear graph was the first name that they could think of, which happened to be correct. It, therefore, became apparent that there was little or no thought process involved since the students did not perform any translation in their responses. There were three correct responses in sub-question 2, which required an algebraic representation, a medium cognitive demand task. The last two sub-questions, high cognitive demand tasks, did not yield any correct response. From this observation, it appears that most students' conception of a linear function is at the interiorisation stage - the first of the three stages. Although sub-question 3 also received an equal percentage as sub-question 1 in terms of responses, a revelation by the interviewed students that they just guessed the correct answer suggests that they are not yet at the reification stage of conception (Sfard, 1991) of a linear function.

In line with previous studies (Cansiz, Küçük & İşleyen, 2011; Bardini et al., 2014), the students appear to regard each representation in isolation from the others. Constructing a numerical table appears to be easier for students than other translations (Ronda 2015, Brendefur et al., 2015). Similar to Adu-

161

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Gyamfi, Bosse and Chandler's (2017) findings, determining the algebraic expression proved to be a more cognitively demanding task than working from the expression to the numeric table and then to the graph. The students' ability to present the correct table of values but failing to translate the information into a correct algebraic expression is evidence of superficial knowledge of the linear function (Doruk, 2019). This finding shows that the students have not yet reached the condensation stage of conception (Sfard, 1991) of a linear function.

Interviewing the students provided first-hand information regarding their thinking, knowledge and misconceptions about the linear function. The students revealed that they struggled to respond to the test items correctly as they were not familiar with contextual representations of a function (Thomson 2015). These obstacles also appeared to have a lot to do with the type of instruction the students received from the current level and previous grades. Functions were taught according to the textbook they used, as follows:

algebraic expression given⟶ table of values/critical points⟶ sketch a graph.

This finding implies that the type of teaching the students are exposed to impedes their ability to understand the linear function conceptually as a unified object with different representations. The students struggle with other representations of a linear function, particularly the contextual representation, which appears to be a consequence of a lack of exposure to such representations. This calls for mathematics teachers to strive for instructional practices that harness procedural knowledge and conceptual understanding of functions and other related mathematical concepts.

It is puzzling that even the students who presented correct equations were unable to recognise the call-out fee and hourly rate as the y-intercept and gradient, respectively. This difficulty confirms the findings by Wilkie and Ayalon (2018) that students could calculate the correct gradient value from a real-life table but did not understand it as the rate of the change. It became apparent that the students memorised procedures without understanding the meaning behind those procedures' concepts. Confusing the y-intercept with the y-axis also indicated a struggle with the vocabulary used in functions. These difficulties are, therefore, indicative of language challenges (Sepeng & Madzorera, 2014) and teaching practices that emphasise procedural rather than conceptual knowledge (Birgin, 2012). Teachers should, therefore, structure their instruction such they identify or design purposeful instructional tasks to facilitate students' understanding. While memorisation, often through drill and practice, of mathematical facts has a role to play in mathematics learning, it should be preceded by in-depth understanding of the concepts (Sfard, 1991). It is equally important to emphasise the vocabulary of such concepts within context-rich word problems so that the mathematics does not become lost in translation.

The findings indicate that six students' conception of a *function* is at the *interiorisation stage* (Sfard, 1991) since they could calculate correct output values using the given input values. This is the entry-level of concept development. Three of these six students who could present correct algebraic expressions of the word problem appear to be at the *condensation stage* (Sfard, 1991). This second level of concept development is demonstrated by students' ability to relate different representations of the same function. Although these students were competent in performing the two translations, they could not identify the gradient and y-intercept of the linear function from the word problem. This finding indicates that none of the students has reached the *reification stage*, which enables viewing a function in all its representations as a unified object (Sfard, 1991). The findings generally indicate that the students' concept development is incomplete.

CONCLUSION

The ability to identify a function and its components in various representations means that the function is viewed as a unified object. This is evidence of a fully developed function concept (Sfard, 1991). The students in this study found it difficult to (1) correctly identify a linear *function* in its contextual representation, (2) translate between the different representations of a linear *function,* and (3) identify components of a linear *function* such as gradient and y-intercept from a contextual representation. The findings are a testimony of the students' underdeveloped linear function conception. The students' incapacity to perceive different representations of a function as a unified whole indicates that they have not yet advanced to the *reification* stage of function conception (Sfard, 1991). Only three of the 17 students demonstrated that they were at the *condensation* stage of understanding a linear function, while the rest were still at the *interiorisation* stage. The identified difficulties might be attributed to traditional teaching practices, which strongly rely on the textbook, focusing on limited representations of functions (Birgin, 2012). Neglecting other representations incites a narrow conception of *functions* (Thomson, 2015). Extensive explanations and real-life examples might help deepen students' understanding of concepts.

These observations highlight the role teachers' instructional practices play in students' knowledge and understanding of constructs such as the linear *function* (Tchoshanov et al., 2017). Watson and Harel (2013) assert that teachers themselves should have a complete, structural conception of *functions* in order to be able to drive students' understanding in the same direction. Teachers need to reinforce their pedagogical content knowledge of *functions* so that they will be better equipped to enhance students' full conception of the linear *function*.

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94

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95

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96

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The influence of different teaching and learning strategies in mathematics – a case study[6]

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ABSTRACT

This article is a case study that examines how the different teaching and learning strategies influence mathematical knowledge acquisition at university. The research hinged on how mathematics lecturers at universities teach and how students acquire the disseminated knowledge. Research stresses that most lecturers have teacher-centred teaching approaches and mathematics teaching is with minimal student participation. Research further asserts that teaching approaches that emphasise student participation is critical in enhancing effective classroom interaction. This means that, as students' learning strategy is dominantly a participatory and collaborative one, lecturers are challenged to create a learning-as-participation environment for effective mathematics classroom interaction. The article reports a study that was conducted among university students and lecturers in a mathematics course at a South African university. The findings were that most lecturers at the university use traditional non-interactive teaching approaches that create passive environments in contrast with the predominant participative learning strategies of most students.

KEYWORDS: teaching strategy, learning strategy, mathematics class interaction, student-centred strategy, university lecturers

INTRODUCTION

How can effective classroom interaction take place and enhance learning among a diverse group of students in a mathematics course? This is a relevant question that most mathematics lecturers ask themselves. Recently there have been calls for reforming mathematics teaching that is rooted in the social constructivist perspective related to Vygotskian principles (Abdulwahed, Jaworski & Crawford, 2012). This perspective emphasises classroom interaction, offering a way forward in that silent and solitary learning is transformed into a sharing activity of rich mathematical ideas between and among students and the lecturer.

In undergraduate mathematics, traditional non-interactive or lecture-centred approaches have been criticized for leaving little time for interaction and conversations among students regarding the constructs and the mathematics content (Skemp, 1986; Schoenfeld & Floden, 2014; Luneta, 2012). To enhance classroom interaction at university, many alternative ways have been recommended. These include two-way communication (Chang, 2011); the capacity of lecturers to enact whole-class discussions (Speer & Wagner, 2009); or finding ways to cater for students' individual differences (Mokhtar, Yusof & Misiran, 2012). These suggestions indicate 'student-centred' approaches, which

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

98

have been emphasised in undergraduate mathematics as opposed to 'teacher-centred' or 'content-centred' approaches (Johnson et al., 2009; Mesa, Celis & Lande, 2014).

There have been several approaches to classroom interaction and several studies have been conducted on how to promote a student-centred teaching strategy and these have included an analysis of inventories of students' learning strategies and interviews about perceptions of lecturers yet, studies on the interaction between lecturers and students are rarely conducted (Ashwin,2012. As Kolb (1984) and Grasha (1996) suggested, the relationship between students' preferred learning strategies and a lecturer's teaching strategy is one of many influential variables that affect classroom interaction. This indicates that for students to respond to the classroom environment and to enhance their capability to learn and take part in learning, the teaching strategy should correlate with students' learning strategies to a greater degree.

In this article, we attempt to show what is happening in a mathematics classroom at tertiary level with respect to learning and teaching strategies and provide reasons why it is important for lecturers to use the appropriate approaches suitable for the majority of their students.

The purpose of the research was (1) to identify the dominant learning strategies exhibited by students, as well as the dominant teaching strategies employed by mathematics lecturers at one urban university in South Africa, and (2) to provide research-based evidence of the appropriate teaching strategies that could correlate with most of the students' learning strategies and improve achievement of learning outcomes. For this purpose, an explanatory sequential mixed-methods approach was used.
The article is organised around two research questions:

1) What are the prominent learning strategies and teaching strategies exhibited in mathematics classes at one urban university in South Africa?
2) What are the most appropriate teaching strategies that address the most prominent learning strategies among mathematics students?

The findings generated through this study provide a foundation for the improvement of mathematics classroom interaction in South Africa and other countries with students with diverse abilities and backgrounds.

Classroom interaction in mathematics education
There has been a shift in how learning mathematics is viewed: from 'learning-as-acquisition' (something that happens within the minds of individuals) towards 'learning-as-participation' (Sfard, 2001). In other words, participation in the learning process becomes one of the significant ways to understand mathematics concepts (Goos, 2004).

In a traditional mathematics classroom, effective participation involves activities that require students to listen to and watch mathematical procedures demonstrated by the lecturer and then to complete textbook exercises afterwards (Luneta, 2014. However, research (Chambers et al., 2008) shows that memorization with understanding and reproduction of procedures, discussion, collaboration, and participation in reform-oriented mathematics classrooms effectively build intellectual challenges. Instead of relying on the lecturer, students are expected to actively engage with mathematics by learning how to develop explanations, make predictions and debate alternative approaches to problems. These classroom interactions between and among students and a lecturer can be regarded as important for teaching of and learning mathematics.

Mathematical conversations among students and the teacher play a key role in shaping mathematical proficiency, competence, and disposition (Gresalfi et al., 2009). Engaging with mathematical constructs

helps students to discover important mathematical concepts by making conjectures, talking, questioning, and debating problems in the interactive learning process (Stein, 2007). Participation as a collective activity would promote mathematical critique and argumentation, leading toward the proof, justification, and development of important mathematical concepts as a necessary step for conceptual understanding (Truxaw & DeFranco, 2007).

In tertiary education, undergraduate students are regarded as practitioners along with lecturers because of the significant role of their participation (Abdulwahed et al., 2012). However, studies assert that students in higher education do not actively interact or participate in the teaching process (Rudduck & McIntyre, 2007). Particularly mathematics classes have been criticized for failing to encourage and motivate students to participate (Turner et al., 1998).

According to Gresalfi et al. (2009), the relationship among individual students and how they conceive their classroom environment are critical for learning mathematics. Frenzel, Pekrun and Goetz (2007) provided evidence that the environmental characteristics perceived by students closely relate to their motivation, academic engagement, and mathematics achievements. Their findings were compatible with a study conducted by Gilbert et al. (2014) which pointed out that classroom contexts affect mathematics classroom interactions.

Other key factors in classroom interaction are the knowledge of students' learning strategies and an understanding of the nature of their relationships (Cheng & Zhang, 2017; Iurea et al., 2011). Since students learn better and engage more in a classroom environment congruent to their preferences (Wong, Ding & Zhang, 2016), catering for the differences between the lecturers and students have been discussed and studied for decades. It was a focus of teaching in the UK in the late 20th century termed as the differentiation approach (Chambers, 2008). This approach entailed providing teaching to students based on their differentiated abilities. Chowdhury (2015) also suggested that it is both effective for students and comfortable for the lecturers to maintain and understand each other's teaching and learning strategies.

As mentioned above, not much research has been conducted on classroom interaction strategies between lecturers and students in undergraduate mathematics classes. Furthermore, the extent to which preferred teaching and learning strategies relate to classroom interaction has also received little attention. In short, there was a need to identify and examine teaching and learning strategies' relationships and how these enhance mathematics classroom interaction at university.

Teaching and learning strategy in classroom interaction

The use of social constructivist teaching – which is designed to promote students' participation in the learning process – compared to more traditional teaching methods, such as lecturing, has been associated with higher grade achievement, enhanced intellectual curiosity, and the development of superior creativity and leadership skills (Henson, 2003). To achieve all these, learning should focus on interaction, negotiation, discussion, and collaboration instead of instructing only on isolated facts. It is important to enhance mutual construction of conceptual understanding through classroom interaction, taking into consideration the teaching style of the lecturer and students' preferred learning strategies (Grasha, 1996; Kolb, 1984). The traditional lecture method was popularized by the Greeks in the 5th century BC. It was widely used in universities when books were scarce to motivate and create interest among large numbers of students (Friesen, 2014).

Grasha (1996) defines teaching strategies and learning strategies respectively as interpersonal relationships with students and responses to the needs of the classroom environment, and as an individual characteristic that influences a learner's capability to understand new knowledge and to participate in learning environments. In this definition, communicative and interactive aspects of

strategies in the classroom are emphasised and teaching strategies and learning strategies are considered to be constructs related to classroom interactions (McCaskey, 2010).

Firstly, teaching strategy refers to all of the teaching techniques, activities, and approaches that a teacher employs in the classroom. It can be associated with a teacher's behaviour in the class (Cotton, 2000), the context of the teaching (Rahimi & Nabilou, 2011) and how they manage their classes (Yilmaz & Çavaş, 2008). It is evident that teaching strategy is a very influential factor in students' learning experiences since teachers provide the 'vital human connection between the content and the environment and the learners' (Heimlich & Norland, 1994: 109).

Though there are various teaching strategies, Grasha identifies five specific teaching strategies. These strategies be a continuum of teaching (see Table 1) and were observed amongst teachers at university. Out of these five teaching strategies, the facilitation approach is claimed to enhance classroom interaction (e.g., Wachira, Pourdavood & Skitzki, 2013; White, 2003; Gresalfi, 2009). These strategies require (university) teachers to be flexible and able to interweave knowledge with skills (Sherin; 2002) or construct their thoughts and decision-making processes during teaching (Thomson, 1984). A lecturer with a facilitator teaching strategy can listen to classroom conversations and observe classroom interactions between and among students and themselves. Mathematical knowledge acquisition is enhanced when there is synergy between teaching and learning.

Table 1:
Grasha's Five Teaching Strategies

Expert	Formal authority	Personal model	Facilitator	Delegator
• Experienced, • Eager to transfer information, • Focusing on preparing students completely.	• Considering the positive and negative feedbacks of students' behaviour, • Meeting the objectives. • Having clear expectations from their students.	• Believing in the personal example on how the students can think, • Encourag-ing the students to observe & compete.	• Supervising • Emphasising the interaction (asking questions & expressing opinions), • The students' capacity in gaining practical independency is imperative.	• Developing the students' ability to function indepen-dently & autono-mously.

Teacher-centred   Student-centred

Learning strategies consist of different dimensions of interaction between and among students and their lecturer. Grasha and Riechmann identified three bipolar dimensions, namely Dependent-Independent, Avoidant-Participatory, and Competitive-Collaborative. These dimensions represent six learning strategies which measure the preferences for classroom interactions that focus on student attitudes toward classroom activities, learning content, lecturers, and peers (see Table 2).

Dependent	▪ Little intellectual curiosity. ▪ Learning only what is required.
Independent	▪ Confident in their learning abilities. ▪ Prefer to work alone.
Avoidant	▪ Not enthusiastic about learning content. ▪ No participation.
Participatory	▪ Good citizens in class. ▪ Enjoy attending classes & participating in class activities.
Competitive	▪ Study to perform better than others. ▪ Like to receive attention & recognition.
Collaborative	▪ Learn by sharing ideas. ▪ Like to work with others.

According to literature, the Participatory and Collaborative strategies can be regarded as the more interactive strategies, which involve sharing ideas and active participation in small-group problem-solving or group works Participatory and Collaborative learning strategies, could possibly improve classroom interaction, and create a learning-conducive environment for both the lecturer and students (Könings, Seidel & Van Merriënboer, 2014).

As earlier alluded to, there are controversial opinions on the effectiveness of matching teaching and learning strategies. Thus, the meshing hypothesis (teaching that matches a student's learning strategies leads to greater learning than mismatched teaching) is controversial. It is because of this tension that the study engaged with the empirical data to investigate the importance or invalidity of such a claim.

RESEARCH DESIGN AND METHODS

The research was a mixed method design, which made use of quantitative and qualitative methods. It employed a sequential explanatory mixed method design to obtain rich data for pragmatic reasons. The first procedure gathered qualitative data followed by quantitative data. These two different data collection approaches allow the examination of the overlapping phases of data gathering (Creswell & Clark, 2007).

Participants

The participants were chosen from two groups: students who were registered for mathematics modules and lecturers who were teaching mathematics at an urban university in South Africa. 276 university students participated (147 male & 129 female) of which 141 were natural science students, 71 education students, and 64 engineering students. 29 lecturers or professors participated from the Department of Pure Mathematics and Applied Mathematics and the Faculty of Education (16 males & 13 females). With the intent of gaining more in-depth information, another group of 24 participants were purposely selected for interviews (16 students & seven lecturers). The criteria for selecting the participants for the qualitative phase included: (i) being participants in the quantitative phase; and (ii) students had to have high scores in Collaborative and Participatory learning strategies (being the most popular learning strategies) (eight students with Collaborative & eight students with Participatory learning strategies); and (iii) seven lecturers with more teacher-centred (T-D) teaching strategies (high scores in Formal Authority & Personal Model) and two lecturers with more student-centred (S-C) teaching strategies (high scores in Facilitator & Delegator). The Expert score was not considered because 97% of lecturers had a high score in this teaching strategy.

102

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Instruments

The 'Grasha-Riechmann Student Learning Strategy Scales (GRSLSS)' and the 'Grasha (1996) Teaching Strategy Inventory' (GTSI) were used for the quantitative data. Each of the six learning strategies in the GRSLSS is measured with 10 items according to modes of student behaviour in a tertiary learning environment: Independent, Dependent, Collaborative, Competitive, Participatory, and Avoidant. The learning strategies were evaluated on a 5-point Likert type scale (Grasha, 1996). The GTSI instrument was used to assess the five teaching strategies (Expert / Formal Authority / Personal Model / Facilitator / Delegator) and involved all 29 lecturers. The instrument has been widely used and yield valid and reliable results (Behnam & Bayazidi, 2013). We took cognisance of the fact that this instrument was used in an Iranian context and among predominantly adult scholars. We were therefore careful in our analysis of how we interpreted the students' views on learning.

An unstructured interview protocol was used to collect qualitative data. The content of the informal interview questions focused on students' participation and the interaction between a lecturer and students in real mathematics classrooms, personal attitudes toward learning and teaching mathematics.

Procedure and analysis

The data collection took place at the university during the first and second semesters of 2018. In the first phase, frequency counts and cross-tabulation were utilized to analyse the demographic information and the participants' answers to separate items in each domain. To compare means of learning strategies based on gender and studying year, an 'Independent-samples T-test' (for parametric data) and a 'Mann–Whitney U Test' (for nonparametric data) were used. The 'Kruskal-Wallis test' (for nonparametric data) was used for the comparison of learning strategies among students from different faculties.

For the richness and the depth of description in the second phase, three data sources were used: (i) in-depth unstructured interviews; (ii) researcher's reflection notes on each participant's responses immediately after the interviews; and (iii) electronic follow-up interviews with each participant to secure additional information on the emerging themes.

In the analysis of qualitative data, a grounded theory approach to gathering and coding data was adopted. When researchers attempt to make sense of their data by organizing and interpreting them, a classificatory scheme needs to be chosen. Corbin and Strauss (1990) state that the process of analysis in the grounded theory is dependent on the purpose: very useful description, conceptual ordering (classifying and elaborating) or developing a theory. A conceptual ordering (high-level description) is important for the generation of knowledge, and it can make a valuable contribution to a discipline. Since the analysis of this research in the qualitative phase was to classify and elaborate the qualities of learning mathematics (conceptual ordering) perceived by lecturers and students. The open code was used to identify concepts and to discover their properties and dimensions, and the axial coding was used to connect and group the identified codes.

To consolidate the results of the research further, the findings from the quantitative and qualitative phases were integrated with existing literature. The integration of the quantitative and qualitative data was essential to provide an informed thick description of findings and further to develop implications for the development of mathematics classroom discourses.

The dominant teaching strategies

Table 3 shows that the Expert teaching strategy was the most frequent modality of high scores; the second most popular strategy was Formal Authority followed by Personal Model teaching strategy, which all fell into the cluster of T-D teaching strategies.

Comparison of the Mean and Standard Deviation of Teaching Strategies

	Minimum	Maximum	Mean (SD)
Expert	3.38	5.00	4.10 (.39)
Formal Authority	3.13	4.88	4.03 (.42)
Personal Model	3.00	5.00	3.90 (.54)
Facilitator	1.50	4.88	3.23 (.85)
Delegator	2.13	4.13	3.03 (.55)

The fact that 97% (n = 29) of lecturers had high scores in Expert (see Table 4) indicates clearly that mathematics lecturers believe their role is mainly to teach and to set high standards.

Table 4:
The Score and Frequency of Grasha Teaching Strategies

		Low	Moderate	High
Expert	Score	1.0-2.29	2.3-3.43	3.44-5.0
	Freq. (%)	▪	1 (3.4)	28 (96.6)
Formal Authority	Score	1.0-2.96	2.97-3.86	3.87-5.0
	Freq. (%)	▪	10 (34.5)	19 (65.5)
Personal Model	Score	1.0-3.07	3.08-4.07	4.08-5.0
	Freq. (%)	1 (3.4)	19 (65.5)	9 (31.0)
Facilitator	Score	1.0-2.64	2.65-3.79	3.80-5.0
	Freq. (%)	7 (24.1)	14 (48.3)	8 (27.6)
Delegator	Score	1.0-1.86	1.87-3.0	3.01-5.0
	Freq. (%)	▪	17 (58.6)	12 (41.4)

With an in-depth analysis of the quantitative data from 'Teaching Strategy Inventory', the first five most frequent items that mathematics lecturers regarded as 'Very important' related closely to T-D teaching strategies (See Table 5).

Table 5:
The Five Frequent Statements that Lecturers valued highly

Question No.	Statements	Teaching strategy
5	Sharing my knowledge and expertise with students is very important to me.	Expert
9	I typically show students how and what to do in order to master the mathematics lessons content.	Personal Model
10	I want to students to leave this course well prepared for further work in this area.	Expert
20	This course has very specific goals and objectives that I want to accomplish.	Formal Authority
2	I set high standards for students in my mathematics class.	Formal Authority

It means most lecturers still employ the traditional teaching T-D strategies in mathematics classrooms at university. This shows that mathematics, engineering, and natural science faculties are generally less inclined to adopt student-centred pedagogies than other faculties (Lindholm & Astin, 2008).

The dominant learning strategies

The Statistical Package of the Social Sciences (SPSS) 24.0 was used to analyse the quantitative data using descriptive and parametric statistics (or non-parametric alternatives if necessary) (Pallant, 2020). Table 6 shows the frequency distribution of samples.

Table 6:

Frequency Distribution of Samples based on Gender, Discipline, Studying Year

	Gender		Studying Year			
Discipline	Male	Female	1st	2nd	3rd	Total
Engineering	44	20	26	24	14	
Science	84	57	82	37	22	
Education	19	52	12	30	29	
Total	147	129	120	91	65	276

The range of the mean scores in each domain was marked as low, moderate, or high according to the ranges suggested by Grasha (1996). Collaborative ($M = 3.69$ / 3.5-5.0 scores were regarded as 'High'), Competitive ($M = 3.06$ / 2.9-5.0 scores were regarded as 'High') and Participatory ($M = 4.03$ / 3.9-5.0 scores were regarded as 'High') were found to be more prevalent among the university students sampled.

There were differences in learning strategies based on gender, field of study, and year of study. With regard to gender difference (see Table 7), there was a significant difference in the scores of the independent learning strategy (t (276) = 2.528 $p = .012$, two-tailed Independent-sample T test) and the Dependent learning style ($U = 7206.5$, $Z = -3.368$, $p = .001$ two=tailed Mann–Whitney U Test). Male students tended to be more independent and prefer to study on their own. On the other hand, female students prefer strong guidance and concrete hands-on experience and benefited more from well-organised and structured teaching. This could be interpreted to mean that female students are more agreeable and conscientious than male students (Rubinstein, 2005).

Table 7:

Mean and Standard Deviation Distribution of Learning Strategies by Gender

	Male		Female	
	Mean	SD	Mean	SD
Independent	3.47	.58	3.29	.59
Dependent	3.86	.51	4.04	.48
Collaborative	3.64	.68	3.67	.78
Competitive	3.14	.76	2.99	.79
Participatory	3.98	.60	4.05	.58
Avoidant	2.44	.55	2.43	.58

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

105

There was a significant difference of learning strategy between junior and senior students (see Table 8). A 'Mann–Whitney U Test' revealed the differences in the bipolar relationship of the Participatory–Avoidant. (Participatory learning strategy (U = 6479.0, Z = -2.649, p = .008 two-tailed) and Avoidant learning style (U = 6010.5, Z = -2.666, p = .008 two-tailed)). 1st-year students were more Participatory than 2nd and 3rd year students.

Table 8:
Mean and Standard Deviation Distribution of Learning Strategies by Studying Year

	Junior (1st year)		Senior (2nd & 3rd year)	
	Mean	SD	Mean	SD
Independent	3.35	.54	3.42	.63
Dependent	4.00	.54	3.94	.48
Collaborative	3.74	.73	3.61	.73
Competitive	3.10	.81	3.07	.75
Participatory	**4.11**	**.59**	**3.94**	**.58**
Avoidant	**2.32**	**.55**	**2.52**	**.57**

In relation to the field (Science, Education, Engineering) (see Table 9), the 'Kruskal-Wallis' test was conducted, and a significant difference was found in the score of Collaborative learning strategies across three different disciplines (Engineering (n = 64); Science (n = 141); and Education (n = 71)), χ^2 (2, n = 276) = 10.79, p = .05). The students in the Education Faculty tended to acquire more information by sharing and cooperating with lecturers and peers than in other faculties.

Table 9:
Mean and Standard Deviation Distribution of Learning Strategies by Field

	Engineering		Natural Science		Education	
	Mean	SD	Mean	SD	Mean	SD
Independent	3.40	.54	3.41	.58	3.32	2.57
Dependent	3.93	.46	3.91	.53	4.04	.48
Collaborative	**3.77**	**.66**	**3.54**	**.68**	**3.84**	**.85**
Competitive	3.10	.75	3.01	.80	3.15	.75
Participatory	4.10	.58	4.00	.59	4.07	.60
Avoidant	2.37	.42	2.40	.55	2.57	.68

The perceived qualities of the mathematics classroom discourse

The transcribed interviews of the 16 students (eight students with Participatory and Collaborative learning strategy respectively) and seven lecturers (five lecturers with T-D teaching strategy and two lecturers with S-C teaching strategy) were analysed. Out of the three dominant learning strategies, the Participatory learning strategies and the Collaborative learning strategy were chosen. The Competitive learning strategy was not chosen because there was a positive correlation between the Participatory learning strategy and the Competitive learning strategy. Students who tend to compete are 'good classroom citizens' and more willing to do what the teacher wants them to do (Diaz & Cartnal, 1999). Also, on-campus students prefer the Collaborative while off-campus students prefer the Competitive learning strategy (McCaskey, 2010).

106

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Table 10 shows the characteristics of the mathematics classroom interaction that were perceived by different teaching strategies and learning strategies respectively: the two dominant learning strategies (Participatory and Collaborative) and the two opposed teaching strategies (T-D / S-C). Each number in table 10 indicates how many times lecturers or students mentioned those characteristics during the interviews.

Table 10:
The Characteristics of the Mathematics Classroom Interaction (n=23; 7 lecturers and 16 students)

	The characteristics of the mathematics classroom interaction	A (%)	B (%)	C (%)	D (%)	Total (%)
1	Positive attitude to participate	4 (80)	2(100)	6 (75)	5 (62.5)	79.38
2	Little confidence & low self-efficacy	5 (100)	2 (100)	4 (50)	5 (62.5)	78.13
3	Realistic examples	3 (60)	2 (100)	5 (62.5)	5 (62.5)	71.25
4	Careful attention to students' conceptual understanding	4 (80)	2 (100)	4 (50)	4 (50)	70.00
5	The importance of what lecturers question	3 (60)	2 (100)	6 (75)	3 (37.5)	68.13
6	Tutorial period	3 (60)	1 (50)	5 (62.5)	5 (62.5)	58.75
7	Break time during the class	1 (20)	2 (100)	5 (62.5)	4 (50)	58.13
8	Mutual communication	2 (40)	2 (100)	3 (37.5)	4 (50)	56.88
9	Small group discussion	2 (40)	1 (50)	4 (50)	5 (62.5)	55.63
10	Lack of interest in mathematical knowledge	4 (80)	2 (100)	1 (12.5)	1 (12.5)	51.25
11	Linkage to students' previous knowledge	3 (60)	1 (50)	1 (12.5)	5 (62.5)	46.25
12	Unprepared students	4 (80)	2 (100)	1 (12.5)	1 (12.5)	43.75

Note: A – 5 lectures with T-C teaching strategy / B – 2 lecturers with S-C teaching strategy / C – 8 Students with participatory learning strategy / D – 8 Students with collaborative learning strategy

The 12 characteristics were chosen because these were expressed by either over 50% of lecturers or 50% of students. Out of the 12 characteristics, only nine (over 55% of total percentage) were categorised under the four themes (see Table 11): (i) articulating conceptual understanding; (ii) shaping mathematical argumentation; (iii) collaborative setting; and (iv) strategic environment.

Table 11:
Categories and Subcategories

Categories	Sub-categories	Characterised actions
Articulating Conceptual Understanding	Authentic (real life) examples	An instrument for students to reflect on what they have learned & for lecturers to gain ideas of classroom interaction.
	Better listener	Lecturers' careful attention to students' level of conceptual understanding.

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

107

Shaping Mathematical Argumentation	Low self-efficacy	Little confidence to discuss, debate, & reason.
	Thought-provoking questions	The fundamental cause of students' conjectures and justification.
Collaborative Setting	Positive attitude	Students' positive attitude to participate in classroom interaction.
	Effective tutorial	Tuition period with interactive tasks.
	Small group discussion	Interactive discussion among peers during classroom.
Strategic Environment	Purposive interval	Break time to think over and to reflect.
	Reciprocal environment	Dialogue format & approachable atmosphere.

DISCUSSION AND IMPLICATIONS

Articulating conceptual understanding: The first disparity between lecturers and students in terms of classroom interaction was how much they comprehended mathematical concepts. Abstract mathematical information easily grasped by lecturers was not always easy for students to understand. As a result, mathematical concepts explained and discussed in the classroom were frequently beyond students' understanding and mathematical knowledge acquisition was hampered. A lack of interaction in mathematics classrooms was one of the obstacles students faced. This theme reveals the students' need for concreteness. To minimize this disparity and to make a classroom more active, 'Authentic or real-life examples' were frequently mentioned by lecturers and students (the first sub-category). Although undergraduate mathematics is primarily symbolic mathematics that requires abstract thinking, 'real maths' (everyday experiences or objects) would possibly increase classroom interaction.

Yet, how they viewed authentic examples varied: lecturers with the S-C teaching strategy prefer instruments to trigger students' mathematical insight; students with a Participatory learning strategy preferred opportunities to reflect on what they learned; or students with a Collaborative learning strategy used real examples to explain concepts to peers. Regardless of their different views, lecturers and students all agreed that authentic examples could keep classrooms alive and assist lecturers to build up solid interaction in their class.

Classroom interaction in mathematics has been playing a central role in enhancing students' conceptual understanding in comparison to instrumental or procedural understanding, which is obtained in a traditional lecture-based classroom (Steinberg, Empson & Carpenter, 2004). Traditional lecture-based methods hamper conceptual knowledge acquisition. However, 90% of the lecturers mentioned (no.11 in Table 10) that most students were not well prepared to grasp mathematical concepts at the level of university mathematics. Studies (Luneta, 2014) in South Africa show that there is a big gap between what the universities require from first-year students and the mathematical knowledge they come with from high schools. As a result, lecturers are expected to be 'better listeners' (the second sub-category) who orchestrate classroom interaction that helps students to construct mathematical concepts and facilitates a conceptual understanding of key information. Lecturers with an S-C teaching strategy suggested constant but indirect evaluation of students' understanding in order to assist better classroom interaction.

Shaping mathematical argumentation
The development of mathematical proficiency has been emphasised not only for those who study mathematics as their major, but also as part of non-major subject choices. It is critical for students to develop deep conceptual understanding, and also to be able to make concrete their understanding

through explanation and argumentation (Carpenter, Franke & Levi, 2003). In this respect, shaping mathematical arguments in class is one of the essential aspects of classroom interaction.

All lecturers were aware of the importance of mathematical arguments. However, from both the students' and the lecturers' input there was very little effective and efficient mathematical argumentation that took place. Not many students actively participated, and classroom discussion did not always include significant mathematical content. There might be two reasons for this: students' 'low self-efficacy' and their lack of interest in mathematics.

Regardless of the different learning strategies, students did not believe they had enough mathematical knowledge to discuss, debate and reason ('Low self-efficacy' – self-efficacy is defined as the judgments students make about their potential to learn mathematics successfully and their belief in their own capabilities). Self-efficacy has the potential to facilitate or hinder a mathematics learner's motivation, use of knowledge, and disposition to learn (Tait-McCutcheon, 2008). It is closely related to students' learning strategies and affects classroom participation (Yates, 2002). In this regard, to make classroom interaction mathematically rich and sufficient, students' self-efficacy should be considered, and it is critical to create an environment that encourages students to do the necessary activities that result in enhancing classroom interaction.

'Thought-provoking questions' emerged as the second sub-category. This was because the questions lecturers provided seemed appropriate and could be the platform for shaping mathematical argumentation. Lecturers with a T-D teaching strategies employed the questions to develop students' mathematical thinking, whereas with an S-C teaching strategies lecturers analysed students' answers to their questions to understand students' way of reasoning. On the other hand, students viewed lecturers' questions as the source of preparing for exams. Participatory students used the questions as the resources to think further and Collaborative students had discussion time among peers based on those questions. This implies that lecturers should carefully consider how and what kinds of questions they offer in the classroom. By asking thought-provoking questions, lecturers create a problematic interaction and informal conjectures turn out to be a formal fact in the process of debating.

Collaborative setting

Many lecturers mentioned that the ineffective collaborative setting was mainly due to the passive attitude of students and partly because of time constraints. Students also acknowledged their unwillingness to participate. Students' positive attitude towards participation could be critical to create successful classroom interaction ('Positive attitude'– the first sub-category). Tutorials are good opportunities for students to establish their confidence to discuss and debate mathematical concepts and it helps them to take part in small group discussions in class (the second and third sub-categories). The tutorial, including many hands-on activities and interactive tasks, has been used for collaborative learning by lecturers and it has played a significant role for students to practice classroom interaction regardless of their learning strategies (no. 8 in Table 10).

Classroom interaction goes hand in hand with collaborative learning, which leads to co-construction of knowledge and the acquisition of communication skills (Bouta & Retailis, 2013). Effective classroom interaction depends upon the extent to which collaborative settings are established in the classroom. To make a productive collaborative setting, students' 'Active attitude' is required.

Many students preferred to join small group discussions instead of whole classroom discussions. What students experienced in small group discussions could develop not only mathematical knowledge, but also their skills to listen to each group member and to give constructive feedback. Many studies stated that learning in small co-operative groups fosters students' cognitive learning processes and motivation (e.g., Schmidt & Moust, 2000; Langer-Osuna, 2016).

109

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Strategic environment

Participatory students mentioned that an 'approachable atmosphere' would be helpful, where a lecturer accepted students' answers and occasionally followed up their responses. In line with 'approachable atmosphere', S-C teaching approach' lecturers suggested that the dialogue format created for students should be ideally informal.

Students wanted to have more time in class to practice and to reflect on what they have been learning. Providing intervals (the first sub-category) was constantly mentioned by students instead of filling class time with lecturing and writing on the board. During the intervals students might have opportunities to think over what the lecturer explained or to reflect on what has been discussed (Parsons & Brown, 2002). Given that learning mathematics needs introspective and reflective thinking, the intervals provided by lecturers could improve the quality of classroom interaction.

To enhance classroom interaction, the environment should be more reciprocal (the second sub-category). According to students, the long presentation with high technology caused less communication between a lecturer and students. The 'Chalk and Talk' approach, that is writing out a mathematical narrative on the board while talking aloud, (Artemeva & Fox, 2011) was recommended. The verbal explanations, gestures in interacting with writing on the board and the use of questions might be used both as rhetorical devices and in interaction with students.

Effective mathematics classroom interaction and differences in teaching and learning strategy

Orchestrating productive mathematics classroom interactions require different teaching skills from conventional university lectures. This traditional approach focuses mostly on high level mathematics content and differs from teaching that includes mathematics classroom interaction where students' participation forms a significant part of mathematical content.

The qualitative analysis (Table 11) showed that effective mathematics classroom interaction requires a learning-conducive environment. If a lecturer with a T-D teaching strategy wants to be attentive to students' conceptual understanding (Better listener) or to create dialogue format teaching (Reciprocal environment), he or she needs to make an extra effort (See Table 11). In short, learning-as-participation becomes auspicious not only for students but also for a teacher, because teachers should become learners themselves (Schifter, 1998).

In this learning-conducive environment the teaching and learning strategies and classroom interaction can be seen as interdependent. For instance, if a lecturer with a T-D teaching style is likely to focus on mathematical content rather than students' participation, then the teaching becomes highly directive with less interaction. The teaching focused mainly on mathematical content might be preferable to dependent students but easily fails to support students with an independent learning strategy, who are willing to develop their own reasoning and justification skills. On the other hand, excessive focus on participation by a lecturer with an S-C teaching strategy can result in classroom interaction that appears to promote classroom reform. It might reinforce Collaborative and Participatory learning styles but fails to produce substantive mathematical outcomes.

In the analysis of quantitative data, most lecturers had T-D teaching strategies (see Table 3 & 4) and the dominant learning strategies were Competitive, Participatory and Collaborative learning strategies, which befit S-C teaching strategies. The qualitative data showed that the differences between T-D and S-C teaching strategies were clearer than the differences among students according to their learning strategies (see Table 10). There were important differences of teaching strategies in respect of what effective classroom interaction entailed.

110

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Firstly, there was a difference between T-D and S-C teaching strategies with regard to mathematics content. Lecturers with S-C teaching strategies were more aware of the needs of realistic and authentic tasks (100% over 60%, no. 3 in Table 10) and also gave more consideration to the questions they asked students (100% over 60%, no. 5 in Table 10).

Mathematics relating to the real-world application has been generally encouraged (Matthews, Adams & Goos, 2009) with realistic and authentic mathematical tasks encouraging student participation in classroom interaction. Providing authentic tasks help students to make concrete their uncertain and partial ideas in real time and it would be one of the ways to make classroom interaction productive (Felder & Silverman, 1988).

As evident in Table 11, thought-provoking questions, is another difference between T-D and S-C teaching strategies, which encourages students to question their own assumptions and relocate their errors, thus formulating mathematical argumentation. As a result, these questions should be carefully formed by considering students' level of conceptual understanding instead of structuring highly mathematically directive discussion.

This requires lecturers to be better listeners, who facilitate conceptual understanding of crucial concepts in general and orchestrate the whole classroom mathematical discussion. This new role of lecturers espoused by Davis (1997, p.366) as 'a participant in the exploration' (hermeneutic listening) and is further embraced by Rasmussen as 'generative listening' for designing mathematical teaching. Paying more attention to students' reasoning and conjectures transforms the mode of the classroom into 'more a matter of flexible response to ever-changing circumstances than of unyielding progress toward imposed goals' (Johnson & Larsen, 2012, p.123). This two-way communication between lecturers and students keeps students engaged and motivates learning (Chang, 2011). To make sense of students' responses and their struggles, lecturers may also learn some new mathematics and discover an opportunity to make mathematics classroom interaction productive and mathematically rich (Johnson & Larsen, 2012).

Secondly, Table 11 shows that there were several differences between T-D and S-C teaching strategies in terms of maintaining the process of participation. To create the 'Strategic environment', as one of the perceived qualities of mathematics classroom interaction, both T-D and S-C teaching strategies lecturers agreed that interactions between a lecturer and students and among students were important. However, they had preferred different interactive formats. These are a structured format where students could participate in the traditional chalk-and-talk environment and a dialogue format where there were open discussions and various contributions.

The structured format in a chalk-and-talk environment, which lecturers with T-D teaching strategy preferred could be helpful for students with a Dependent and Participatory learning strategy, but it might cause classroom interaction that is inflexible and inactive. On the other hand, the dialogue format which lecturers with an S-C teaching strategy preferred requires the skills of idea sharing, intellectual explanation or social interactive collaboration, which might be difficult for many students. Moreover, without a lecturer playing a central role, the classroom interaction easily becomes unbalanced without substantive mathematical outcomes.

The process of mathematical interaction is closely related to the creation of a classroom climate that changes different roles and responsibilities for the lecturer and the students. This change should envision the engagement of all students in interaction by monitoring their participation in discussions and by examining the nature and type of diverse students (White, 2003).

Thirdly, to build effective mathematics classroom interaction, affective factors should be considered. Rovai (2001) explains that a sense of trust and interaction and a sense of classroom interaction are mutually interdependent. This means that the members of a classroom interaction, including the lecturer, should have shared goals and values. Among the characteristics of the mathematics classroom interaction, the most frequently mentioned by lecturers and students related to affective factors (attitude, confidence & self-efficacy, see Table 10). Affective factors, especially self-efficacy, is critical for students to utilize cognitive and metacognitive learning strategies more vigorously in mathematics (Mousoulides & Philippou, 2005) and is closely connected to a self-motivation and active attitude (Wang et al., 2017).

This affective influence on students could be one of the reasons why there is little difference among learning strategies when it comes to classroom interaction. There was a slight difference among learning strategies – the importance of what lecturers' question (no. 5 in Table 10). Participatory students were more concerned about what lecturers questioned than Collaborative students (75% over 37.5%). This slight difference did not indicate that the difference between these two learning strategies were directly linked to mathematics classroom interaction. There might have been other influential variables: students' focusing mainly on passing exams, as many lecturers mentioned (no.10 in Table 10) or the correlation between the Participatory and Dependent learning strategy.

Students who took up the mathematical modules might not have been well prepared to practise learning-as-participation in classroom interaction or they might have not been much interested in mathematical knowledge. Regardless of teaching strategies, lecturers agreed that students were interested not in gaining knowledge but in passing exams thus, they were not prepared to study mathematics at university (nos. 9 & 11 in Table 10).

In conclusion, for effective classroom interaction, as the quantitative and qualitative data analysis shows, lecturers are recommended to have more S-C teaching strategies. To lay the platform for learning-as-participation, lecturers' focus should be not only on mathematical content, but also on what students need in class, which would be realistic and authentic mathematical tasks, thought-provoking questions based on students' conceptual understanding and a more dialogue-format classroom environment.

CONCLUSION

Based on the analysis of the quantitative and qualitative data presented in this article, two issues are proposed as being more at the core of lecturers' roles to meet the complex demands for the effective mathematics classroom interaction. These are, firstly, the need for a new perspective for teaching mathematics through classroom interaction, and secondly, as this article shows, according to their teaching strategies lecturers may choose to emphasise mathematical content over students' participation or vice versa in classroom interaction. Clearly, a variety of variables along with teaching strategies influence teachers' decisions about how to facilitate classroom discourse and to create two-way communication. There has been substantive research on how a lecturer's knowledge constrains and enables teaching. This study shows that the relationship between their knowledge and the ways in which lecturers facilitate classroom interaction is also of importance.

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The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

112

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The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

113

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114

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115

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Formerly *The Journal of Independent Teaching and Learning*

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116

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
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117

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

An assessment of the employability of learners who attained their qualifications through recognition of prior learning in Botswana[1]

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ABSTRACT

This study assessed the abilities and competencies of Recognition of Prior Learning (RPL) graduates in Botswana and their employability. Twelve participants identified from various RPL education and training fields, and hairdressing and beauty therapy services were interviewed. The findings indicate that RPL has overall life-shaping consequences for the learners involved and for this reason, it was highly embraced by participants; RPL gives learners access to post-school education, including other qualifications; RPL benefits learners and it is thus value for money invested by the Botswana Government. Therefore, the promotion of social inclusion should be embraced and adopted as a mode of assessment to capacitate human resource development in Botswana. The article concludes by recommending a partnership between Government and relevant institutions and organisations to audit skills in the country to uncover the unused skills, as well as to design RPL that is relevant to the local needs.

Keywords: RPL, out-of-school education, training and development, human resource development

INTRODUCTION

The formal economy offers more opportunities for skills development, however, the informal economy equips informal workers with skills, especially through learning by doing (Gewer, 2021). The Conference on The World Declaration on Education for All held in 1990 in Thailand envisioned the universalisation of access to education for all children, youth, and adults. As a result, the Botswana Government developed policies to mitigate the barriers that its citizens face regarding educational access. The policies include the Revised National Policy on Education [RNPE] (1994), National Development Plan 9 2003/04-2008/09 (Republic of Botswana, 2003), and Republic of Botswana. (2016): Vision 2016. These policies created awareness about the citizens' knowledge and skills obtained through non-formal education, thus creating the demand for the potential of their recognition of learning in Botswana. As a matter of fact, the 1994 RNPE decrees the inclusion of non-formal and informal learning as part of lifelong learning in education and training.

Various countries have strived to implement Recognition of Prior Learning (RPL), mainly due to their commitment to non-discriminatory and inclusive practices related to access and equal education and training. For instance, Namibia has identified, as one of the key features of the National Qualifications Framework (NQF), the provision of opportunities for its citizens to gain qualifications through the recognition of competencies regardless of whether they were gained in formal, non-formal and

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

118

informal settings (UNESCO, 2013). Namibia deems RPL important in this regard (UNESCO, 2013). It has also been observed that technical and vocational skills primarily emanate from informal apprenticeships in sub-Saharan Africa, South Asia, and Latin America (Gewer, 2021). The scope of this article falls on sub-Saharan Africa and further on Botswana.

The Botswana Qualifications Authority (BQA) which was established under the Vocational Training Act No 22 of 1998, implemented the Botswana National Vocational Qualifications Framework (BNVQF); this happened before establishing the National Credit and Qualifications Framework (NCQF) as its core function in 2013. Through this establishment, the principles and processes of the RPL were introduced in 2006 into the country's education and training system. This responded to the mandate of Botswana Training Authority (BOTA) to promote access to vocational training, learning and skills development in all sectors of Botswana's economy. The BQA Act No 24 of 2013 mandates the BQA to develop policies and criteria for RPL. The RPL policy was positioned in the setting of the National Human Resource Development Strategy (NHRDS), successive National Development Plans and other important government initiatives. The NHRDS (2009-2022: 14) stipulates that to build the country's strategic human resource potential, a platform should be created based on the current educational attainment level of the people, including the labour market in which they are employed. The NHRDS drew on a life cycle analysis, which pointed to the areas of concern in lifelong learning in Botswana where RPL would critically address the limited levels of opportunities, failure to appreciate that learning is a lifelong activity, absence of personal commitment, and lack of recognition of the need for self-development. This development creates a need to inquire into the systems that recognise RPL in Botswana, which are non-discriminatory.

As is the case in other countries, Botswana has, over the years, employed traditional methods to collect evidence of learners' performance such as examinations, tests, and other specially constructed assessment tasks. Mooketsi (2012) claims that such systems have, for a long time, been generally associated with formal modes of learning in that they tend to discriminate as they disregard knowledge and skills acquired in informal and non-formal settings. Hence, there was a need to transform the education system in the country by introducing RPL. However, RPL in Botswana is a relatively new concept with little research. Little is known about the process of RPL and how Botswana's institutions administer it. Despite the significant strides that the BOTA has made in developing and implementing the RPL system, since 2009 when RPL assessments were conducted in a number of indigenous fields of learning, no such assessment has been effected in any specialist or modern areas. According to the BOTA Statistical Bulletin (2012), the indigenous fields of learning where RPL assessments were conducted include basketry, traditional song and dance, leather craft, and pottery in the Okavango area. To date, no evaluation has been done on those assessments, nor an assessment of their impact on the stakeholders. The Botswana Government, through the BQA Act No 24 of 2013, has been fully advocating for the implementation of RPL not only for indigenous skills but also for a wide range of modern skills in different fields of learning. This called for a need to assess the influence of RPL in Botswana.

This study explored the processes of RPL in Botswana with a view to unearth the readiness of the RPL 'graduates' to execute abilities and competencies (to perform routine duties) in the workplace and the ultimate benefits of RPL to the education and training system of Botswana.

The following research questions become necessary when trying to assess the employability of learners whose qualifications were attained through RPL:
1. What is the RPL graduates' knowledge of RPL?
2. How ready are the RPL graduates to execute the abilities and competencies they have acquired in a workplace?
3. How beneficial is RPL to the education and training system in Botswana?

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

119

THEORETICAL BACKGROUND

RPL was drawn from Kolb's (1984) experiential learning framework which is in turn informed by Dewey's learning cycle (Jeffs, 2017). Kolb (1984) argues from a learning cycle perspective that people learn from their daily experiences of life. The Kolb learning cycle considers reflection as an integral part of learning; the process of learning follows a pattern that is based on four stages. These stages include concrete experience (i.e. having the actual experience), reflective observation (i.e. reflecting on the experience), abstract conceptualisation (i.e. learning from the experience), and active experimentation (i.e. trying out what has been learned) (McLeod, 2023). Experiential learning is the idea that experiences are generated through our ongoing interactions and engagement with the world around us, and learning is an inevitable product of experience (FutureLearn, 2021). This theory of learning differs from the cognitive and behavioural learning theories as it takes a more holistic approach. It considers the role that all of our experiences play in our learning, including our emotions, cognition and environmental factors (FutureLearn, 2021).

Experiential learning is typically about the observation of a phenomenon and doing something with it. This can happen through testing the action and interaction the purpose of which is either to learn more about it or apply a theory to obtain the desired result. Experiential learning in this study is a key principle through which to assess and recognise prior learning. According to Kolb's theory advanced by Jeffs (2017), effective learning is determined by progressing through the four stages described above. Hence, the four stages are relevant in this study as they frame the understanding of the experiences of the participants, their learning from the training that they have undergone in the fields cited above, and the application of the competencies that they have acquired from the training.

The RPL process receives applications from individuals coming from diverse situations and experiences. For example, some of these people observed their elders working and later developed an interest and followed their passion without any schooling background. These learning styles have their advantages and contribute toward a holistic learning process. For instance, the Congress of South African Trade Unions (Cosatu) (2000) has identified reasons for RPL in themes such as social justice, access to education and training, validating knowledge, personal and social empowerment, improving the education and training system, and job opportunities. This logic centres personal and social development within the education and training system. Regarding self-learning, individuals freely analyse their most efficient styles and identify the areas that they can improve in the process of learning. We also observed that the learners classified under RPL differ in their learning styles and habits.

LITERATURE REVIEW

An overview of RPL

RPL has emerged in recent decades as an important concept in education policy development. The European Centre for the Development of Vocational Training (Cedefop) (2015) has since validated the identification, documentation, assessment and certification of an individual's learning outcomes acquired through non-formal and formal learning. The world's economy rests more on people from low-income groups (Palmer, 2020) the majority of whom are from developing countries (Gwer, 2021). These people have accumulated experience and acquired skills, hence a need to implement the RPL that would make them better people socio-economically. RPL is characterised by certain variations in practices, contexts, concepts, and conceptions such that it is also called Accreditation of Prior Experiential Learning or Recognition of Current Competency (Andersson, Fejes & Sandberg, 2013; 2016). From the beginning, RPL was viewed as an assessment process to formally recognise learners' prior learning and the competencies which they have acquired through informal and non-formal learning compared to the registered unit standards or learning outcomes in a specific qualification (Van

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

120

Rooyen, 2003; Gray et al., 2004). This assessment system recognised that learning and acquisition of knowledge and skills may occur informally and non-formally at sites such as workplaces other than through the formal modes associated with formal education and training institutions (Andersson et al., 2013). An emphasis was placed on the learner's ability to demonstrate competence or produce evidence of his/her competencies against set standards or assessment criteria for a particular qualification or part of a qualification, irrespective of where, when, and how such competencies had been acquired. The learner was required to demonstrate the competencies that matched stipulated standards and assessment requirements for the target award or qualification.

RPL assessment processes were normally designed and implemented (Gray et al., 2004) for the participants to gain access to a course or job, credit for an award, or for promotion, or salary increase. Deller, Coetsee and Beekman (2007) categorised the RPL applications for:

- assessment to offer opportunities for the formal recognition of demonstrated experiential learning
- access to promote access to courses of study based on the learning acquired informally rather than the achievement of stipulated entry requirements
- awards and/or certification, a work-based learning system that considers the previous, current, or even planned experiential learning related to standards for a specific qualification
- diagnosis to help individuals to identify their learning achievements from work and previous learning experiences, skills gaps, or performance problem areas for training and development purposes
- progress to help disadvantaged groups to gain entry into higher programmes of study without emphasis on direct linkage to relevant academic standards.

As noted by Deller et al. (2007), RPL assessment, irrespective of intended purposes, required participants to demonstrate the competencies that match the specified learning outcomes and assessment criteria for such learning achievements to be considered worthy of credit. It was, therefore, imperative that there be clear RPL assessment requirements and criteria, policy, processes, and procedures, which were made public for the RPL to be implemented effectively for whatever purposes they can be considered. Self-esteem and professionalism among participants helped them to contribute at an organisational level. Andersson and Fejes (2012) conclude that RPL has valuable effects on its stakeholders.

Aggarwal (2015) conducted a study for International Labour Organisation (ILO) on RPL in which he postulated that RPL can improve *inter alia* employability, mobility, lifelong learning. According to Aggarwal (2015), encouraging lifelong learning can produce a competent and adaptable workforce that can stand the challenges of the current complex labour market, reduce the skills shortage gap, and develop holistically. In a way, RPL enhanced the skills portability of the migrant workers, fostered their mobility and employability, as well as created opportunities for them to get decent jobs or even self-employment. According to the South African Qualifications Authority (SAQA) (2016), most institutions of higher learning in South Africa now treat RPL as one of the alternative ways to admit students. For instance, the University of South Africa (2023) indicates that experience could translate into subject credits within a qualification or direct access to undergraduate and postgraduate qualifications. This is also happening in other countries around the world. For example, in Australia, RPL starts with a person's training, apprenticeship, or traineeship, to grant him/her credit for the units in which he/she shows competence and reduce the time he/she would take to obtain the qualification (Queensland Government, 2014). Whilst acknowledging that the establishment of RPL procedures at the level of individual countries is embedded in a global diffusion process, such reforms are simultaneously shaped by the growth trajectories of each country's education system (Maurer, 2023).

121

A study by ILO (2018) notes the benefits of RPL to both employees and employers, i.e. employers who have invested in their workers for a long time can advance their skills and experience for a particular job. Employers could take advantage of RPL to build on the educational profile of their employees and support the applicants to expand their employment prospects. With this, as the authors of this paper, we also saw the issue of cost efficiency emerging because of RPL. The ILO study (*ibid*.) also suggested that if RPL could be incorporated into education and training, a positive impact on the labour market, the country's economy, and society could be visible. Makeketa and Maphalala (2014), through a mixed-methods study, investigated the RPL's effectiveness and its impact on improving the lives of previously marginalised groups in the workplace in South Africa, using Eskom's Northern Region as a case study. Makeketa and Maphalala (2014) administered a questionnaire to a sample of employees and conducted interviews with three participants. The study revealed that RPL does exist in Eskom's workplace and efforts about its implementation can be traced; several milestones were achieved in the business in the region; there was still more to be done to realise the full and effective implementation of RPL; several gaps and challenges hampering the success of the RPL were identified, from building capacity to quality assurance (Eskom Academy of Learning, 2011).

The RPL benefits in Botswana's education and training system

The Botswana Government, through its plans and policies on education and training had maintained that all learning, regardless of how it was obtained, should be worthy of recognition and credit. BQA (2015) states that RPL critically adds to the mechanisms which enable the achievement of equity and acceleration to access education and training. Gray et al. (200) identified the benefits of RPL, focusing on employees and employers. Employee benefits may include the following: (i) they can access an award-bearing course, (ii) their informal non-formal learning is recognised toward acquiring credits and a qualification while employed, thus saving them time and money, (iii) a platform is created for them to negotiate their career development or progression, (iv) their personal development and growth are promoted, (v) their self-awareness, confidence, and self-esteem are boosted, and (vi) they can build on their previous experience so that replication of learning is prevented (Gray et al. 2004). The Sustainable Development Goals include a commitment to ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all (Goal 4), and the Education 2030 Framework for Action has called on countries to provide lifelong learning opportunities for youth and adults that encompass formal, non-formal and informal learning (United Nations, 2015).

Srivastava and Jena (2015) report that RPL can contribute toward equity by creating a platform for people to achieve qualified status and thus increase their qualifications and expertise. Srivastava and Jena (2015) also assert that individuals are increasingly required to have the necessary attributes to move and adapt to modern and changing times. Due to a lack of appropriate qualifications, a large proportion of learners face severe disadvantages in getting decent jobs, promotions and accessing further education, even though they might have the necessary knowledge and skills (Aggarwal, 2015). The RPL process can help such learners acquire a formal qualification that matches their knowledge and skills, and thus contributing towards improving their employability, mobility, lifelong learning, social inclusion and self-esteem. In the process, equity in recognition at work and other opportunities such as better remuneration and promotion can be realised. According to Bohlinger (2017), the core idea of RPL is to promote, make visible and full use of the entire scope of learning results and (work) experience gained by an individual over the lifespan irrespective of where, when, and how the learning took place. Individuals, therefore, need to continuously learn from their experiences and contribute significantly to the operations of their organisations. The development of such attributes, as observed by Stephenson (1992) (Gray et al., 2004), requires the individual to manage his/her own learning, which is critical for RPL.

RESEARCH METHODOLOGY

The study adopted an interpretive paradigm to describe the worldview to inform the meaning of data (Chilisa & Kawulich, 2015). We believe that people construct and reproduce reality and knowledge through communication, interaction, and practice – we communicated (through interviews) and interacted with the participants to understand their views from a practice point of view as far as it culminated in their RPL. We mediated knowledge about the participants' reality through the research we conducted (Tracy, 2013). This is because, through interpretivism, we could describe the nature of the practices and experiences of our participants. Our aim was to strive to interpret reality as the participants understood and experienced their world. Epistemologically, we strived to understand how the participants acquired this reality (training) and the extent to which it was valid and limited (Chilisa & Kawulich, 2015) that could qualify them for RPL or not. These authors underscore that truth can be known through varied methodologies. Thus, the chosen methodologies were followed to achieve this.

BQA (2021) piloted the RPL in a few fields of learning from 2016 until 2018, as per its mandate to promote the uptake of RPL assessments in education and training providers. These fields included services (hairdressing and beauty therapy as the sub-field), education and training (early childhood education as the sub-field), building and construction (bricklaying as the sub-field), manufacturing, engineering and technology (welding and fabrication as the sub-field), and agriculture and nature conservation (livestock farming as the sub-field). Fifty (50) candidates were assessed by the Botswana Qualifications Authority through local institutions for RPL from which 12 participants were drawn for this study. These were candidates who were found in the capital city and its vicinity. Therefore, the study used purposive selection mainly to access relevant information for the study. This method was appropriate for this study because the candidates were geographically easily accessible and were from were representative of various fields such as hairdressing, building and construction, welding and fabrication and agriculture. Purposive sampling is the process of selecting a sample that represents a particular population (Gray et al., 2009). Data were gathered from the participants through in-depth semi-structured interviews to get a deeper and interpretation of their experiences and perspectives (Ritchie et al., 2013). The use of open-ended questions allowed the participants to relay more information and understanding of the subject matter. Data were recorded in a notebook during interviews.

Validity and reliability are critical aspects of any given research. Wallen and Fraenkel (2001) describe validity as the extent to which an instrument gives the information needed and reliability as its consistency. Validity was tested by a team of experts at Botswana University of Agriculture and Natural Resources, and the University of Botswana. The experts were asked to verify the readability, clarity, and coverage of questions in the interview guide. To determine reliability, a mock interview was conducted with two candidates who were not part of the 12 participants, so that we could establish the practicality and understandability of the interview. This is where we checked the understanding and ability to answer the questions, highlighting the areas of confusion and scrutinising any unforeseen errors, as well as estimating the average time the interview would take to complete.

To address ethical issues, we first sought ethical clearance from the University of Botswana's Office of Research and Development. Upon the granting of clearance, we sought permission for data collection from the Permanent Secretary, Ministry of Tertiary Education Skills and Development. The permission letters granted were used to introduce the study to the participants, its purpose, and the procedures used during data collection. The participants were not just persuaded into taking part in the study as their permission was also requested (Creswell, 2015). We asked for their permission and, by negotiating with them, protected their personal details in the interview sheets by treating them confidentially and anonymously. For this reason, names are not disclosed in reporting of the findings.

123

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Data analysis

Thematic analysis was employed to describe how participants responded to the items raised in the interview guide. Data were split into bits, and the pieces were constructed together (Dey, 2005). The phenomena were described, and classified from the primary sources (participants), followed by tracing how the concepts were interconnected with each other. In essence, we transcribed, coded, and categorised the data and built the themes ultimately (Flick, 2014; Miles, Huberman & Saldana, 2014). We adopted traditional and modern analysis methods in which we used paper and pencil, and developed tables to enable data transcription, created minor categories of themes highlighting sections in different colours, and formed the main themes to answer the research questions. In summary, our data gathering, transcription, coding, categorisation, and thematic analysis zigzagged and involved constant comparative analysis methods (Creswell, 2012).

Figure 1:
Zigzagging of data collection and analysis to realise themes saturation (Creswell, 2012)
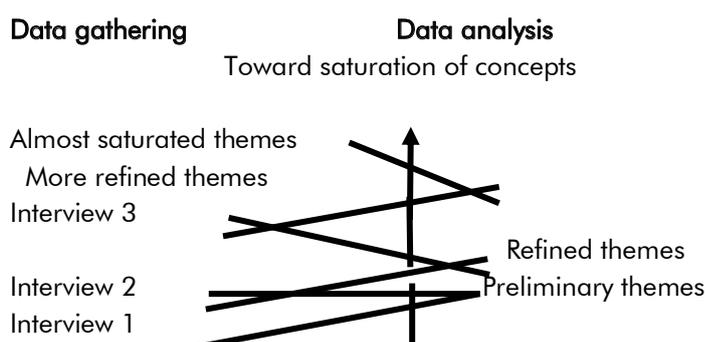
Figure 1 gives an indication of an in-depth interview through which data were collected, analysed from the preliminary categories, and we identified clues and refined the meanings of themes. This process forced us into a back-and-forth swing as shown in Figure 1. This way data were reduced and transformed to be more readily accessible, and understandable and to draw out various themes and patterns. Hence, for Berg (2004) data analysis in a qualitative study refers to data reduction, display and conclusions and verifications. After data have been collected, reduced and displayed, analytic conclusions began to emerge and define themselves more clearly and definitively.

FINDINGS

Knowledge and involvement of RPL

The background information on RPL was sourced from participants at the beginning of the interview sessions to ascertain if they had knowledge of RPL and whether they had ever been involved with RPL before. Participants were at first confused using the word RPL, even though all were subjected to the identification and assessment process. The analysis indicated that eight of them were knowledgeable about and had experience with RPL, while the other four had varied views, which include not knowing about RPL or not being sure what RPL was all about. One participant, a beneficiary of RPL, stated that BQA introduced him to RPL,

> I did not know much before until the Botswana Qualifications Authority personnel visited me and indicated that they wish to take me for a short training after which I will be certificated.

The analysis revealed that the participants were experienced and skilled to a greater extent but needed formal recognition. Hence, one participant appreciated the government's training strategy. Referring to the skills and talents that one participant had, he said:

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

124

> Yes, it is a strategy, so to speak, used by the government to identify us who hold certain skills or talents but had not gone for formal schooling.

Another participant knew about RPL and the opportunity it presented for her to acquire obtain a qualification,

> for me, this is an opportunity for lifelong learning as it promotes alternate pathways to acquiring qualifications for us who somehow did not complete formal schooling. Currently, I am enjoying learning through this route more so that the government is taking us seriously now.

Improvement in career life after RPL

Participants were asked to reflect on their abilities and competencies after acquiring their qualifications through RPL and if there had been any improvement in their career life. Their views revealed that RPL had capacitated them in certain areas and that their career life had improved. The participants were confident that they could implement what they had learned. For instance, a participant who was an assistant teacher before could now develop worksheets and teach, a competency that she did not have prior to undergoing RPL. She now had her own class to teach,

> I have my own class that I teach without being assisted and I am also respected.

Another participant had this to say:

> Before being assessed, I was just an assistant teacher with no Early Childhood qualification, but now I have a qualification and I can apply for preschool teaching jobs advertised anywhere.

A participant who underwent training in the Hairdressing and Beauty Therapy subfield felt that she was already skilled, however,

> having a certificate to show that I am a qualified hairdresser gives me dignity. I know my job and I can apply for a job at any hair salon.

Opportunity to upgrade qualification

The improvement of participants through RPL could take them even to higher education levels. It is in this sense that the analysis revealed that participants valued education as they stated that if given the opportunity to upgrade their qualifications to a higher level, they would do so. Thus, it was evident from the analysis that the participants realised the need for further education through progression to higher NCQF levels. One participant said in this regard:

I started hairdressing long before at home observing my elder sister. Later I worked in her salon; what I learned was recognised by the Botswana Qualifications Authority. After certification, my sister promoted me to a salon supervisor. As such, if I am given another chance to increase my qualification at a formal institution, I believe I can go high.

Along the same line, another participant said:

> It is my desire to further my studies to get a higher qualification given that age is still on my side.

The participants hoped for the Government to support them financially in their training. This claim finds relevance in one participant,

125

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

to upgrade my qualification, I have applied to a local Brigade but due to financial challenges as a self-sponsor, I could not enrol. I wish the Government or Botswana Qualifications Authority could finance my training again.

Competency to perform duties

The participants were asked about their level of competency to carry out routine duties in their workplaces. Data analysis showed that they believed that having learned from their practical experience, they were competent to perform duties accordingly in the workplace. When asked how they were being monitored and evaluated at the workplace, one participant said,

Management assesses us and tells us where to improve and where we are doing well.

Another participant said,

As a hairdresser, my customers assess my work. They always tell me if they are satisfied with my work on their hair, and with that, I know I am very competent.

RPL as a necessity

The participants' views were gathered with respect to RPL as a critical necessity and imperative. The findings revealed that they embraced RPL as a necessity, except for one, who expressed a different view. To this participant, RPL was unnecessary. When probed for elucidation of his view, he responded:

Being in possession of a qualification certificate does not guarantee the ability to produce quality desired results. One can still achieve the best results in the workplace without a qualification certificate. Having acquired basic education is enough for me so far. With the kind of job I do, I can easily walk from one job to the next one in a day without any need for a certificate.

One of the participants who appreciated the need for RPL had a view that

being knowledgeable and skilled without a qualification certificate is heartache but having a certificate on its own makes life easier.

With that, it is evident that participants viewed RPL as a necessity. Some participants had not undergone formal education and training, but they were happy that their confidence had been restored through recognition of their skills.

DISCUSSION

In answering the research questions in this study, it is noticed that RPL has an overall life-shaping consequence for learners who participate in it. This is mainly in the form of access and equity. The participants demonstrated their knowledge and value of RPL in this regard. The findings show that RPL creates opportunities to access post-compulsory education and other qualifications, thus increasing social inclusion. RPL sets them at the door of such a level of education. For instance, looking at the designations of the participants' views, they continued with their line of work after being assessed and attaining qualifications. They were found in the pursuit of their specialisations and for that matter, others were ready to enrol with tertiary institutions to further their studies in those areas. This is a clear indication that RPL is embraced and that it should be adopted as a mode of assessment to affirm the learners' abilities and competencies. Clearly, the introduction of RPL promises those who did not qualify or were less qualified in the past greater inclusion in formal education and training (Rakometsi, 2014). The introduction of RPL anticipated it to be a mechanism for individuals to be confident, and for the

126

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

formal learning system to recognise the knowledge and skills that individuals have acquired either through life or work experience. Indeed, in this article, participants attested to some level of abilities and competencies – they shared their experiences and reflected on what they were capable of, some even before undergoing RPL.

The central perception of RPL to be construed by participants who participated in this study was that of increased self-esteem in the workplace. Some participants in this study indicated increased self-esteem and recognition, therefore, they deemed this as the central effect of RPL. This supports Anderson and Fejes (2012), who claim that the increased self-esteem and recognition of prior knowledge because of the effects of RPL in the workplace can be related to a more professional attitude and competence in the workplace. The introduction of RPL by Botswana Government promises to improve the lives of its people judging from the gains that participants have realised from the short training that led to their certification ultimately. The RPL programme did not only benefit the participants in their career lives but it benefited the Government as well as the programme yielded results – it is a good investment (and value for money) in changing the lives of its people.

According to the authors, a more professional attitude is closely related to an increase in self-esteem, producing a more professional attitude in the workplace. The findings of this study prove that non-formal education can be transformed into a tool that can restore dignity and recognition of people who are involved in the low levels of the job sector. Such employees can assume more responsibility in practice after RPL. Such a change in the workforce may be linked to the readiness of participants to perform routine jobs in the workplace and thus, renders them employable. In this study, we argue that RPL, if well supported by Botswana Government and private institutions can build an individual's confidence and self-esteem. The explicit development of the learner's identity could be engaged in this regard to support and motivate him/her to be determined to learn further. The emphasis on increased confidence and self-esteem is depicted in this study when the participants unanimously highlighted how their career lives changed after RPL and that now, they could perform their daily routines confidently. Indeed, the findings confirmed the benefits of RPL (Gray et al., 2004) to both the participants and the Government to a larger extent.

The findings categorically reveal that RPL is a beneficial assessment process in the education and training sector in Botswana (BQA, 2015) and that it should be adopted, promoted, and fully implemented. We learned from this study that the programme reflected the four aspects of Kolb's theory – participants' views revealed their concrete experience in their career fields, some prior to RPL and some after RPL, the study helped them reflect on their abilities and competencies, they conceptualised RPL and expressed their knowledge and experiences of it, and they enacted or implemented what they had learned. Berglund (2010) conducted a study focusing on the contribution of prior learning assessment to workforce development. The author noted that there has been a shift from company to company, from a focus on professional growth to personal growth (Berglund, 2010). The author also argued that RPL is a means of holistically combining professional and personal development. To this author, RPL encourages a more holistic conceptualisation of what learning is, who learners are, and how learning takes place. Berglund (2010) further argued that RPL may better enable the workforce to complete the transition from employment to employability. The findings showed that RPL can contribute immensely to the companies' competence and the employability of individuals. The findings revealed that some learners were absorbed in some workplaces.

The findings of this study imply that RPL has become an important tool through which many countries worldwide hope to support the prominence of lifelong learning, as well as to develop economic prosperity. The contribution of this study lies in the understanding that Botswana, being a developing context (Gewer, 2021) has embraced RPL to improve the lives of its people. A developing context presents a unique scenario considering the high employment rate and the large portion of the

127

population being from low-income groups (Palmer, 2020). Botswana showcases how the situation can be turned around through RPL, something that other developing contexts can learn from. Though the initiative is in its infancy stage, the findings show that it is producing fruits already judging from the benefits the participants got from RPL. It is important to conceive of RPL as a lifelong learning programme for individuals to identify and verify their own achievements in learning throughout life (Boud, 2000). A lesson derived from this argument is that RPL should emphasise access to education and training. Also, resources should be used to open pathways for adult learners into higher education and support them.

RPL is an attractive and viable proposition to improve the relationships between the education and training provider with employers and the government with an aim to transform its learners and staff competence. We thus think that RPL could open opportunities in higher education to enrol scores of informally qualified, mature, and working adults. However, RPL should always be evaluated and improved especially in the developing context so that the pre-RPL abilities and competencies that individuals have cannot be compromised. The participant who did not see a need for RPL but wanted his abilities and competencies to be recognised through certification suggests diversification of RPL to cater to situations such as this.

CONCLUSION

This study shows that RPL graduates are knowledgeable in RPL, have abilities and competencies that engaging in RPL confirmed, RPL benefited them and the Botswana Government, and that the graduates are employable as such. The study indicates Botswana has implemented RPL as an attempt to improve the socio-economic lives of its people by putting them on a path for educational improvement and increasing their chances of employability. By so doing, Botswana recognises the enormous skills possessed by its citizens who attained their skills informally. RPL serves as a feasible strategy for skills development and capacity building in Botswana in an endeavour to produce enough well-equipped employees for its economic development. Education and training is a strong transformative force that can promote human rights and dignity, eradicate poverty, deepen sustainability and improve livelihoods. We thus advocate for the recognition and promotion of RPL as a tool to make an informally qualified workforce gain access to formal education. There is a need for the country, in partnership with relevant institutions and organisations, to conduct countrywide skills search with a view to uncovering the unused skills. This idea is triggered by literature, which widely reveals that RPL is central in the endeavour to produce employees who are knowledgeable, skilled, and have the requisite competencies to perform various activities. However, RPL in a developing context such as Botswana should not follow a traditional approach but must be sensitive to the dynamics of skills and talents that the citizens possess. With proper evaluation, RPL that is relevant to the context can be developed.

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129

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Formerly *The Journal of Independent Teaching and Learning*

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130

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131

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Transforming students' perceptions of selfhood through pedagogical theatre strategies[1]

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ABSTRACT

Traditional approaches to postgraduate psychological education are inherently reductionistic - drawing on positivist theoretical models designed for understanding our physical bodies rather than our thoughts, feelings, and actions. Taking a decolonial stance, and advocating for critical reflexivity, this paper argues that theatre holds a potential space for students to engage with selfhood in complex ways. Positioned within critical pedagogy, theatre strategies can present vital opportunities to personalise historical eras, enabling intertwined psychodynamic, cultural, economic, and ideological factors to impact sensuously, emotionally, and cognitively on students. Such immersive opportunities can foster students' awareness of the social embeddedness of subjectivity, prior to their engagement with clinical practice. Drawing on Fugard's political tragedy, 'Sorrows and Rejoicings', possible guidelines are suggested as to how theatre can educate students about the impact of taken-for-granted socio-political attitudes, norms, and values on selfhood.

Keywords: chosen traumas, critical pedagogy, decolonisation, postgraduate psychological education, social unconscious

INTRODUCTION

Gender-based violence, poverty, racism, sexism, homophobia, xenophobia, and the failure of social care are just a few of the socio-political struggles faced by many, daily. To ignore these struggles in postgraduate psychological education–maintains a split between the individual and society. This split cultivates the impression that our social embeddedness does not contribute to the aggression, hatred, apprehension, frustration, and misery we can experience in our lives.

One of the principal ways our social embeddedness impacts us is through the idea of race – a classification system that sorts citizens socially, based on physical characteristics (Akhtar, 2012). Race organises culture and knowledge production in both the Global North and Global South. For example, Quijano and Ennis (2000), working in Latin America, describe how race historically has been used to justify colonial domination. Acting as a social hierarchy, race sustains a matrix of colonial power, impacting subjectivity, and leading to racial discrimination and stigmatisation. As a result, colonial racial identities in Latin America – in which whites, blacks, mestizos (mixed race), and Indians have been sorted into distinct groups with broadly shared characteristics – have displaced the many varied indigenous Latin cultures, undermining indigenous knowledge systems, local understandings of distress, and ways of healing (Mills, 2014).

From an African perspective, Frantz Fanon (1986), in his book *Black Skin, White Masks*, describes the impact of racism on the black psyche and selfhood. In looking at the relationship between the coloniser and the colonised, Fanon discusses how undesirable and unwanted traits are projected onto people with black skin. Importantly, he goes on to describe how such longstanding racist projections are internalised, bringing about a longing (both at the conscious and unconscious level) to be white. In a similar vein, M. Fakhry Davids (2020), a British psychoanalyst, argues that from a young age, black children's internalisation of racism leaves an imprint on their mind. Davids describes how such an internalised racist structure comes to regulate relationships at both a personal and interpersonal level. Ultimately, identifications with and against ethnic and racialised groups depend on unconscious projections on to these groups, and the definition of self in relation to other: rational or irrational; white or black. Such dichotomies are the outcome of power relations, where the second term in the relation - for example irrational or black - is defined as inferior and more marginal (Lo & Diop, 2022). Thus, identification with and against ethnic and racialised groups inevitably impacts subjective experience.

The sociologist, Michael Rustin (2004), writes on the subject of psychoanalytic defenses in a social way. In doing so, he shifts the focus from the individual to the collective psyche. Rustin is interested in explaining why, following the collapse of Soviet communism and the end of the Cold War, Western societies still feel threatened by their enemies. He argues that by identifying a discernible enemy (and projecting destructive impulses onto it) governments can justify aggressive retribution, packaged as counterterrorism. For Rustin, the paranoid creation of an 'evil enemy' serves a cohesive social function, providing citizens with 'psychic reassurances in identification with their nation against its enemies' (Rustin, 2004: 34). Thus, the operation of social defenses (Jaques et al., 1955, Menzies-Lyth, 1961) and the social unconscious (Foulkes, 1964, Fromm & Funk, 2017) are keys to understanding how we see ourselves and others - as friend or foe, good or bad, desirable or undesirable, healthy or pathological.

To begin educating clinicians in culturally competent practice (Hart, 2020, Tummala-Narra et al., 2018) - where poverty, racism, sexism, homophobia, xenophobia, the failure of social care, and other socio-political struggles, are understood as impacting the meaning we ascribe to our experience - it is vital that students (especially in those working in oppressed and racialised contexts) become aware of the social embeddedness of subjectivity. In response to this need, theatre strategies are put forward towards enhancing subjective awareness.

To substantiate the utility value of theatre, I begin with a review of gaps in the field of postgraduate psychological education, before exploring how theatre can address these areas. In this paper postgraduate psychological education refers to Honours, Masters, and PhD level of study.

The need for culturally competent postgraduate psychological education

Given the dominance of Western positivism (the belief that we can arrive at knowledge by analysing facts without considering values or emotions), postgraduate psychological education has traditionally focused on the asocial, medico-scientific search for explanations of individual behaviour. However, more recently, critics worldwide have highlighted that imposing Western models of psychopathology on other cultures is a damaging form of colonialism (Boyle, 2022, Bracken et al., 2016). This has led to calls by both academics and concerned clinicians to transform postgraduate psychological education in order to view subjectivity as socially embedded (ibid.). Although postgraduate institutes are now more cognisant of the need for appropriate contextual models of education, alternatives to psychiatric diagnosis have had trouble shaking off the legacy of positivism. For example, Boyle (2022) points out that the vulnerability-stress and biopsychosocial models continue to emphasise biological factors over socio-political and relational considerations, preventing emotional distress being understood as a meaningful response to life circumstances. The failure of these alternative models to truly transform, reveals the extent to which positivism has come to organise culture and knowledge production,

impacting what is understood as desirable or 'best practice'. In other words, academic scholarship has been legitimised as a science under parameters established by Western scholars, causing other forms of thinking and knowledge production to become marginalised and stigmatised (Mills, 2014). There is a pressing need, therefore, to decolonise postgraduate psychological education in order for race, class, gender, religion and sexual orientation, as well as other diversities, to be seen as aspects of identity which are dynamics of both the patient and clinician in the therapeutic space (Lobban, 2013).

In my 2023 empirical review of South African psychology Honours students' impressions of their education thus far - the subject of my next study in this area - most students felt ill equipped to engage with the impact of political, economic, and social variables on self-hood. Instead, they felt their education had predominantly been positivistic, fostering a medico-scientific understanding of self, focused on genetic pre-dispositions, personality traits, and intrapsychic phenomena. This is alarming given that some 30 years ago many scholars working against apartheid – for example, Butchart and Seedat (1990), Foster (1989), Gibson (1989), Ingleby (1988), Mohutsioa-Makhudu (1989), Punamäki (1988), and Swartz and Levett (1989) - noted the deep and enduring impacts of political oppression, economic disparity, and apartheid on subjectivity. Given the difficulties encountered in South Africa's transformation from a position of racism and violence to a democratic non-racial society, developing awareness of the socio-political embeddedness of subjectivity remains an imperative (Kagee and Price, 1994).

In order to see ourselves as active agents, creating meaning and making choices in our lives - while also recognising that we are, at various times, both helped and hindered by bodily, environmental, economic, cultural, political, psychological, and ideological factors – we must move away from the positivist dichotomy of individual vs society, and understand how our social embeddedness impacts subjectivity (Boyle, 2022). This argument is rooted in Fanon's (1986) insight into subjectivity as both a private domain as well as a social construction. In other words, subjectivity must be seen as connected to the public processes and practices that contain and restrain it. In keeping with this argument, identity has more recently become theorised as decentred, ambivalent, contradictory, provisional, contextual, and de-essentialised. This represents an important move away from the Western positivistic notion of selfhood as rational and self-aware, to a conceptualisation of self as also being shaped and directed by emotions, unconscious desires, relational elements, and socio-political impacts (Lo & Diop, 2022).

Taking a decolonial stance in education and knowledge production means that we - as researchers, educators, and students - must reflect critically on our relationships with each other, the theories and resources we draw from, and the knowledge produced through these interactions. Decolonial approaches force us to recognise the socio-political context impacting those producing such work. For example, there are specific reasons why the call to decolonise resonates strongly with me. To elaborate, I was born in Northern Ireland during 'the Troubles' – a time that saw Northern Irish society deeply divided in terms of religion and nationality (Auld, 2022a). I completed my education as a clinical psychologist at a university in South Africa – once again, a society deeply divided, this time by race and access to resources. In both countries, such divisions directly impacted selfhood. These divisions restricted where you lived and went to school, the games you played, the language you spoke, the career you aspired to, the friends you made, and whom you could desire and marry. As an immigrant to South Africa, my complicated and at times contradictory positioning within the socio-political norms and values of both the Global South and Global North, emphasise how I inhabit multiple sites. My positioning as both an insider and outsider in various social narratives and discourses, has caused me to question the multiple ways that my context has shaped me (Auld, 2022a, Auld, 2022b, Auld, 2022c).

My complicated and contradictory positioning has led me to realise that subjectivity is impacted by the 'sociocultural power differentials' (Lykke, 2010: 67) or socio-political hierarchies in which it takes

shape, while these power relations become more meaningful when viewed through the lens of individual experience. Being able to acknowledge how our own subjectivity has been impacted by the taken-for-granted socio-political power relations into which we are born and raised highlights our inability to divorce ourselves from socio-political influences, and the need to think about how this impacts the therapeutic relationship.

Awareness of how taken-for-granted socio-political norms and values impact subjectivity is supported by scholars such as Butler (1990), Frosh et al. (2002), Grosfoguel (2009), and Haraway (1988). For example, critical theory - the Marxist-inspired movement originally associated with the work of the Frankfurt School - highlights how social structures dominate and oppress. Butler (1990) builds on critical theory in her important work on intersectionality - describing the ways in which systems of inequality based on gender, race, ethnicity, sexual orientation, disability, class, and other forms of discrimination, 'intersect' to create unique dynamics and effects. In a similar vein, Haraway (1988) argues against a disembodied subjectivity – where objectivity and neutrality are held up as 'best practice' - and instead advocates for embodied subjectivity. Haraway challenges us to reflect on how our own positioning within available social narratives and discourses shape what we observe. Likewise, Grosfoguel (2009) also argues that we express ourselves within the confines of available socio-political power relations. According to Frosh et al. (2002), our positioning within these hierarchies defines the kinds of experiences available to us. It is imperative, then, that we use an intersectional approach to knowledge systems in postgraduate psychological education, in order to explore how taken-for-granted socio-political power relations interweave with one another and shape subjective reality.

Transgenerational trauma

In my earlier work, exploring the decolonisation and transformation of postgraduate psychological education (Auld, 2022a, Auld, 2022b, Auld, 2022c), I highlighted the group psychoanalytic concept of the 'social unconscious' as a way of assisting students to explore how some of their most deeply held attitudes and values have roots in the cultural and societal circumstances into which they are born. Extending these earlier discussions, the concept of the social unconscious is also helpful in assisting us – as clinicians, researchers, educators, and students – to explore the transgenerational consequences of massive trauma experienced by one group (social, ethnic, or national, amongst others) at the hands of another. This aspect of the social unconscious gives us insight into how issues of personal distress and crisis are intertwined with broader socio-political conflicts.

To elaborate, the concept of the social unconscious was initially formulated by Fromm (2001) and subsequently by Foulkes (2018), Hopper (2002), Volkan (2001), Dalal (1998), and Weinberg (2007), amongst others. In his work, *Beyond the chains of illusion: My encounter with Marx and Freud*, Fromm (2001) sought to link Marxist ideas around ideology and the psychoanalytic concept of repression, to grasp how social constructs - which are historical and conditional – can be experienced as natural and inevitable. Drawing from Fromm's work, the concept of the social unconscious allows us to contemplate how we not only repress parts of ourselves, but society itself becomes a repressive force. Going further, Volkan (1999) explains how large groups become used as receptacles for unacceptable ways of thinking, feeling, and behaving (both at individual and group levels), and how this supports socially accepted aspects of identity and a shared sense of sameness. As a result, instead of risking exclusion by trying to meet our own needs – which may be different from those valued in our social system – we accept what is socially valuable and change ourselves accordingly, defensively projecting or repressing the unwanted aspects.

Weinberg (2007) highlights factors such as shared anxieties, fantasies, social defence mechanisms (Jaques et al., 1955, Menzies-Lyth, 1961), myths, and memories as key to the operation of the social unconscious. In his work he focuses on the traumagenic nature of the social unconscious by drawing on Volkan's (2001) thoughts around 'chosen traumas'. Here, Volkan describes how, within large groups,

there exists an un-mourned or unresolved psychological representation of a shared trauma in relation to loss. Chosen traumas are pushed into the social unconscious via defensive operations, such as repression and denial. Through generations the unprocessed trauma lies as if dormant, unconscious, and unprocessed within the group, in relation to its former oppressors. If in the future the group is threatened by a new peril, it can fall back on old patterns of responding to conflict, with a reactivation of these past traumas. In other words, as Baldwin (1985: 410) notes,

> … the great force of history comes from the fact that we carry it within us, are unconsciously controlled by it in many ways, and history is literally present in all that we do.

The operation of the social unconscious is then reflected in the way we absorb, replicate, and reinforce attitudes, norms, and values, without us realising we are doing so, impacting our subjectivity and the meaning which we ascribe to our experience (Dalal, 1998). This insight has an important implication for postgraduate psychological education – namely, an awareness of the social unconscious, and the legacy of chosen traumas, can enable us to understand how culture shapes our behaviour and interactions.

Drawing these points together, to develop culturally informed postgraduate psychological education we need to take a decolonial stance to address the limitations of positivism and undermine racist colonial knowledge production. As a way forward, employing pedagogical strategies which develop awareness of the social unconscious, opens the potential of enabling students to explore the impact of taken-for-granted socio-political attitudes, norms, and values on subjectivity. Such strategies must also allow us to reflect upon the transgenerational legacy of massive trauma, and how this affects the meaning we ascribe to our experience in the here-and-now. Theatre strategies are put forward to facilitate this awareness by bringing historical eras to life, allowing students to explore how psychodynamic, cultural, economic, and ideological factors impact them personally.

Theatre strategies

Moving beyond entertainment to pedagogical utility, theatre has the potential to open an educational space in which our social embeddedness can be brough to awareness, explored, interrogated, and challenged. Theatre has the power to clarify, to inform, to unsettle, to incite, and to arouse. It can be deliberately contrived to focus on socio-political struggles around abuse and exploitation. For example, Brazilian playwright Augusto Boal's (1985) *Theatre of the Oppressed*, is a well-known theatre form which stimulates critical observation and representation of reality. This theatre form utilises a set of dramatic techniques whose purpose is to bring to light systemic exploitation and oppression operating within common situations. Another example of the pedagogical utility of theatre is from within my own local community of Durban, KwaZulu-Natal, South Africa. Here, Empatheatre has emerged as a research-based, theatre-making methodology. Empatheatre is co-directed by Mpume Mthombeni, Neil Coppen, and Dr Dylan McGarry, in collaboration with a variety of other artists, academic researchers, and responsive citizens. Starting with action-based research, co-participants and key partners identify issues of socio-political concern, with the aim of developing dramatic productions and creating a space for reflexive deep listening. It follows that, by drawing on theatre productions which are local to the postgraduate psychological education programme, theatre can bring awareness to, provide an experience of, and provoke discussion about, broader socio-economic, cultural, political, and ideological forces impacting upon us as citizens of whatever socio-political context in which we find ourselves.

Elaborating further, as an immersive art form, theatre targets multiple senses simultaneously, engaging the audience mind, body, and soul. Theatre does not simply tell a story - it makes us, as the audience, feel what is happening, affecting us personally. Such active engagement makes theatre useful from a critical pedagogical perspective. Theatre's great strength is in helping students become aware of

otherwise taken-for-granted socio-political norms and values that impact them first-hand through the characters in the play, instead of hearing about the second-hand effects of life's struggles during lectures. This transformative experience is only possible because theatre does not bind the student to their own ethnocentric worldview - instead, through theatre, students are able become immersed in the characters' lives. This opens the possibility of a student distancing themselves from their own perspective enough to see the situation in a different way. By so doing, students can contemplate new points of view non-threateningly - facilitating fewer defensive explorations of contentious socio-political realities such as race, class, gender, religion, economic status, and sexual orientation (Alkin & Christie, 2002, Duncan, 2008, Sonn et al., 2013, Stevens et al., 2013).

In his critique of traditional Western teaching methods, Brazilian educator and philosopher Paolo Freire (1970) views students as passive - receiving information in lecture format and simply 'banking' this knowledge without giving it much consideration. Western techniques of learning, such as taking notes or listening to a lecture, do not require students be actively involved (Tovani & Moje, 2017). In other words, with traditional Western education, students are not asked to reflect on, or question, the bias inherent in the knowledge, course content, or classroom resources, that they are being presented. They are also not required to engage critically with, or analyse, how these biases shape their thinking. In other words, they lack a critical consciousness (Freire, 2018). This makes it difficult for students to question the nature of knowledge itself or come up with their own interpretations of the ideas they are presented with.

Responding to Freire's (2018) critique of Western teaching methods, cultural-historical activity theory (CHAT) offers a valuable lens for understanding how education can be transformed from one focused on acquiring information to one concerned with cultivating cultural awareness. Facilitating this move, Vygotsky's (1978) sociocultural perspective on learning provides a framework for the first generation of CHAT. In his response to the positivist behavioural assertion of a simple relationship between stimulus and response, Vygotsky emphasises that learning is mediated by culture - which in turn is shaped by individual agency. In other words, Vygotsky understands children's development as shaped by their social interactions with adults and peers. Here, learning is seen as occurring as children engage in purposeful activity with others who possess more knowledge about the task at hand.

Vygotsky's colleague Leont'ev (1981) and others, such as Il'enkov (1977, 1982) and Davydov (1988, 1990), subsequently developed the second generation of CHAT. In Leont'ev's conception, the unit of analysis is the group instead of the individual subject. Il'enkov (1977, 1982) then incorporated Marxist ideas about dialectics and contradictions into CHAT by suggesting that internal contradictions are the driving force for change and development within an activity. Finally, Davydov (1988, 1990) translated Il'enkov's dialectical theories of learning into classroom-based teaching strategies, introducing the movement from the abstract to concrete via steps in which students engage and respond actively with their environment.

In the 1980s, Engeström (2001, 2014) took up Leontiev's CHAT and applied it to learning in organisations. One of the forces driving the development of this third generation of CHAT has been a growing recognition that cultural diversity (Cole, 1988, Griffin, 1984) results in varied ways to accomplish tasks - and can, therefore, affect definitions and perceptions of any given task as well as its relation to other tasks and activities. The third generation of CHAT also provides a way to integrate the individual and social levels of analysis: individuals are seen as having varying capacities to engage in different kinds of activities (e.g., cooking or composing music), but their ability is constrained by what is available in the environment (e.g., utensils or instruments) and by rules that govern behaviour (e.g., those governing musical performance).

137

Going further, Engeström's (2001, 2014) expansive learning theory helps us understand how to create spaces where students can learn from one another's experience, and where educator and students can develop new knowledge together. This is facilitated, as Gutierrez (2008) suggests, when educator and students co-construct a third space, where each brings their knowledge to bear. Here, both educator and students' diverse cultural backgrounds, discourses and knowledges become resources for mediating learning. In this way, Engeström and Gutierrez challenge us to create spaces in the classroom for students and educator alike to learn about themselves and each other.

Taking up this challenge, in contrast to traditional Western teaching methods, theatre – and African Storytelling as an early form of theatre – opens a space to afford both educator and students first-hand engagement with taken-for-granted socio-political attitudes, norms, and values. Theatre makes it possible for educator and students, as members of the audience, to contribute to the performance. To put it another way, with theatre there is an actor-audience collaborative relationship. Theatre presents a space where educator and students are personally involved while simultaneously being removed enough from their own ethnocentric perspective to be able to engage critically (Haselau & Saville Young, 2022). Film and television, or even YouTube plays, do not have this facility as the performance in these formats is fixed rather than interactive. As a result of theatre's relational, interactive, and collaborative nature, it has the potential to facilitate educator and student understanding, as well as to stimulate the processing of information around complex topics involving power, oppression, interpersonal relationships, and individual subjectivity. This active engagement can be further enhanced, post-performance, through a series of educator facilitated discussion groups. Creating a third space in the classroom where educator and students can think critically about the social norms and values portrayed in the performance, helping students develop a better awareness of how power relationships affect people's (as citizens) thoughts, feelings, and actions.

Freire's (2018) critical pedagogical approach advocates students developing a critical consciousness towards learning by engaging in self-directed inquiry. Such active engagement empowers students to view themselves as citizens and agents, dispelling the misperception that they are isolated from their socio-cultural communities, or are unable to effect change. Theatre, as a critical pedagogical strategy, aligns with these goals, for, as Jackson (1993: 35) points out,

> Any good theatre will of itself be educational - that is, when it initiates or extends a questioning process in its audience, when it makes us look afresh at the world, its institutions and conventions and at our own place in that world, when it expands our notion of who we are, of the feelings and thoughts of which we are capable, and of our connection with the lives of others.

Utilising theatre as a critical pedagogical strategy, therefore, aligns with contemporary constructivist models of teaching and learning. According to Pammenter (1993: 59),

> Theatre, at its best, is the communication and exploration of human experience; it is a forum for our values, political, moral and ethical. It is concerned with the interaction of these values at a philosophical, emotional, and intellectual level.

Incorporating theatre as a critical pedagogical strategy in postgraduate psychological education enables students not to be passive recipients of facts, but as agents of their own learning. In other words, theatre does not just focus on the transmission of information, but rather on exposing students to a variety of contexts and situations to help them actively and critically engage in knowledge construction.

138

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Let us now look at how theatre, as a critical pedagogical strategy, can be employed in a postgraduate psychology education. While the context of my use of theatre is in an institute of higher education in South Africa, the activity could also be offered as a short course for qualified clinicians engaging in continuing professional development anywhere in the world. It is recommended that 36 education hours be given to the activity.

PROCEDURE

In terms of a procedure to integrate theatre into postgraduate psychological education, the following steps may be used as a guide:

1. A first step is for students and educator to explore the development and socio-political background of theatre within their community.

2. Any resultant journal articles and texts can be circulated between the students and educator. These readings make up the resources for the module.

3. The reading resources are used as starting points in a series of educator facilitated discussions around the relationship between theatre and the local (historical) socio-political climate.

4. Following this series of discussions, educator and students attend a production of a local play, rich in socio-political context. A useful interdisciplinary move would be to attend a production in the drama department of the tertiary institution in which your postgraduate programme is situated. Such a move ensures relevance of subject matter and performance, promotes interdisciplinary collaboration, is practically accessible, and cost effective. If this is not possible, your local community theatre company (either amateur or professional), or high school, can provide useful alternatives.

5. Students are then asked to write a reflective essay exploring how the play impacts them. It is important to highlight to students that there are no 'right' or 'wrong' responses. The following questions can be used as a guide to reflection:

- What do you imagine are the playwrights' intentions in writing this play?
- What socio-political context is the playwright writing from?
- Briefly describe the characters, their relationships, and conflicts (internal/external/inter-personal)
- How are socio-political categories such as race, age, gender, and class engaged with in the play?
- What are the play's themes and messages?
- Describe the play's set, props, and costumes and suggest what their use might communicate to the audience.
- What is the relevance of the play, in terms of when it was written, and the current socio-political climate?
- By engaging and reflecting on the play in this manner, what have you learnt about the impact of your own socio-political context on you?

6. Returning to the classroom, the educator - acting as facilitator - encourages each student to discuss their reflective essay with the rest of the class. The class looks at any similarities or differences that may emerge between their essays, as well as any insights gained. Students can elaborate on the tools they used to immerse themselves in the character's life. For example, with a performance analysis is a tool an actor uses during the text-analyses of a play. Here the actor creates a character profile where he or she finds common threads and differentiates his or her socio-political background to the character.

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

139

Often during this process, the actor also needs to find a commonality which they share with the character, in order to create a truthful performance. The aim of the performance analysis is to engage with selfhood and positioning of self in the world.

7. The class then selects socio-politically contentious aspects of the play to perform role plays, with students taking on various characters (see Auld, 2022c for further information on role play as a pedagogical strategy to assist students engage with the social embeddedness of trauma). This allows students to further grapple with and reflect on the taken-for-granted socio-political attitudes, norms, and values.

8. Next, the class is divided into groups of three and asked to devise a three-minute short 'trailer' for the play. The aim of this activity is for students to distil out the central themes. The students then perform, and video record, this trailer, before sharing it with the rest of the class.

9. Students take turns to be in the 'hot seat', as the character they portray. They are interviewed by their peers to further explore, and make explicit, the character's social embeddedness.

10. After the filming of the trailer, and taking the hot seat, the students are given an opportunity to reflect on their experience. Each student is asked to write another short reflective essay - this time specifically about the socio-political attitudes, norms, and values impacting the character they portray. These 'writing-in-role' essays are shared with the class during class discussion time.

11. If time allows, the whole procedure may be repeated with a new socio-politically rich play.

Anecdotal illustration
1. Example of background research
Closely associated with the work and theories of Freire, Augusto Boal, the Brazilian theatre practitioner, drama theorist, and political activist, has been influential in South African theatre and society. Of particular interest, Boal's work on conscientisation through theatre, and his ideas regarding the utilisation of theatre for socio-political purposes, have been very influential in the shaping of the protest theatre movement of the 1960s, 1970s and 1980s, as well as the more socially conscious community work of the 1990s. The English version of his first book, *Theatre of the Oppressed* (Boal, 1985), influenced many South African theatre practitioners and theorists during the struggle against apartheid, while his later handbook, *Games for Actors and Non-Actors* (Boal, 2002), has become an important tool in the post-apartheid period.

Drawing on Boal, Athol Fugard - born in Middleburg, South Africa, in 1932 - is a playwright, novelist, actor, and director, who is widely regarded as one of South Africa's greatest playwrights. Fugard often draws on his own personal experience as inspiration for his work. For example, during apartheid, Fugard was friends with prominent local anti-apartheid activists and, as a result, Fugard and his family were placed under government surveillance for many years. His passport was confiscated by the authorities, and he was prevented from travelling abroad. The apartheid government gradually, over time, increased its restrictions on his work and freedom of movement, finally banning the publication and performance of his plays. Some of these personal experiences and events are reflected in this play, *Sorrows and Rejoicings* (Fugard, 2002).

2. Example of a trailer
Fugard's play, *Sorrows and Rejoicings*, explores the legacy of South Africa's policy of apartheid on three women - one classified as 'white', one 'black', and one 'coloured'. Initially, it appears that these women have little in common, except for their connection to one man, a white poet named Dawid. The three women meet in a small Karoo village after Dawid's funeral. The white woman, Allison, was

Dawid's wife, while the black woman, Marta, was his former lover and is the mother of their coloured child, Rebecca. Dawid, despite loving the Karoo village in which he grew up, was driven into exile because of his anti-apartheid activism. He appears to the audience only in flashbacks as the women share their memories of him, confronting their misunderstandings and resentments, as well as the shackles that have been handed down to them from the past, managing to connect and reconcile in the present, with the hope of moving on in the future.

(Hilferty, 2002)

3. Example of a student's reflective essay

Sorrows and Rejoicings is set in the late 1990s - just before the turn of the century - in a post-apartheid South Africa. Under apartheid, almost every aspect of life in South Africa was specified and regulated - from where you might live and work, to whom you might relate to and how. Establishing links with others during apartheid was, therefore, severely curtailed: Black people were not allowed to associate with white people, and vice versa, and this separation is evident in the play. During apartheid, Dawid has a child, Rebecca, with Marta and, because of this illicit relationship, Dawid must constantly disassociate himself from his daughter. This is conveyed when Allison says (Fugard, 2002: 29),

> And then when I saw little Rebecca - I think she was already about one year old - I knew for sure. Poor Dawid! He made it so obvious by deliberately ignoring the child when she was in here with you.

Race and racial divisions, therefore, play a major role in *Sorrows and Rejoicings*. Apartheid resulted in Dawid having to leave Marta and Rebecca. Due to the segregation of the different races, Dawid went on to marry Allison, a white English woman. Allison highlights the white privilege that resulted from apartheid when she says to Marta (Fugard, 2002:,31), 'Had I got him, like so many other things in my life, because in addition to all my other splendid virtues, I had white skin?'

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

141

The title of the play contains the nouns 'Sorrows' and 'Rejoicings', which are, in many ways, polar opposites. Symbolically, the split between 'Sorrows' and 'Rejoicings' echoes the imposed divisions of apartheid - the separation of South Africa into two racist categories, black and white. On one hand, 'Sorrows' is a reference to the Latin poet, Ovid's, letters – *Trista* meaning sorrows (Ovid, 1924) - written during his exile from Rome by the Emperor Augustus. On the other hand, 'Rejoicings' is reference to the title Dawid chose for his poetry anthology (to be written during his exile from South Africa). In terms of 'Rejoicings' Dawid hopes that his exile will offer a chance for him to come to life, and find his voice, after being stifled by the repressive apartheid regime. 'Rejoicings' symbolises Dawid's hope to make a difference to South Africa's future generations. Unlike Ovid's 'Sorrows', Dawid's 'Rejoicings' are meant to celebrate his newfound freedom and hope in London. Unfortunately, Dawid's hope for the future ends as the legacy of apartheid lives on in him: He feels he has lost his soul, being removed from the land he loves so much. He finds life in London to be the opposite of what he has envisioned - he experiences it as soulless and alienating. This is seen by the various memories of Dawid's life voiced by the women in the play. Unfortunately, the division of 'Sorrows' and 'Rejoicings', does not allow for diversity and collaboration. By focusing on 'Rejoicings' Dawid does not engage with life's complexities, and, therefore, reconcile his pain and sorrow, gain the ability to mourn loss, and move on.

The division and separations brough about by apartheid are also reflected symbolically using language. An example of this is the pronunciation of 'Dawid'. During apartheid Afrikaans was regarded as the language of the oppressor. In Afrikaans, the poet's name is pronounced 'Dawid'. However, in English, his name is pronounced as 'David'. Allison prefers to call Dawid by the English pronunciation, whereas Marta calls him Dawid. These different pronunciations reflect the differences between the two women and make the divide between them seem even greater.

The play, although written in 2002, resonates with issues still encountered in the lives of many South Africans. In both South Africa and many other parts of the world where divisive social systems, and the resultant trauma, have impacted the social unconscious, leaving a transgenerational legacy. The play encourages people to take a stand against prejudice, not just by protesting and acting out, but by talking and connecting. In post-apartheid South Africa, sorrow clings to all South Africans. We are still facing the aftermath of this divisive social system, slumbering in the social unconscious only to flare up at the slightest provocation. Themes of resentment and violence come up at multiple points in the play, as they do in day-to-day life in post-apartheid South Africa. For example, Rebecca feels a deep resentment towards her father, as he abandoned her mother and herself and 'ruined their life'. Rebecca is violent in her burning of Dawid's poems, which were an important emotional connection between her mother and father during apartheid.

Another aspect of socio-political trauma is revealed through the play's critique of patriarchy. Women in the play are depicted as strong, complex, and capable of forgiving a man who, ultimately, cannot forgive himself. Opposingly, the only man in the play, Dawid, is portrayed as two dimensional and extreme - he is either full of life and ideas, striving for ideals, or he completely falls apart, full of shame and inadequacy, becoming an alcoholic. Dawid is unable to reconcile life's sorrows and rejoicings while the female characters, although flawed, can open to one another, see past sorrows, and grasp the possibility of rejoicing despite this pain.

The trauma of betrayal is also a pinnacle theme. Dawid has a history of betraying women - leaving and abandoning both Marta and Rebecca. He also betrays and abandons Allison by drinking, not supporting her career, by losing his job, and returning to South Africa without telling her. He also betrays his own ideals - he wanted to go to London to find his voice and use it to save South Africa, however, he soon loses sight of his goal and falls into alcohol abuse to dull his sorrows.

142

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

The actor-audience relationship is intimate, causing the character's socio-political struggles to affect the audience personally. The entire play is set in the living room of a family home in the Karoo, which traditionally is a place for a family to come together. The Karoo is also a stripped land and, therefore, stripped decor also allows the audience to focus even more intently on the characters in the play. When a character speaks, they generally engage in emotional monologues. This has the effect of drawing the audience in and making us aware of the characters inner world, hopes, dreams, and desires. In so doing the audience has a deep and personal attachment to the characters. The actors use no over the top facial expressions, so the acting is natural and relatable. In terms of props and set design, symbolically, a table represents the coming together of people to share in communion around food. However, in apartheid South Africa citizens were split apart. The table, therefore, within this socio-political context represents, the divide in South Africa.

I believe that Fugard's intentions in writing this play are to demonstrate the transgenerational legacy of apartheid and how this impacts people at an individual, family, and social level. As the play unfolds in the post-apartheid period, the main characters, Marta, Allison, Dawid, and Rebecca represent the disconnection, misunderstanding, alienation, and resentment that has built up and been passed on during apartheid. With Rebecca, a sullen and impotent figure in the doorway of the living room for most of the play, there is the ominous sense of the legacy of apartheid - violence and resentment - blocking the door and preventing future possibilities. However, the end of the play is hopeful with Rebecca's confrontation of this legacy within herself, after listening to the testimony of Allison and Marta. Ultimately, Rebecca comes to realise that through connecting with others, opening herself up to understand where these two older women are coming from, as well as the sorrows and rejoicings they have lived through, there is hope for communion and creativity in the future.

CONCLUSION

Given that prejudice and prejudgements govern and limit our formulation of experience, such taken-for-granted socio-political attitudes, norms, and values are an integral part of who we are, and therefore, cannot be ignored when we understand the other (Bhattacharya & Kim, 2018). In other words, everyone holds prejudices and discriminates against people who are perceived as different from them. These prejudices influence both our conscious thoughts and unconscious assumptions about other people, as well as the ways in which we interact with them (Esprey, 2013). Fonagy and Higgitt (2007) and Straker (2006) suggest that, just as our early relationships shape our attachment styles and relational patterns, so too are we shaped to take on specific roles when interacting with others. Unless we cultivate a consciousness that liberates us from these roles, we are likely to remain trapped within them (Love, 2013). Drawing on the play, *Sorrows and Rejoicings*, there is no getting away from the ghosts of the past. As the play illustrates, you carry them within you. We need to engage with these ghosts to alleviate some of the bitterness of the present – a process which has both personal and political dimensions. In terms of a way forward, unlike positivist thinkers, we need to incorporate prejudice into our understanding of selfhood - rather than trying to avoid it - to enable us to view life as complex and multi-layered, and open the door to the possibility of change and growth in the present and future (Bhattacharya & Kim, 2018).

Important arguments by critical scholars such as Boyle (2022), Bracken et al. (2016), Fanon (1986), Frosh (2018), Laclau and Mouffe (1988) have led to calls for a decolonial stance to postgraduate psychological education. To accomplish this, Mathebane and Sekudu (2017), working within the South African context, advocate inculcating critical awareness of the impact of taken-for-granted socio-political attitudes, norms, and values on subjectivity. In other words, we - as educators - need to develop critical pedagogical strategies–to explore how narratives - the stories told to make sense of experience - are derived from wider cultural narratives. Such initiatives must highlight how some ways of understanding and experiencing the world are more accessible and socially endorsed than others.

We need pedagogical strategies which enable us to explore how we compare ourselves against prevailing social discourses, resulting in social shame when we fail to attain socially prescribed ideals (Boyle, 2022, Layton, 2007). These initiatives need to help us trace how socially stigmatised and undesirable aspects of self can be defensively split off and projected, at both an individual and social level (Jaques et al., 1955, Menzies-Lyth, 1992), onto others. In other words, as Layton (2007) points out, we need educational tools to help us reflect on how each society has its own socially embedded sense of acceptable ways of thinking, feeling, and behaving. Such taken-for-granted socio-political attitudes, norms, and values then set the unquestioned parameters about who and what is deemed good/desirable/healthy. Through such pedagogical strategies we can develop an awareness within postgraduate psychological education of how behaviours and experiences that do not correspond to the socio-political norms and values of a given culture can lead to feelings of anger, hatred, and resentment for some, as well as shame, embarrassment, and humiliation for others.

As a critical pedagogical strategy, theatre provides students with first hand engagement with taken-for-granted socio-political attitudes, norms, and values. In the illustration, *Sorrows and Rejoicings*, we can see how theatre's relational, interactive, and collaborative nature can fully engage the student, creating a space where they can think critically about the norms and values portrayed in the performance. The illustration also highlights how students can reflect on themselves as citizens who are embedded in their socio-cultural communities. In this way, theatre, as a critical pedagogical initiative, aligns with contemporary constructivist models of teaching and learning, where students are not passive recipients of facts, but rather agents of their own learning. How theatre strategies can be applied to the different levels of postgraduate psychological education, will be the subject of my next study in this area.

For psychological practice to be relevant to non-Western cultures within the Global North and Global South, institutes of higher education have an ethical responsibility to take a decolonial stance and foster critical awareness of the ideological underpinnings of psychological theories, research, and knowledge production. In non-Western cultures, such as South Africa, postgraduate psychological education must consider the multicultural and resource-constricted context in which we operate. While universities that offer advanced education in psychology are aware of the need for contextual models, because of the dominance of positivism, Western approaches are idealised and held up as best practice. Such approaches separate the mind from the body, the individual from the social group, removing values, ethics, and power interests from theory and practice (Boyle, 2022). Blindly accepting these universal assumptions can lead educators, students, and clinicians to view patients as passive objects instead of active agents who create meaning within their socio-political context. This can perpetuate cycles of abuse for patients and leave students feeling inadequate and insufficient in their skills.

The political landscape, cultural differences, and the effects of economic hardship are just some aspects we must consider when understanding emotional distress and suffering, to be effective practitioners. By discussing the psychosocial causes of distress - such as racism, sexism, and engineered inequality - we can facilitate critical awareness, opening the possibility of finding ways to address unspoken issues within and between racial groupings that have arisen out of the traumas born in a racially haunted history. Many other themes in Fugard's (2002) *Sorrows and Rejoicings* are also relevant in today - the absent father figure and the impact thereof on households, for instance. Although we need to be reminded of a colonial and segregated past, we also need to be sensitive to the current issues of poverty and inequality experienced by all races in South Africa. Therefore, the role of psychology in the future of this country could also include the healing of polarised societies using theatre pedagogies.

144

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145

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
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146

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147

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148

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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149

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

Fifteen years of The Independent Journal of Teaching and Learning: A review and bibliometric analysis[1]

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ABSTRACT

The rise of academic publishing due to the 'publish or perish' phenomenon has placed increased scrutiny on African scholars. The limited footprint of African scholars in international open-access journals has led to a drive for Africa to produce and disseminate its research. Publication analytics has become an essential strategy for journals for managing journals. This study uses bibliometric metrics to explore the publications metrics of the Independent Journal of Teaching and Learning, an open-access journal in South Africa. The study analyses bibliometric data from its articles published between 2008 and 2022. The study highlights the research clusters, themes and hotspots in the journal. This study helps obtain a snapshot of the journal's status. The paper illustrates the development trends of the journal, which provides an essential reference for the future development of this and other similar journals. The journal has made a significant impact on the education landscape in South Africa.

Keywords: bibliometric analysis, degree of collaboration, doubling time, journal quality, keyword analysis, relative growth rate

INTRODUCTION

The 'publish or perish' phenomenon in academia pressures academics to produce more research outputs (Teelken, 2012). Knowledge creation and application determine power, development, and equality worldwide. The heart of knowledge creation is the Global North, with the Global South hindered in this regard by a lack of scholarship and by not participating in global knowledge production and its dissemination (Wolhuter, 2017). A study by Asare, Mitchell and Rose (2021) found that between 2010 and 2018, only 25% of open-access articles on education research were from Africa. Open-access articles by authors based in Africa primarily appeared in journals with low-impact factors, casting doubt on the calibre of these publications. Choosing open access is impacted by the associated costs, which tends to steer African authors toward low-impact journals with minimal or no associated costs. Despite official fee waivers, authors from Africa are constrained by the higher fees charged by higher-impact journals (Asare *et al.*, 2021). The pay-to-publish model employed in most open-access journals may encourage these journals to publish more submissions to generate more revenue. This conflict results in worries about the quality and the allure of predatory publications (Tomaselli, 2021).

South Africa's school and post-school education systems have difficulties that present excellent research opportunities. Both have experienced and still experience turmoil and violence, and they also must contend with the realities of high drop-out and low success rates, as well as other difficulties. The Department of Higher Education and Training (DHET) administers the government's incentive

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

150

programme in South Africa. The DHET funds institutions in exchange for articles published in journals in their accredited list (Academy of Science of South Africa, 2020). One of the factors influencing the rise in South African paper publications is the research incentive programme by the DHET (Lee & Simon, 2018).

Out of the more than three hundred South African journals, only 17 focus on education and offer possibilities for academics to publish their findings across various study disciplines. Nine of these journals have a broader focus, such as *The Independent Journal of Teaching and Learning* (The IJTL), the *South African Journal of Education* and the *Journal of Education*. Eight are 'specialist' journals with a specific focus, including the *Southern African Journal of Environmental Education* and the *South African Journal of Childhood Education* (Academy of Science of South Africa, 2020).

The IJTL, formerly the Journal of Independent Teaching and Learning, was founded in 2006 by the Independent Institute of Education, a private education provider in South Africa. The IJTL aims to provide a platform for researchers specialising in primary, secondary and tertiary education sectors to publish their work (The Independent Institute of Education, 2022). The IJTL has grown and developed, publishing 17 volumes to date. The IJTL is accredited by the DHET and is indexed by major bibliographic databases, such as the Clarivate's Web of Science (WoS) - Emerging Sources Citation Index (ESCI), Sabinet (Sabinet ePublications in the Education, Social Sciences and Humanities Collections – Open access), and EBSCOhost. The WoS ESCI indexed IJTL from 2008 (The Independent Institute of Education, 2022).

Advances on the Internet and other technologies that aid the production and dissemination of information forced journal publications to move from hard-copy prints to open-access publishing with more frequent volumes and issues (Asare *et al.*, 2021). From 2006 to 2016, The IJTL published one volume with one issue per year. The following year, it transitioned from the annual print publication format to an online, open-access journal following international standards. The IJTL also continued with one volume per year but increased the issues to two (The Independent Institute of Education, 2020).

The IJTL publishes empirical research, synoptic articles, reflective papers, theoretical articles, discussion or advocacy papers and book reviews. The IJTL also publishes doctoral abstracts where recent doctoral graduates in primary, secondary and tertiary education could showcase their research. The IJTL's editorial policy allows authors to publish once within a three-edition cycle. Less than half of the reviewers for an edition should not have conducted reviews in the previous issue. Furthermore, unpaid reviewers review articles as part of their academic citizenship (*The Independent Journal of Teaching and Learning*, 2020). This practice allows for various reviewers to be involved in the review process. This and other sound editorial processes have enhanced the quality of articles published in the journal.

Bibliometrics is a sub-research field within the library and information sciences field that studies bibliographic data by exploring, organising and analysing large amounts of data (Daim et al., 2006). Bibliometrics track academic journal citations to understand the past and forecast the future (Morris et al., 2002). When using bibliometrics, the researcher explores, organises and analyses vast amounts of historical data to identify unseen trends. Several bibliometrics methods exist that visualise the data and reveal qualitative and quantitative developments with a topic. These methods involve quantity indicators, which measure productivity; quality indicators, which measure the impact; and structural indicators, measuring the connections between the various scientific actors (Durieux & Gevenois, 2010). Bibliometric analysis can construct a comprehensive journal overview (Bar-Ilan, 2008) and create a retrospective look at its development (Schwert, 2002).

A review of the literature revealed numerous bibliometric analysis works on a wide variety of issues, such as areas of interest (Chiu & Ho, 2007), countries (Bornmann, Wagner & Leydesdorff, 2015),

institutions (Cancino, Merigó & Coronado, 2017), journals (Ittmann, 2021), enduring problem areas (Maphosa, Doorsamy & Paul, 2022) and topical issues (Maphosa & Maphosa, 2022). Literature reveals that many scholars analysed journals to map their characteristics and progress when they reach a significant milestone or anniversary. For example, IEEE Transactions on Learning Technologies (Zurita et al., 2022) published a bibliometric analysis for its fifteenth anniversary. Glottometrics published a bibliometric study commemorating its seventeenth anniversary (Lin & Liu, 2017).

Reputational and citation-based approaches are two techniques that are frequently used to gauge journal quality. In the first approach, specialists evaluate journals to ascertain how people perceive overall status and quality. Due to the limitations in this approach, for example, specialists may rank journals they are unfamiliar with poorly, even though they perform well using other measures, citation approaches are widely used. Journals may also be ranked highly due to achieving a level of excellence in the past, even though their current performance is relatively modest (Hodge & Lacasse, 2011). The citation-based approach is a performance analysis approach that measures influence and productivity indicators, for example, the number of articles published and citations received. There are scientific measures to calculate the scientific growth rate of publications and citations within a journal or research field, such as the relative growth rate (RGR) and doubling time (DT) model (Mahapatra, 1985).

In 2022, The IJTL celebrated its seventeenth anniversary and fifteen years of being indexed by WoS ESCI. In commemoration of this event, this study is a retrospective analysis of The IJTL's publications since WoS indexed it. The study aims to gauge the journal's quality using the citation-based approach (performance analysis). Additionally, a bibliometric analysis measures success and quantitatively visualises and summarises history (Valenzuela et al., 2017). This study analyses the degree of collaboration (DC), RGR and DT of articles published in The IJTL between 2008 and 2022. The objectives of this study are to:

- analyse articles published between in the journal 2008 and 2022
- determine the DC among authors
- demonstrate the RGR and DT of articles published in the journal
- identify the citation trends of articles published in the journal
- identify the research themes and hotspots in articles published in the journal.

The rest of this paper is structured as follows: Section 2 outlines the methodology followed for the study and how data were collected and analysed. Section 3 presents the results using descriptive methods and the outcomes from analysis done on VOSviewer version 1.6.18. Section 4 discusses the results' implications. Finally, in Section 5, the article analyses the conclusions and limitations of the study.

METHODOLOGY

The bibliometric analysis assesses bibliographic data to determine the research themes and hotspots (Ye, Song & Li, 2012) and the prominent trends in the field (Merigó et al., 2017). This study collected bibliographic data from Clarivate's WoS comprehensive citation database (Bar-Ilan, 2010). The data were collected by searching for the *Independent Journal of Teaching and Learning* under 'publication titles' in WoS, which generated 185 documents. The study focussed only on peer-reviewed articles because these can be considered 'certified knowledge'. Editorial articles were not considered because they were not peer-reviewed. Twenty-two editorial articles were excluded, leaving 163 articles published between 2008 and 2022, which were retrieved for analysis. Table 1 summarises the details of the data used.

A bibliometric analysis of The IJTL was constructed using several indicators, such as authorship analysis, DC, RGR, DT, h-index and citation analysis. The most influential articles and the geographical distribution of authors are analysed. VOSviewer is a free tool that generates maps on indicators such as

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

152

bibliographic coupling, co-authorship, citation, co-citation and co-occurrence of keywords. This study uses VOSviewer to develop a co-occurrence network and a density visualisation map to identify the research clusters, themes and hotspots using bibliographic material obtained from the WoS database.

Table 1:
Data summary

Criteria	
Data source	Clarivate's Web of Science
Search terms	Independent Journal of Teaching and Learning
Citation index	ESCI
Publication period	2008 and 2022
Document type	Article
Language	English
Number of articles	163

RESULTS

This section presents the results of this study: authorship analysis, publication and citation analysis and h-index, DC, the RGR and DT of publications and keywords analysis.

Authorship Analysis

Two hundred and seventy-six authors (nine of these authors contributed two articles each) wrote the 163 articles published by The IJTL between 2008 and 2022. Table 2 shows the authorship analysis of articles. In 2010 and 2013, all articles published in the journal had one author. In 2009 and 2011, articles were published by a single author or co-authored. Seventy-four of the 163 articles (45.4%) were written by one author.

Table 2:
Authorship analysis of articles

Year	Total Articles	Number of authors					Co-authorship	Total authors
		1	2	3	4	5		
2008	6	4	-	2	-	-	2	10
2009	6	4	2	-	-	-	2	8
2010	6	6	-	-	-	-	0	6
2011	6	4	2	-	-	-	2	8
2012	6	4	1	1	-	-	2	9
2013	6	6	-	-	-	-	0	6
2014	8	2	5	1	-	-	6	15
2015	8	2	5	-	-	1	6	17
2016	8	2	5	1	-	-	6	15
2017	16	8	7	-	1	-	8	26
2018	16	6	10	-	-	-	10	26
2019	15	6	6	3	-	-	9	27

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

153

2020	18	6	8	4	-	-	12	34
2021	18	6	6	2	2	2	12	42
2022	20	8	10	1	-	1	12	36
Total	163	74	67	15	3	4	89	285
		45.4	41.1	9.2	1.8	2.5		

Articles with two authors contributed 67 (41.1%), three authors 15 (9.2%), and multiple authors seven (4.3%). It is also detected that the usual trend for The IJTL is that nearly half of the articles are written by one author, followed by two co-authors. The journal has an average of 0.58 authors per article.

Table 3 shows the information on the top ten cited articles. As can be seen, articles in the journal receive a fair amount of citations, indicating the quality of the articles being published in the journal. The table also shows that the articles have received more citations on Google scholar than on WoS. The most cited work of The IJTL is *Revisiting the debate on the Africanisation of higher education: an appeal for a conceptual shift* (Letsekha, 2013), which was cited 35 times, with an average citation per year of 3.18. The article *Stimulating and maintaining students' interest in computer science using the hackathon model* (Mtsweni & Abdullah, 2015) is the second most cited, with 17 citations, with an average of 1.89 per year. *Project-based learning for professional identity: A case study of collaborative industry projects in marketing* (Vande Wiele et al., 2017) is the third most cited article with 11 citations, with an average citation per year of 1.57. the top three cited articles are the only ones with an average citation per year greater than one.

Table 3:
Top 10 cited articles

	Article Title	Reference	Citations	Average citations per year
1	Revisiting the debate on the Africanisation of higher education: an appeal for a conceptual shift	(Letsekha, 2013)	35	3.18
2	Stimulating and maintaining students' interest in computer science using the hackathon model	(Mtsweni & Abdullah, 2015)	17	1.89
3	Project-based learning for professional identity: A case study of collaborative industry projects in marketing	(Vande Wiele, *et al.*, 2017)	11	1.57
4	Reflections on the NCS to NCS (CAPS): Foundation phase teachers' experiences	(du Plessis & Marais, 2015)	8	0.89
5	Higher education studies as a field of research	(McKenna, 2014)	8	0.8
6	Mentorship challenges in the teaching practice of distance learning students	(du Plessis, 2013)	8	0.73
7	'Only a name change': The move from Technikon to University of Technology	(McKenna & Powell, 2009)	8	0.53
8	Risk, resilience and retention a multi-pronged student development model	(du Plessis & Benecke, 2011)	5	0.38

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

154

		Country	Count	% of 163
9	Student throughput trends in postgraduate level: An African case study	(Botha, 2018)	4	0.67
10	A conceptual competence-based framework for enhancing the employability of graduates	(Moolman, 2017)	4	0.57

Authors from 16 countries published 163 articles. Of these, five are African countries, Europe has five countries, the Middle East has three, Asia has two, and the Americas has one. Table 4 shows the articles shows the contributions of the authors. As shown, authors with institutional affiliation with institutions based in South Africa (151) dominate, accounting for nearly 93%, followed by Zimbabwe (3), accounting for nearly 2%.

Table 4:
Publications per country

	Country	Count	% of 163
1	South Africa	151	92.6
2	Zimbabwe	3	1.8
3	Bahrain	2	1.2
4	England	2	1.2
5	France	2	1.2
6	Thailand	2	1.2
7	USA	2	1.2
8	Austria	1	0.6
9	Botswana	1	0.6
10	Iran	1	0.6
11	Lesotho	1	0.6
12	Nigeria	1	0.6
13	Norway	1	0.6
14	Pakistan	1	0.6
15	Saudi Arabia	1	0.6
	Sweden	1	0.6

Table 5 shows the top 11 most common institutional affiliations out of the 64 claimed by authors. Of the 64 institutions, 43 contributed one article each, three contributed two articles each, and three contributed three articles each. The University of Zululand, Cape Peninsula University of Technology, Nelson Mandela University, and Stellenbosch University contributed five articles each. The most common institutional affiliation for authors is the University of South Africa, with 21 articles, followed by the University of Johannesburg, with 17 and the University of KwaZulu Natal, with 16. Authors affiliated with the Durban University of Technology and The Independent Institute of Education (the owners of the IJTL) contributed 12 articles each.

All the top eleven most common institutional affiliations are from South Africa, indicating a strong interest in The IJTL by institutions in South Africa. This is expected as The IJTL is based in South Africa and is on the DHET list, meaning authors from public institutions in South Africa receive incentives from

publishing in the journal. Furthermore, the fact that The IJTL does not charge publication fees is an advantage for African authors. This supports the dominance of South Africa (Table 3) regarding the geographical location of the authors.

	Institution	Count	% of 163
1	University of South Africa	21	12.9
2	University of Johannesburg	17	10.5
3	University of KwaZulu Natal	16	9.8
4	Durban University of Technology	12	7.3
5	The Independent Institute of Education	12	7.3
6	North-West University	11	7.2
7	University of Pretoria	10	6.1
8	University of The Free State	8	4.9
9	Rhodes University	7	4.3
10	University of Fort Hare	7	4.3
11	University of Witwatersrand	7	4.3

Publication Analysis, Citation Analysis and H-Index Analysis
Figure 1 shows the publication and citation trends for articles published in the journal between 2008 and 2022. One hundred and sixty-three articles were published in the past 15 years, with an average of 10.9 per year. In the last six years, 103 articles have been published, with an average of 17.2 articles per year. There were no citations in 2008, 2010, 2011 and 2013. Citations below ten per year from 2008 to 2016 were observed. There was a steady increase in citations from 2017, reaching a peak of 51 in 2021. The 163 articles were cited by 193 articles 197 times between 2008 and 2022. Each article has been cited with an average of 1.21. The retrieved research papers have an h-index of seven. The h-index of seven means that of the 163 research articles, seven have received at least seven citations.

Figure 1:
Publication and citation trends of articles published in The IJTL
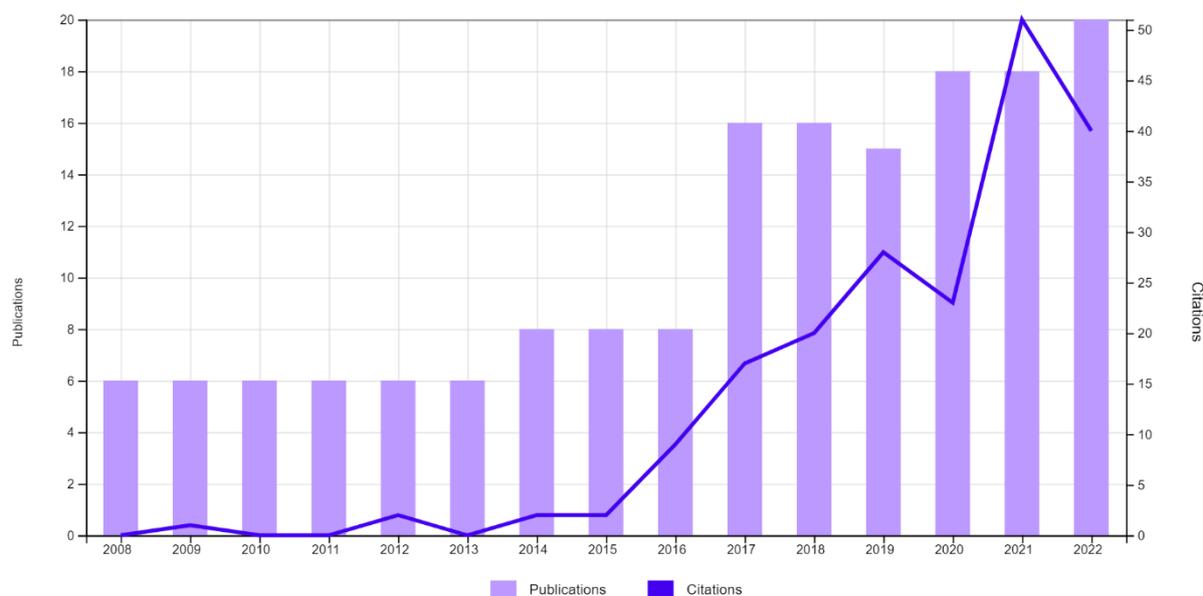
Degree of collaboration

The DC indicates the extent of collaborative research. The DC of The IJTL publications is measured by using the formula below (Subramanyam, 1983):

$$DC = Nm/Nm+Ns \qquad (1)$$

where Nm = the number of multi-authored articles; Ns = the number of single-authored articles.

Table 6 shows the DC among authors with articles published in the journal between 2008 and 2022. There was no collaboration in the articles published in 2010 and 2013, as they were all single-authored. The highest DC was achieved in 2014, 2015 and 2016 with a value of 0.75, followed by 0.67 in 2020 and 2021. It is also seen from the table that the years 2008, 2009, 2011, 2012, 2017, and 2022 fall below the average DC (0.55). Overall, the DC for the articles published by The IJTL is 0.55. It means that slightly more articles are co-authored than single-authored.

Table 6:
Degree of collaboration among authors

No	Year	Ns	Nm	Ns + Nm	DC
1	2008	4	2	6	0.33
2	2009	4	2	6	0.33
3	2010	6	0	6	0.00
4	2011	4	2	6	0.33
5	2012	4	2	6	0.33
6	2013	6	0	6	0.00
7	2014	2	6	8	0.75
8	2015	2	6	8	0.75

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

157

9	2016	2	6	8	0.75
10	2017	8	8	16	0.50
11	2018	6	10	16	0.63
12	2019	6	9	15	0.60
13	2020	6	12	18	0.67
14	2021	6	12	18	0.67
15	2022	8	12	20	0.60
Total		74	89	163	0.55

Relative Growth Rate and Doubling Time of Publications

The RGR and DT are essential research scientometric techniques when measuring the status quo of a journal (Mahapatra, 1985). RGR is the increased number of articles per unit of time, and DT is the time required for exponentially doubling a quantity. RGR and DT were used to calculate The IJTL's research productivity from 2008 to 2022. The formula below was used to calculate the RGR (Mahapatra, 1985):

$$RGR: 1\text{-}2^R = log_e W_2 \text{ - } log_e W_1 / T_2 \text{ - } T_1 \tag{2}$$

Where

$1\text{-}2^R$: mean RGR over the specific period of the interval.

$log_e W_1$: log of the initial number of articles.

$log_e W_2$: log of the final number of articles after a specific interval period.

$T_2\text{-}T_1$: the unit difference between the initial time and the final time.

The formula below was used to calculate DT (Mahapatra, 1985):

$$DT = 0.693/R \tag{3}$$

where R = RGR

Table 7 presents the RGR and DT of The IJTL. The values show a slight increase and decrease during the study period. For example, RGR decreased from 0.69 in 2009 to 0.13 in 2022. To better understand RGR, averages for every five years were calculated. There is a decrease in the mean RGR from 0.32 (2008-2012) to 0.19 (2013-2017) and then to 0.15 (2018-2022). The DT increased steadily until 2016, with a value of 4.95. The DT decreased in 2017 to 2.89, when articles published yearly doubled from eight to sixteen. After that, the DT increased steadily, reaching 5.33 in 2022.

Table 7:
Relative growth rate and doubling time of articles in The IJTL

Year	Articles	Cumulative Articles	$log_e W_1$	$log_e W_2$	RGR	Mean RGR	DT	Mean DT
2008	6	6	0	1.79	0	0.32	0	1.65
2009	6	12	1.79	2.48	0.69		1.00	
2010	6	18	2.48	2.89	0.41		1.69	
2011	6	24	2.89	3.18	0.29		2.39	
2012	6	30	3.18	3.40	0.22		3.15	
2013	6	36	3.40	3.58	0.18	0.19	3.85	3.85

158

2014	8	44	3.58	3.78	0.20		3.47	
2015	8	52	3.78	3.95	0.17		4.08	
2016	8	60	3.95	4.09	0.14		4.95	
2017	16	76	4.09	4.33	0.24		2.89	
2018	16	92	4.33	4.52	0.19	0.15	3.65	4.58
2019	15	107	4.52	4.67	0.15		4.62	
2020	18	125	4.67	4.83	0.16		4.33	
2021	18	143	4.83	4.96	0.13		4.95	
2022	20	163	4.96	5.09	0.13		5.33	

Keyword Analysis

Keyword analysis was used to understand the research themes and topics in articles published in The IJTL. Keywords co-occurrence shows the research hotspots in a research field. The keyword co-occurrence analysis is an efficient and essential instrument that supports knowledge mining and provides a view of the research trends (Li et al., 2016). The keyword analysis was performed by extracting terms from the titles and abstracts of the articles. Full counting was used to count all term occurrences, and the threshold was set to 15. There are 3699 keywords in the titles and abstracts of the articles published in the journal from 2008 to 2022.

Seventy-three terms met the threshold, and based on this, VOSviewer calculated 60% most relevant terms, resulting in 44 terms. Analysis of the terms revealed a singular and plural form of the same term. The plural was removed, leaving 43. Figure 2 indicates the keyword co-occurrence network of articles published in the journal. VOSviewer was used to generate clusters. Analysis of the cluster analysis shows the different research themes in each cluster. Terms that belong to the same cluster are closely related to one another. In other words, any given cluster reflects a research theme based on the similarity of the terms used in the title and abstract to categorise each article. This suggests that even while the terms are objectively connected to one a not share enough links to form a cluster.

Each colour represents a cluster, and there are four clusters coloured red, green, blue and yellow. The red cluster is the biggest, with 12 items, followed by the green and blue, each with 11 items and the yellow cluster has nine. *Skill*, *institution* and *knowledge* are prominent in the red cluster; *student, teaching and university* are prominent in the blue cluster; *teacher, learner* and *school* are dominant in the green cluster; *analysis*, *performance* and *assessment* form the yellow cluster. The research focus of the journal can be classified into four clusters. In the first cluster (red), the research theme centred on institutions, skills, knowledge and problems. The second cluster (green) focuses on schools, with research themes on the teachers, learners, classroom and community activities. The third cluster (blue) shows the research theme covering student, teaching, university, and higher education as the main focus areas fourth cluster (yellow) is about performance, analysis and assessment research.

159

A node represents a term; the bigger the node means the term appears more frequently in the title and abstract of the one hundred and sixty-three articles. The closeness between the nodes indicates more association between them. The line between the two keywords implies that they have appeared together. The thicker the line is, the more co-occurrence they have (Gu et al., 2017). Figure 3 shows the keyword density visualisation map, the same terms as figure 2. In a visualisation map, related terms occurring in articles form research hotspots (van Eck & Waltman, 2017). Each term is illustrated by using density illustrated through different colours.

The number of occurrences of the term in the title and abstracts of the articles was used to calculate the density visualisation. The keyword density map shows the overall structure of a research field and draws attention to the most critical areas in the field (Chawla & Davis, 2013). VOSviewer uses colours to reveal the density of the terms, with green having the lowest density while red having the highest density (van Eck & Waltman, 2017). Changing colours from green to yellow and then red means more occurrences of the term. The terms in the red area appear more frequently, followed by yellow; however, the keywords between the green and blue areas appear less frequently. VOSviewer also forms a network map with a cluster-specific structure. The research hotspots in The IJTL articles are clustered around the terms: *teacher, school* and *learner*. Another prominent research area focuses on *students, teaching* and *institution*. This shows that these terms have appeared more frequently in articles published between 2008 and 2022.

Student, teacher, school, and *learner* are the most common keywords used in the journal. The journal shows a clear orientation to research in primary, secondary and tertiary education sectors. The keyword density map showed that there are matured research themes and emerging research themes. The matured research themes are centred around *teachers, school* and *learner*. Additionally, *student, teaching* and *institution* represent mature themes. Figure 3 also shows some emerging research themes: strategy and *mathematics, researcher* and *context* and *peer*.

DISCUSSION

This study sought to evaluate the quality of articles in The IJTL by measuring its performance metrics. The study presents a bibliometric analysis of articles published in The IJTL between 2008 to 2022 using data collected from Clarivate's WoS database. Authors who contributed to the journal, their affiliated institutions and countries, citation and h-index, DC, RGR and DT of publications were analysed to provide insights into the development trends of the journal. Keyword co-occurrence analysis was used to identify the research themes and hotspots showing past and present research directions.

The results show that there is an increase in the number of authors contributing to the journal and that there is a balance between single-authored articles and co-authored articles. Two hundred seventy-six authors wrote the 163 articles (with nine authors writing two articles each), with single authors accounting for 45%, two at 41%, three at 9%, and more than three at 5%. The citation analysis shows that articles published in the journal are being cited, with the most cited article having an average of over three citations per year. The 163 articles have been cited 197 times, with an average of 1.21 citations per article and an h-index of 7. This is in line with a study by the Academy of Science of South Africa of about two hundred South African journals' publication output, and citations revealed that the

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

161

vast majority of them were hardly noticeable in the global rankings (Academy of Science of South Africa, 2006).

The IJTL has a global reach attracting authors from 16 countries around the globe. Authors based in South Africa dominate publications in the journal, accounting for more than 90%. There is a need for The IJTL to increase their reach in Sub-Saharan Africa, where research on primary, secondary and tertiary sectors brings new and diverse perspectives. This dominance is shown in terms of the most common institutional affiliations, with the top 10 from the country. The University of South Africa is the most common institutional affiliation, with 21 articles. The DC in The IJTL publications is 0.55. It means that slightly more articles are co-authored than single-authored, indicating increased collaborative research. The IJTL has a better DC than the *Journal of Indian Education* (2014-2019), which was 0.30 (Jain, 2021) and the *Journal of Higher Education Management* (2007 – 2016), which was 0.43 (Antia-Obong, Casselden & Pickard, 2019). The journal has room for improvement as some journals have achieved higher DC levels, such as the *International Journal of Physical Education, Fitness and Sports* (2017-2021), which was at 0.94 (Mahadeva & Shivaraja, 2022).

Initially, the number of articles published per year was low and grew in later years, reaching a maximum of 20 in 2022. The average number of articles published per year for the journal is 10.9 for the fifteen years under review. In the last six years, the average number of articles published per year increased to 17.2, indicating publication growth. Publications in The IJTL kept rising yearly; RGR and DT demonstrated that the quantity and the growth rate of research kept expanding and declined in 2022. This is because only one issue of 2022 was included in the study, with the second issue in progress. The average of the RGR was between 0.69 (2009) and 0.13 (2022), where the DT increased from 1.00 to 5.33 from 2009 to 2022. The average RGR calculated in five-year periods shows a steady decline from 0.32 to 0.19 and then to 0.15. The average DT increased steadily from 1.65 to 3.85 and then to 4.58. This means the journal takes more to produce the same number of articles.

The IJTL has a sound editorial policy stipulating that various reviewers be used; 75% of authors emanate from multiple institutions, and authors publish only once in three editions (The Independent Institute of Education, 2020). The requirement that at least 75% of articles published in a journal come from different institutions is prescribed by the DHET (Department of Higher Education and Training, 2015). This authorship stipulation aims to raise the standard of academic publications. The journal's focus area is an essential niche in the education landscape, given that only 17 journals focus on education in South Africa. There is scope for The IJTL to increase publications by including special issues. The IJTL can also enhance the quality of the published papers by appointing area editors specialised in the areas they are handling. The journal has three focus areas - primary, secondary and tertiary education. In the future, the journal could consider splitting the volumes or issues to be focused on one of the three areas.

CONCLUSION

In 2022, The IJTL celebrated its seventeenth anniversary and 15 years of being indexed by the WoS database. This event served as the impetus for this study, which uses two techniques, performance analysis and scientific mapping analysis, to thoroughly assess the journal's accomplishments. The study analysed articles published between 2008 and 2022 using bibliometric methods revealing the journal's knowledge structure and development process. It provides a general overview of the publication and citation structure of the journal.

The result shows the strong growth of The IJTL and a healthy balance between single-authored and co-authored articles in the journal. 163 articles were published over the fifteen years under study and have been cited 197 times. The journal has significantly increased its output and influence. The DC indicates

162

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

a slightly higher collaboration in the articles. RGR and DT demonstrated that the research's quantity and growth rate kept expanding and declined in 2022. South Africa is the most productive and leading country, and the University of South Africa is the most influential institution. The fact that the journal has drawn several authors from various international locations demonstrates its worldwide reach.

The IJTL is vital in accumulating and disseminating knowledge in primary, secondary and tertiary education sectors. The study employs a wide range of indicators to provide information. It presents the data from several angles so readers can interpret it by interests and priorities. The findings paint a picture of the present perception of The IJTL and prove that the themes of interest have changed over the past fifteen years. The results also depict the journal's research themes and trends. IJTL will grow in published articles, and the citations received.

The current study uses various bibliometric metrics but has certain limitations. Additionally, the citation data used to assess the impact in this bibliographic analysis may not reflect the quality of individual articles. This bibliometric study used citation data from the WoS database, whose limitation was carried forward into this study and excluded citations of articles not indexed by the WoS database. In the future, other bibliometric metrics, such as co-citations and indices like the i10 index, can be used for further analysis. Also, excluding the 2006 and 2007 publications not indexed by the WoS may influence the bibliometric metrics of the IJTL.

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163

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164

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Practitioners' Corner

Challenges faced by intermediate phase English First Additional Language teachers in establishing classroom libraries in Limpopo Province[1]

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ABSTRACT

Classroom libraries have an important function in the development of reading abilities for English First Additional Language (EFAL) learners in the Intermediate Phase (grades 4 to 6). This research aimed at exploring the challenges faced by the Intermediate Phase EFAL teachers in establishing classroom libraries in a rural circuit of the Limpopo Province to promote learners' reading ability. A qualitative grounded theory approach was employed using observations and an interview schedule with semi-structured open-ended questions. Nine participants were purposefully selected. The study found that there was limited relevant reading material, a lack of space for setting up a classroom library in overcrowded classrooms, teachers' lack of knowledge on organising the classroom library books and a lack of strategies on how to control the checking in and out of books. It is recommended that schools should first allocate funds for buying books and seek donations for reading material from public libraries as well as non-governmental organisations. Inservice training should be conducted to equip teachers with the basic skills of organising and facilitating the checking out and returning of classroom library books.

Keywords: classroom libraries, classroom interaction pedagogy, English First Additional Language (EFAL), rural circuit, primary school teachers, reading ability, reading comprehension

INTRODUCTION

Classroom libraries play a significant role in developing the Intermediate Phase (grades 4 to 6) learners' reading ability in English First Additional Language (EFAL), especially in disadvantaged rural primary schools with limited access to books. Harmon et al. (2019) state that an essential characteristic of the classroom environment that encourages reading ability provides learners with immediate and easy access to books. According to the Progress in International Reading Literacy Study (PIRLS), South African primary school learners, particularly those in rural regions, fared below the threshold of 500 countries, with some failing to meet the benchmark for fundamental reading skills (Howie et al., 2017). These learners are from poor backgrounds where parents cannot afford to buy books to read at home, the schools they attend are under-resourced and far from public and city libraries. Krashen (2019) maintains that classroom libraries are the only source of books for many children from poor backgrounds and more investment in these libraries means better language and reading ability development. Krashen (2019) emphasises that without access to reading materials, it becomes challenging to develop learners' reading ability, which is the basis for learning expansion, independent and life-long learning. Asri, Cahyono and Trisnani (2021) assert that learners with deprived solid basic reading skills will have difficulty in developing appropriate reading ability later in the advanced reading

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly The Journal of Independent Teaching and Learning

167

phase. Therefore, the establishment of classroom libraries with diverse reading materials may improve reading abilities in the rural Intermediate Phase.

Omigie and Idiedo (2019) describe the classroom library as a resource centre that the teacher in the classroom organises to enable learners to easily access reading books and other learning materials, while the National Council of Teachers of English (2017) describes the purpose of having the classroom library as developing learners' reading ability, increasing their vocabulary, increasing inspiration, engagement, academic attainment and helping them become critical thinkers. In addition, Mojapelo (2020) asserts that learners who have access to library reading materials such as books and magazines, develop reading habits that are essential for lifelong learning. Gao et al. (2018) find that in classrooms with book corners in rural China, the amount of time learners spent reading on their own increased and allowed learners to develop reading abilities. However, Gao et al. (2021) found that learners from the urban Shaanxi province in China scored better in reading in English as they were from wealthy families with reading books at home and classroom libraries at schools. On the other hand, learners from disadvantaged rural areas of Guizhou and Jiangxi provinces with no classroom libraries scored very low on their reading tests (Gao et al., 2021). Hughes-Hassell (2021) found that classroom libraries in disadvantaged communities tend to be smaller with fewer new books being added every year.

CONTEXT OF THE STUDY

Classroom Interaction Pedagogy (CIP) is funded by the National Research Foundation (NRF) and Women in Research (WiR) engaged scholarship project which works cooperatively with teachers to find innovative ways in which to teach and learn EFAL in the Intermediate Phase. Since its commencement in 2018, workshops have been conducted in Limpopo province. Several topics on teaching English were included in different training sessions where the facilitators and teachers shared their ideas on how to improve the teaching practices of this target language. The establishment of classroom libraries was one of the suggested teaching strategies to improve learners' reading ability in the rural circuit in South Africa's Limpopo region. The circuit includes 14 primary schools and is located in an area with significant levels of poverty, unemployment, and illiteracy among adults. The home language, Sepedi, is used as the language of instruction in the Foundation Phase (grades R–3), but EFAL is introduced in the early grades to equip learners with the English language skills needed in the Intermediate Phase (grades 4–6) and the Senior Phase entry grade - Grade 7 - where English is the language of learning and teaching (LoLT). There are no public libraries in the neighbourhood, and no school libraries at any of the schools visited by the researchers which mean that most primary school learners do not have access to reading materials.

Against this background, the study aimed to explore the challenges faced by Intermediate Phase EFAL teachers in establishing classroom libraries in a rural circuit of the Limpopo province to promote learners' reading ability. The aim of the study is to answer the question: What are the challenges faced by Intermediate Phase EFAL teachers in establishing classroom libraries in a rural circuit of the Limpopo province to promote learners' reading ability?

THEORETICAL FRAMEWORK

This study used grounded theory, established by Glaser and Strauss (1967), as a framework to answer the stated research question. Glaser and Strauss (1967) established this approach with the determination of the construction of a theory grounded in the data and the understanding that the theory might be developed through qualitative data analysis. In contrast to other approaches, grounded theory is an explicit methodology that creates a theory based on data that has been meticulously gathered and analysed. The body of research tends to favour an inductive strategy that lets

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

168

the data drive the conclusion of the investigation rather than attempting to push it into a pre-set pattern.

Conducting a grounded theory study allows for the identification of general ideas, the development of theoretical explanations and offers new insights into a variety of relational experiences of the participants and the phenomenon (Corbin & Strauss, 2015). In this case, the grounded theory was considered relevant as the study focused on the challenges that Intermediate Phase EFAL teachers faced in establishing classroom libraries in a rural circuit of the Limpopo province to promote learners' reading ability. Grounded theory, according to Charmaz (2006) and Kolb (2012), operates inductively, is less theory-bound, is frequently performed in local languages, and can capture real-life experiences and narratives, such as challenges faced by the Intermediate Phase EFAL teachers in establishing classroom libraries. The methodology of grounded theory is a way of building a social theory about a topic by studying the experiences of people who are involved with it (Du Plessis & Marais, 2017). The theory was deemed suitable since it permitted the researchers to ground the study in the participants' responses which aligned with the study's findings.

LITERATURE REVIEW

The review of the literature, which draws on current topics from an international, African and South African context, discusses the establishment of classroom libraries to enhance reading ability to provide further insight from a global perspective. The review also highlights challenges faced by teachers in establishing classroom libraries for learners to access reading materials in disadvantaged rural areas to improve their reading ability.

Classroom libraries are the backbone of classroom activities in the Intermediate Phase (IP) since daily activities draw on the reading materials from the classroom library (Reutzel, Parker & Fawson, 2002). Santa et al. (2000) found that children who have access to books that they have selected (Allington & McGill-Franzen, 2013) are more likely to improve their ability to recognise words, sentences and paragraphs, and to make sense of the overall meaning and increase their desire to learn to read. Without ready access to reading material such as storybooks, magazines, newspapers, and dictionaries, learners may be taught to read, but will not develop the habit of reading and thus improve their reading ability. However, in establishing classroom libraries, teachers have been faced with a number of challenges which are discussed in the subsequent sections.

Reading materials

The lack of reading materials to establish classroom libraries is a burning issue around the world specifically in rural areas. This led to a lack of motivation among Filipino learners as there was slow progress in their reading (Mangila & Adapon, 2020). Similarly, in Nigeria, Akinfenwa (2019) noticed that the lack of reading materials had eroded the reading culture that used to prevail in producing the best authors and publishers which implies that the literacy standard dropped amongst Intermediate Phase learners. Mohammed and Amponsah (2018) discovered that learners' poor reading skills in Ghana were caused by a number of factors such as a lack of classroom libraries, reading materials and a lack of reading competition among learners in primary schools. This lack of interaction with reading materials gives rise to learners experiencing difficulties in developing their literacy skills. Mupa and Chinooneka (2016) found that in Zimbabwe, learners who lack reading materials at home and school, even if they were being taught by highly qualified teachers, performed poorly at school. The lack of reading resources means that learners do not develop good reading habits, nor do they develop their literacy skills. Creating a rich environment filled with relevant reading material enhances reading abilities among learners (Chou, Cheng & Cheng, 2016).

169

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

In Tanzania, Malekani and Mubofu (2019) found that the lack of reading materials to establish and maintain classroom libraries was due to inadequate funds allocated as those in authority did not see the vital role that libraries play in the enhancement of reading ability. Paton-Ash and Wilmot (2015) discovered that in some South African schools, funds allotted for libraries were used for other purposes since libraries were not considered seriously as the foundation for academic success. The few materials teachers had in the classrooms were not given to learners to read at home as they were not returned or returned in a dilapidated state. Therefore, teachers decided to keep the materials safe in the cupboards, only to be read while in class, to avoid losing books (Makena & Mpiti, 2020). In the same vein, Mojapelo (2018) found that the deteriorating situation with reading material, especially in historically underprivileged rural regions in the province of Limpopo deprived teachers and learners of the opportunity to establish and maintain functional classroom libraries.

Overcrowded classrooms
Overcrowding in classrooms seems to be the norm in most primary schools in disadvantaged areas. In South Africa, the learner-teacher ratio of 32.90 (that is, 32 learners for every teacher) was increased to 37.90 in 2013 (Department of Basic Education [DBE], 2016). There are consistent reports of overcrowded classrooms in South Africa and in some cases, the recommended teacher-learner ratio is exceeded. According to Khan and Iqbal (2012), a classroom is considered overcrowded if there are more learners present than is ideal and this results in a reduction in the learners' ability to read. However, due to escalating numbers of enrolled learners in schools, teachers are facing classes of learners of 50 or more (West & Meier, 2020).

In Namibia, the teacher-learner ratio in many schools is reported to be 1:55 or 1:90 in rural schools, which is beyond the stipulated norm of 1:40 (Nakale, 2020). As a result, there is a lack of space in the classroom to establish a classroom library and a daily struggle for teachers to explain and teach the learning content. Research has shown that overcrowded classrooms cause disruptive behaviour, health problems, lack of efficiency in lesson delivery and lack of space (Boyi, 2013; Marais, 2016; Olaleye, Ajayi, Oyebola & Ajayi, 2017; Matsepe, Maluleke & Cross, 2019; Ntsala et al., 2021). Teachers face challenges while trying to inspire learners to read at their particular levels of excellence in this type of learning environment (Marais, 2016). In addition, the lack of cooperative learning activities (Matsepe et al., 2019) deprives learners for individual attention (Du Plessis & Letshwene, 2020), and modern interactive pedagogies, which are crucial in the modern era, cannot be implemented (Ayub, Saud & Akhtar, 2018).

In contrast, in countries such as Finland, the average 2017 teacher-learner ratio was 13.67 at the primary level (The Global Economy, 2021). Teachers were able to actively support and provide scaffolding for learners' reading, adapt flexibly to the groups, interact with learners individually and organise tasks in a flexible manner (Lempinen, 2017). Consequently, the Fins are better at reading as it is believed that smaller classes provide a better teaching and learning environment (Lempinen, 2017).

Organising of books
To be organised is good practice as everything will be in its place and easily accessible. Nagaraja (2018) affirms that organising the reading material in the classroom library helps the user to locate books easily. Bates and Cook (2020) assert that it is the duty of the teacher to develop and manage a system for organising, arranging and cataloguing their classroom library - without a consistent system and maintenance, the classroom library can become neglected and disorganised.

Though there is no wrong way of organising a classroom library, Paton-Ash and Wilmot (2015) assert that a system should still be in place, for instance, an alphabetised-by-author system for fiction and the Dewey decimal system for non-fiction books and Antunez (2021) explains that the Dewey decimal system is a classification scheme used by libraries to organise books on shelves according to the

subject. However, Berrill (2018) revealed that in the United Kingdom, most teachers were not in favour of arranging classroom library books on shelves as congestion was a problem when returning books. The preferred strategies were to use bins, organised by topic, placed in areas of the room that allows easy access, while other teachers used bins on the shelves. Starr (2021) indicated that challenges were encountered when the classroom library was positioned at the back of the classroom; however, learners' attitudes changed when the library was moved to the centre of the classroom as it was the very first thing that the learners saw when they walked in and every time they needed to go to the bathroom (Starr, 2021). Although the reading resources in classroom libraries were freely accessible, according to a case study done in Ghana public primary schools by Omenyo (2016), the arrangement was not based on any official classification scheme. Sometimes, some learners could not find their favourite books and it was discovered that learners had purposefully concealed the books for later use, particularly books that were limited in number (Omenyo, 2016).

A study carried out in 10 primary schools located in South-Western Townships (Soweto) and northern and western suburbs of Johannesburg, South Africa by Paton-Ash and Wilmot (2015), found that the five no-fee paying schools that had established classroom libraries did not follow a particular shelving or recording system. This meant that there was no record of what resources were in the library and who had the books. Even though some public primary schools had sourced books, these were locked in staff rooms, or stored in cupboards or boxes as teachers did not know what to do with them (Paton-Ash & Wilmot, 2015; Shandu, Evans & Mostert, 2014). This finding implies a lack of knowledge among teachers on the appropriate organisation and management of classroom libraries, particularly in disadvantaged areas. Shonhe (2019) asserts that insufficient development training in organising libraries results in additional difficulties including poorly organised books, poor treatment of books, and general loss of stock. In contrast, Paton-Ash and Wilmot (2015) found that all five fee-paying schools were equipped with a library software programme that recorded their acquisition. This means that all books were organised and issued through the computer to the learners whose names were also on the computer (Paton-Ash & Wilmot, 2015).

Checking out and returning books
Checking in and out of classroom library books can be daunting as it can take time away from teaching. Adding pockets, printing cards, and reshelving books can be overwhelming and shorten teaching time in order to make books available to learners (Catapano, Fleming & Elias, 2009). The Elementary Librarian (2012) finds that when the responsibility of checking books in and out is given to learners, books were checked out to the wrong learners, and not returned on time, and sometimes learners went home with books that were not checked out. To mitigate the loss of books, Stroup (2021) put in place a policy that was shared with parents, which stipulated that if a book was lost or damaged, they would pay for the book at the current expense. This suggests that parents were encouraged and assigned the responsibility of instilling in their children a passion and reverence for books.

Knows (2018) identified the challenges of checking out and returning books. These included learners who failed to sign out books before taking them to their seats and ultimately home, who often forgot to sign their books back in before checking out another and who took more than the number of books allowed when signing them in and out. Additionally, lost books and torn pages were never reported and there was no way to keep track of the records. Much teaching time was wasted when learners had to write their names, book titles and dates, particularly when the sheet for signing in and out was misplaced (Andersen, 2012; Harmon et al., 2019; Knows, 2018). However, Coppens (2018) found that a designated return spot, labelled 'Books to be returned to the Class Library' assisted learners in returning books to the correct basket.

Knows (2018) suggests that using a computer-assisted program or an app such as the Booksource App, makes the whole check-in and out process easy and timesaving. In addition, Visness (2018)

claims that the Booksource App was the perfect tool to address all checkout needs as the app can scan new books, easily find learners' names added to the system and check out the books directly to them.

RESEARCH METHODOLOGY

The researchers' motivation for using grounded theory as the theoretical framework and research methodology was the decision of the researchers for conducting an open-minded investigation of the nature and challenges faced by the Intermediate Phase EFAL teachers in establishing classroom libraries in a rural circuit by applying the principles of grounded theory.

This study employed a qualitative phenomenological approach to learn more about the difficulties Intermediate Phase EFAL teachers encounter when creating classroom libraries in a rural Limpopo province circuit to support learners' reading skills. Phenomenology is an interpretive process in which the researcher makes an interpretation of the meaning of lived experiences of the participants (Creswell, 2007). The selection of nine Intermediate Phase teachers with more than five years of EFAL experience was purposeful. These teachers attended the Classroom Interaction Pedagogy (CIP) workshop where they were trained on how to establish classroom libraries. The criteria for the selection of schools were schools with overcrowded classrooms, a sufficient number of learners and a smaller number of learners.

When selecting the data collection instruments, grounded theory was employed since the development of the theory is aided by the information gathered via fieldwork observations and interviewing the participants. In addition, the inductive data analysis process entailing open coding, axial coding, and selective coding which is the main characteristic of grounded theory, was followed. To gather qualitative data for this study, semi-structured interviews and observations were used. During the interviews, an interview schedule with open-ended questions was used. The following questions were posed: Have you established the classroom library? If yes, how did you access the reading material? If not, why? How do you organise your classroom library books? Briefly, explain your checking out and returning books. Notes were made (memos, which are in line with grounded theory) to recognise the main ideas which needed further investigation. With the participants' consent, a tape recorder was used during the interviews which lasted for about 45 minutes.

Since the researchers were not involved in the activities of the participants, non-participant observation was conducted. Using an observation sheet, the researchers noted the reading materials in each classroom library and how these were arranged, the classroom space, how many learners were in each class, and how books were checked out and then returned. A reflective journal was kept where the research process was documented to ensure the study's credibility. The study used triangulation to ensure the reliability and validity of the research instruments.

Data analysis

The researchers employed an inductive data analysis process to analyse qualitative data. Creswell and Creswell (2018) emphasise that the inductive process illustrates working back and forth between the themes and the database until the researchers have established a comprehensive set of themes. After successfully collecting the data, and transcribing observations and interviews, the commencement of 'open coding' took place. Open coding entailed reading every word in the text to find the solution to the research question was the first stage, followed by the analysis process with axial coding. The process involved regathering the data emerging from the first step of open coding with the aim of identifying a fundamental phenomenon. The purpose was to identify the connection between the categories, which is demonstrated in the findings, as identified from the data. As the underlying relationship between sub-categories and categories, Corbin and Strauss (2008) explain that axial coding mostly requires inquiry and comparison, which fits well with inductive and deductive thinking. The final stage, selective coding, is described as a process of finding and placing the core category,

linking it to other categories in a systematic way, corroborating similarities and relations among categories, and finalising categories that require modification and development (Corbin & Strauss, 2008).

Memos were written to connect codes and categories. Memos are the theorising and noting of thoughts concerning the codes/themes and their relationships that the analyst finds interesting while coding, (Glaser & Strauss, 1967). The data from the observations and interviews were grouped into themes and supporting categories. The participants were offered the opportunity to read the transcripts in order to check that the data was accurate, a process referred to as member checking or verification.

Ethical issues
This research adhered to institution policy which required ethical clearance (certificate number: 2017/09/13/90233522/01/MC), before interaction with the participants. Participants were given copies of the consent forms to sign. Anonymity was strictly adhered to by not indicating the participants' names and their schools. Participants were informed that they might leave the study at any moment if they felt uncomfortable.

FINDINGS AND DISCUSSIONS

The purpose of the study was to examine the difficulties that Intermediate Phase EFAL teachers faced in establishing classroom libraries in a rural circuit of the Limpopo province to promote learners' reading ability.

Table 1:
Biographical information of the Intermediate Phase EFAL teachers (n = 9)

School	Number of learners in each classroom	Participants	Gender	Years of teaching experience	Ages of participants
A	63	P1	Female	17	39
	68	P2	Female	21	49
B	65	P3	Female	6	30
	59	P4	Male	22	49
C	38	P5	Female	17	42
	37	P6	Male	19	51
D	40	P7	Male	25	55
	36	P8	Female	11	37
E	35	P9	Male	10	37

As indicated in Table 1, four male and five female teachers were interviewed. There was no attempt to balance the genders as the teachers were already employed and allocated EFAL as their teaching subject. Most of the participants were in their 30s to 50s and had between six and 25 years of teaching experience. Data revealed that five of the nine teachers were not qualified to teach EFAL as they had specialised in other subjects. The following challenges were indicated by the participants and are discussed under four themes.

Lack of reading materials

Of the nine participants, six managed to establish classroom libraries. It was observed that all the established classroom libraries had limited reading material. However, teachers were innovative and creative in locating reading material from a number of sources.

> P5: I just picked here and there but I managed to get something even the newspapers. I got the books from the school. I found the books in an old school building which was closed.

> P8: After the workshop, I went to the storeroom to check books and establish a classroom library. Some were just gathering dust in there. Though they are few books, I tried to get whatever I could.

> P9: Books are not enough. Learners are restricted in reading so that others can get a chance. Learners like what we have as they are very much interesting; they take them home.

> P7. The challenge is that we do not have funding for purchasing reading material. I asked parents during the meeting to assist with any reading material.

Six classroom libraries were established with teachers obtaining books from a variety of sources which implied that learners were able to access the reading material, even though it was limited, and learners were encouraged to share the available books. Therefore, having classroom libraries in every class means that quality and age-appropriate reading material is easily accessible (Haupt, 2020). Teachers were motivated to find and collect the unused available reading materials to promote learners' reading ability. Although reading material was limited, learners were able to have something to read in class and take home. The teachers also invited the parents to participate in their children's reading by donating or providing any available reading materials since school funds were limited. However, limited funds deprived teachers of the opportunity of establishing and maintaining functional classroom libraries (Mojapelo, 2018).

Overcrowded classrooms

The number of learners in their classrooms was between 35 and 68. The Department of Basic Education (DBE, 2016) prescribes the teacher-learner ratio of 1:33. However, the data revealed that the number of learners was well over the number prescribed and not in line with Departmental policy. This implies that in these under-resourced schools, overcrowded classrooms may result in challenges such as lack of individual learner attention, classroom management and an environment not appropriate for teaching and learning.

Of the nine participants, three did not establish classroom libraries citing overcrowded classrooms leading to lack of space as the reason.

> P4: The problem of overcrowding is disturbing us very much. As you see, the class is overcrowded. It is not easy for me to make those smaller groups.

One of the six teachers placed reading materials available in the classroom on the learners' tables.

> P3: I did not set up the classroom library because the class is full to the brim. So, we just use flashcards, reader books, and newspapers. Every Wednesday we do drop all and read as well because we do not have the library, we give them newspapers, and other books that they can borrow and then they read for fun.

174

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

The other four teachers arranged the class in large groups by positioning the tables which made it difficult to move around as the tables were too close to the door. Yet, another teacher established a classroom library in the storage room as space in the classroom was limited.

> P2: We asked the principal to turn the storage room into a library because there is no accommodation. The classes will take turns in visiting the library. We tried to make the space and put shelves.

Overcrowded classrooms, an escalating number of learners in classrooms and a lack of space-challenged teachers in implementing strategies such as classroom libraries to provide a reading environment conducive to developing reading comprehension, are challenges that teachers face. The overcrowding also makes it difficult for learners to work in smaller groups where the teacher can effectively attend to diverse reading abilities (Marais, 2016). However, the ability of teachers to provide learners with reading materials despite the growing number of learners in their classrooms is commendable.

Lack of knowledge in organising books

Lack of knowledge in organising books for the classroom library was identified as a challenge, particularly in the limited space in each of the classrooms. One of the teachers wanted to organise the books in levels of difficulty; however, the books were haphazardly organised in the classroom library.

> P5: Even though we found a few books, we lack knowledge on how to organise them at their levels, we pack them as like books being there. As you see, we have magazines that learners read for enjoyment. We do not channel them to say go and read this book.

In three classrooms, books were shelved, though the teachers did not follow a particular system. One teacher grouped books according to fiction and non-fiction genres.

> P8: The challenge is the grouping of books. We have several types, fiction, non-fiction, and references. These books and newspapers were locked in the school library, and we did not have the keys. We have taken them to be used in our classroom library. I have a lack of knowledge in arranging books.

Another teacher organised books with spines facing the learners. However, because there was no adequate library equipment such as book ends, the books kept falling over due to a lack of support.

> P9: The books are just falling; I am not sure how to get them to stand straight. I don't know how to support them, and I have no ideas.

Teachers tried several ways of organising books, though it was challenging as there was a lack of knowledge in achieving this exercise and perhaps a lack of logic in arranging the books according to the reading needs of their learners and a lack of creativity in using substitutes for library equipment such as bricks as book ends. According to Bates and Cook (2020), organising and arranging reading material without a consistent system and maintenance results in the classroom library becoming disorganised. A system should be put in place which would enable the learners to know where to get books and find them with ease.

Checking out and returning books

The six teachers had concerns about checking out books for reading in class and at home and returning them to the classroom library. One teacher had allocated the responsibility to a learner

librarian who oversees writing down the books' names, dates, and titles. Learners were observed choosing a book and queueing for registration at the learner librarian's table.

> P6: In my classroom, we have a librarian, she is responsible for writing the dates when the learners take the books and retrieve them. I ask learners to stand in a queue, and she writes down the names and comes to me so that I can sign. She also has a section where she writes several books per title so that they can be constantly counted. If there is a problem, then we can know who is accountable for that book.

However, another teacher was worried about the state of the books brought back after reading.

> P7: Some books are torn or shabby in their return. Maybe they were not taught to respect books. Others are troublesome as they lose books.

The teachers used various strategies for checking out and returning books. The six teachers were not comfortable with the strategies used in the past, as they were considered time-consuming and ineffective in preventing the loss of books. Though learners were responsible for checking out and returning books, the Elementary Librarian (2012) warns that it is risky for learners to be assigned the responsibility as they can be overwhelmed by the process and the system can fail.

CONCLUSION AND RECOMMENDATIONS

The paper sought to explore the difficulties encountered by the grade 4 to 6 EFAL teachers in establishing classroom libraries in a rural circuit of the Limpopo province to promote learners' reading ability.

CONCLUSION

The findings of the current study were supported by the literature reviewed earlier. A classroom library is a readily accessible source of reading material for learners living in rural areas to develop their reading ability which increases their vocabulary, fluency and comprehension all of which influence academic achievement. Access to relevant and interesting reading material can also develop reading habits and a culture of reading amongst the learners, which is essential for lifelong learning. Participants agreed that they encountered challenges in establishing classroom libraries. However, they were determined to find reading material to create a reading environment conducive to promoting reading as they realised the importance of developing reading literacy skills at this level of schooling. However, motivated teachers encountered challenges that hindered them in creating and maintaining interesting and age-appropriate classroom libraries:
- Limited relevant reading material.
- A lack of space in overcrowded classrooms.
- Little knowledge of organising the classroom library books.
- A lack of strategies on how to control the checking in and out of books.

Due to the study's qualitative nature, the findings are contextually bound and cannot be generalised to a larger population. There is room for further research to be conducted from the perspective of urban primary schools, specifically in the Intermediate Phase. Even though the study used a small rural sample, it was able to get detailed descriptions of the phenomenon from the participants' perspectives, and the goals were met.

176

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

RECOMMENDATIONS

This research, firstly, contributed to the body of knowledge on this topic. Secondly, the practical implication is that the findings could be used to address the challenges faced by teachers in establishing classroom libraries. Thirdly, policy regarding classroom libraries could be influenced by this data. Therefore, it is recommended that:

- Schools should actively allocate funds for buying books and seek donations for reading material from public libraries, non-governmental organisations and private institutions.
- Schools should put a central library where classes can take turns to its access. This can be a temporary solution to a lack of space in the classrooms.
- Inservice training should be conducted to equip teachers with the basic skills of organising and facilitating the checking out and returning of classroom library books.

Finally, it is suggested that a quantitative study be conducted in more rural schools so that the results can be generalised because the findings of this study are contextually bound.

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177

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178

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181

The Independent Journal of Teaching and Learning - Volume 18 (1) / 2023
Formerly *The Journal of Independent Teaching and Learning*

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