






Investigating the Major Contemporary Issues facing First-year Students at a South African University of Technology

Anton Michael Pillay¹ , Jeremiah Madzimure²  & Muntuwenkosi Chili² 

¹ University of Johannesburg, South Africa.

² Vaal University of Technology, South Africa.

ABSTRACT

This qualitative research study investigated critical contemporary issues faced by first-year students at a University of Technology in South Africa. Drawing from interviews with five participants, the study illuminated three major challenges: academic pressures during the transition, financial constraints, and technology integration. The findings revealed that adapting to new pedagogical methods and academic expectations causes stress and a sense of inadequacy. Financial burdens stemming from tuition fees and living expenses hinder engagement while technology's integration presents both opportunities and challenges, accentuating the need for digital literacy education. The study underscored the importance of comprehensive orientation programs, financial aid initiatives, digital literacy training, and peer mentoring to address these issues. Recommendations also encompass flexible learning pathways, holistic well-being support, and collaborative spaces. By recognizing and proactively addressing these challenges, higher education institutions can facilitate smoother transitions, foster inclusive environments, and ultimately enhance the overall first-year student experience. This research contributes valuable insights to guide policy development and support mechanisms, ensuring the academic success and holistic well-being of first-year students in the dynamic landscape of higher education.

Correspondence

Anton Michael Pillay

Email: antonpillay@hotmail.com

Publication History

Received: 19th October, 2023

Accepted: 17th November, 2023

Published online:

1st March, 2024

Keywords: *First-year students, Contemporary issues, Higher education, Transition challenges, Academic pressures.*

INTRODUCTION

In the ever-evolving landscape of higher education, the experiences and challenges encountered by first-year students have garnered increasing attention from scholars, educators, and policymakers.¹ According to Jandri, the transition from secondary education to university life is a critical phase that significantly shapes students' academic trajectories, personal development, and overall success.²

The tertiary education landscape has undergone profound changes over the past decades, driven by factors such as technological advancements, globalization, and shifts in societal expectations.³ These changes have brought forth a myriad of challenges for first-year students as they embark on their academic journeys. As

¹ Abdulhamit Karademir, Fatih Yaman, and Özkan Saatçioğlu, "Challenges of Higher Education Institutions against COVID-19: The Case of Turkey.," *Journal of Pedagogical Research* 4, no. 4 (2020): 455.

² P. Jandri, "Safeguard Research in the Time of COVID-19," *Nature Medicine* 26, no. 4 (April 2, 2020): 443–443, <https://doi.org/10.1038/s41591-020-0852-1>.

³ Seth Oranburg, "Distance Education in the Time of Coronavirus: Quick and Easy Strategies for Professors," *SSRN Electronic Journal*, 2020, <https://doi.org/10.2139/ssrn.3553911>.

universities strive to provide inclusive and supportive learning environments, it becomes crucial to identify and address the issues that may hinder the successful integration and engagement of incoming students.⁴

The transition from secondary education to higher education represents a critical phase in a student's academic journey that is marked by a myriad of challenges that can significantly impact their academic performance, personal growth, and overall well-being. Amongst these challenges, first-year students often encounter a range of contemporary issues that impede their smooth integration into university life. These challenges encompass a variety of dimensions, including academic pressures, social isolation, financial constraints, technological adaptation, and the complexities of navigating an unfamiliar and intricate campus environment. Although existing research provides valuable insights into some of these challenges, a comprehensive qualitative investigation is needed to holistically grasp and analyze the multifaceted nature of the issues confronted by first-year students within the unique context of a University of Technology.

According to Rosser, first-year students often face a plethora of challenges that span academic, social, emotional, and logistical dimensions.⁵ Academic pressures, such as adapting to new teaching methodologies and rigorous coursework can lead to feelings of inadequacy and stress. The need to establish new social networks, manage finances, and navigate an unfamiliar campus environment can contribute to feelings of isolation and homesickness. Additionally, the increasing prevalence of digital technologies in both learning and social contexts presents opportunities and challenges for students as they negotiate their identities and learning strategies.⁶ In the context of a University of Technology, where programs are often oriented towards practical and industry-relevant skills, the challenges faced by first-year students may take on unique dimensions. The integration of hands-on experiences, internships, and technology-driven pedagogies may introduce distinct pressures and expectations.⁷

To address the multifaceted issues that arise during this transition, it is essential to delve into a comprehensive exploration of the major contemporary challenges faced by first-year students.⁸ Thus, this qualitative research study aims to explore and gain profound insights into the major contemporary challenges confronted by first-year students at the University of Technology, a prominent South African University during their critical transition to higher education. It further aims to provide a nuanced understanding of the unique obstacles encountered by these first-year students to shed more light on their perspectives, concerns, and coping strategies. While existing research has shed light on some of these challenges, a focused qualitative exploration is necessary to capture the lived experiences of first-year students in all their complexity. Through in-depth interviews, this study seeks to uncover the nuanced narratives of first-year students at the University of Technology, providing valuable insights that can inform targeted interventions and support mechanisms. By amplifying the voices of these students, this research aspires to contribute to the ongoing efforts to enhance the quality of higher education and ensure the holistic well-being and success of those embarking on their academic journeys.

LITERATURE REVIEW

Access and Equity in Higher Education

One significant contemporary issue in higher education in South Africa is the need to enhance access and equity for historically disadvantaged groups. Following the end of apartheid, efforts have been made to redress past inequalities and increase participation rates among black and minority populations. However, challenges such as limited financial resources, inadequate student support services, and a lack of appropriate infrastructure persist. Research by Cloete and Bunting explored the complexities of transforming higher education in South Africa, focusing on issues related to access and equity.⁹ The authors argued that although progress has been

⁴ Jelle Mampaey and Wim Lambrechts, "Reactive Brand Management in Higher Education: The Case of a Teacher Training Programme in the Netherlands," *Journal of Marketing for Higher Education*, November 22, 2022, 1–15, 7. <https://doi.org/10.1080/08841241.2022.2143001>.

⁵ Andrew Rosser, "Higher Education in Indonesia: The Political Economy of Institution-Level Governance," *Journal of Contemporary Asia* 53, no. 1 (January 1, 2023): 57, <https://doi.org/10.1080/00472336.2021.2010120>.

⁶ Norhaslinda Daud, Norlia Mat Norwani, and Rohaila Yusof, "Students Financial Problems in Higher Education Institutions," *International Journal of Academic Research in Business and Social Sciences* 8, no. 10 (November 9, 2018), 1560. <https://doi.org/10.6007/IJARBS/v8-i10/5312>.

⁷ Tayla McCloud and David Bann, "Financial Stress and Mental Health among Higher Education Students in the UK up to 2018: Rapid Review of Evidence," *Journal of Epidemiology and Community Health* 73, no. 10 (October 2019): 979, <https://doi.org/10.1136/jech-2019-212154>.

⁸ Tanisha Jowsey et al., "Blended Learning via Distance in Pre-Registration Nursing Education: A Scoping Review," *Nurse Education in Practice* 44 (March 2020): 102775, <https://doi.org/10.1016/j.nepr.2020.102775>.

⁹ N. Cloete and I. Bunting, "Access, Success and the Need to Build Solidarity: Transforming Higher Education in South Africa," *South African Journal of Higher Education* 29, no. 2 (2015): 1–23.

made in increasing enrolment rates among previously marginalized groups, there is still a long way to go in achieving true equity. Their study highlighted the need for comprehensive policies and interventions to address structural inequalities and promote inclusivity in higher education.

Quality Assurance and the Role of Accreditation

Another key issue in South African higher education is the assurance of quality in both public and private institutions. As the higher education sector continues to expand, ensuring that all institutions meet the necessary standards becomes crucial. The Higher Education Qualifications Sub-Framework (HEQSF) has been established as a regulatory framework, which includes the implementation of quality assurance systems and mechanisms. A literature review conducted by Shaukat and Du Plessis examined the role of accreditation in quality assurance in South African higher education.¹⁰ The authors argued that while accreditation has played a significant role in enhancing accountability and quality, challenges such as inconsistently applied standards and limited resources hinder its effectiveness. The study suggested that a more standardized approach to accreditation, coupled with increased resources, could strengthen quality assurance in the sector.

Decolonization of the Curriculum

In recent years, there has been an increasing emphasis on decolonizing the curriculum in South African higher education. This movement seeks to challenge and transform Eurocentric perspectives in education and ensure the inclusion of indigenous knowledge and African contexts. Although progress has been made in integrating African and indigenous knowledge systems, there is ongoing debate and resistance from certain sectors. A study by Higgs and Polzer investigated the decolonization of the curriculum at two South African universities.¹¹ The research highlighted the challenges such as resistance from faculty and a lack of resources faced in decolonizing the curriculum. The study emphasized the need for collaborative approaches, faculty development, and the development of supportive policies to support the decolonization efforts.

METHODOLOGY

In this study, a qualitative research methodology was employed, specifically utilizing semi-structured interviews, to conduct an in-depth exploration of the major contemporary issues that first-year students faced at the University of Technology. Semi-structured interviews were chosen as they provided a balance between flexibility and focused inquiry. This allows participants to express their experiences, viewpoints, and emotions freely while enabling the researcher to steer discussions toward key research objectives.¹² A purposive sampling strategy was employed to select a diverse group of five current first-year students representing various academic disciplines within the University of Technology. The selection aimed to capture a comprehensive range of perspectives and challenges.¹³ Participants were chosen considering factors like gender, age, academic program, and socio-economic background to ensure a well-rounded representation.

Semi-structured interviews were conducted individually with each participant. As suggested by Busetto, Wick, and Gumbinger, participants' consent was obtained before the interviews, ensuring accurate data capture.¹⁴ An interview guide was developed with open-ended questions and prompts aligned with the research objectives. The guide encouraged participants to share their experiences with academic, social, financial, technological, and campus environment challenges. Throughout the interviews, probing questions and follow-up prompts were utilized to encourage participants to provide detailed responses, delve deeper into their experiences, and contribute rich qualitative data.

The data collected from the interviews underwent thematic analysis. This method involved systematically identifying recurring themes, patterns, and significant statements within the data.¹⁵ The analysis process unfolded in several iterative stages:

¹⁰ M. Shaukat and A. Du Plessis, "The Role of National Accreditation in Assuring Quality of Higher Education in South Africa: A Literature Review," *Quality in Higher Education* 24, no. 1 (2018): 29–50.

¹¹ P. Higgs and T. Polzer, "Towards Decolonizing the Curriculum: Insights from the Zimbabwean and South African Contexts," *Journal of Social Science Education* 19, no. 3 (2020): 54–74.

¹² N. Basias and Y. Pollalis, "Quantitative and Qualitative Research in Business & Technology: Justifying a Suitable Research Methodology," *Review of Integrative Business and Economics Research* 7 (2018): 98.

¹³ L. Haven, Tamarinde, and Leonie Van Grootel, "Preregistering Qualitative Research," *Accountability in Research* 26, no. 3 (April 3, 2019): 232, <https://doi.org/10.1080/08989621.2019.1580147>.

¹⁴ Loraine Busetto, Wolfgang Wick, and Christoph Gumbinger, "How to Use and Assess Qualitative Research Methods," *Neurological Research and Practice* 2, no. 1 (December 27, 2020): 6, <https://doi.org/10.1186/s42466-020-00059-z>.

¹⁵ Doris Elida Fuster Guillen, "Qualitative Research: Hermeneutical Phenomenological Method.," *Journal of Educational Psychology-Propositos y Representaciones* 7, no. 1 (2019): 219.

Familiarization: Researchers immersed themselves in the collected data to gain a comprehensive understanding of the narratives shared by the participants.

Coding: The data was systematically coded, categorizing segments of information into emergent themes related to the challenges faced by first-year students.

Theme Development: Codes were organized into broader themes that encapsulated the major contemporary issues uncovered through the study.

Data Interpretation: Researchers critically examined the relationships between themes, seeking connections and insights that offered a comprehensive grasp of the challenges experienced by first-year students.

Report Generation: The findings were presented in a coherent narrative, supported by direct quotes and specific examples extracted from the interviews.

Ethical approval was obtained from the university's research ethics board before conducting the study. Participants provided informed consent, ensuring that their rights and confidentiality were upheld throughout all stages of the research process.¹⁶ By employing semi-structured interviews, this qualitative research methodology yielded nuanced insights and provided a comprehensive understanding of the major contemporary issues that first-year students encountered at the University of Technology.¹⁷

FINDINGS AND DISCUSSION

Through the qualitative research conducted at the University of Technology, three major contemporary issues emerged as significant challenges faced by first-year students within the higher education sector. The following discussion provides an overview of these critical issues, drawing insights from participants' experiences and perspectives.¹⁸

Academic Pressures and Transition Challenges

First-year students encountered substantial academic pressures and transitional challenges during their entry into university. The shift in teaching methodologies, coupled with a higher level of academic expectations, posed difficulties for participants.¹⁹ Adapting to new learning approaches, managing increased workloads, and aligning with rigorous academic standards were sources of stress. Providing tailored orientation programs, academic resources, and mentorship support could significantly assist students in navigating these challenges effectively.

Financial Strain and Accessibility

Financial constraints were a prevalent concern among first-year students. The cost of tuition, textbooks, and living expenses created substantial financial stress, and this impacted participants' ability to focus on their studies. Many students resorted to part-time employment, which in turn affected their academic engagement. Ensuring accessible financial aid, transparent cost structures, and offering comprehensive financial counselling could alleviate the burden of financial strain and promote equitable access to higher education.²⁰

Technology Integration and Digital Literacy

The integration of technology into the learning environment presented a dual challenge for first-year students. While digital tools and online resources offered opportunities for enhanced learning experiences, participants struggled with adapting to new technologies and developing digital literacy skills. This gap in digital competence hindered their academic progress. The findings emphasize the significance of offering

¹⁶ Julius Sim et al., "Can Sample Size in Qualitative Research Be Determined a Priori?," *International Journal of Social Research Methodology* 21, no. 5 (September 3, 2018): 622, <https://doi.org/10.1080/13645579.2018.1454643>.

¹⁷ Victoria Sherif, "Evaluating Preexisting Qualitative Research Data for Secondary Analysis," in *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, vol. 19, 2018.

¹⁸ Isabella Giulia Franzoi et al., "Housing Conditions and Psychological Distress among Higher Education Students: A Systematic Literature Review," *Journal of Further and Higher Education* 47, no. 2 (February 7, 2023): 233, <https://doi.org/10.1080/0309877X.2022.2102416>.

¹⁹ Jennifer M. Geiger et al., "A Descriptive Analysis of Programs Serving Foster Care Alumni in Higher Education: Challenges and Opportunities," *Children and Youth Services Review* 85 (January 2018): 287, <https://doi.org/10.1016/j.childyouth.2018.01.001>.

²⁰ Antonio Duran and Anne-Marie Núñez, "Food and Housing Insecurity for Latinx/a/o College Students: Advancing an Intersectional Research Agenda," *Journal of Hispanic Higher Education* 20, no. 2 (April 13, 2021): 136, <https://doi.org/10.1177/1538192720963579>.

comprehensive digital literacy training and ongoing technical support to ensure that students can effectively navigate and leverage technology for their academic pursuits.²¹

Discussion Summary

The qualitative research conducted at the University of Technology illuminated key contemporary issues that profoundly impact the experiences of first-year students in the higher education sector. The qualitative study revealed three critical contemporary issues facing first-year students in the higher education sector: academic pressures and transition challenges, financial strain and accessibility, and technology integration and digital literacy. These issues collectively contribute to the complex landscape that first-year students navigate as they embark on their higher education journey.

The study revealed that academic pressures and transition challenges are pivotal points of concern. The adjustment to new pedagogical approaches, coupled with heightened academic expectations, can lead to stress and feelings of inadequacy. Additionally, the burden of financial strain, stemming from tuition fees and living expenses, impedes students' ability to fully engage in their studies. The integration of technology, while offering innovative learning opportunities, presents a learning curve and underscores the importance of digital literacy education. Addressing these challenges requires a multifaceted approach that combines academic support, financial assistance, and technological training. By recognizing and proactively tackling these issues, higher education institutions can foster a more supportive and inclusive environment, enhancing the overall well-being and success of first-year students.

RECOMMENDATIONS

Based on the insights garnered from this study, the following recommendations are put forth to address the identified contemporary issues and enhance the first-year student experience within the higher education sector:

Comprehensive Orientation Programs: Implementing robust orientation programs that acclimate first-year students to the academic environment, teaching methodologies, and campus resources is mandatory. These programs should emphasize time management, study skills, and strategies for adapting to new learning expectations.

Enhanced Financial Support: Establish accessible and transparent financial aid programs that cater to the diverse financial needs of first-year students. Financial counselling services should be readily available to assist students in managing expenses and making informed financial decisions.

Digital Literacy Initiatives: Integrate digital literacy education into the curriculum to equip students with essential technological skills. Offer workshops, seminars, courses, or online resources that empower students to navigate digital tools effectively for academic and professional purposes.

Peer Mentoring and Support Networks: Develop peer mentoring initiatives that connect first-year students with experienced peers or faculty members. Peer mentors can provide guidance, facilitate social integration, and offer insights into managing academic challenges.

Flexible Learning Pathways: Create flexible academic pathways that allow students to adjust gradually to the higher education environment. Introduce bridge programs or pre-university courses that equip students with foundational skills before engaging in full-time academic coursework.

Holistic Well-being Services: Establish comprehensive well-being services that address both academic and personal challenges. Institutions should provide counselling, mental health support, and workshops on stress management to foster a positive and supportive campus environment.

Financial Literacy Education: Integrate financial literacy education into the curriculum to empower students with essential financial management skills. This knowledge will enable students to make informed decisions about budgeting, managing loans, and navigating financial challenges.

²¹ Katharine M. Broton and Sara Goldrick-Rab, "Going Without: An Exploration of Food and Housing Insecurity Among Undergraduates," *Educational Researcher* 47, no. 2 (March 7, 2018): 121, <https://doi.org/10.3102/0013189X17741303>.

Technology Support Centres: Setting up technology support centers or helpdesks that offer guidance and technical assistance to students encountering difficulties with digital tools and platforms.

Collaborative Learning Spaces: Design collaborative learning spaces that encourage interaction among students and faculty, fostering a sense of community and reducing social isolation.

Continuous Feedback Mechanisms: Establish channels for ongoing feedback from first-year students to identify emerging challenges and adapt support mechanisms accordingly.

By implementing these recommendations, higher education institutions can create a more nurturing and conducive environment for first-year students. Addressing academic, financial, and technological challenges collectively will not only enhance the overall experience of first-year students but also contribute to their academic success, personal development, and holistic well-being.

CONCLUSION

This paper has successfully highlighted the challenges that first-year university students face. The findings were much like an audit in that they presented a snapshot in time of the complications of a first-year student not only as an individual but also the student's impact on the university and teaching and learning itself. Higher education is definitely on the brink of a revolution and harnessing the experience of first-year students is vital to reconceptualizing the university. The study's key recommendation is that universities should not ignore the importance of the first-year orientation program as the long-term student success is rooted in how the new student is welcomed and informed. Universities' leadership and more importantly university finances must not attempt to 'take shortcuts' and thus dilute the first-year experience.

BIBLIOGRAPHY

- Basias, N., and Y. Pollalis. "Quantitative and Qualitative Research in Business & Technology: Justifying a Suitable Research Methodology." *Review of Integrative Business and Economics Research* 7 (2018): 91–105.
- Broton, Katharine M., and Sara Goldrick-Rab. "Going Without: An Exploration of Food and Housing Insecurity Among Undergraduates." *Educational Researcher* 47, no. 2 (March 7, 2018): 121–33. <https://doi.org/10.3102/0013189X17741303>.
- Busetto, Loraine, Wolfgang Wick, and Christoph Gumbinger. "How to Use and Assess Qualitative Research Methods." *Neurological Research and Practice* 2, no. 1 (December 27, 2020): 14. <https://doi.org/10.1186/s42466-020-00059-z>.
- Cloete, N., and I. Bunting. "Access, Success and the Need to Build Solidarity: Transforming Higher Education in South Africa." *South African Journal of Higher Education* 29, no. 2 (2015): 1–23.
- Daud, Norhaslinda, Norlia Mat Norwani, and Rohaila Yusof. "Students Financial Problems in Higher Education Institutions." *International Journal of Academic Research in Business and Social Sciences* 8, no. 10 (November 9, 2018). <https://doi.org/10.6007/IJARBS/v8-i10/5312>.
- Duran, Antonio, and Anne-Marie Núñez. "Food and Housing Insecurity for Latinx/a/o College Students: Advancing an Intersectional Research Agenda." *Journal of Hispanic Higher Education* 20, no. 2 (April 13, 2021): 134–48. <https://doi.org/10.1177/1538192720963579>.
- Franzoi, Isabella Giulia, Giuliano Carnevale, Maria Domenica Sauta, and Antonella Granieri. "Housing Conditions and Psychological Distress among Higher Education Students: A Systematic Literature Review." *Journal of Further and Higher Education* 47, no. 2 (February 7, 2023): 229–41. <https://doi.org/10.1080/0309877X.2022.2102416>.
- Fuster Guillen, Doris Elida. "Qualitative Research: Hermeneutical Phenomenological Method." *Journal of Educational Psychology-Propósitos y Representaciones* 7, no. 1 (2019): 217–29.
- Geiger, Jennifer M., Megan Hayes Piel, Angélique Day, and Lisa Schelbe. "A Descriptive Analysis of Programs Serving Foster Care Alumni in Higher Education: Challenges and Opportunities." *Children and Youth Services Review* 85 (January 2018): 287–94. <https://doi.org/10.1016/j.childyouth.2018.01.001>.
- Haven, L., Tamarinde, and Leonie Van Grootel. "Preregistering Qualitative Research." *Accountability in Research* 26, no. 3 (April 3, 2019): 229–44. <https://doi.org/10.1080/08989621.2019.1580147>.
- Higgs, P., and T. Polzer. "Towards Decolonizing the Curriculum: Insights from the Zimbabwean and South African Contexts." *Journal of Social Science Education* 19, no. 3 (2020): 54–74.
- Jandri, P. "Safeguard Research in the Time of COVID-19." *Nature Medicine* 26, no. 4 (April 2, 2020): 443–443. <https://doi.org/10.1038/s41591-020-0852-1>.

- Jowsey, Tanisha, Gail Foster, Pauline Cooper-Ioelu, and Stephen Jacobs. "Blended Learning via Distance in Pre-Registration Nursing Education: A Scoping Review." *Nurse Education in Practice* 44 (March 2020): 102775. <https://doi.org/10.1016/j.nepr.2020.102775>.
- Karademir, Abdulhamit, Fatih Yaman, and Özkan Saatçioğlu. "Challenges of Higher Education Institutions against COVID-19: The Case of Turkey." *Journal of Pedagogical Research* 4, no. 4 (2020): 453–74.
- Mampaey, Jelle, and Wim Lambrechts. "Reactive Brand Management in Higher Education: The Case of a Teacher Training Programme in the Netherlands." *Journal of Marketing for Higher Education*, November 22, 2022, 1–15. <https://doi.org/10.1080/08841241.2022.2143001>.
- McCloud, Tayla, and David Bann. "Financial Stress and Mental Health among Higher Education Students in the UK up to 2018: Rapid Review of Evidence." *Journal of Epidemiology and Community Health* 73, no. 10 (October 2019): 977–84. <https://doi.org/10.1136/jech-2019-212154>.
- Oranburg, Seth. "Distance Education in the Time of Coronavirus: Quick and Easy Strategies for Professors." *SSRN Electronic Journal*, 2020. <https://doi.org/10.2139/ssrn.3553911>.
- Rosser, Andrew. "Higher Education in Indonesia: The Political Economy of Institution-Level Governance." *Journal of Contemporary Asia* 53, no. 1 (January 1, 2023): 53–78. <https://doi.org/10.1080/00472336.2021.2010120>.
- Shaukat, M., and A. Du Plessis. "The Role of National Accreditation in Assuring Quality of Higher Education in South Africa: A Literature Review." *Quality in Higher Education* 24, no. 1 (2018): 29–50.
- Sherif, Victoria. "Evaluating Preexisting Qualitative Research Data for Secondary Analysis." In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, Vol. 19, 2018.
- Sim, Julius, Benjamin Saunders, Jackie Waterfield, and Tom Kingstone. "Can Sample Size in Qualitative Research Be Determined a Priori?" *International Journal of Social Research Methodology* 21, no. 5 (September 3, 2018): 619–34. <https://doi.org/10.1080/13645579.2018.1454643>.

ABOUT AUTHORS

Anton M. Pillay is a Postdoctoral Research Fellow at the University of Johannesburg, South Africa. He is based in SARCHI: African Diplomacy and Foreign Policy.

Jeremiah Madzimure, Vaal University of Technology, South Africa.

Muntuwenkosi Chili, Vaal University of Technology, South Africa.