Ms Rachel Tholakele Khoza

University of Johannesburg,
Johannesburg Business School

Operationalizing the Metaverse in South African Higher Education: A Readiness Assessment and Strategic Framework

PRESENTATION OVERVIEW

01 Background & Problem

02 Theoretical Foundations

03 Research Methodology

04 Key Findings (5 Themes)

05 Discussion

06 The MRIF Framework

07 Conclusion

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The Metaverse: A Transformative Innovation

What It Is

Persistent, immersive virtual environments via avatars, VR, AR & AI

What It Enables

Virtual labs, simulations, digital digital campuses & experiential experiential learning

Why Now

4IR technologies reshaping teaching, learning & institutional operations operations globally

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Building on Khoza & Botha (2025), which proposed the metaverse as a solution to study-space shortages

In 2025, there were 337,158 matriculants seeking bachelor's studies, but only 202,000 first-year places available across all 26 public universities. News24 spoke with 19 institutions that received over 4.2 million applications for 131,987 first-year places [7]. Out of 26 universities, this study will report only 3 and its application results. University of Johannesburg had 693 990 applications and only 10500 spaces, Cape Peninsula University of Technology had 518 300 applications and 9 235 spaces, Northwest University had 390 00 and only 12 937 spaces.

[7] Govender, P., 2025. *Applications*. News24, 16 January. Available at: https://www.news24.com [Accessed 1 June 2025].

Scaling TVET Without the Bricks

2.5M

Enrolment target by 2030

NDP 2030 & White Paper for Post-School Education set ambitious TVET expansion goals

Gap/Problem

Infrastructure can't scale

- Brick-and-mortar expansion at this scale is financially impossible
- Infrastructure & workshop space shortages
- Lecturer capacity constraints

Metaverse offers a scalable, immersive alternative

?

Readiness is unknown

Little empirical evidence on whether SA HEI especially TVET colleges are ready for immersive metaverse-based learning environments

This study investigates whether Higher Educational Institutions in South Africa especially TVET are ready to implement metaverse in education.

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Four Lenses on Adoption and Learning

Diffusion of Innovations

Rogers et al. (2014)

Adoption depends on perceived usefulness, compatibility, complexity & institutional support

Technology Acceptance Model

Davis (1989)

Perceived usefulness + perceived ease of use drive willingness to adopt

Constructivist Learning

Active knowledge-building

Learners build knowledge through interactive, experiential engagement

Connectivist Learning

Alam (2023)

Learning as digital networking & collaborative knowledge construction

DOI & TAM explain WHY institutions and individuals adopt; CLT & CNT explain HOW the metaverse pedagogically delivers once adopted

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Qualitative, Interpretivist, Exploratory Case Study

PARADIGM

Interpretivist · exploratory case study design

SAMPLING

Purposive — 8 participants across policy, leadership & frontline levels

COLLECTION

Semi-structured interviews — MS Teams

ANALYSIS

Braun & Clarke (2006) six-phase thematic analysis

TRUSTWORTHINESS

Lincoln & Guba (1985): credibility, dependability, confirmability, transferability

EIGHT PARTICIPANTS — THREE LEVELS

1 **National Policy**

DHET Director of Lecturer Development · DHET Acting Director of International Scholarships

2 **Institutional Leadership**

Deputy Principal (Majuba TVET) · Deputy Chief Education Specialist (eLearning Directorate)

3 **Frontline Lecturers**

CJC, Majuba & Vhembe TVET Colleges — daily teaching realities & pedagogical shifts

04 KEY FINDINGS (Themes 1 & 2)

Infrastructure Is Uneven · Educators Lag Students

Theme 1

Institutional Infrastructure Readiness

"TVET colleges have made massive progress by adopting LMSs and online teaching platforms, but there are still limitations because of inadequate bandwidth, outdated computers, insufficient software licences and shortages of modern devices."
Participants

"We have urban universities, rural universities, historically white universities and historically black universities… some rural universities did not have the basic equipment, basic internet connection and basic computers."

— Senior DHET official

Progress post-COVID is real — but uneven along historical institutional lines.

Theme 2

Digital Competencies & Capacity Building

"The educators would require hands-on technical training, instructional design support, continuous professional development, mentoring and communities of practice..."

"Students may embrace immersive technologies because it aligns with their experiences… but some educators have cyberphobia and fear of technology."

A digitally fluent student body meets an instructional workforce constrained by "cyberphobia."

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Weak Governance · Real Risks · Genuine Opportunity

Theme 3
Policy & Governance Readiness

"I don't think we have policies in our institutions that guide us about how to utilise technology and how to manage technology."

Weakest dimension of preparedness — ethics, cybersecurity, AI governance all unaddressed

Theme 4
Implementation Challenges & Risks

"The institutions should be very careful that they don't widen the existing inequalities… equity should be embedded into every stage."

Financial constraints, cybersecurity, digital inequality, change resistance

Theme 5
Opportunities & Future Potential

"I can take my students to Table Mountain while I'm in Johannesburg… students engage with experiential learning."

Strong optimism for engineering, tourism, hospitality, logistics, aviation training

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Readiness Is a Sociotechnical Ecosystem, Not a Tech Question

1 Two-tier risk

Basic internet + outdated hardware ≠ metaverse readiness. Without targeted investment, SA risks a technologically enriched experience for urban universities and a resource-constrained one for rural/TVET campuses.

2 TAM explains the educator gap

Perceived usefulness (PU) of the metaverse is widely acknowledged. Perceived ease of use (PEOU) remains low — lack of instructional design support and hands-on training is the bottleneck, not motivation.

3 DOI explains the stuck adopters

Institutions lack the organisational support systems to move educators from 'laggards' or 'late majority' into active adopters. Professional development must run parallel to procurement — not follow it.

4 Governance vacuum = systemic risk

Traditional online-learning policies are unequipped for the metaverse's ethical, legal and operational complexity — student safety, identity, algorithmic bias, cross-border data. DHET and councils must move from reactive to proactive governance.

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The Central Paradox: Risk vs Opportunity

RISK

Theme 4

- Extreme financial strain on public budgets
- Risk of worsening the digital divide
- Cybersecurity & data privacy threats
- Psychological strain from extended immersion

VS

OPPORTUNITY

Theme 5

- Democratises access to expensive physical training
- Bridges theory-practice gap safely & iteratively
- Aligned with constructivist & connectivist pedagogy
- High value for engineering, tourism, logistics, aviation

Resolution: the metaverse must not be pursued as novelty or generic lecture replacement — it must be strategically targeted to modules where virtual simulation offers a clear cost advantage over physical infrastructure.

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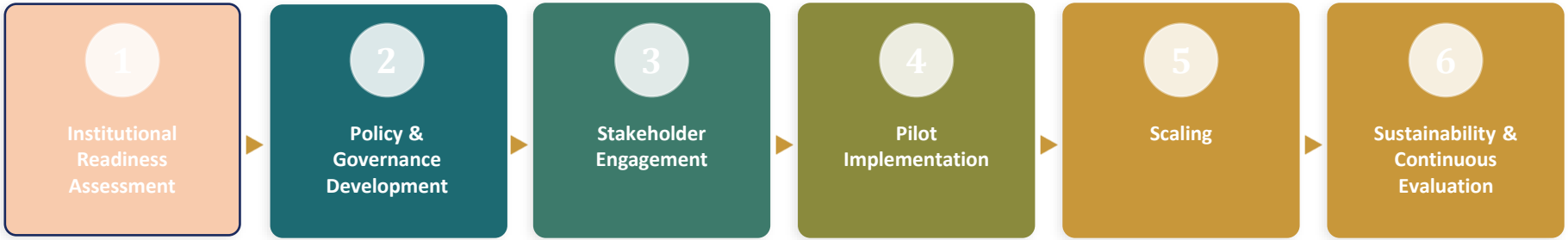
Metaverse Readiness & Implementation Framework (MRIF)



Grounded in: Constructivism · Connectivism · Technology Acceptance Model · Diffusion of Innovation Theory

EACH PHASE ALIGNS FOUR DIMENSIONS:

Technology
Infrastructure & adoption

Human Capacity
Training & competencies

Governance
Policy & ethics

Pedagogy
Strategic vision & equity

Feasible and Desirable — If Implemented Deliberately

1

Readiness is emerging, not established

Growing institutional interest and post-COVID digital progress — but infrastructure disparities, weak governance and funding constraints remain.

2

The MRIF provides the missing roadmap

A context-specific, six-phase pathway through readiness assessment, governance, capacity building, piloting, scaling and evaluation.

3

Equity must be designed in, not bolted on

Without targeted intervention, metaverse adoption risks deepening — not resolving — South Africa's existing educational inequalities.

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Questions???

Grazie for your attention!

Email: rkhoza@uj.ac.za,