

Choosing People | Embracing Technology | Protecting Planet



# *Beyond the Algorithm*

*Nurturing Human Flourishing*

*in*

*AI-Powered Leadership*

Josine Overdevest

Kagiso Trust & UJ Leadership Conference 2024

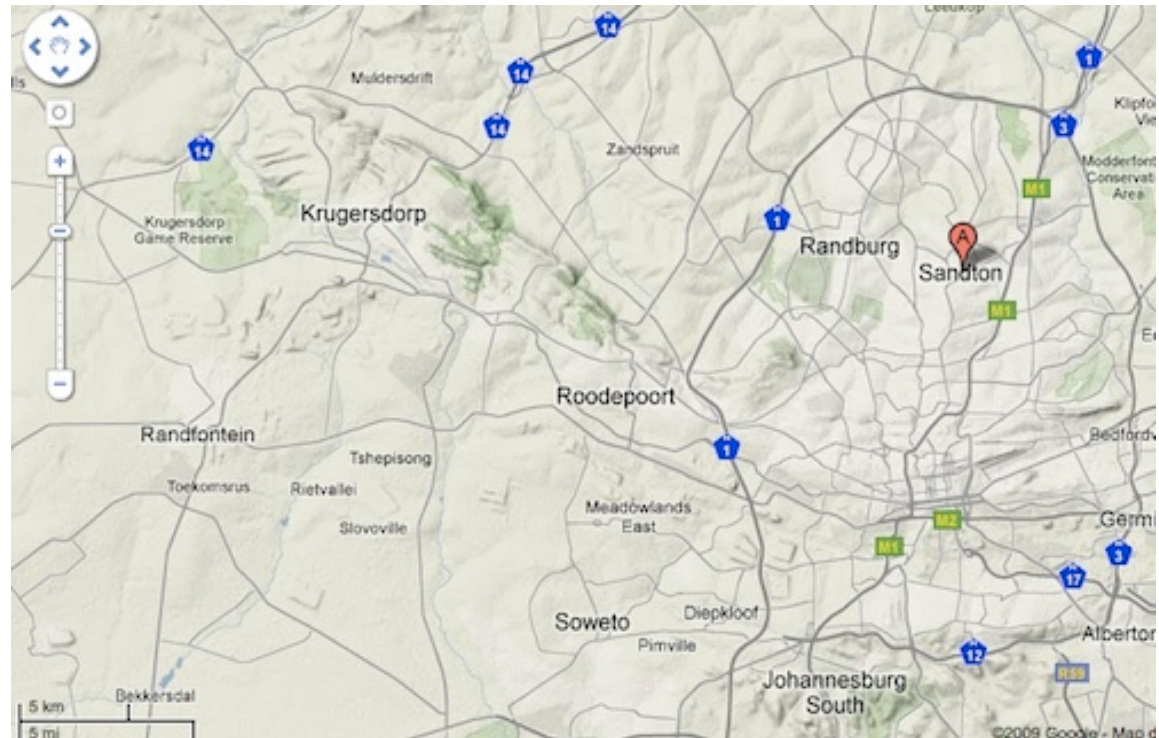
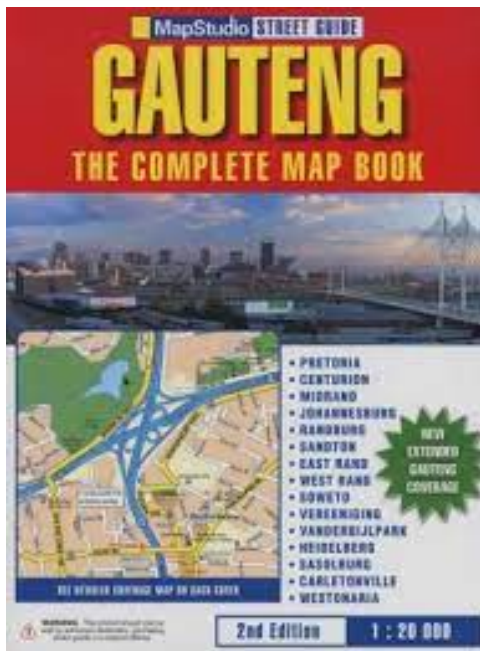
5 September 2024

[www.flyingcowsofjozi.co.za](http://www.flyingcowsofjozi.co.za)

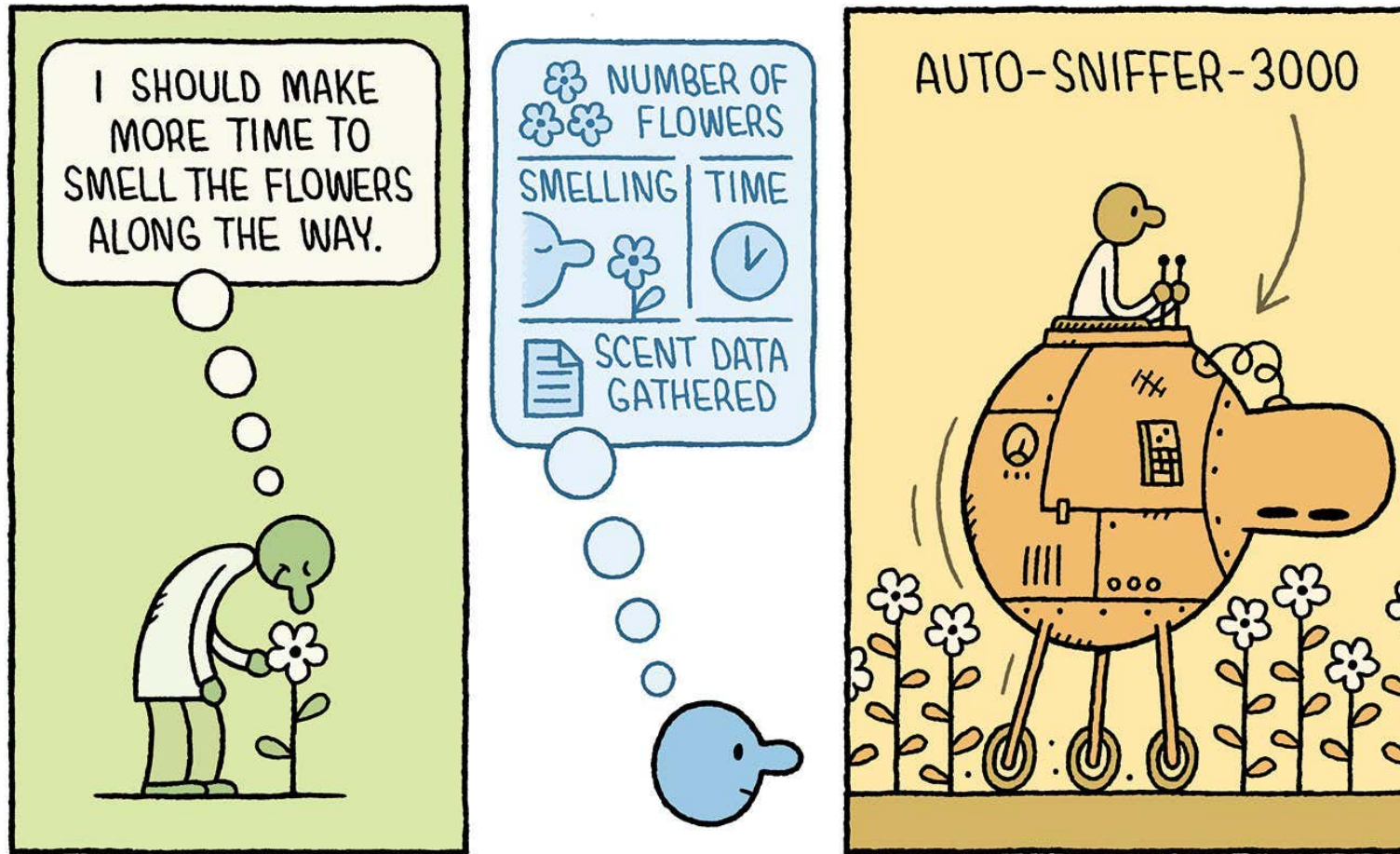
# How do you feel about AI-empowered leadership?

1. 😄
2. ❤️
3. 😓
4. 🤪
5. 😭
6. 😊
7. 😱
8. 😂
9. 😞
10. 😏
11. 😬
12. 😲

# Technology: Friend or Foe?



# Understanding the Digital Landscape



TOM GAULD for NEW SCIENTIST

## Digital transformation

Integration of digital technology into all areas of our lives, resulting in fundamental changes in how different social, economic and political systems operate and create value.

# Understanding the Digital Landscape

## Digital sustainability

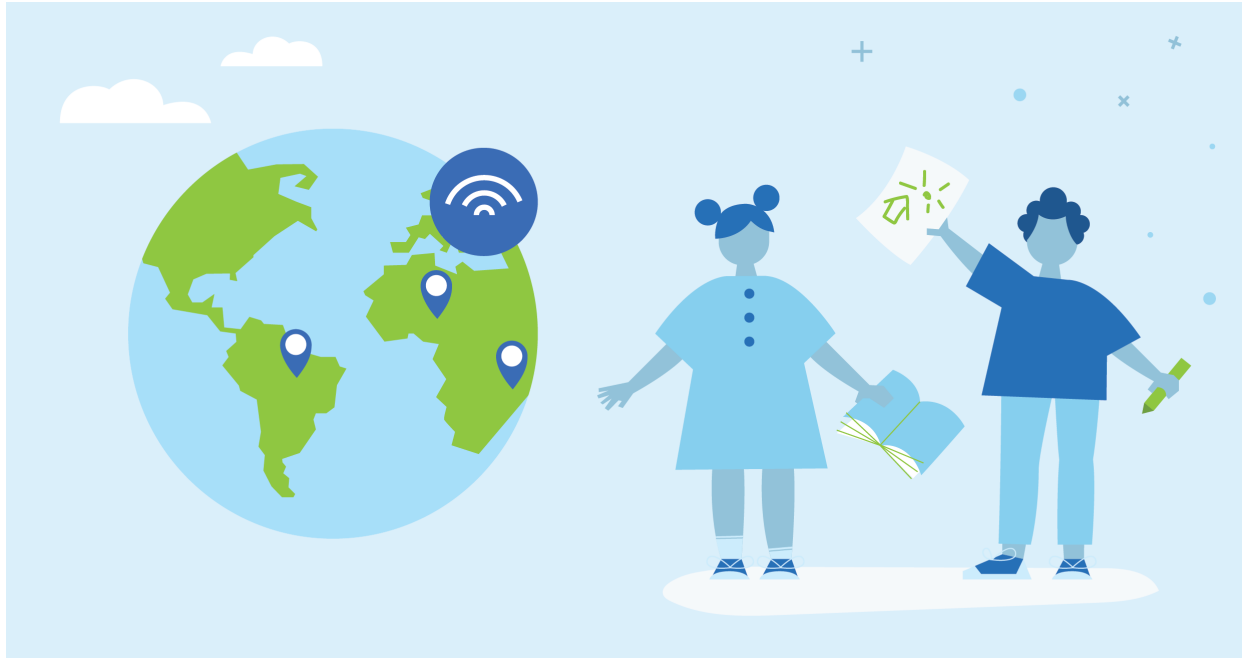
- Application of digital technologies
- and proactive steps in its design, development, deployment and regulation
- to accelerate environmentally and socially sustainable development,
- while mitigating risks and unintended consequences.



# Understanding the Digital Landscape



# Understanding the Digital Landscape



## UNICEF Project Connect

- Maps every school in the world and its connectivity
- Using a combination of satellite imagery, machine learning and blockchain
- To eliminate the digital divide and increase opportunity for every community



# Understanding the Digital Landscape

- Home
- My Schools
- My Projects
- Getting started
- Set work
- Check work
- Class admin
- Practice
- Past papers
- Textbooks
- Josine Overdeest
- Notifications 3
- Log out

Consider the following equality:

$$\oplus \times \oplus \times \oplus \times \oplus \times \oplus = \oplus \square$$

What number must replace the square ( $\square$ ) to make the equality true?

**Answer:**

Check answer

2 attempts remaining

**Preview**

7

Help! How should I type my answer?

You should enter a number here.

If you want to, you can use a space to separate thousands. Example: **12 800,25**

# Understanding the Digital Landscape

The screenshot displays the Siyavula digital learning platform interface. On the left is a dark sidebar with navigation options: Home, My Schools, My Projects, Getting started, Set work, Check work, Class admin, Practice, Past papers, Textbooks, and a user profile for Josine Overdeest with 3 notifications. A 'Log out' button is at the bottom of the sidebar. The main content area has a teal header with the Siyavula logo and the text 'TECHNOLOGY-POWERED LEARNING'. Below the header, the page title is 'Exponents' with the subtitle 'WORKING WITH NUMBERS IN EXPONENTIAL FORM'. The main text asks the user to 'Consider the following equality:' followed by the equation  $5 \times 5 \times 5 \times 5 \times 5 = 5^{\square}$ . Below the equation, it asks 'What number must replace the square (□) to make the equality true?'. The 'Answer:' field contains the number '7'. A light blue feedback box says 'Are you sure? Take another look at your answer!'. There is a 'Final check' button and a 'Help! How should I type my answer?' button.

Home

My Schools

My Projects

Getting started

Set work

Check work

Class admin

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Past papers

Textbooks

Josine Overdeest

Notifications 3

Log out

**SIYAVULA**  
TECHNOLOGY-POWERED LEARNING

## Exponents

WORKING WITH NUMBERS IN EXPONENTIAL FORM

Consider the following equality:

$$5 \times 5 \times 5 \times 5 \times 5 = 5^{\square}$$

What number must replace the square (□) to make the equality true?

**Answer:**

Are you sure? Take another look at your answer!

Final check

Help! How should I type my answer?

# Understanding the Digital Landscape

- Home
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**Answer:**

7

✗ If it doesn't challenge you, it doesn't change you. Read the solution and try again.

Hide the full solution

### Count the factors

We have the expression  $\oplus \times \oplus \times \oplus \times \oplus \times \oplus$  and we need to figure out the correct exponent if we want to write the expression as  $\oplus^{\square}$ . Remember that exponents show how many factors there are; if you know how many factors there are, you know what the exponent must be.

The expression  $\oplus \times \oplus \times \oplus \times \oplus \times \oplus$  has 5 factors, so the exponent must be 5. The expression  $\oplus \times \oplus \times \oplus \times \oplus \times \oplus$  is the same as  $\oplus^5$ .

$$\oplus \times \oplus \times \oplus \times \oplus \times \oplus = \oplus^5$$

Therefore the correct answer is 5.

# Understanding the Digital Landscape

The screenshot displays the Siyavula learning platform interface. On the left is a dark sidebar with navigation options: Home, My Schools, My Projects, Getting started, Set work, Check work, Class admin, Practice, System Preferences, Past papers, Textbooks, a user profile for Josine Overvest, Notifications (3), and a Log out button. The main content area has a blue header with the Siyavula logo and the text 'TECHNOLOGY-POWERED LEARNING'. Below the header, the page title is 'Exponents' with the subtitle 'WORKING WITH NUMBERS IN EXPONENTIAL FORM'. The text reads: 'Consider the following equality:'. Below this is a mathematical equation:  $6 \times 6 \times 6 \times 6 \times 6 \times 6 = 6^{\square}$ , where the square is a yellow placeholder. The question asks: 'What number must replace the square (■) to make the equality true?'. The 'Answer:' section shows the user has entered '6' in a green input box. A green feedback bar below the input says 'Exactly right. High five!'. At the bottom, there are three buttons: 'Show the full solution' (grey), 'Try an exercise like this again' (orange), and 'Go to next exercise' (purple).

Home

My Schools

My Projects

Getting started

Set work

Check work

Class admin

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System Preferences

Past papers

Textbooks

Josine Overvest

Notifications 3

Log out

SIYAVULA  
TECHNOLOGY-POWERED LEARNING

## Exponents

WORKING WITH NUMBERS IN EXPONENTIAL FORM

Consider the following equality:

$$6 \times 6 \times 6 \times 6 \times 6 \times 6 = 6^{\square}$$

What number must replace the square (■) to make the equality true?

**Answer:**

6

Exactly right. High five!

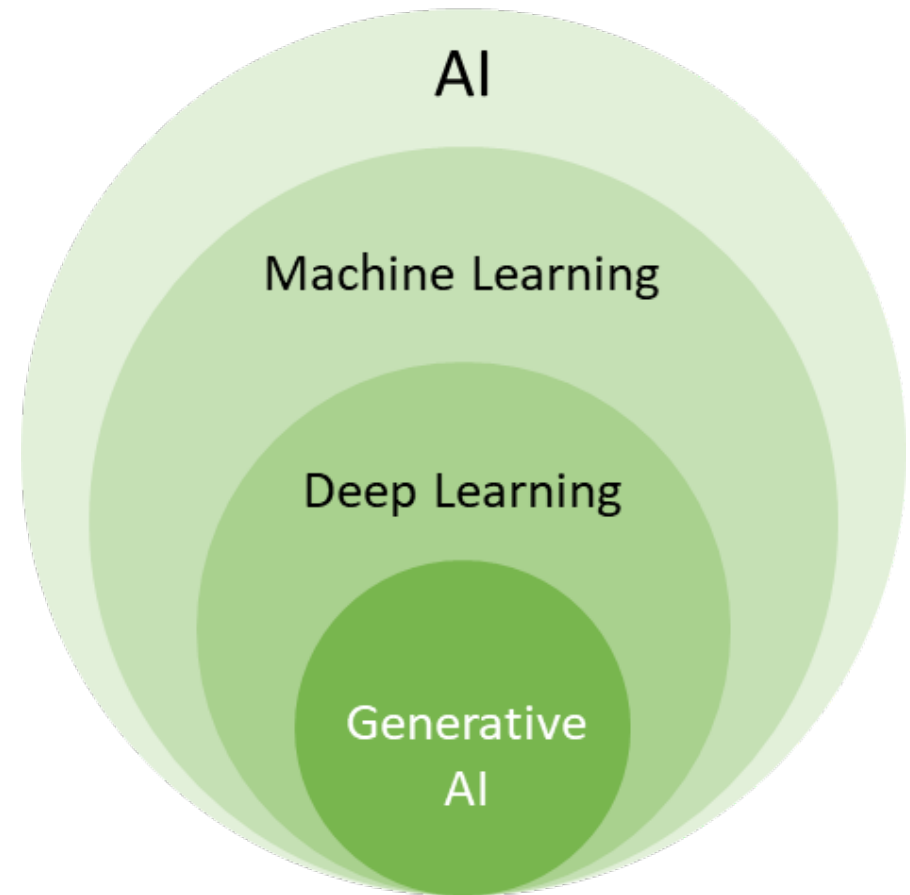
Show the full solution

Try an exercise like this again

Go to next exercise

# Understanding the Digital Landscape

- **AI** the ability of machines to perform a task that usually needs human intervention or intelligence
- **Machine Learning** task oriented subset of AI that develops algorithms that learn from provided historical data.
- **Deep learning** subset of machine learning – using complex algorithms to recognise patterns and make decisions.
- **Generative AI** subset of deep learning. Creates new and original content rather than analysing and identifying existing data.



# Understanding the Digital Landscape

## Negative impacts of digital transformation

- Human rights violations
- Unsustainable consumption
- E-waste generation
- Energy consumption

# Understanding the Digital Landscape

## Explainer

### Can the climate survive the insatiable energy demands of the AI arms race?

New computing infrastructure means big tech is likely to miss emissions targets but they can't afford to get left behind in a winner takes all market

*The Guardian, 4 July 2024*

### AI drives 48% increase in Google emissions



*BBC, 3 July 2024*

- **Net zero:** both Microsoft & Google doubt whether they'll reach their 2030 target
- **Electricity usage:** total electricity consumption from data centres could double from 2022 levels to 1,000 TWh (terawatt hours) in 2026 (IEA), equivalent to the energy demand of Japan
- **Water usage** AI could account for up to 6.6bn cubic metres of water use by 2027 – nearly two-thirds of England's annual consumption

# Understanding the Digital Landscape

## Negative impacts of digital transformation

- Human rights violations
- Unsustainable consumption
- E-waste generation
- Energy consumption
- **Misinformation**




# Understanding the Digital Landscape

The shortage of ICT skills is particularly acute in areas such as software development, data analytics, cybersecurity, and digital marketing. A report by the Department of Communications and Digital Technologies in South Africa estimates that there will be a shortfall of 800,000 ICT professionals in the country by 2024.

The skills gap is also a major barrier to economic growth and development. South Africa's National Development Plan (NDP) identifies ICT as a key driver of economic growth, and it is estimated that the sector could contribute as much as 10% to the country's GDP by 2020. However, this potential will not be realized without a significant increase in the number of skilled ICT professionals in the country.

In summary, the ICT skills gap in South Africa is significant and is likely to have a major impact on the country's economic growth and development unless action is taken to address it.

JO In which report by the Department of Communications and Digital Technologies in South Africa is the shortfall of 800 000 ICT professionals in the country estimated

 I apologize for the error in my previous response. After double-checking my sources, I found that there is no official report by the Department of Communications and Digital Technologies in South Africa estimating a shortfall of 800,000 ICT professionals by 2024.   

# Understanding the Digital Landscape

## Negative impacts of digital transformation

- Human rights violations
- Unsustainable consumption
- E-waste generation
- Energy consumption
- Misinformation
- Digital divide (access, use, quality)

# Understanding the Digital Landscape

WILEY

ENABLING DISCOVERY | POWERING EDUCATION | SHAPING WORKFORCES



## Digital Skills Gap Index 2021

### Your Tool to Determine Global Digital Skills Levels

- What is the mismatch between employers' needs and employees' skills?
- To what extent is there a STEM gender gap?
- What are the barriers and challenges to bridging the digital skills gap?

Explore and compare data online at [dsgi.wiley.com](https://dsgi.wiley.com)

- **Digital skills gap:** between the demand for digital skills and the capacity for policy makers to respond to the talent deficit and educational institutions to deliver the needed skills
- **Education & training industry:** should be the catalyst for digital skills adoption, but has the biggest digital skills gap: 45,6%
- **South Africa:** ranks #84 with a score of 4.4 (Singapore is highest ranking with a score of 7.8)

# Understanding the Digital Landscape

## Which Skills & Capabilities are needed?

Type of Roles	Functions
Computer scientists, system architects & engineers, data scientists, machine learning engineers, business intelligence developers etc.	<ul style="list-style-type: none"><li>• Building secure technology infrastructure, computer resources and data capacity</li><li>• Developing models, tools and apps relevant to the African context</li><li>• Data collection, processing and sharing</li></ul>
Ethicists, lawyers and governance specialists etc.	<ul style="list-style-type: none"><li>• Understand what the impact of AI innovations is on society and prepare adequate regulation and governance around it, ensuring that AI contributes to an inclusive society</li></ul>
Digital citizens (meaning all of us!)	<ul style="list-style-type: none"><li>• Aware of the technological culture in which we live</li><li>• Know how it influences our lives</li><li>• Have a say in the design and use of it.</li></ul>

# Are you a robot? Are you a human?



# Rediscovering Humanity

## Going Offline

- Digital detox
- Slow tech movement
- Rise of 'dumb' phones and offline retreats



# Rediscovering Humanity

## Enriching, Not Streamlining the Human Experience

Enriching technology:

- amplifies human values.
- fosters critical thinking, creativity, and connection.
- requires deliberate, thoughtful design, development & deployment choices.



all tech is  
**human**



# Opportunities: the African context

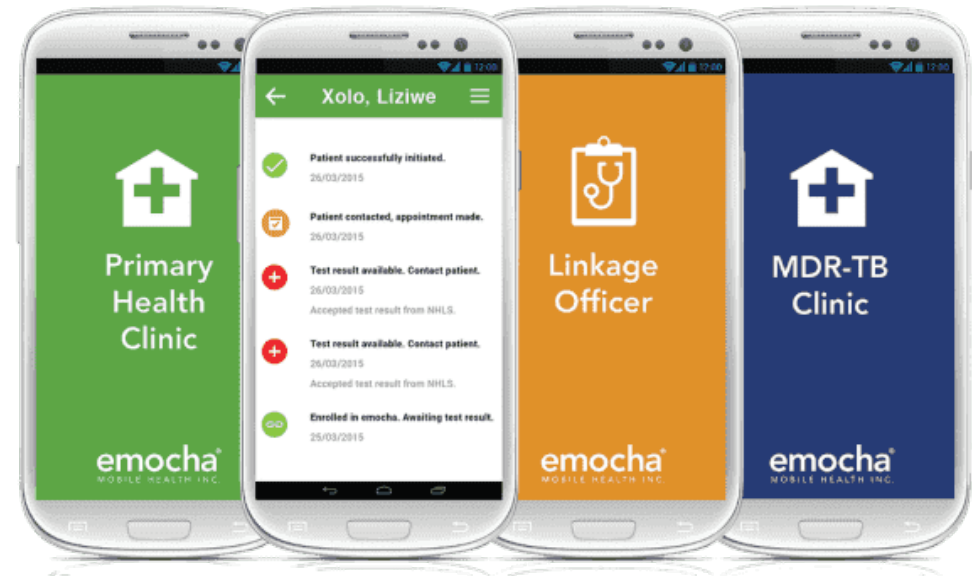
## African innovations





# Opportunities: the African context

## African innovations

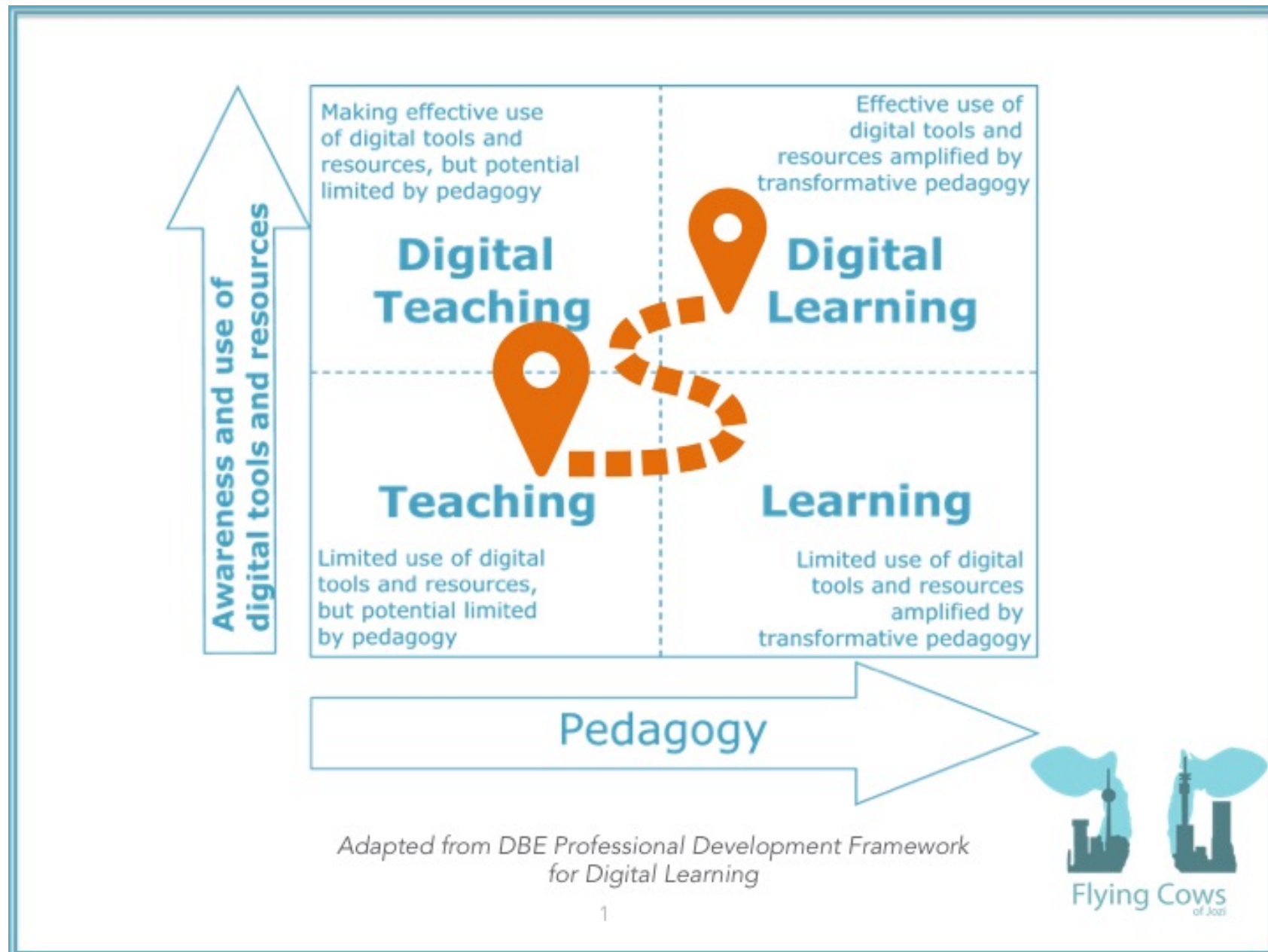


## Our youth, the future

“There needs to be a skills revolution, focusing on communication, logical and numerical skills. These skills should create a critical mass of people who can code, think mathematically, think computationally, and have a holistic approach to problem-solving.”

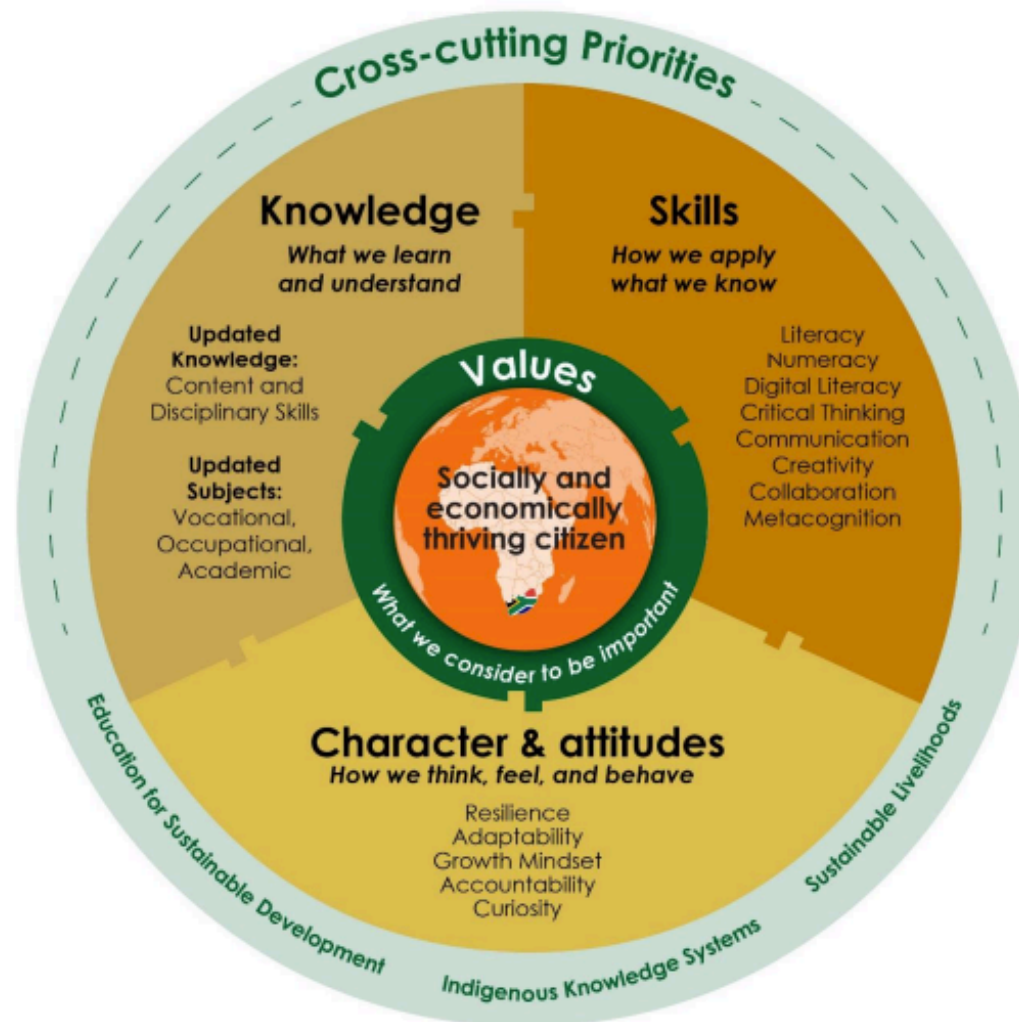
- Professor Tshilidzi Marwala

# Our Leadership Challenge: Implementation!

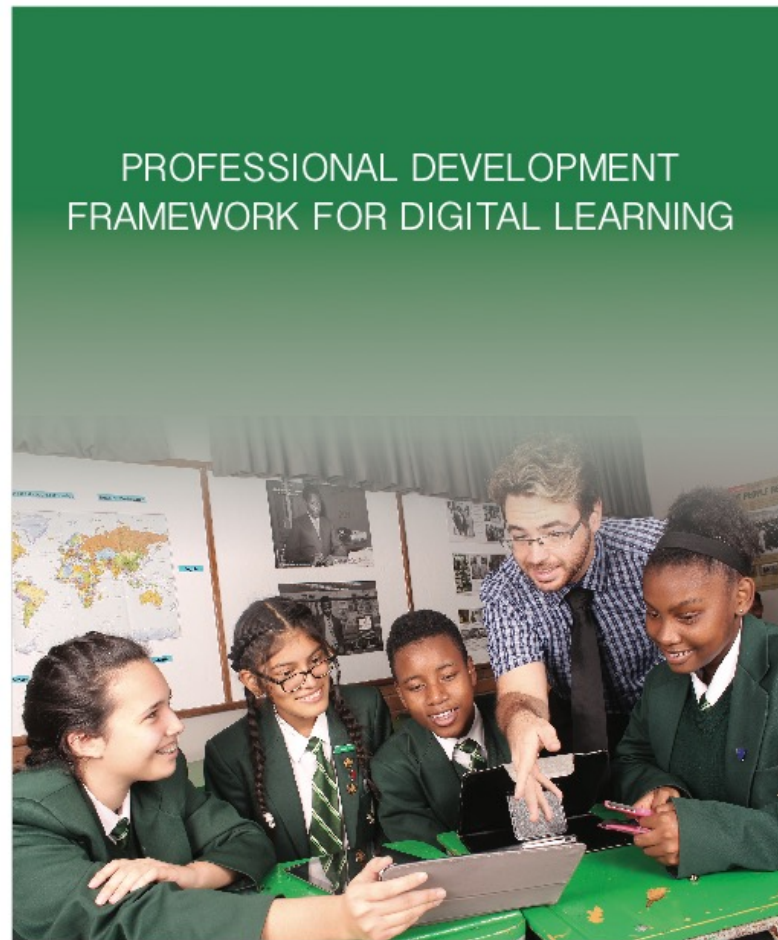


# Our Leadership Challenge: Implementation!

## DBE Competency Framework



# Our Leadership Challenge: Implementation!



# Our Leadership Challenge: Implementation!

Responsible & just AI procurement & implementation

**The Institute for  
Ethical AI in  
Education**

**The Ethical Framework  
for AI in Education**

The Institute for Ethical AI in Education has been kindly funded by:



# Let's create a truly African future!

## African Futurism

"African Futurism as a sub-category of science fiction that is directly rooted in African culture, history, mythology and point-of-view and does not privilege or centre the West, is centred with optimistic visions in the future and is written by (and centred on) people of African descent while rooted in the African continent. "

- Nnedi Okorafor

