

FROM AI ACCESS TO AI AGENCY

Building an equitable STEM pipeline for South Africa

Mpolai Koloko

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Why AI in STEM education, and why now?

The opportunity is real. So are the implementation risks.

01

PERSONALISED

Learning pathways and real-time feedback

02

EXPERIENTIAL

Simulations, virtual labs and inquiry

03

DATA-INFORMED

Earlier insight into learning needs

04

FUTURE-READY

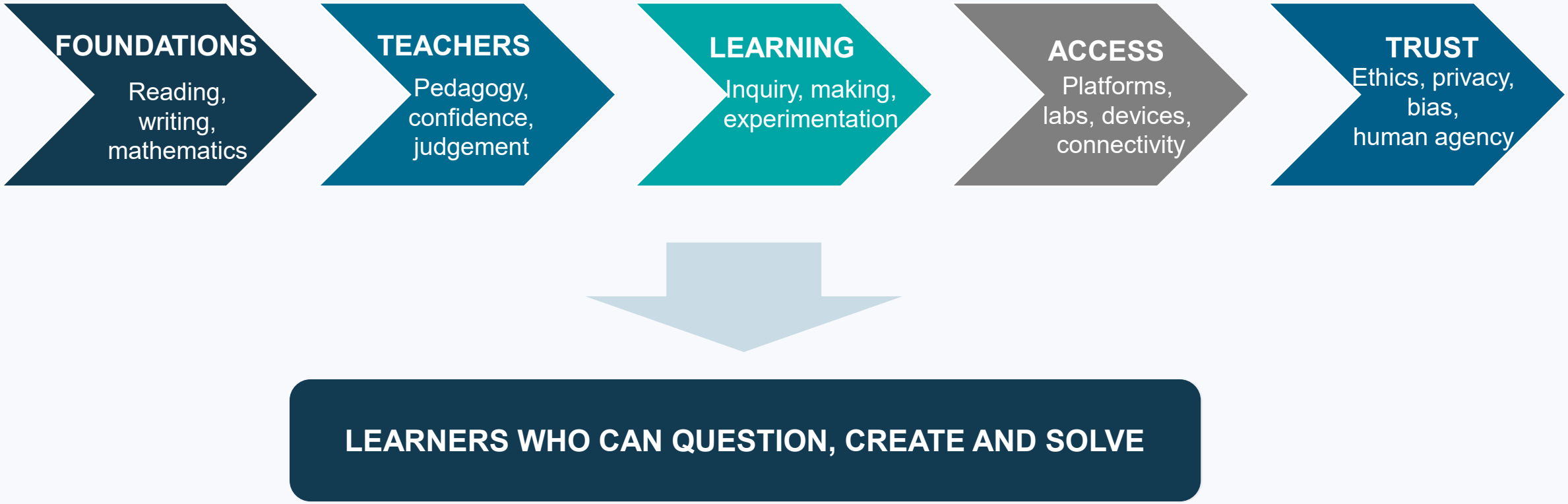
AI literacy, problem-solving and careers

But without infrastructure, teacher capability, curriculum fit and responsible-use guardrails, AI could deepen the divide it promises to close.

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Our proposition: build the conditions for responsible use

AI becomes educationally valuable when it strengthens the whole learning system.



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Sasol Foundation's STEM response

Teacher support	Continuous professional development
Learner innovation	Coding & Robotics, Girls Hackathon and Energy Innovation Challenge
Digital access	DBECloud and scalable, open learning resources
Practical STEM	Mobile science laboratories and science-centre partnerships
Career pathways	Reimagined Sasol TechnoX and career education



One pipeline: teacher capability → learner experience → access → application → pathways

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Priority 1: strengthen teachers before scaling tools



What responsible integration requires

- Subject-specific pedagogy, not generic tool training
- Ability to verify outputs and expose misconceptions
- Assessment design that protects foundational mastery
- Age-appropriate scaffolding from “about AI” to “with AI”
- Professional learning communities for continuous support

AI should amplify teacher judgement, not replace it.

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Priority 2: move learners from consumption to creation

The strongest AI-STEM experiences start with a real problem, not a prompt.

1

NOTICE

Observe a community or environmental challenge

2

INVESTIGATE

Gather evidence and test assumptions

3

BUILD

Code, prototype, simulate or model

4

QUESTION

Check AI outputs for accuracy and bias

5

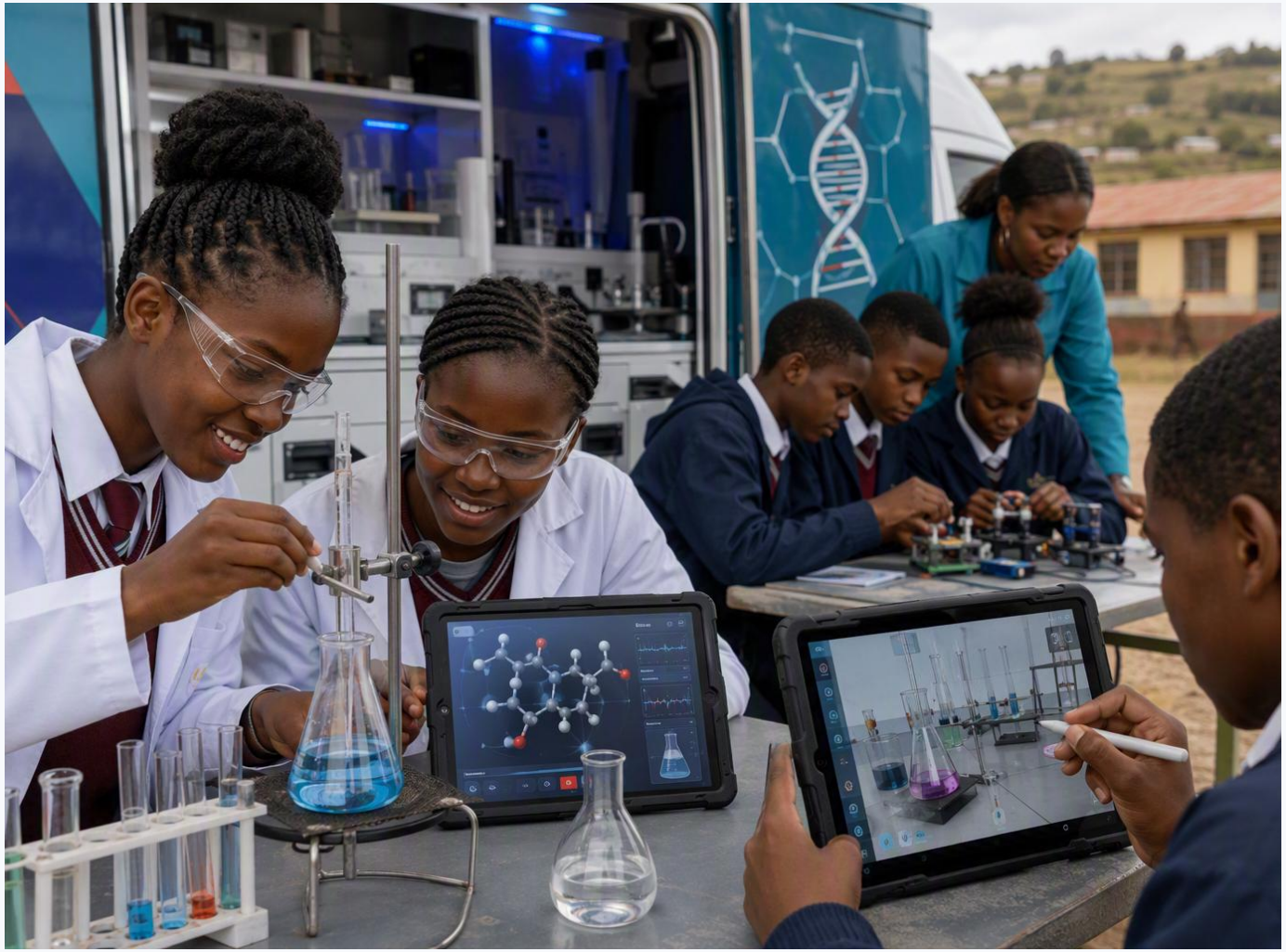
EXPLAIN

Defend the reasoning, not only the answer

Application points: Girls Hackathon • Energy Innovation Challenge • Coding & Robotics • Science-centre innovation studios

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Priority 3: design for access where learning happens



An inclusive access model

- **DIGITAL**
- **PHYSICAL**
- **HUMAN**

The point is not identical access. It is equitable opportunity to learn, practise and create.

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Priority 4: embed responsible AI guardrails

HUMAN AGENCY

Learners explain and defend their reasoning

ACCURACY

Outputs are checked against evidence

FAIRNESS

Bias and exclusion are actively examined

PRIVACY

Personal and learner data are protected

TRANSPARENCY

Use of AI is disclosed and attributable

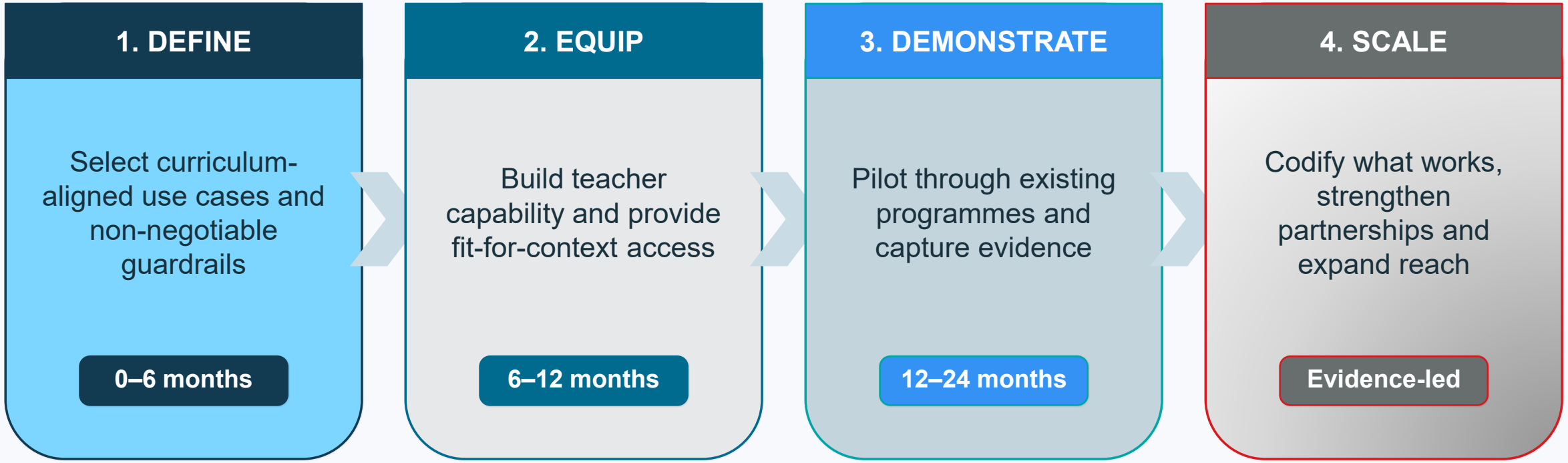
SUSTAINABILITY

Environmental and social costs are discussed

Responsible use must be taught, practised, assessed and modelled across the system.

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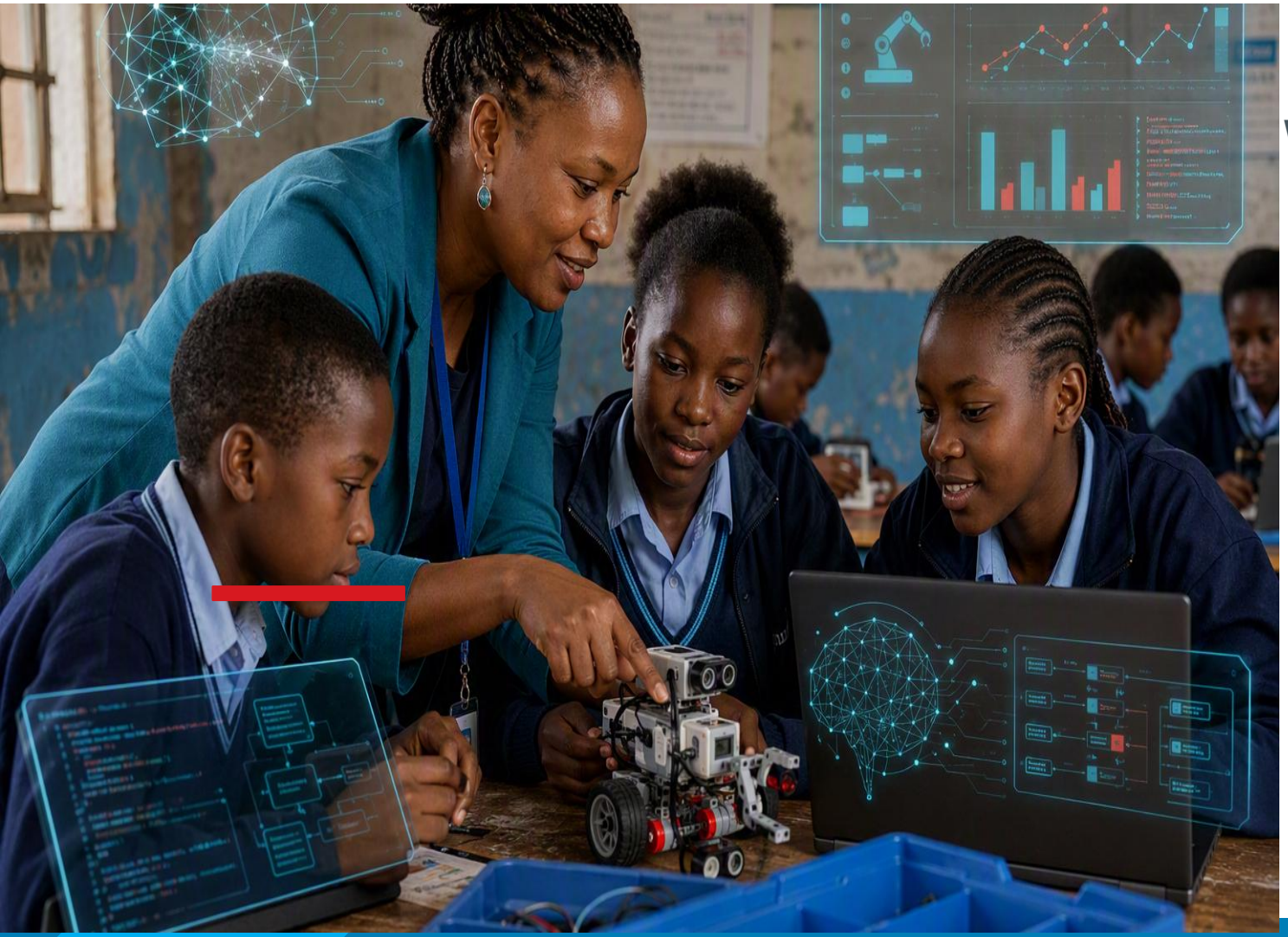
A practical pathway from pilots to system value



Evidence to track Teacher confidence • learner reasoning • participation and access • curriculum outcomes • safe and ethical practice

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THE CHOICE BEFORE US

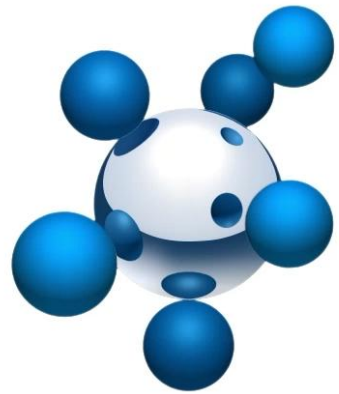


Will AI widen the divide, or widen possibility?

Our answer must be built through teachers, learners, trusted partnerships and evidence.

From access to agency.
From tools to transformation.

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