Improving Standards with Sustainable & Inclusive Educational Technology

- Gauteng as a case in point -

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Background/Context

- Gauteng is 1.5% of South Africa's land mass
  - It is the most populous province in South Africa with more than 26% of the population (26%) -16.1 million people
  - Contributes over a third of the national GDP and is the 7th largest economy in Africa
- Size and Shape of Gauteng Education
  - 2 700 087 learners
  - 103 062 Teachers
  - 3201 schools
  - 15 Education districts


OUTSIDE

UNESCO has defined inclusive education as “an ongoing process aimed at offering quality education for all while respecting diversity and the different needs and abilities, characteristics and learning expectations of the students and communities, eliminating all forms of discrimination”.

(UNESCO, 2009)

Improving educational standards

- One of the fundamental components of the United Nations' sustainable development 2030 agenda is quality education. It aims to ensure inclusive and equitable quality education for all.
- For years, we have been striving to develop an education system that would create bright and creative minds to adapt to upcoming changes and make innovations.
- We must understand that a high-quality education is all about outcomes and standards
- Outcomes is a result of learning that is a visible demonstration of three major things:
  - knowledge,
  - competence, and
  - orientations.
- These three are the most crucial factors determining an education system's quality.
- So, how can we improve the learning standards of education?

Key levers for raising standards

- Raise standards for teachers
  - Teachers' effective professional development is a primary requirement for securing effective teaching. Professional development of teachers can be a crucial driver in recruitment, staff development, retention, school improvement, and student well-being. Also, it is one of the most straightforward areas in which policymakers can have an impact.
- Improved teaching methods
  - Employing technology-based performance demonstration of academic learning is necessary. This can be done with the help of podcasts, video lectures, slide presentations, etc. All of these advanced teaching methods innovate and enrich the learning experiences.
- Cooperative learning
  - When learners acquire knowledge outside of traditional learning methods, they learn more. Cooperative learning helps develop emotional and social skills and provides a valuable foundation for living as family members, workers, and citizens.
- Analytical learning
  - What is most commonly missing in today's educational system is the implementation of analytical thinking, learners should be given ample time and be taught different ways to connect previous knowledge and experience with the information acquired in new lessons. It helps students develop the ability to evaluate problems effectively by performing critical thinking.
- Address and acknowledge overcrowding
  - Overcrowding in schools is not a new issue. When classrooms are overcrowded, learning is less effective.

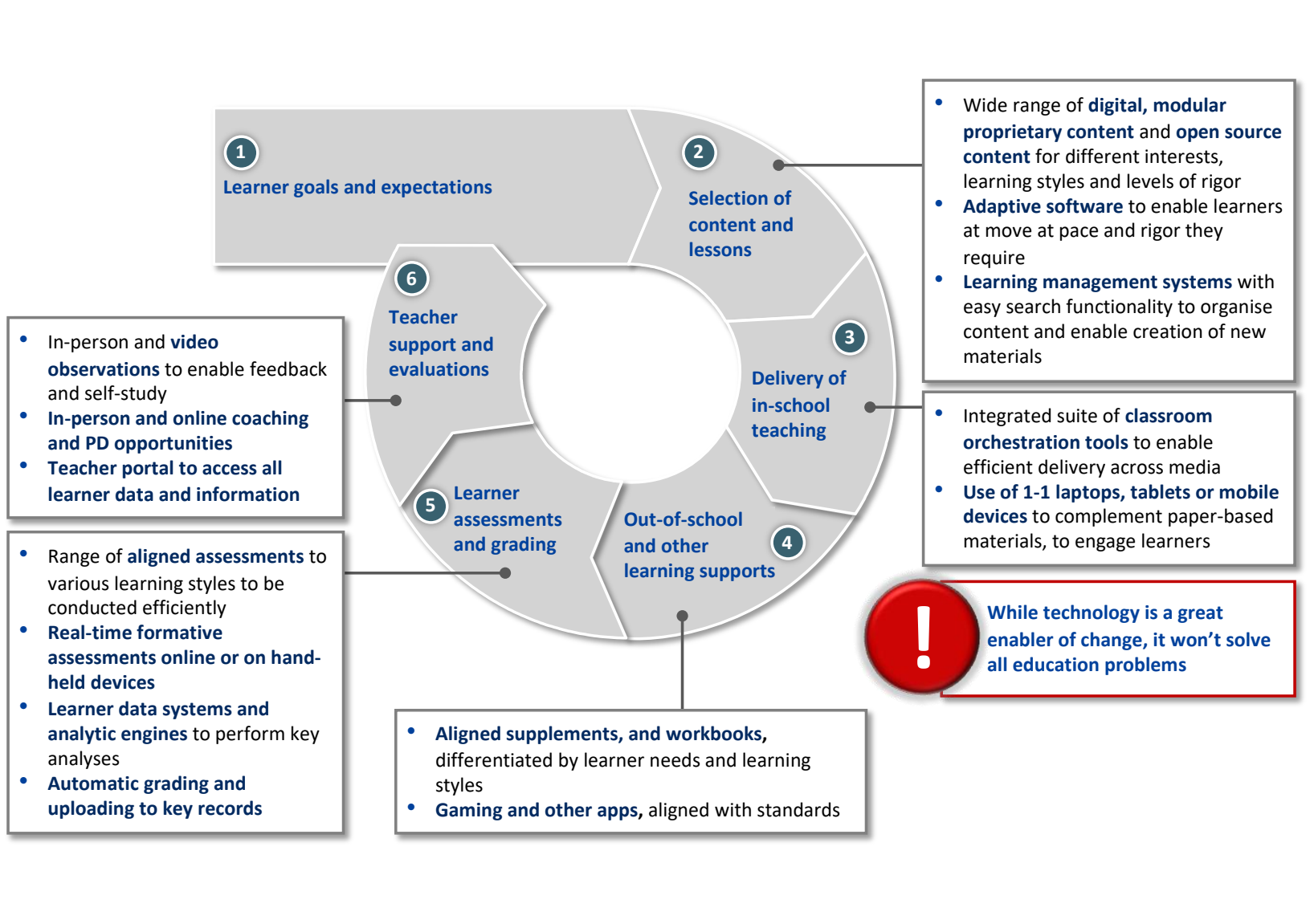
Role of Educational Technology in raising standards

Approach in Gauteng

Educational Technologies

- Educational technologies have emerged as an essential tool to achieve this goal.
- Educational technologies encompass a range of tools and devices, from the radio to smartphones to robots. Not limited to physical devices/hardware, technologies are also software, innovative technology, and applications.
- Gauteng has adopted a multi-faceted approach
  - Classroom devices, Learner Devices
  - Connectivity
  - Content Portal – open source, government owned and government developed
  - Broadcast – built a studio during COVID-19 pandemic
  - Radio
  - Robotics
  - Simulators

Technology can accelerate transformation along the learning lifecycle

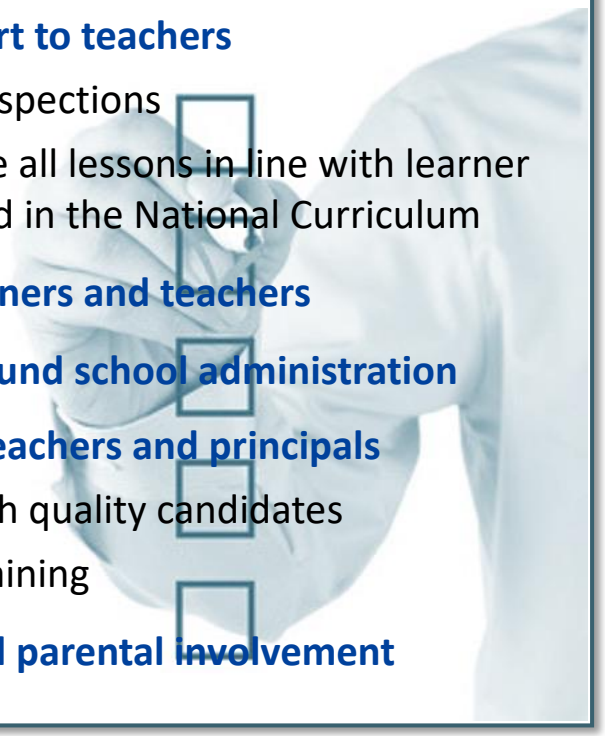


While technology offers massive benefits to education, it is not a silver bullet that will address all of our challenges

Technology alone is insufficient: there are numerous non-tech interventions that need to be addressed in parallel

Interventions required regardless of a technology solution

- **Get schools to minimum infrastructure quality levels**
- **Provide low-level support to teachers**
  - Increase classroom inspections
  - Script and standardise all lessons in line with learner requirements outlined in the National Curriculum
- **Raise attendance of learners and teachers**
- **Create transparency around school administration**
- **Improve the calibre of teachers and principals**
  - Recruit and retain high quality candidates
  - Provide leadership training
- **Increase community and parental involvement**



Gauteng has specific aspirations that help determine a suitable target classroom model

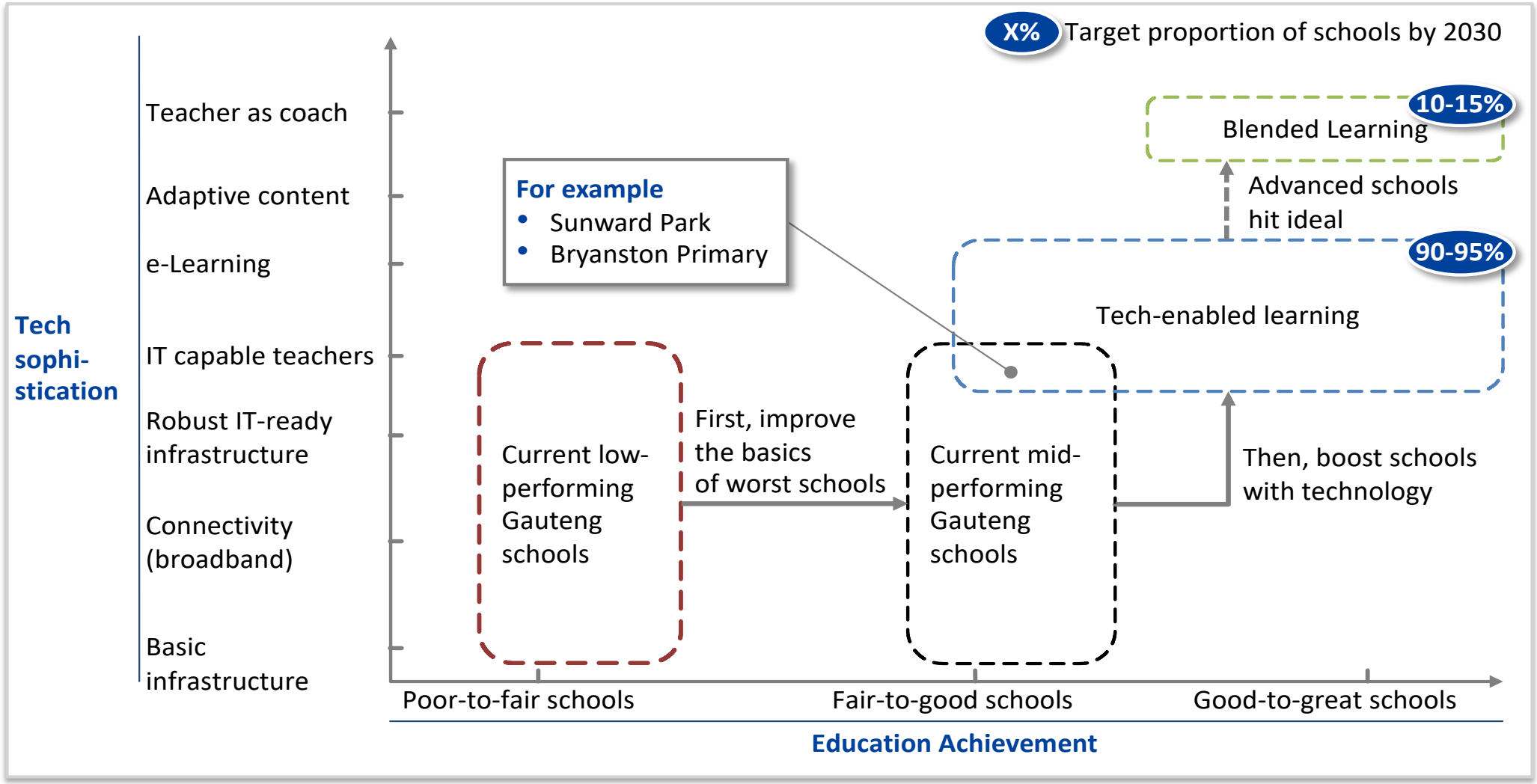
Classroom configuration	Aspirations
Teaching style	• Teachers will have high levels of skill and deep curriculum knowledge • Teachers will be the principal guides through lessons
Medium of teaching	• Most lessons will be taught with paths, but will be guided by teacher
Configura-tion of classroom	• Classrooms will maintain their physical confinteractive content through a smart board • Learners will not create their own learning iguration and layout
Subject being taught	• Teachers will have the ability to facilitate learning at different paces
Mix of learners in classroom	• Classrooms will have one cohort only • Learners should advance in accordance with outcomes specified in CAPS for each subject and grade
Exercises	• Learners will use engaging, adaptive exercises and have digital assessments • Paperless classroom

These models utilise an increasing amount of technology and different teaching approaches to transform the classroom

Increasing tech sophistication

Classroom configuration	Minimal-Tech *Low-skilled teachers given a boost*	Tech-enabled Learning *Standard high-quality teaching, more engaging lessons*	Blended Learning *Learner-paced learning, teacher has more 1-on-1 time*	Radical Transformation *Fully-realised self-directed learning*
Teaching style	Teacher lectures whole class at once on a single subject		Teacher controls multiple activities around class	Classes are learner led, teacher as coach
Medium of teaching	Blackboard focused lessons	Interactive content provided via Smart Board	Multimedia: smart boards, tablet exercises, paper books, collaborative projects	
Configuration of classroom	One group oriented around the teacher and blackboard		Multiple groups working on different tasks	Super-individualised – every learner works independently
Subject being taught in class	Single subject being taught at any given time		Diverse tasks in groups around single subject	Every learner potentially doing different subject
Mix of learners in one classroom	Single age group and grade present in each classroom			Age and grade varies as learners work independently
Exercises	Paper-based lessons only	25-50% digital exercises & lessons, some on tablets, some on smart boards		75% digital exercises & lessons – mostly tablets

Tech-enabled learning fits Gauteng's quality improvement goals but a small number of schools can aim for Blended Learning by 2030



Advantages of ICT in education

- New technological tools not only bring innovation to academic centres, but also speed up the transfer of information, increase learner interest, and allow processes to be automated, among other aspects to be taken into account.
- It improves concentration and comprehension.
- It promotes student flexibility and autonomy. New technologies promote autonomous learning for students. With the incorporation of digital alternatives such as online courses, each student can learn at their own pace, optimising time and resources .
- ICT encourages critical thinking.
- It facilitates communication between teachers and learners.
- New technologies in the classroom, specifically those that allow access to online content, improve learning productivity by optimising instruction time and it feeds collaborative work,
- It stimulates motivation.
- Another advantages of ICT in education is that teaching professionals can incorporate new teaching methodologies, thus improving academic results and encouraging dynamism in the classroom.

Disadvantages of ICT in education

- Technologies are not perfect; just as they bring many benefits to education, they also have some disadvantages to be taken into account.
- Distractions and lack of attention. Digitalisation means opening up unlimited access to multiple resources and sources of information, such as web pages, social networks or chats, and therefore, they take attention away from the subject matter.
- Excessive impact. Excessive and inappropriate use can lead students to a compulsive relationship with technology, which can lead to an inability to control consumption and, consequently, have adverse effects on the student's health, social, family and academic life.
- It reduces the development of other skills. Practices such as writing, public speaking and reasoning may be nullified by the widespread adoption of digitisation in academic institutions.
- Consumption of false information.
- Theft of personal data.
- It reduces human contact.
- It amplifies bullying.

Inclusivity and Sustainability

Key considerations

Digital equity and inclusion in education

- The use of digital technologies to support and scaffold learning to maximise the learning experiences of all learners
- Digital technologies must be used to support the inclusion of diverse student groups in education in a number of ways including enhancing accessibility of educational content, increasing personalisation and providing distance learning opportunities.
- However, persistent digital inequalities can undermine digital equity and inclusion and equity and inclusion in education generally, particularly for the most disadvantaged students.
- Building a technology solution for education must be premised on the importance of inclusive design and implementation of digital technologies. It must also with the distribution and use of tools in a way that does not disadvantage or reduce learning opportunities of certain groups.
- In addition, there is a need for education systems to focus on capacity building such as teacher training, as well as adequate resourcing of digital tools.

Building a sustainable ICT environment

- In order to enable Blended Learning, extensive teacher training and a comprehensive technology solution will be rolled out in the classroom, across schools, at district level, and at centre.
- The required agreements are
  - Training: pre-service and ongoing training on e-literacy, multi-group management, integrating tech into syllabus
  - E-Content: instructional content, static digital resources, supplemental support and adaptive software
  - Devices: tablets with 3G and keyboards for learners and teachers; electronic whiteboards and laptops for teachers
  - Connectivity and network: Central server hosting content; HSBB access to schools; and wireless access within schools
  - Analytics: real-time diagnosis for teachers; and dashboards for principals, districts and centre
  - Infrastructure: classroom refurbishments for safety and power
  - Maintenance and support: 1st line maintenance on-site, with 2nd line support at centre
  - Security: armed patrol and CCTV at schools, community officers, frame agreement with SAPS

Closing Remarks

- Technology can be a powerful tool for transforming learning. It can help affirm and advance relationships between educators and students, reinvent our approaches to learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all learners.
- Our schools should be incubators of exploration and invention. Educators should be collaborators in learning, seeking new knowledge and constantly acquiring new skills alongside their students. Education leaders should set a vision for creating learning experiences that provide the right tools and supports for all learners to thrive.
- However, to realize fully the benefits of technology in our education system and provide authentic learning experiences, educators need to use technology effectively in their practice.
- Furthermore, education stakeholders should commit to working together to use technology to improve standards in education.