

DIGITAL EDUCATION: SOUTH AFRICA'S ECONOMIC IMPERATIVE



EDUCATION AND THE ECONOMY

Education is a fundamental building block of economic growth. Unfortunately, the current education system is based on traditional methods developed for the industrial era. As we make the move towards a digital economy, the entire education value chain must be aligned to this transition. What we need now is a trained workforce that is able to compete in the globalised environment. Hence, **e-Education or digital education** is a vital step towards ensuring economic health, especially in South Africa, where 30.1% of the population is under the age of 15 (Statistics SA, 2016). A digital education system is the solution to the education crisis in South Africa, but in tackling this head-on, we will also address challenges in other aspects of the economy, including health, energy, and transport.



CHALLENGES IN SOUTH AFRICA'S CURRENT EDUCATION SYSTEM

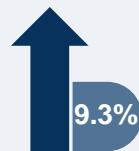
South Africa is facing significant challenges throughout its education system, such as high costs, low retention rates, poor study content, and untrained teachers. A 2016 study by Estian Calitz and Johan Fourie of Stellenbosch University found that university fees are significantly more expensive now in real terms than over the last century. The cost of both public and private education rose by 9.3% in 2015 from 2014, outstripping the inflation rate, which declined from 6.1% to 4.0% in the same period.

Percentage Point Change in Headline Inflation 2015



Decline in inflation from 2014 to 2015

Education Inflation Rate 2015



Rate at which the cost of education changed from 2014 to 2015

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Higher fees and enrolment costs are a result of the rising costs of maintenance and municipal services, and a volatile rand-dollar exchange rate. High university fees are a barrier to South Africans' pursuit of a tertiary education, ultimately hindering overall growth of the country. In 2016, the "Fees Must Fall" student protest movement was a contentious issue as students appealed for a drop in the cost of tertiary education, however this movement triggered the use of technology by teachers' to deliver content to students. Overall, the university graduation rate remains low, which does not favour development of a strong skill base.



STUDENT GRADUATION RATE IN 2014

15%
UNDER-GRADUATES

21%
MASTERS

21%
DOCTORAL

Source: Department of Higher Education and Training, 2014



EDUCATION TRENDS IN SOUTH AFRICA

RISING COSTS OF EDUCATION

Education costs have skyrocketed over the past few decades and are acting as a barrier for students to enter university.

LOW RETENTION RATES

Only 45% of students who enrolled at primary school reach matric.

LEARNERS ARE INTERESTED IN TECHNOLOGY

There are many learning opportunities available that appeal to students such as massive open online courses (MOOC) and other broad online learning platforms such as Udemy, and Next-Gen Study tools such as Lumosity.

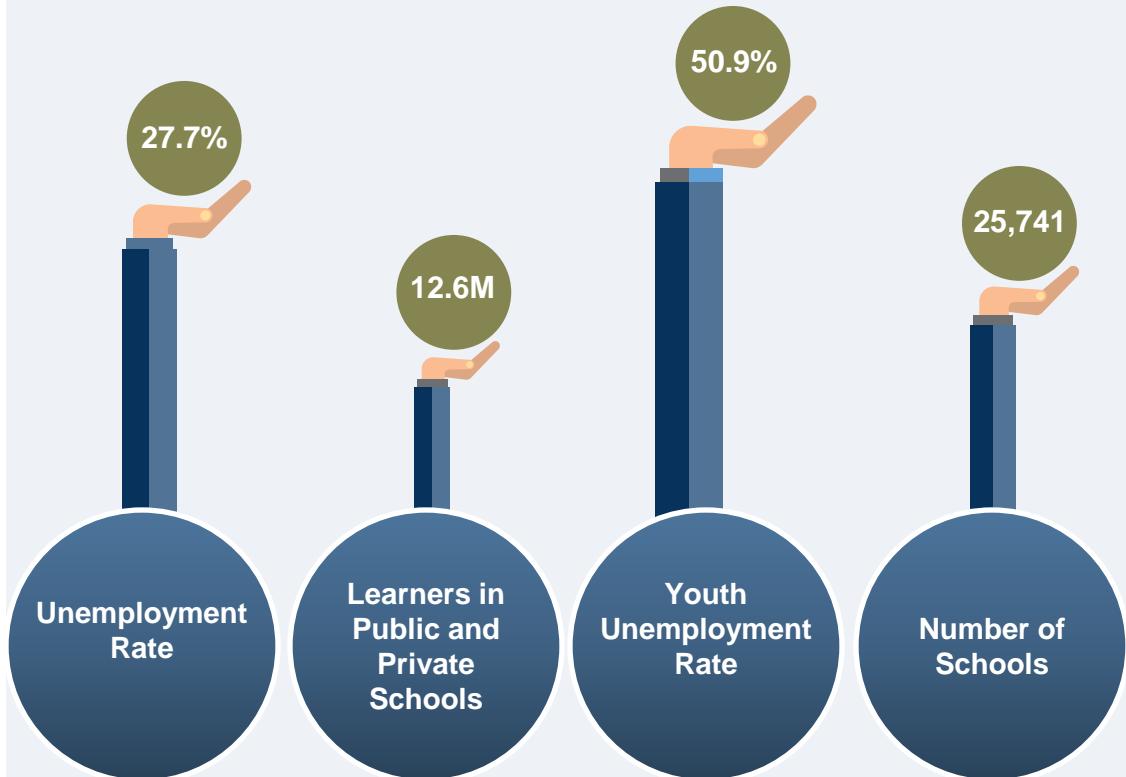
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DIGITAL TRANSFORMATION

The **opportunity costs** of improving the education system far outweigh the once-off investment costs. If we leverage the rise in digital technology by using data and advanced analytics, cyber systems, the Internet of Things, and cloud computing, we can tap into the far-reaching potential of South Africa's future workforce. Despite there being many e-Education initiatives, few have been able to pave the way for the larger-scale uptake of e-Education. Is this due to insufficient budgets, lack of human readiness, or inadequate technology deployment? **This poses another question: Just how ready is South Africa to tackle the transformation of education?**

The digital transformation of education requires a tailored approach—one that is focused on ensuring a strong foundation throughout the education value chain. To ensure a strong digital system, South Africa needs to place particular emphasis on each pillar: infrastructure, technology, the human factor, and policy and funding.



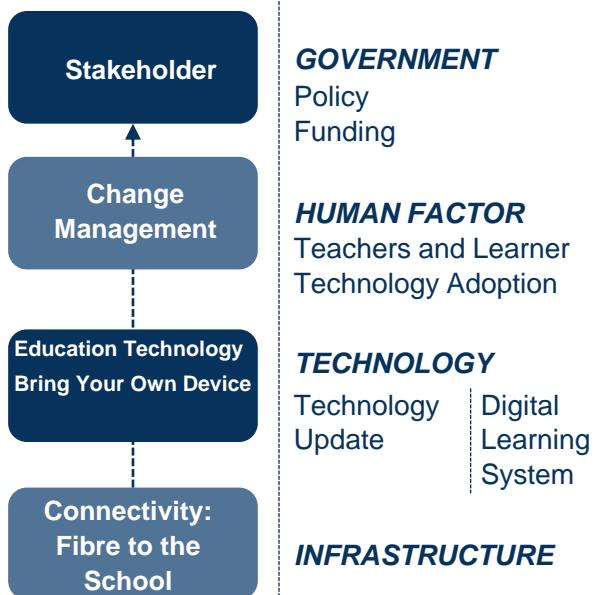
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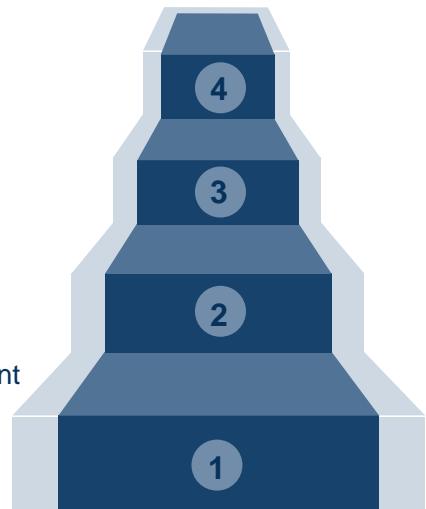
KEY COMPONENTS IN THE EDUCATION SYSTEM VALUE CHAIN



SOUTH AFRICA'S ROAD TO A DIGITAL EDUCATION SYSTEM



TOTAL DIGITAL EDUCATION SYSTEM



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INFRASTRUCTURE

The quick and successful uptake of digital education systems requires widespread internet connectivity. *The World Development Report 2015* by the World Bank shows that although in many cases digital technologies have boosted growth, expanded opportunities, and improved service delivery, their combined impact has fallen short and is unevenly distributed. Essentially, the real benefit of technology is not felt by society because of the **digital gap**; closing this gap will be vital, especially with regard to Internet access.

India has taken tremendous strides in trying to advance its education system with an emphasis on digitising rural India through e-technology. Under the Digital India campaign, the use of digital solutions in private schools has placed the country ahead of the technology adoption curve compared with some developed countries. In 2014, according to the Indian government, 67% of India's population lived in rural areas; in 2016, only 9% were connected to the Internet, according to the Telecom Regulatory Authority of India. South Africa, positioned on a far smaller scale than India with regards to population, can certainly follow suit and also expect positive outcomes. About 35.2% of the country's population is rural, 17.9% of which have access to the Internet via mobile phones and 2% with home connections. Nevertheless, enhanced government programmes are needed to boost broadband capability in schools and universities throughout the country; perhaps the government needs to aggressively employ initiatives such as *Fibre to the School*.

As in India, the South African government can collaborate with various telecom service providers as well as global players such as Google and Facebook to empower remote areas of the country. By making the basic infrastructure for Internet services a national priority, the first pillar for a digital education system would be built.

However, digital education programmes in rural parts of the country can also be designed to run on limited Internet connectivity using hotspots and shared resources. South Africa has many tiers of schools; Frost & Sullivan believes that e-Education programmes can be designed accordingly to ensure equal learning opportunities for all South Africans.

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By employing other technology innovations, sharing content from teacher to learner without an Internet connection makes it possible to design successful e-Education programmes for rural areas of the country. Digital education can use collaborative tools that perpetuate knowledge sharing not only between **teacher and student** but also among **students**.



TECHNOLOGY



The use of technology in the form of products and apps to enhance learning, pedagogy, and instruction is commonly referred to as EdTech. EdTech makes relevant, quality education accessible to the masses. There are a plethora of Edtech resources; new business models have emerged in direct-to-student content sale through massive open online courses (MOOCs) and new opportunities in augmented and virtual reality content. MOOCs and blended and adaptive learning use technology including laptops, iPads, smart boards, Apple and Google apps, and Adobe Connect for personalised educational journeys that address skills gaps in disrupted industries. All in all, there are more than enough digital learning systems and content to choose from; South African programmes need not re-invent the wheel, but rather mix and match to devise a strategy that is best for the curriculum.

It is imperative to be able to measure the impact that e-Education programmes have on students, schools, and the country; however, many existing e-Education programmes in South Africa are currently unable to accurately assess this impact. Integrating digital learning solutions is an issue in the country as data is essentially isolated, making it difficult to build a *big data* picture to justify the investment. Most schools do not have data warehouses to collect and store data for analysis, and teachers are unable to review overall analytics because dashboards are not always user-friendly.

South Africa, therefore requires suitable hardware with seamless interconnects between digital learning solutions across devices. Digital service providers can offer improved analytics to measure learning outcomes and ultimately, return on investment. **Bring your own device** can also play a pivotal role in advancing the move towards large-scale digital education.

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HUMAN FACTOR: TEACHER AND LEARNER ADOPTION

The most prominent challenge in the execution of small-scale e-Education programmes in the country is the reluctance of teachers' to make use of technology in classrooms because they are unfamiliar with it. Without an ongoing professional development programme, teachers will not be able to develop the necessary skills to leverage the benefits of digital learning solutions. More suitable, tailored training programmes are needed to mitigate the weaknesses of the e-Education system. Teacher degree programmes need a stronger focus on information and communication technologies and e-Education management. e-Learning platforms tailored for South Africans will keep students interested and are likely to improve retention rates. The youth today have grown up in a digital age constantly exposed to intellectually stimulating information; legacy teaching techniques are less effective at retaining the attention of learners. According to Beverly Woolf, author of "Building Intelligent Interactive Tutors" (2008), technology based on artificial intelligence can be applied to learning platforms to perform tasks such as processing, reasoning, planning, and cognitive modelling. Biometrics can be used to track the development of each child. Each learner can essentially have a tailored learning guidance system.

Studies shows that students learn best when they are actively engaged with the curriculum and content.

Students who used online tutorials scored higher in math, natural science, and social science than those who did not use computers.

Students who used computers to write their own stories scored significantly higher on measures of reading skills.

Primary school students who used online learning software in reading had significantly higher reading scores.



Source: J. Kulik, SRI International (2003)

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GOVERNMENT

In South Africa, digital programmes have been implemented with the rollout of hardware such as smart boards and laptops to schools; however, many of these are small-scale projects. Investments in hardware and digital solutions are a challenge for school administrations with limited funding. Sufficient funding is needed to support the costs of infrastructure and technology and for ongoing teacher training programmes. Frost & Sullivan believes that public-private partnerships are needed for sufficient support to all parts of the value chain. Private sector participation will provide the necessary technology and associated services. A policy framework, as well as incentives, must be put in place to encourage the private sector to participate in the transformation of the country's education system.



CONCLUSION

e-Education is a critical enabler of skills development and growth, not only for the traditional economy but for the upcoming digital economy. e-Education will result in a lower-cost, higher-quality, and more productive education system. With a surplus of technology advancements and EdTech to leverage off, South Africa can rapidly transition to using e-Education to supplement all learning. The country-wide uptake of digital learning, however, needs appropriate planning along each step of the value chain and extensive public-private partnerships. A key challenge for schools is the lack of funding to incorporate the latest digital learning solutions in the classroom, worsened by the reluctance of teachers' to use unfamiliar technology. Many educators are unskilled to review analytics dashboards because they find them difficult to use. Frost & Sullivan believes that a successful e-Education programme needs a solid, step by step approach, each with its own tailor-made strategy. Only then can the country have equality in education and develop a stronger, better-equipped workforce to meet the needs of the future workplace.

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FROST & SULLIVAN: WHAT WE DO

Frost & Sullivan has experts around the world with more than 150,000 hours of combined experience in delivering ICT and e-Government-related engagements. Frost & Sullivan is therefore well positioned to strengthen South Africa's education transformation. We identify the elements that will create a successful e-Education model based on a detailed understanding of end-user preferences, perceptions, and attitudes.

What we do:

- Assess gaps in existing strategy and develop implementation strategies considering infrastructure, application, processes and organizational realignment
- Assess existing policies in South Africa and review their ability to promote and support innovation in the education sector
- Develop a comprehensive policy and implementation blueprint for the South African government
- Identify existing e-Education roadmaps, identify the state of development, assess the reasons for not reaching milestones such as infrastructure, funding, incentives, and technological expertise.



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