

How South Africa can prepare for a data-driven education system

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There are [significant disparities](#) in South Africa's education system. Schools are divided into quintiles, from one to five; the poorest, in quintile one, struggle enormously with a lack of resources and support.

They also tend to have poorer educational outcomes. That has a direct effect on university admission and outcomes.

One of the government's attempts to address these inequalities is through technology. This began as early as 2003 with the [Draft White Paper on e-Education](#). These and similar policies aim to resource more marginalized schools, universities and colleges with digital tools. This, in a bid to "leapfrog" access to interactive learning content and improved administrative capabilities. COVID-19 lockdowns have made this approach "imperative ... now the only thing we can do," [according to](#) the country's Ministry of Basic Education.

More and more, [data](#) and data-driven tools are emerging as a central feature of this digital response. Developers of these technologies promise a new level of insight and automation that mimics human intelligence. They argue this will bring greater efficiency and effectiveness to both teaching and learning as well as to administrative processes. They suggest that [performance dashboards](#), [automated assessments](#), [chat bots](#) and [adaptive learning technologies](#) can mitigate many of the challenges faced by the country's teachers, lecturers, district managers and university administrators.

There's a growing global [evidence base](#) to support these sorts of approaches. For instance, teachers in under-resourced schools with large classes could use technology to gather individualized data. With this they could develop more personalized learning experiences for pupils based on their strengths and weaknesses.

Data is the backbone of these tools. The growth of machine learning and other intelligent applications has been spurred by the increased collection and availability of data. Such data underlies the kinds of adaptive applications and emerging technologies that are proposed for use in the [education](#) system.

We collaborated on [a guide](#) that examines how South Africa can ensure its data policy and governance takes some of the lessons and concerns from previous education technology implementations into account. It also considers the practical steps needed for this to happen. The guide is part of a series curated by the [Policy Action Network](#) (PAN), a project by South Africa's Human Sciences Research Council (HSRC).

Here are some of the things a data policy for South Africa's education system should consider.

Technology impact

Experience shows that simply providing technology to teachers or students has a limited effect on educational outcomes. The benefits of online, assisted learning and behavioral interventions also vary depending on how technology is used, and in what context. This is highlighted in working papers that review the effectiveness of educational technology [globally](#) and in [developing countries](#).

In South Africa, questions about effectiveness are amplified. That's because of concerns about [unequal Internet access](#). [Cost-effectiveness](#) and [teacher perceptions](#) are also issues.

Data management

A key issue centers on how data is collected, shared and used. It's crucial that personal information should be kept private. Education institutions need to comply with the [Protection of Personal Information Act \(POPIA\)](#), which comes into force effect later in 2021.

Another question concerns sharing and reuse across the wider spectrum of education data. This ranges from the content of books and journal

articles to administrative data, such as student enrolments and graduations. Sharing or publishing this data in a responsible way can [stimulate the development](#) of many creative and useful applications. But data sharing intersects with evolving [copyright laws](#) and debates around ownership and reuse. These will have implications for data-driven innovation in the sector.

A third point is to reckon with well-documented concerns about [bias](#) embedded in existing data which is being used in decision-support applications. If this isn't dealt with, data-driven applications may reinforce historical prejudices and practices related to education.

A holistic policy response

South Africa doesn't have to reinvent the wheel to deal with these issues. Other countries are exploring policy approaches that could guide or inform its approach. For instance, a governmental think tank in India developed a national [artificial intelligence \(AI\) strategy](#). This points to various examples of how the country can use AI technologies to support education. Importantly, however, it also suggests replicating the UK's [Center for Data Ethics and Innovation](#) to ensure ethical and safe use of data.

Echoing this approach, [a report](#) commissioned by the Australian National Department of Education, outlines how critical it is that the application of AI should accord with human rights.

There are also existing resources in South Africa. These include the recently released 4th Industrial Revolution (4IR) [report](#) and [recommendations](#) from a 2019 Department of Higher Education and Training discussion on 4IR implications. POPIA and related legislation provide guidance on how data should be published, used and handled, including for [automated decision-making](#).

These resources recognize that a variety of underlying issues need to be addressed to benefit from data-driven innovation, such as connectivity and processing capacity. AI-powered systems are resource-intensive. Any introduction of data services will require a supportive digital infrastructure plan which addresses performance, security *and* inclusion.

Another priority is skills. There are [existing guidelines](#) to support teachers using digital technologies. These guidelines recognize the interdependent nature of content, ways of teaching, and technology. Additional training and updated guidelines will be needed to address the role and use of data, probably starting with a broad data literacy program.

But more will be needed. Technology policy, adoption and spending in education often involves more than one ministry. This makes early engagement and communication important.

Specific policies will have to be updated or developed to guide the use and implementation of data, machine learning and the wider spectrum of automated decision-making tools. These should govern how data is collected, handled and shared to balance relevant transparency, privacy and ethics principles and laws. Educators, policymakers, researchers and innovators in the sector all need to get involved.

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