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

Blackboard forgotten? Children are working on laptops in this classroom.
Photo: fauxels, Pexels

Having access to digital technology has become central to efficient teaching and learning in schools, especially since the COVID-19 pandemic forced global school closures. *Mmaki Jantjies* and *Paul Plantinga* consider inequalities and highlight the importance of a data policy for the South African education system in this article that first appeared in *The Conversation*.

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 marginalised schools, universities and colleges with digital tools 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 Department 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 that 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 kinds of approaches. For instance, teachers in under-resourced schools with large classes could use technology to gather individualised data. With this, they could develop more personalised learning experiences for pupils based on their strengths and weaknesses.

Data form the backbone of these tools. The growth of machine learning and other intelligent applications has been stimulated by the increased collection and availability of data. Such data underlie 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 HSRC's Policy Action Network project.

Here are some of the issues 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 behavioural 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 centres on how data are collected, shared and used. Personal information must 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 relates to the sharing and reuse of education data across the wider spectrum. 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 that are 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 a local 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 Centre 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 recognise 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 that addresses performance, security and inclusion.

Another priority is skills. There are existing guidelines to support teachers using digital technologies. These guidelines recognise 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 programme.

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 are 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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