



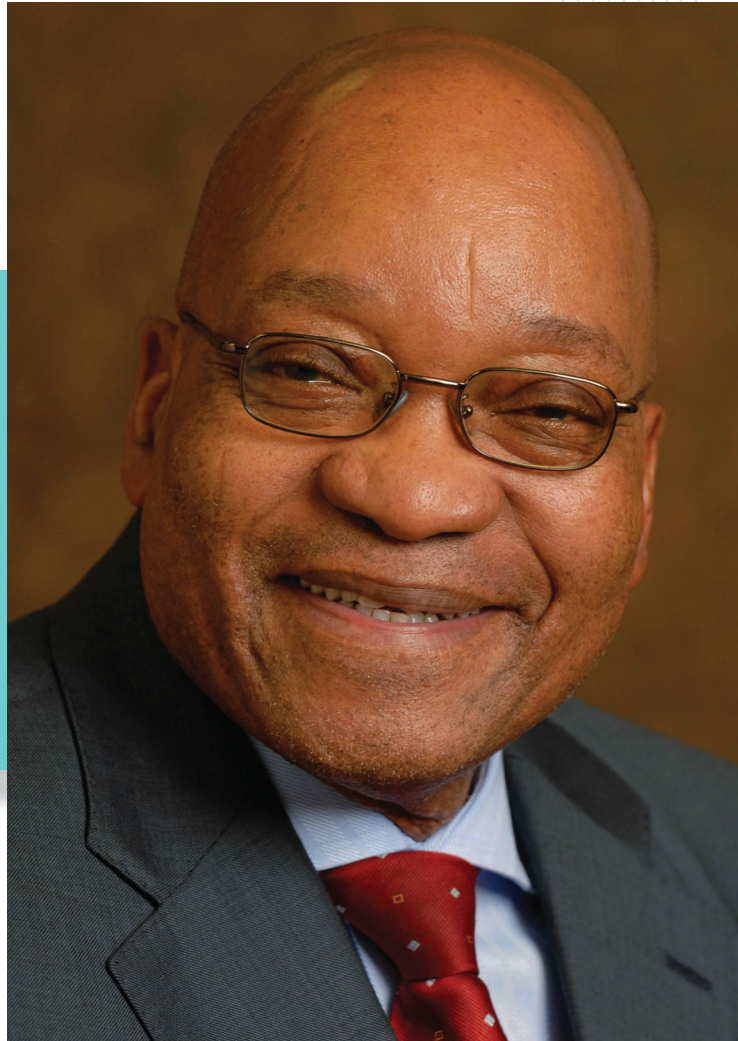
OPERATION PHAKISA: ICT IN EDUCATION

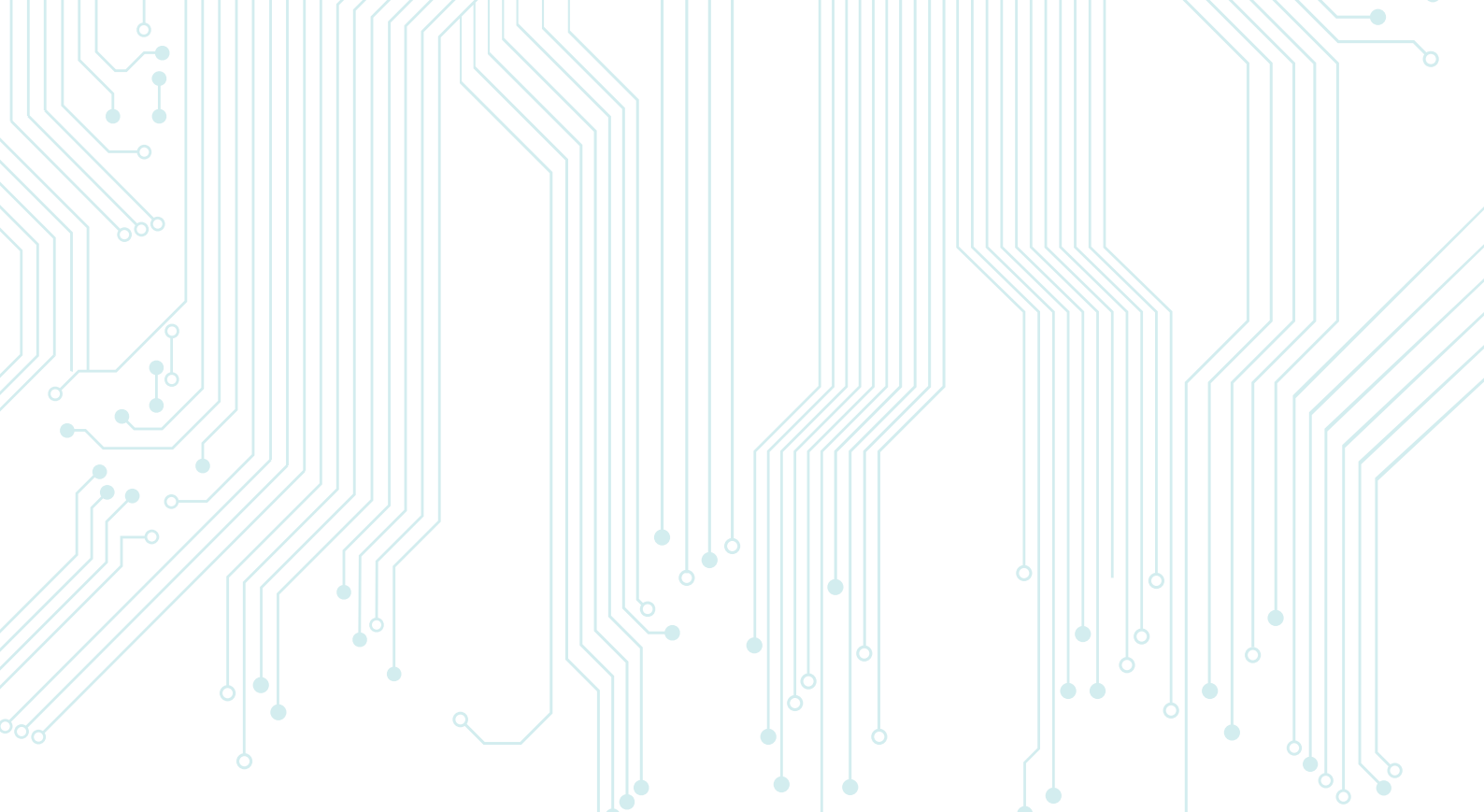
ABRIDGED REPORT ON THE OUTCOMES
OF THE OPERATION PHAKISA LAB
AND ICT IN EDUCATION FRAMEWORK



basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

 **OPERATION
PHAKISA**
planning | implementation | growth





“We emerge from the Operation Phakisa ICT in Education lab with a national ICT implementation plan for the sector, which speaks to the ICT needs of the different school contexts and is flexible enough to accommodate the ever-evolving 21st century classroom models.”

**At the launch of Operation Phakisa,
President Jacob Zuma**





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Executive Summary

Operation Phakisa, a programme led by the Office of the Presidency, works with various government sectors to fast-track the achievement of goals outlined in the National Development Plan (NDP). The premise of the NDP as it applies to education is to address issues of access, equity and redress, as well as provide quality education to all South African learners.

Information and Communication Technology (ICT), as emphasised in the NDP, are tools that can assist in improving the quality of basic education. The NDP also recognises that the development of an ICT capable society requires the development of critical thinking and technological skills during school years.

Globalisation has increased the pressure on government to adjust to new realities. One of these new realities is the global technological revolution that is happening within an increasingly connected and knowledge-intensive world. As per the NDP, countries that adjust to the rapidly changing environment and take advantage of opportunities for knowledge sharing and communication, are those that succeed in making substantial advances in reducing poverty and inequality.

As per the Global Competitiveness Report, the South African economy is able to compete with the best in the world in some sectors, but economic growth is hindered by factors such as a weak public healthcare system, poor education results and ongoing labour market inflexibility. The main risk for the SA economy is that these low-ranking factors drag the other, better ranked components systematically lower.

“Every South African learner... will be able to use ICTs confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community.”

Leveraging the power of ICT in Education

The strategy for Operation Phakisa is to:

- Determine how the basic education sector can leverage the global technological revolution to enhance learning and provide learners with a new sets of skills;
- Reach learners with limited or no access (especially those in rural and remote regions);
- Facilitate and improve the professional development of teachers;
- Employ further cost saving mechanisms associated with the delivery of traditional instruction.

The Operation Phakisa strategy supports the White Paper on e-Education goal that states, “Every South African learner ... will be able to use ICTs confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community by 2013.” In 2004, only 6.4% of citizens had access to the internet compared to 50% of the school population today. These figures demonstrate some strides in ICT in Education; however, progress in achieving the White Paper goal has been gradual and inadequate. Many of the challenges in ICT advancement can be attributed to competing school priorities, limited human and financial resources, and the low-level of school e-readiness. Access to the internet and ICT infrastructure has the potential to be the biggest equaliser to a fully inclusive and modernised society. One of the steps taken by the government to achieve ICT readiness is the SA Connect policy to roll out broadband with a broader aim to have every South African connected by 2020.

Operation Phakisa

To address these issues cohesively, the ‘ICT in Education’ Operation Phakisa lab commenced on 6 September 2015 and His Excellency, President Jacob Zuma, launched the initiatives emanating from the lab on 2 October 2015.

Over the course of the four week lab, 120 participants worked in five specific workstreams namely:

- Digital content and curriculum;
- Teacher professional development;
- e-Administration;
- ICT lifecycle management and support;
- Connectivity.

The lab commenced with a contextual analysis of the basic education environment through the identification of challenges, future trends and key lessons learnt from relevant initiatives.

Through ICT in Education experts, with validation from leadership, and syndication with other key stakeholders, the lab emerged with the following Operation Phakisa ICT in Education initiatives:

	Source and Curate Digital Content: Content curation and assuring the quality of digital content to support the curriculum.
	Deliver an Online Learning Platform: Developing and adopting a Learning Management System (LMS).
	Data Analytics: Establishing a data analytics process to track usage of the ecosystem.
	Blended Teacher Professional Development: Training teachers to integrate ICTs into pedagogy.
	Research-based Teacher Development for Innovative Teaching: Instituting a research-based teacher development centre.
	Mobile Application for Teacher Wellness: Providing support to teachers through a digital communication tool.
	Integrated e-Administration: through accessible, integrated, accurate, reliable and complete data.
	Provision of ICT equipment: Managing the lifecycle of IT devices to ensure that learning takes place.
	School IT Support Services: Establishing an ICT services support hub for education.
	Accelerated Schools Connectivity Roll-out: Ensuring broadband connectivity to schools.

An integrated roadmap, high-level implementation plans, detailed 3ft plans, operational and logistical tasks and performance indicators support the initiatives outlined in this report.

Through a comprehensive costing analysis, the combined funding of all initiatives for the rollout of ICT in Education over the 5-year time frame was calculated. The largest portion is for the procurement and support of all required ICT infrastructure. The Department of Basic Education (DBE), along with the support of key sister departments, the private sector, and innovative funding models are therefore critical to the success of the programme.

Equipping all schools with ICT for teaching, learning and e-administration in the next five years is an ambitious, but necessary national imperative. ICT paves a way for virtual classrooms and makes cognitive development attainable and accessible beyond the walls of the classroom. Therefore, the deployment of ICT tools and digital devices must be a crosscutting political priority with a long-term commitment and recognition that ICT is indispensable for the country to sustain high-quality education.

The aim of the basic education sector must be to use educational technology to strengthen the learning environment, while being able to access learning materials any time and anywhere. To maximise access, government must put its stakes on affording ICT in all South African schools.

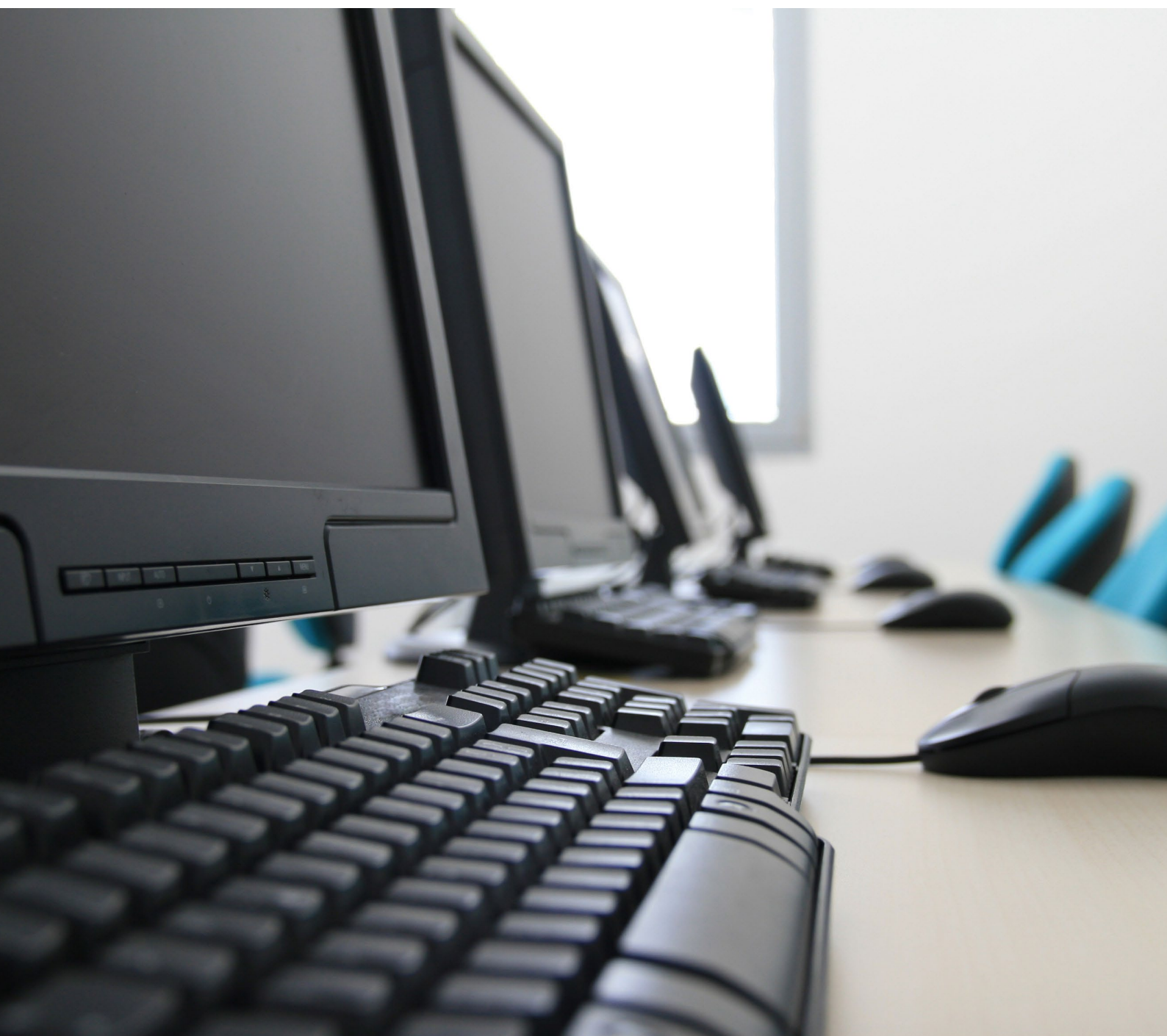


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Overview of Operation Phakisa

Introduction

Under the leadership of the Department of Planning, Monitoring and Evaluation (DPME) in the Presidency and the Department of Basic Education (DBE), the lab was a focused and intensive exercise that engaged approximately 120 participants from across the education and ICT sectors, private sector, academia, NGOs, labour, and other experts in the field. Over the four weeks, the participants were tasked to develop a detailed problem analysis, prioritise needs, produce intervention plans, and recommend delivery plans for the Presidency and DBE to enact.



ICT in Education: Theory of Change Statement

The key change envisaged through the Operation Phakisa ICT in Education initiatives is the enablement of quality basic education to enhance learning and learner outcomes. Significant change can be realised through the following:

- Learners and teachers who embrace self-directed learning, knowledge creation, creativity, collaboration and research;
- A dynamic teacher workforce that takes ownership of their professional development;
- Multi-dimensional flow of accurate data and critical information from all levels of the basic education sector;
- Access to relevant and individualised learning, anywhere and at any time; and
- Provision of free, high-speed and secure broadband to all schools.

The outcomes are dependent on the realisation of the following outputs:

- Digital content that enables virtual learning;
- ICT-transformed teaching and learning practices in connected and offline schools;
- A data-driven education administration;
- Provision of affordable and appropriate technology along with IT support; and
- Internet connectivity to all schools.

Conceptual Framework for Implementation

The strategy identified and adopted during the pre-lab phase was focused on the Big Fast Results (BFR) approach of rapidly and effectively improving service delivery in government sectors. Enhancing education using ICTs requires significant paradigmatic shifts in how we view quality education and the way these services are delivered. The conceptual framework to implement such practices utilises a combination of systems thinking and design with behavioural change.

Big Fast Results Methodology

The government of South Africa adopted the Big Fast Results problem-solving methodology which was developed and implemented by the government of Malaysia. The BFR methodology facilitates the development of detailed plans with a strong theory of change, as well as strong monitoring, evaluation, reporting, and accountability frameworks which are essential for

the successful implementation of national goals and priorities. The BFR approach was adapted to the South African context. To highlight the urgency of delivery, the approach was renamed to Operation Phakisa ("phakisa" meaning "hurry up" in Sesotho).

Operation Phakisa is a results-driven approach, involving setting clear plans and targets, ongoing monitoring of progress, and making these results public. Operation Phakisa is designed to fast track the implementation of solutions on critical delivery issues highlighted in the NDP. Application of this methodology highlights government's urgency to deliver on the goals set in the NDP. The quality of Basic Education remains an apex priority.

The Operation Phakisa lab aimed to improve the deficiency of many public sector plans which tended to provide high-level objectives and targets without the precise details of what needs to be done, by whom, and with which resources.

Implementation through systemic and behavioural change

The methodology will firstly be implemented using an interrelated systems approach that simultaneously targets each layer of the education sector (e.g., schools, districts, provinces and national) in coherent, yet specific ways. Each layer relies on a set of preconditions that must be functional, and adequately in place.

The second paradigm involves a behavioural change approach which requires all stakeholders in the system (from national to school level) to make significant shifts to the way they think and act. Learners are not excluded from changing their conventional views about learning and quality education. Operation Phakisa will require efforts from learners' approach to schooling, teachers' approach to teaching, as well as personal and societal development across the board.

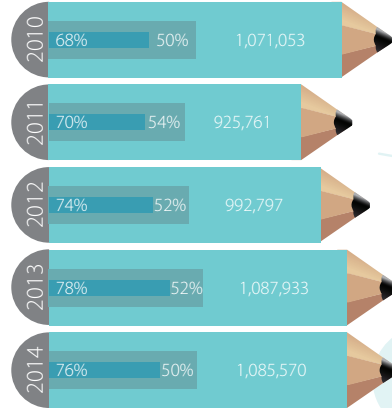


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ICT in Education: Local environment

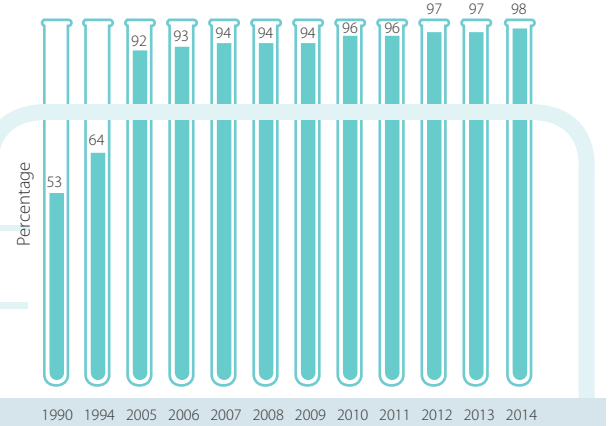
By the time Grade 2 learners get to Grade 12, approximately half of those learners will write the matric exam and a portion of those learners will pass.

Grade 12 Pass Rates



■ COHORT Size (Grade 2)
■ Wrote NSC
■ Passed NSC

% Qualified Educators (1990-2014)



87
district
offices



31:1
Learner
Educator
Ratio

12.8
million
learners

416 093
educators

25 691
schools

60%

of schools are satisfied
with District Support

Over **7500**
schools have
more than 40
children per class

Understanding the digital divide

The White Paper on e-Education uses the term 'digital divide' to refer to the relative usage of information and communication technology in the country and within education. This is an international measurement instrument and has been used to determine South Africa's status.

The Digital Divide is the gap in the access to and usage of information and communication technology, including the skills to make use of the technology within a geographic area, society or community. The divide within countries may refer to inequalities between individuals, households, businesses, or geographic areas, usually at different socio-economic levels or other demographic categories. The divide between differing countries or regions of the world is referred to as the 'global digital divide,' examining this technological gap between developing and developed countries on an international scale.

Statistics published by StatsSA in the General Household Survey 2014 indicated that 40.9% of South African households have at least one member who either used the Internet at home or had access to it elsewhere. Despite promising numbers, only 10% of households have internet access. That means that 30% of the people who go online do it either at work (16%), school/university (5.1%) or at an internet cafe (9.6%).

Limited statistics pertaining to ICT in Education have prevented an accurate trend analysis and therefore the key component that was used in measuring the digital divide is access to the Internet. Based on the StatsSA General Household Survey 2014, internet access is the highest among households in the Western Cape (21.1%) and Gauteng (15.7%) and the lowest in the North West (4.5%) and Limpopo (3%). There are far more households in metropolitan areas that have internet access at home (16.4%), compared with households in rural areas (2%) and 9.2% in urban areas.

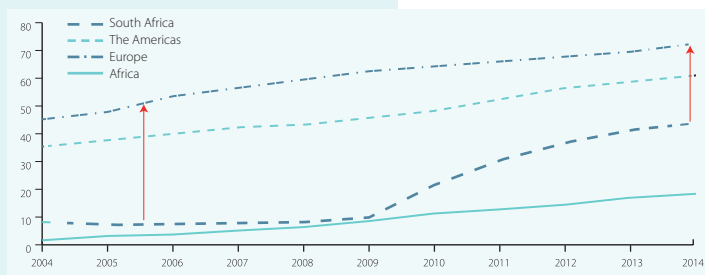
When comparing these findings with Statistics South Africa's numbers from 2012, there has only been a marginal increase in households with internet access. In the 2012 report, 40.6% of households have at least one member who access the internet, and 9.8% of South African households have internet access at home.

According to statistics provided by the DBE, approximately 53% of schools are connected to the internet in South Africa in 2016.

According to the International Telegraph Unit (ITU) world telecommunication indicators, South Africa has managed to decrease the global digital divide that exists between South Africa, The Americas and Europe, based on people using the internet. The graph below depicts that decrease in the gap between these countries.

The ITU indicates that South Africa has managed to increase the number of people using the internet from 8.43% in 2004 to 49% in 2014. Despite this effort, the global digital divide remains a reality.

Another measurement that is used to indicate the usage and access of ICT in South Africa is the "Global Information Technology Report 2015" as published by the World Economic Forum. It uses a Networked Readiness Index (NRI) to rank the state of countries' information and communication technology. According to the NRI, South Africa is ranked 75th of 143 countries in the study in terms of ICT readiness and dropped five places since 2014.





Leveraging ICTs to Strengthen Quality Basic Education

SUMMARY OF INITIATIVES

Workstream 1: Digital Content and Curriculum



Initiative 1: Source and Curate Digital Content

Dynamic, interactive and inspiring digital content is sourced that is relevant to a South African context and aligned to National Curriculum Statement for use by teachers and learners from Grade R – 12.



Initiative 2: Deliver an Online Learning Platform

Digital content is available on an integrated e-education cloud repository that includes a Learning Management System and broadcasting channels.



Initiative 3: Data Analytics

The use of digital content is managed and used to inform decision-making and ongoing improvements to the system.

Workstream 2: Teacher Professional Development



Initiative 4: Blended Teacher Professional Development

Teachers have professional development opportunities through blended learning and teaching mechanisms.



Initiative 5: Research-based Teacher Development for Innovative Teaching

Ongoing and innovative research informs teaching methodologies and pedagogical content knowledge and teachers integrate ICTs into their daily professional practices.



Initiative 6: Mobile Application for Teacher Wellness

A mobile application that looks after the wellbeing of each teacher in the country.

Workstream 3: e-Administration



Initiative 7: Integrated e-Administration

An ICT enabled e-Administration platform that integrates data from various sources and produces accurate, reliable and complete information.

Workstream 4: ICT Lifecycle Management and Support



Initiative 8: Provision of ICT equipment

Every learner, teacher, and administrative staff member receives an age and education appropriate device.



Initiative 9: School IT Support Services

Functioning and operational technical IT support structures for schools.

Workstream 5: Connectivity



Initiative 10: Accelerated Schools Connectivity Roll-out

Alignment of SA Connect connectivity targets with Operation Phakisa connectivity requirements.



Initiative 1: Source and Curate Digital Content

Environment

Current challenges

- Most educational content is limited to English;
- Not all content is appropriate for the South African context;
- There is a lack of Norms and Standards or Guidelines for quality assurance of digital content;
- There is a lack of synchronised collation of existing content from DBE, provinces and partners.

Future trends

- Quality content that is available anywhere, any time and at any pace;
- Norms and Standards or Guidelines are:
 - Responsive to user needs, teaching and learning styles and barriers to learning and teaching, in particular, content is capable of running on a variety of platforms and is responsive to disabled learners' needs;
 - Quality of content is checked and available for use in schools; content is applicable to schools with different levels of e-readiness; that is, bandwidth-heavy content is delivered primarily to schools which have broadband or via on-site caching servers;
 - A rich content repository, hosted on a central cloud, has been delivered; and
 - The content repository includes 3D simulations, educational games, modelling software, apps and other resources.

Our aspiration is to source dynamic, interactive and inspiring digital content that is relevant to the South African context and aligned to the National Curriculum Statement (and CAPS), Grade R – 12.

What is dynamic, interactive and inspiring digital content?

- Used to improve teachers' pedagogical content knowledge, as well as their ICT skills;
- Constantly evolves through contributions made by professional learning communities, teachers, and Open Educational Resources (OERs);
- Includes assessments that supports different pedagogical practices;
- Has adaptive assessments and immediate feedback;
- Addresses National Curriculum Statement (and CAPS) deliverables;
- Allows for flexible learning pathways.

How will content be sourced, accessed and stored?

Sourcing:

- Curating (sourcing, sorting, classifying and giving access to) content, both proprietary, DBE, OERs and proprietary solutions, especially content in languages other than English;
- Coordinating with teacher and subject specialists who develop content on an ongoing basis; and
- Crowdsourced (OER) content can be peer-vetted when it is shared.

Accessing:

- Online: through the learning and content management system, app store, and other online resources;
- Offline: through local caching server;
- Pre-loaded on devices, especially for disabled learners; and
- Broadcast TV channels such as the DBE Channel, open satellite channels, public broadcast channels, video streaming sites, and in the future, DTT (Digital Terrestrial TV).

Stored:

- Repository on the central cloud;
- Local content server which automatically synchronises; and
- Local devices, where space is available.

How is the quality of the content assured?

- Norms and Standards or Guidelines developed to determine e-content and broadcast quality and format;
- Selected official content to be verified by a quality assurance team;
- Electronic process for quality assurance (QA);
- Efficient high-quality processes identified to convert paper-based content to electronic content; and
- Teacher-developed (OER) content can be vetted socially by peer review (other teachers).

How will the curation and quality assurance of digital content reduce current costs?

- Systemic cost-savings with regard to the printing and delivery of hard-copy LTSM and assessment materials, over time. That is, as more e-LTSM is used, less hard-copy LTSM will be required, resulting in cost savings over time. At first, there will be a dual cost of generating electronic content and paper-based content.

By 2020, we want to have the following impact:

- ICT equipped teachers and learners;
- Synergy between provinces, national and private partners as digital content is shared;
- Consultation and coordination between various stakeholders;
- Improved learner performance due to individualised learning methods;
- Increased competitiveness of learners with a drive to improve individual academic performance; and
- Employable post-school learners.

Measuring progress (Grade R – 12):

- Enriched, interactive, and digitised content resources (lessons) in all formats for the DBE Cloud available;
- Interactive workbooks, enriched textbooks, broadcast content, developed and available;
- 100% completed and fully functioning broadcasting solution comprising a variety of components such as satellite, digital streaming, Digital Terrestrial Television (DTT).

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	108 500	53 675	53 675	53 675	53 675	323 200
Personnel	46 541	17 200	17 200	17 200	17 200	115 341
Total						438 541

Funding options:

- Donor funding or utilisation of donor resources;
- Re-appropriation of existing budgets;
- Establish funding Memoranda of Understanding (MOUs) with sister departments;
- Educational discounts by vendors;
- Available LTSM budget as hard copy would be discontinued;
- Cost-saving agreements with content developers.

Alternative revenue streams:

- Selling of aggregated, differently packaged versions of e-content for use on other platforms or beyond borders;
- Making greater use of vetted OER to reduce the quantity of required proprietary or official content. That is, leveraging the teaching community's time and expertise through voluntary contributions to the content sourcing and curation process.

Cost drivers:

- Initial licensing and royalty costs for sourcing of proprietary content if applicable;
- Review and upgrading of content to digital form;
- Staff provisioning and remuneration;
- QA and screening process;
- Advocacy with private and external stakeholders;
- Content hosting;
- Creation and development of official content.

How do we plan to make the initiative sustainable after implementation?

- A dedicated team of specialists who will keep up with global trends;
- Ongoing evaluation and monitoring of Norms and Standards or Guidelines;
- Continuous sourcing of new and emerging technologies or OER that will have a positive impact on effective teaching and learning;
- Selling e-content, as described above.



Initiative 2: Deliver an Online Learning Platform

Environment

Current challenges

- Uncoordinated management of digital interventions and content amongst provinces resulting in:
 - Scattered content among provincial and private portals and developers;
 - Time wasted to conduct content search from multiple sources;
 - Duplicate functionality (multiple e-platforms);
 - Inappropriate digital content, e.g., not quality assured or customised to the needs of teachers and learners.
- Limited portal functions (currently only Thutong portal);
- Insufficient technological literacy of teachers to use the technology and to get learners to be excited about it.

Future trends

- A unified cloud repository that directs users to available resources;
- Indexed repository of national resources;
- Tagged digital content with metadata for easy retrieval;
- Secure question and answer bank via the DBE Cloud;
- Online national assessments, e-marking and e-NSC; that is, digital examinations for all levels, both formative and summative, for National Assessments and School-Based Assessments (SBAs);
- Learning takes place any time, anywhere;
- Learners in under-resourced and rural areas have access to content; and
- Mechanisms of delivery support inclusive education.

Our aspiration is to provide an integrated e-education portal that includes a Learning Management System and broadcasting channels.

Key components of an integrated e-Learning Platform

1. A well-functioning, easily-accessible cloud that stores and delivers learning material and information to all learners and teachers in South African schools:
 - Hosting facilities, data security and secure access;
 - Storage of information and resources;
 - Access to educational content, tools, apps, online courses and programmes;
 - Administrative services to schools.
2. A dedicated education broadcasting service:
 - Dedicated education channels using both radio and television;
 - Telematics;
 - Non-linear (e.g. video on-demand, streaming video).
3. Offline distribution on storage devices:
 - A local server containing the cloud's static content;
 - The content could be updated on an automatic schedule via satellite broadcast or internet, or manually, via physical uploading to local content servers.
4. Online assessments:
 - Formative and summative assessments and reporting;
 - Online National Assessments and NSC;
 - Standardised item banks.

Benefits for the user

- Access to the curriculum support material that is aligned and quality-assured;
- One cloud repository or "portal" for curated, South African educational content;
- Immediate feedback on e-assessments;
- Directed to appropriate content for remediation and extension;
- Links to both paid and free teaching and learning content hosted on external sites;
- Access a virtual school, content and courses online or offline;
- Efficient use of broadcast via radio and television (including Telematics), delivering quality content to large numbers of learners and teachers.

By 2020, we want to have the following impact:

- Fully functional, accessible and well-resourced cloud, including a well-managed virtual classroom;
- Teachers and learners are provided with tools to develop 21st century skills and can learn anywhere at any time;
- Content is curriculum-aligned, with embedded intelligence that can direct learners to formative remediation;
- Create a global educational collaboration forum; and
- The solution is updated as per the fast pace of technological change.

That can be measured by:

- 100% achieved functional cloud service in place;
- 100% of all content is broadcasted as planned;
- 100% of all content is stored and available offline.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	47 655	17 405	16 405	15 405	15 405	112 275
Personnel	2 455	2 455	2 455	2 455	2 455	12 276
Total						124 551

Alternative revenue streams:

- Donor funding including Public Private Partnership (PPP) initiatives;
- Selling of developed content;
- Non-intrusive audience-appropriate advertising;
- Crowd-funding.

Major cost drivers:

- Cloud repository/Portal
 - Hosting of cloud;
 - Data management;
 - Maintenance and upgrade costs;
 - Licensing costs for proprietary content.
- Broadcasting
 - Infrastructure for DTT broadcast TV channels;
 - Signal distribution;
 - Data transmission;
 - Licensing costs for proprietary content;
 - Expanding the broadcast footprint of the existing DBE channel.

Overview of implementation plans

The high level implementation plan starts in the first year with the development of a dynamic learner management system that will be launched in the second year whereafter users are uploaded and the system is continuously updated. The plan is to develop additional modules in year four and five (e.g., electronic exam papers, etc.).

The low-level, detailed “three-feet” (3ft) plan provides a detailed plan for the LMS and delivery platform that outlines the task to establish a team to manage this virtual learning environment. The plan includes the steps to setup, plan and develop an online and offline portal and LMS to host digital content. This also includes the tasks to include broadcasting mechanisms.

We will have to manage the following risks:

- Ongoing intellectual property and copyright costs;
- Support and maintenance costs for cloud/portal;
- Ongoing cyber threats including internet safety;
- Lack of connectivity for schools;
- Lack of spectrum for wireless services;
- Limited coverage/access to the broadcast

services;

- Concurrent mandates of provinces could hamper coordination of initiatives;
- Teachers’ and learners’ ICT skill levels;
- Learners lack respect for their teachers if teachers are not competent with the new technology;
- Effectiveness and scale of training;
- Funding and budget for the upgrading of equipment; and
- Development of e-assessments and items for item banks.

How do we plan to make the initiative sustainable after implementation?

- A discussion forum within the DBE to involve relevant officials in discussions and to share lessons learnt;
- Content that becomes available can continuously be made available in provinces and nationally;
- Sharing of broadcasting models to minimise duplications and lead to best practice and reduction of costs.



Initiative 3: Data Analytics

Environment

Current challenges

- Lack of accurate data to inform the curation, delivery, usage and sustainability of digital content;
- Time-delayed and resource-dependent learner assessment systems;
- Lack of inter- and intra-departmental communication and co-ordination about the use, delivery and curation of digital content.

Future trends

- Immediate feedback about content usage and learner performance in online assessments and classroom activities;
- Access to real-time and accurate information about curriculum, learner performance and systemic efficiencies;
- The extent to which digital content is fully integrated into classroom management and teaching practices can be easily ascertained;
- Clear understanding of big data around usage and learners' learning patterns; and hence the ability to identify learners experiencing learning challenges early, before it is too late; and
- Immediate awareness of gaps in delivery of solutions resulting in iterative improvements of the digital content value chain.

Our aspiration is to manage and use the data relating to e-learning and to use the information for decision-making and ongoing improvements to the system.

What is data analytics?

The DBE will monitor and evaluate the impact of e-learning on learner outcomes and 21st century skills. This will be done through the collection, analysis and interpretation of data pertaining to the uptake, usage, user experience, learner performance, pedagogical impact and systemic efficiencies of the e-learning ecosystem.

What will the data analytics report?

- Automated, real-time collection and usage of the e-learning system;
- Ongoing feedback from users regarding usefulness and value of content;
- Gaps in available learner content knowledge;
- Real-time tracking of learner assessment and achievement;
- Submission and collaborative editing of teacher-created and editable digital content (OER or Creative Commons);
- General utilisation levels, levels of deployment of technologies.

By 2020, we want to have the following impact:

- Iterative feedback to:
 - Improve digital content system;
 - Source and quality assure relevant content based on priorities, needs and identified learning gaps;
 - Improve the adaptive learning layer with specific attention to remediation, progression and enrichment of learners;
 - Improve delivery of solutions.
- Systemic time-saving with regard to the collection of data, its analysis and feedback into improvement and development programmes, in particular learner assessment and tracking.

That can be measured by:

- 100% established and functioning task team and national content unit;
- One data-driven annual report on content uptake, usage and user feedback from a stable LMS;
- One data-driven annual report on learner performance on core content, e-assessments and SBA via LMS;
- A clear data set which lets DBE predict which learners will experience challenges; and
- One data-driven annual report on pedagogic impact (LMS).

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	14 888	-	-	-	-	14 888
Personnel	8 999	-	-	-	-	8 999
Total						23 887

Note: The LMS training will be absorbed in the teacher professional development initiative

Alternative revenue streams:

- Non-intrusive audience-appropriate advertising;
- Monetising of aggregated, differently-packaged versions of online content for use on other platforms or beyond borders;
- Private sector deployment of human resources or secondment;
- Attraction of innovation funding via global initiatives and awards;
- Online tutoring services linked to content support;
- Crowd-funding campaigns.

We aim to implement strategies to reduce the cost of the following cost drivers:

- Software and delivery platform development and maintenance, specifically around usage-monitoring functionality;
- Monitoring and evaluation processes, e.g. human resources costs, to be managed and budgeted in advance.

Overview of implementation plans

The high-level implementation plan in the first year is to establish a baseline for the usage of content. From there, mechanisms and processes will be implemented to measure the usage and impact of digital content, on teaching methods as well as on learner performance.

The low-level detailed “3ft plan” describes the process for establishing the team who will be responsible for managing the data that will flow from the system, as well as outlines the tasks, roles, and responsibilities on how to collect and analyse data to measure impact, usage and effect on performance of learners and teachers. The last part of the plan focuses on the tasks.

We will have to manage the following risks:

- Inadequate or non-existent internet connectivity at schools;
- Poor uptake or buy-in from stakeholders;
- Inadequate human resource capacity to manage, collect and analyse data;
- Low levels of technical and pedagogic skills of teachers;
- Inadequate mentoring and development of teachers for ICT integration;
- Inadequate system monitoring; and
- Low levels of e-readiness of schools.

How do we plan to make the initiative sustainable after implementation?

- Iterative feedback to improve the ecosystem value chain;
- Well-qualified, empowered staff at all levels, with appropriate authority and time to fulfil their mandate;
- Acknowledgement of the significance of the Monitoring and Evaluation (M&E) process by all stakeholders at all levels of the system;
- Commitment and buy-in from all stakeholders involved in the M&E process;
- Willingness of stakeholders to implement remedial recommendations from the review and reporting process; and
- Engagement with data analysis scientists, statisticians and other appropriate researchers who can guide in the interpretation of the big data extracted from the system.



Initiative 4: Blended Teacher Professional Development

Environment

Current challenges

The following challenges have resulted in teachers with negative attitude, low morale and diminishing motivation:

- Lack of institutions with the appropriate skills and capacity to offer quality and relevant programmes;
- Uncoordinated planning, funding and resource allocation with respect to teacher education and professional development across and between institutions;
- Lack of teachers with sufficient ICT awareness, ICT equipment, competence and confidence;
- Poor management and lack of support.

Future trends

Future teachers have the following attributes:

- A learning programme designer, developer and assessor;
- A facilitator, mentor and coach;
- An emotional and psychological support agent;
- A diagnostician and remedial agent;
- A lifelong learner; who
- Has the necessary ICT skills to identify quality online content and digital resources and design lesson plans which incorporate digital learning resources.

Our aspiration is for teachers to have professional development opportunities through the use of blended learning and teaching mechanisms.

What is blended teacher professional development?

Blended teacher professional development refers to development programmes and courses for professional, personal, and school environment growth. These courses are accessible via ICT and are supported by face-to-face training. Teachers will have the opportunity to gain CTPD points through the SACE-approved courses.

The proposed solution:

Moving from the current 100% face-to-face training to a National Digital Teacher Development training platform whereby approximately 70% of training is supported by face-to-face, if necessary, as aligned with the National Institute of Curriculum and Professional Development and Provincial Teacher Development (NICPD) structures. This solution includes:

- A user-friendly platform hosted in the DBE Cloud that offers a course catalogue consisting of curriculum support, leadership, administration, personal development, ICT literacy and integration programmes for teachers;
- The use of integrated multiple platforms where possible (PC, mobile applications, radio, TV, social media etc.) as well as face to face;
- Courses are endorsed by SACE and accredited;
- Training is linked to the Continuing Professional Teacher Development (CPTD) points management system and other performance-related incentives;
- The courses meet the standards and requirements of all educational statutory bodies. In particular, guidelines on the teacher training course content, and its goals and pedagogic aims, will be developed.

By 2020, we want to have the following impact:

- Quality teachers who have undergone personal growth and development;
- Teachers that are professional in the classroom;
- On-demand training (anywhere, any time);
- Self-paced learning;
- Coordinated, immediate and unbiased feedback on training results;
- Availability of interactive, modular, multi-media training tools;
- Teachers have access to a variety of learning experiences that are reinforced; and
- Training programmes are quality-assured.

That can be measured by:

- 100% of teachers trained on required material by 2018;
- 100% of post level 1 teachers enrolled in ICT learning pathway training;
- 100% of office-based educators trained on customised ICT learning pathway;
- 100% of principals and deputies enrolled in customised ICT learning pathway training;
- 100% of Heads of Departments enrolled in customised ICT learning pathway training;
- 100% of school administrative assistants enrolled in customised ICT learning pathway training.

Financial Investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	33 232	3 082	3 082	3 082	3 082	45 558
Training	322 299	285 068	256 678	261 178	104 742	1 229 964
Personnel	9 189	9 001	9 001	7 089	7 089	41 370
Total						1 316 891

We aim to implement strategies to reduce the cost of the following cost drivers:

- Supporting of delivery structures at National and PED levels (NICPD, PTDIs, DTDCs etc.);
- Digitising existing material, and developing new material, internally;
- Negotiating with sister departments to assist with training costs, e.g. DHET and the universities;
- Online training delivery and assessment;
- Monitoring and Evaluation.

Overview of implementation plans

The high level implementation plan consists of two phases:

Phase 1: Face to face training of teachers in the integration of ICTs in pedagogy. During this phase, a team will be established to develop the necessary Norms and Standards or Guidelines, and the courseware, that will be used for continuous online training of teachers. The courses will not focus on computer literacy but on using ICTs to enhance teaching and learning, and how to use the DBE's e-administration tools, such as SA-SAMS.

Phase 2: An online teacher development course is established.

The low-level "3ft plan" focuses on how to create awareness, as well as structure the appropriate ICT training for in-service and pre-service teachers, both online and face-to-face. The plan also outlines the programme for the continuous development of existing teachers and the recruitment and training of new teachers on an ICT platform that will be part of the greater DBE Cloud system.

We will have to manage the following risks:

- Lack of access to connectivity and ICT equipment for teachers to use ICTs in their daily practice;
- Lack of sustainable funding and a viable long-term funding model;
- Teacher apathy or resistance due to lack of ICT tools necessary to integrate ICTs into teaching and learning;
- Competition between training providers; and
- Lack of teacher development time and approval or accreditation of courses by SACE.

How do we plan to make the initiative sustainable after implementation?

- Ongoing, quality and relevant teacher professional development;
- Establish and strengthen public private partnerships including community involvement;
- Mainstream and increase accountability as part of the strategic plan, annual performance plan and performance agreements;
- Ongoing monitoring, evaluation and support to encourage change in teaching and learning practice across National, Provincial, District, Circuit and school levels;
- Create opportunities to showcase best practice and innovation through newsletters, social media and the DBE Cloud platform; and
- Transfer skills to teachers, administrators and managers.



Initiative 5: Research-based Teacher Development for Innovative Teaching

Environment

Current challenges

- Lack of teachers with sufficient ICT awareness, competence and confidence to implement the required changes;
- Uncoordinated teacher development planning across and between institutions; and
- Lack of funding and resource allocation for teacher education.

Future trends

- Research, development and innovation informs future adaptations of educational needs;
- New teachers are capable of using ICTs to support teaching and learning;
- Institutions mandated for continuing professional teacher development are able to implement, manage, monitor, and evaluate confidently, and support the institutionalisation of the knowledge and skills acquired;
- Teacher diagnostic self-assessment programmes identify specific teacher development needs and ensure tailor-made teacher development interventions.

Our aspiration is to enable ongoing and innovative research to inform teaching methodologies and pedagogical content knowledge, so that teachers become world class in integrating ICTs into their daily professional practices.

How do we enable ongoing and innovative research?

- Strengthen research and innovation capacity dedicated to teacher education;
- Establish a Research and Innovation Centre to coordinate research and share best practise;
- Collaborate with Higher Education Institutions to educate and train all student teachers to work successfully in ICT-enabled environments.

Our solution is based on:

Addressing the lack of ICT awareness, knowledge, competence, and confidence of teachers and keeping abreast of new and emerging technologies through:

- Engaging in diagnostic self-assessment programmes to ensure tailor-made interventions;
- Teacher development programmes incorporating the integration of ICT to strengthen pedagogical content knowledge;
- ICT devices and resources for teachers that are provided at provincial level but which are accompanied by training;
- The National Teacher Awards acknowledge and reward ICT Innovation at school level.

Teacher Professional Development - Research, Development and Innovation capacity should be strengthened by the National Institute of Continuing Professional Development (NICPD) and other stakeholders as follows:

- Strengthen partnerships between research, development, and innovation organisations;
- Develop research themes and a framework for advanced studies (e.g. Masters and PhDs);
- Develop a Monitoring and Evaluating framework for RDE outputs;
- Create mechanisms to ensure research, development and innovation results are utilised in the sector.

Coordinate planning, funding and resource allocation between institutions to implement, manage, monitor, evaluate, the knowledge and skills acquired during the capacity-building programmes:

- Coordinate the communication and research of institutions mandated for Continuing Professional Teacher Development;
- Provide dedicated human resource capacity for institutions mandated for Continuing Professional Teacher Development;
- Ring-fence funding to implement Norms and Standards or Guidelines for Teacher Development Centres and Teacher professional development activities.

By 2020, we want to have the following impact:

Teachers that are competent, confident, knowledgeable and are able to successfully integrate ICTs to support teaching and learning, using advanced pedagogical techniques.

These can be measured by:

- A fully functioning ICT in Education Innovation Centre embedded within DBE structures such as the research unit;
- Strengthened ICT Committees within national, provincial, district and school structures; include ICT Innovation into their agendas;
- Effective pedagogical ICT integration workshop with all stakeholders (L1, L2 and L3);
- 30% of teachers undertake general accredited HEI and other SACE-accredited programmes per annum;
- Two pilot studies completed to test efficacy of implementing new ICT supported methodologies;
- The strengthened Relationship Development Intervention (RDI) capability within NICPD will be established and functional by July 2017;
- By 2019, 50% of teachers have undertaken self-diagnostic assessments and have achieved at least 150 CPTD points.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	4 230	8 260	11 560	13 650	15 210	52 910
Total						52 910

We have considered the following alternative revenue streams:

- Course Fees.

We aim to implement strategies to reduce the cost of the following cost drivers:

- Diagnostic Tests;
- Research.

Overview of implementation plans

The high level implementation plan has two components. The first is to set up a research and innovation centre for teachers within the first two years that will be launched in the third year. The second component is an online platform for research and innovation that will be developed over two years and be rolled out in the third year.

The detailed 3ft plan outlines the tasks required to establish a research and innovation centre for Education where teachers can share innovative teaching practises on an ICT platform such as the DBE Cloud. The plan includes the conceptualisation of the centre; the setup of the necessary structures on district, provincial and national level; and, frameworks for the centre, including different budgeting and funding models.

We will have to manage the following risks:

- Resistance to change;
- Inadequate connectivity;
- Inadequate monitoring and evaluation.

Outside our control but needed to make this initiative work

- Funding.

How do we plan to make the initiative sustainable after implementation?

- The R&I Centre will publish and conduct information sharing sessions so that teachers and managers are aware of new practices;
- Targeted research conducted by researchers and students;
- Limited staff and extensive use of secondments to enhance financial sustainability;
- R&I Centre to operate within an existing institutional structure to reduce running costs;
- R&I teams can be constituted on demand and then discontinued once a challenge has been resolved.



Initiative 6: Taking Care of Teachers

Environment

Current challenges

- Lack of resources and support to teachers;
- Teachers feel disempowered;
- Teachers have negative attitudes, low morale and diminished motivation.

Future trends

- A teacher is a facilitator, mentor and coach;
- Is emotionally motivated to provide psychological support to learners and peers;
- Professional networks (like social networking) affords peer-to-peer support and advice;
- Teachers are able to get their administrative and HR needs met through a user-friendly process; and
- The role of teachers changes continuously within ICT-enabled environments.

Our aspiration is to develop a mobile application that enhances and supports the wellness of teachers.

What is the purpose of the initiative?

- Empower teachers through creating a mobile application which gives them access to information, services and personal development opportunities;
- Provide personal motivation and encouragement for teachers including support systems;
- Distinguish between personal and professional development rather than assuming professional development alone is adequate.

What service does the mobile application provide to the teacher?

- Allows teachers to report on business related matters (payroll, leave, medical aid), institutional matters (sanitation conditions, learner nutrition and transport, school governance) and personal matters (bereavement, substance abuse, financial issues);
- Data monitoring the wellness of teachers is communicated to all levels of the DBE that is then used to provide relevant support for teachers; and
- Functional back-office business processes that support information, for immediate actioning.

What are the typical functions of the mobile application?

- Logging day-to-day grievances and challenges that are experienced; responses and communication via an online service desk;
- Direct grievances to appropriate officials, counsellors or support staff;
- Up to date status of filed grievance monitoring of escalation procedures;
- Produce a range of aggregated reports;
- Access to personal information related to employment, as well as personal evaluation forms, courses and support services (e.g. medical or social service referrals).

By 2020, we want to have the following impact:

A highly competent, confident, content, and motivated workforce that will improve the overall quality of education delivery.

That can be measured by:

- The availability of a platform offering support services;
- 99% of the work-force using the platform;
- A developed service desk front-end;
- A developed tracking system front-end for feedback;
- System-generated reports sent via electronic messaging systems to teachers and officials every step of the way;
- Continuous quarterly reports on service recommendations, number of users registered and usage of services so that further developments can be made.



Financial investment (2017 – 2022)

This initiative has been budgeted for as part of the e-Administration initiative. The development hours for the required software have been taken into consideration, and a cost estimate included.

We have considered the following alternative revenue streams:

- Wellness and personal development companies can advertise in the application.

We aim to implement strategies to reduce the cost of the following cost drivers:

- Initial setup and development cost;
- License fees for proprietary software, if such software is used;
- In-house application use training.

Overview of implementation plans

The plan for this initiative is to develop a mobile application accessible to all teachers with a wide range of service offerings to “take care of teachers”.

The low level “3ft plan” starts with the detailed planning and oversight of this initiative. The plan then continues with the detail of how to identify the different service offerings of the application.

The application URS (User Requirement Specification) will be drawn up by DBE and a project management process put in place to ensure that the delivered product matches the URS.

We will have to manage the following risks:

- Insufficient physical and information (cyber) security and inadequate cyber security policies;
- Inadequate connectivity;
- Inadequate speed of execution;
- Lack of appropriate recruitment and retention strategies;
- Lack of stakeholder buy-in;
- Lack of technical support;
- Lack of cross-platform support.

How do we plan to make the initiative sustainable after implementation?

Monitoring can be done by the call centre administration staff and data from referring of call logs (counts and changes over time) will drive development of new support programmes. The call centre can also deal with following-up on business processes to ensure that blockages are resolved.



Initiative 7: Integrated e-Administration

Environment

Current challenges

- Use of disparate administration systems;
- A large component of data collection is paper-based, in a non-standardised format and often incomplete and unreliable;
- No centralised access point for reporting;
- Duplicated and time-consuming data processing efforts due to a lack of a Single Source of Truth (SSoT);
- Decision-making processes are not informed by current factual and available data;
- Systems for the verification of data and managing accountability for data are inefficient;
- Insufficient consequence management if business processes are not followed;
- SA-SAMS, the current system, is not an online system and does not comprehensively include the critical modules such as LTSM;
- Inadequate individual, holistic and centralised learner profiles e.g. on the DBE Cloud;
- Data usage follows a one-way submission flow from schools to provinces that is not filtered back to schools;
- Lack of school management and leadership capability to use data for decision-making purposes (especially in under-performing schools);
- Inadequate governance, support, buy-in and ownership of ICT at managerial level; and
- ICT is not seen as a strategic tool and ICT initiatives are rolled-out in an uncoordinated manner.

Future trends

- Intelligent tracking strategies for assets, learners and teachers;
- Multiple and dynamic views of curriculum and assessments;
- Reliable education data from a Single Source of Truth, that is, a central database that is accessed online. This database would provide, amongst other data, consistent online examination, assessment and accreditation data, learner and school information. This would result in more interactive assessments to allow for experimental learning and assessment with immediate feedback, and greater integration of data silos; and lastly,
- Parents can intervene timeously in the school life of a learner based on real time feedback on learner performance and attendance.

An ICT enabled e-administration platform that integrates data from various sources and produces accurate and complete information.

How do we plan to transform administration for basic education?

The implementation and use of an education ICT platform that integrates data and that is underpinned by aligned business processes include:

- Accurate, complete, timeous and reliable data from all entry points;
- External data that is available from disparate sources;
- A central portal or cloud where information is accessed, such as the DBE Cloud;
- Supported by strategic advocacy, change management and governance processes.

What are the features of the e-administration platform?

- Existing DBE reporting systems are integrated;
- External stakeholder data (e.g., Home Affairs) is also integrated into the system;
- Production of accurate, reliable and complete data;
- Integrated data warehouse and business intelligence system, that is, a Single Source of Truth;
- Changed attitudes and skills that adopt the new way of doing things.

What are the benefits of the e-administration platform?

- Cost-savings due to:
 - Identification of ghost teachers and learners in the system;
 - Adequate provisioning of teachers;
 - Reduction of paper-based reporting and processes.
- Elimination of replicated administrative processes;
- Multi-dimensional flow of information resulting in informed decision-making;
- Targeted strategic interventions as informed by factual data;
- Reduction of over- or under-reporting of learner numbers;
- Increase financial governance and risk management.

By 2020, we want to have the following impact:

A data-driven education administration that enables the multi-dimensional flow of information from all levels within the education system to inform decision-making and to enhance teaching and learning. This key outcome is supported by the following intermediate outcomes:

- Teachers use automated processes to manage the classroom and have time to respond to individual learner needs;
- School management makes data-driven decisions and focuses their time on strategic issues;
- Parents are digitally informed and support their children based on accurate information;
- Learners can access multiple sources and forms of content and assessments as per their different learning styles and abilities;
- Districts are accountable and have continuous access to planning data that enhances the functionality of schools;
- Provinces use factual data to drive strategic decisions;
- DBE can use factual data to inform policy direction.

That can be measured by:

- 100% of schools and circuits have at least one data officer;
- 100% of schools submit identified data electronically within the specified timeframe;
- 100% of planned independent annual audits conducted;
- Provincial data sets that are available on the e-administration data warehouse;
- Immediate and automatic daily updates from external sources to the data warehouse via appropriate inter-systemic permissions;
- Ten independent data warehouse due diligence audits performed at nine provincial levels and one at National Level;
- 100% utilisation rate of the Business Intelligence system by Provincial Managers, District Managers and schools management;
- 100% of schools utilise the web-enabled SA-SAMS;
- Annual incentive/recognition awards granted to exceptional schools;
- 100% of schools are ranked at the maximum level of e-readiness.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	65 398	41 023	31 807	31 807	31 582	201 623
Training	92 899	289	795	144	136	94 263
Personnel	527 195	527 195	527 195	527 195	527 195	2 635 977
Total						2 931 863

We have considered the following alternative revenue streams:

- Societal contributions;
- Government bonds;
- The structuring of the system development through Public Private Partnerships and Public Public Partnerships; and
- Pooled funding from all provinces.

We aim to implement strategies to reduce the cost of the following cost drivers:

- System development and complexity (including ICT provisioning);

- Number of users to be employed and/or trained;
- The requirement to repeat monitoring and evaluation processes due to a lack of adherence to business processes;
- Level of ICT support required;
- Depth of advocacy at national, province, district and school level.

Initiative 7 *continued*

Overview of implementation plans

The 5-year, high level implementation plan for this initiative has four components:

- The first is to establish a governance and advocacy (change management) framework, including the implementation of quick wins in the second and third year.
- The second component is where business processes are developed in the first year to ensure that data is captured accurately and completely. Independent annual audits will be conducted to ensure all processes are adhered to.
- The third component is to develop an integrated e-Administration system with existing DBE databases during the first two years and implementation in the third year. Training and continuous monitoring and evaluation will be done in years four and five.
- The fourth component is to integrate data from external stakeholders. This will be performed in the first two years, whereafter the data will be integrated into the data warehouse.

The 3ft plan to transform e-administration ensures that existing and new data entering the system is accurate, reliable and complete. This will be done through the development, implementation and monitoring of database administration and business processes, as well as through appointment of skilled data officers.

The next section of the plan is the detailed process on how to integrate external data in a standardised format through functional inter-governmental structures.

The next stage is a detailed plan for the design and implementation of a Single Source of Truth, that is, a web-enabled national data warehouse and business intelligence system that produces customised dashboard reports based on the data needs of schools, districts, provinces and DBE.

The final stage outlines advocacy, the steps for change management and the establishment of governance structures to ensure the sustainability of the transformation process.

The plan also outlines the development of the functionality where the system can integrate with other systems for teacher and curriculum development.

We will have to manage the following risks:

- The lack of buy-in, commitment and ownership of external stakeholders to provide critical data;
- Misalignment of inter-governmental timelines e.g. Integrated Financial Management System (IFMS) roll-out;
- Challenges in the management of the complexity and various levels of ICT maturity in provinces, districts, circuits and schools may lead to uncoordinated roll-out and buy-in from users;
- Insufficient and/or unstable internet connectivity that may prevent submission and access to data;
- Insufficient budget and funding to support the roll-out of the initiative;
- Lack of adherence to governance frameworks business processes, and consequence management; and
- The lack of benchmarking against international best practices may result in inappropriate ICT platforms.

How do we plan to make the initiative sustainable after implementation?

- To expand the vision and function of the existing EMIS unit to incorporate changes intended to reflect all functional areas that rely on e-administration functions and other functions that form part of the System Development Lifecycle (SDLC) including IT Support (that must move from administration);
- Significant behavioural change must occur at school and district level as coordinated by the Change Management team;
- The proposal is that, due to the reliance of behavioral change by users on the success of the initiative, the change management function reports directly to the relevant Head of Department or other designated official;
- The established Advocacy Teams should remain as a permanent change management structure and driver of change, as they are physically located at national, province, district, and circuit levels;
- Operation Phakisa initiatives should be embedded in the performance management contracts for all managerial positions, and job profiles should be updated;
- Ministerial formal buy-in must be obtained to avoid disruptions in implementation.





Workstream 4: ICT Lifecycle Management and Support

Initiative 8: Provision of ICT equipment

Environment

Current challenges

- No robust solutions have been specified nor developed to meet the specific needs of an educational environment;
- To date, most deployments are relatively small and the low volume purchases keep prices high;
- A lack of hardware and license asset management leads to a lack of upgrades, technical support, adequate physical and IT security measures, and monitoring of the movement and condition of equipment;
- Insufficient training in device usage discourages learners and teachers from using devices; and
- Inadequate funds are available for hardware provisioning at schools.

Future trends

- Schools are a blend of physical and virtual learning spaces. Learning is no longer confined to the classroom. Learners have full access to all content, as long as they are within reach of connectivity to internet;
- Personalised learning requires appropriate IT infrastructure, a digitised interactive curriculum, and media-rich supporting content;
- If learners leave the school, they can still do their homework, with the core curriculum stored on their devices; particularly learners with disabilities; and
- A transformation of school IT funding models.

Our aspiration is to create a solutions framework for successful learning environments. To achieve this goal, every learner, teacher, and administrative staff member will receive an age- and education-appropriate device.

What do we mean by provision of ICT equipment?

Devices to learners and teachers:

- Learners will receive education-specific mobile devices in a phased rollout schedule, including devices for learners with special needs. Priority will be given to learners with special needs, multigrade, and rural schools;
- Learners will be permitted to bring their own devices (BYOD — Bring Your Own Device) and use them in class for learning purposes;
- Learners may be allowed to take devices home, with school permission;
- Learners will be supported to access affordable devices;
- Each device will have tracking and recovery technology for security purposes;
- Each device will be preloaded with relevant curriculum content and “apps” where its storage space permits;
- All teacher centres will be made ICT-ready and supplied with e-Libraries;
- Teachers will be provided with education-specific mobile devices in a phased rollout schedule.

IT infrastructure at schools:

- Every office and classroom will have adequate Wi-Fi coverage. Each school will contain a content server, preloaded with the entire curriculum and supporting content to avoid multiple internet downloads by teachers and learners;
- Classrooms will be fitted with a projection/visualisation/display device, which can be integrated with a Learner Management System hosted on a local content server.

Each administrative staff member at schools will:

- Receive a Voice-over-IP handset and a notebook;
- Share a multi-function network printer;
- Have access to a set of charging trolleys to charge devices.

The roll-out of the IT infrastructure will be supported by:

- A concrete set of Guidelines which identify correct and appropriate ICT equipment for teaching and learning, including identifying the necessary equipment and software for disabled learners;
- Collaboration with the DBE's ASIDI unit to ensure that all new schools are ICT-ready;
- A business continuity plan which will include coverage of a sustainable power supply and UPS to ensure continuity of teaching and learning;
- A roll-out plan that includes project and supply chain management, and asset management (more will follow in the section on School IT Support below);
- Software and content automatic updating processes (e.g. remote synchronisation with the DBE Cloud).

By 2020, we want to have the following impact:

- A device in the hand of every teacher and learner;
- Devices and software to support all disabilities;
- Enhanced technology enabled teaching and learning experience.

That can be measured by:

- 100% of teachers with notebooks;
- 100% of learners with appropriate devices including learners with disabilities;
- 100% of schools with administration solutions, which includes devices and a printer, and full Wi-Fi coverage of all offices and classrooms.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	4 423 486	6 437 544	6 437 544	3 218 772	0	20 517 347
Training	0	0	0	0	0	0
Personnel	34 092	34 092	34 092	34 092	34 092	170 462
Total						20 687 809

Alternative revenue streams:

- Non-refundable grants/loans;
- Sourcing devices produced in emerging economy countries, e.g. BRICS;
- Economies of scale;
- CSI/CSR initiatives, including USAO.

We aim to implement strategies to reduce the cost of the following cost drivers:

- Cyclical infrastructure spend with a well-defined refresh cycle, e.g. five years;

- First-line technical support in the form of a School IT Champion;
- Devices for learners, teachers and administrators;
- Content servers;
- Software licenses/costs where necessary;
- Multi-function network printers;
- VoIP handsets for administrative staff;
- Networking hardware, e.g. sufficient Wi-Fi access points per school;
- Power backup solutions and solar power;
- Physical security;
- Charging trolleys.

Overview of implementation plans

The focus of the high level implementation plan is to plan for the e-readiness at primary and secondary schools in the first year and to start with the infrastructure roll-out in the second year. The plan is to supply all teachers and learners with the appropriate devices by end of the fifth year.

The focus of the low-level 3ft plan can be broken up into phases:

- Stakeholder buy-in;
- Roll-out preparation process in terms of resources, infrastructure, framework and security measures at schools, districts, provinces and DBE;
- Solution design and roll-out of devices for every type of school;
- Establishing IT support services that includes a strategic plan for support services and the physical deployment of a national IT support structure;
- Identifying an IT Champion at each school to assist and support the sustainability of the solutions.

We will have to manage the following risks:

- The topographical layout of schools in South Africa varies greatly;
- Many schools are difficult to reach;
- Infrastructure theft;
- Supply chain delays for the very large volumes of equipment that this initiative requires;
- Certain schools do not have an electricity supply;
- Resistance to devices and low usage.

How do we plan to make the initiative sustainable after implementation?

- A five-year refresh cycle for ICT equipment at schools;
- Set up change management structures, systems and processes to sustain the model, particularly to encourage in-class device usage;
- Establish guidelines for asset management to ensure monitoring of loss and budgeting for rollover and replacement/refresh;
- Establish standard operating procedures at each level;
- Develop an Acceptable User Policy to preserve the longevity of all equipment.



Initiative 9: School IT Support Services

Environment

Current challenges

- Previous e-education initiatives in South African schools have focused on the provision of IT solutions, with little to no attention to formal IT Support programmes;
- Lack of asset management resulted in poor records of what IT equipment exists at schools;
- Lack of IT support structures means that much of the IT equipment has not been repaired or replaced; staff did not know how to use the equipment appropriately and kept it locked away;
- No proper upgrade programmes were implemented, which continuously replaced end-of-life IT equipment;
- Lack of formal decommissioning processes to ensure that end-of-life IT equipment is collected from schools and disposed of in an environmentally responsible manner.

Future trends

- Centralised support with first and second line IT support. First-line IT support will be in the form of a "School IT Champion", that is, a person at the school who advocates for, and supports teachers in, using ICTs.
- A structured change management system embedded in schools;
- Individuals feeling empowered to use ICT effectively in the classroom;
- Operational processes are transparent and staff are open to assist with real-time queries and challenges.

Our aspiration is to offer a comprehensive, scalable set of IT support services to all levels of basic education.

What is a comprehensive, scalable set of IT support services?

- A call centre and website to log and support all service requests and incidents will be established as needed;
- Strategically positioned sets of IT operations teams;
- Support provided on a 24/7 basis;
- Remote assistance, where possible, for administrative staff with desktop PCs, to avoid the dispatching of technicians;
- Analytics of call centre data will be used to build an online knowledge base; and
- Avoidance of high-maintenance solutions; that is, solutions which generate many support call-outs.

Our IT technicians will be:

- Placed as close to schools as the density of supported devices allows;
- Appointed from within the community surrounding the schools;
- Trained through recognised certification programmes and in partnership with sister departments that are also running youth ICT training programmes such as SETAs;
- Responsible for troubleshooting IT service disruptions, which the school staff and the IT Champion cannot resolve;
- Adequately deployed to meet needs of districts, based on the size of schools and their geographic proximity to other schools.

How do we log IT incidents?

- All incidents are logged on the national service desk;
- All service requests and incidents will be recorded and technical support progress tracked.

How will we manage the IT Support structures?

- The provinces will be responsible for ensuring the deployment of technical support;
- Private entities — entrepreneurial SMMEs developed from skilled persons living in the districts — will be contracted to perform the entire set of IT Lifecycle functions;
- A Single Service Aggregator will be employed to manage all service delivery partners and vendors;
- Operational support teams will be located at Provincial level;
- A support layer will be created at national level, which will manage incidents with partners and vendors;
- All schools will have access to qualified IT technicians, backed by provincial and national support structures;
- Improved management systems will be available, providing transparent insight into the effectiveness of the IT Support processes.

By 2020, we want to have the following impact:

- A formal support structure with standardised processes will result in a defined service quality experience;
- Local communities will benefit from an IT skills injection and the resultant economic upliftment.

That can be measured by:

- 1 established, fully staffed and operational National support centre, e.g. SITA;
- 9 established, fully staffed and operational provincial hubs, e.g. GITO offices;
- 87 established, fully staffed and operational district hubs;
- 100% of technicians access tools of the trade.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	146 925	324 945	638 059	935 625	1 233 192	3 278 746
Total						3 278 746

We have considered the following funding options:

- A ring-fenced IT budget;
- Tax incentives for increased CSI contributions;
- PPP models;
- LTSM budget adjustments;
- Conditional grants;
- SETA funding.

We have considered the following alternative revenue streams:

- Accessing sister departments' youth ICT training programmes.

We aim to implement strategies to reduce the cost of the following cost drivers:

- While the support service is ultimately determined by the DBE, the management of the IT support function will be handled by a number of private service providers;
- Call centre agents, local technicians and higher-tiered operational teams will be employed by private sector companies, but held accountable by a single service aggregator and strict service level agreements (SLAs).

Overview of implementation plans

The high level implementation plan will focus during the first year of implementation on the establishment of a service model at national, provincial and district levels, as well as determining technical support mechanisms at school level. From the second year onwards, processes will be implemented to ensure the continuous functionality and capability for school service support structures.

The 3ft plan explains how to establish support services for all schools, districts, provinces and national. This will include physical deployment of a support structure for the country.

We will have to manage the following risks:

- Selection and recruitment of suitable candidates who can identify and manage the training programme of individuals from the local community;
- The availability of a system that allows technicians to access the support they need online, from a 24/7 call centre, or by using an escalation process to hand over complex cases to a higher tiered operational team;
- Appropriate technician training programmes;
- Successful adoption of the IT infrastructure and the associated support structures provided to schools.

How do we plan to make the initiative sustainable after implementation?

- School level: Build basic technical capacity in teachers, administration staff and learners, so that they will have requisite knowledge relating to troubleshooting support for basic functions such as:
 - Loading of new e-content onto devices or local caching servers when the automated processes are not available;
 - Ensuring basic functionality of all equipment (connections between printer, laptops and data projectors).
- District level: Build basic technical capacity in district officials:
 - Ensuring basic functionality of all equipment;
 - Ensuring availability of technical support to schools and district offices.
- Provincial level: Provincial officials to advocate for the technical support mandate in order to ensure effective usage of allocated funds. This will require the provincial officials to initiate regular progress and maintenance update syndication forms with districts. This will ensure that adoption rate of using devices will be positive thus creating sustainability.



Initiative 10: Accelerated Schools Connectivity Roll-out

Environment

Current challenges

The challenges span across regulatory, implementation, roll-out and funding issues:

- Existing policy and regulation for national connectivity does not promote infrastructure sharing;
- Significant duplication in connectivity networks;
- Inefficient use of capital in the country;
- Lack of an open access policy around physical infrastructure limits other network operators from participating in SA Connect and also prevents the best competitive price for the rollout;
- No ring-fenced funding for school connectivity. School connectivity is funded by the Universal Services Obligations (USO), Universal Service and Access Funds (USAF), Corporate Social Responsibility funds, and small amounts from the DBE budget;
- Delays in implementing SA Connect; and
- If a single service provider of connectivity is used, it will restrict service delivery and may result in the inefficient use of capital.

Future trends

- Access to education in the future is through high connectivity speeds as content becomes richer with the use of videos and animations;
- Virtual reality and other such technologies transform the classroom;
- Internet connectivity meets the requirements of various sectors and support the rapid pace at which technology and technological adoption is growing.

Our aspiration is to provide recommendations to the DTPS and DoC on how SA Connect can meet the requirements of the DBE.

What is SA Connect?

South Africa Connect: Creating Opportunities, Ensuring Inclusion. South Africa's Broadband Policy specifies the Department of Telecommunications and Postal Services' (DTPS) plans to connect schools, hospitals and other government institutions.

What are the challenges with SA Connect that we need to overcome?

- The bandwidth needs for schools were underestimated;
- Specifications are outdated and must be revised and adjusted;
- Roll-out is slow and must be accelerated;
- Funding models are missing, ambiguous, and might be a challenge to implement;
- A single service provider has certain challenges that will have to be addressed.

What is our recommendation?

- The SA Connect targets must support the educational requirements to fulfil the initiatives of Operation Phakisa ICT in Education. The current SA Connect bandwidth specifications must be adjusted to reflect the requirements of each school and be based on the number of active devices at the school as well as the educational needs case of each school.
- The DBE must therefore produce Guidelines to define the minimum acceptable connectivity speeds for schools, as well as how school-based LANs are to be deployed.
- An objective assessment of existing connectivity needs to be performed and used to inform SA Connect.
- Sources of broadband need to be identified.

What are the Operation Phakisa requirements?

- By the end of the 2018 financial year, 25% of schools must have 10Mbps and another 25% 100Mbps connectivity, in line with SA Connect;
- In 2020, 75% of schools must have 1Gbps connectivity, the other 25% 10Gbps;
- By 2030, all schools must have 10Gbps or higher;
- There must be Open Access and unbundling of connectivity and networks;
- The Private sector should participate in SA Connect through formalised and dedicated funding models;
- The SA Connect timeline should be fast-tracked;
- Digital education content should be e-rated and/or zero-rated (that is, it should be charged at 50% or 0%);
- Coordinated delivery must occur, e.g. the provision of IT devices, training, support, coordinated with connectivity;
- National fibre housing networks exist next to every road, underground electricity, water and sewerage pipes; these should be taken advantage of.

How will we manage the rollout process?

- Access to the internet will have to be sized in proportion to simultaneously browse and still experience high-quality broadband;
- An implementing agent function to monitor and manage all the service providers, coordinate the project plan, and escalate issues back to DTPS;
- Service providers must be allowed to choose the most appropriate technology for a specific environment as a variety of last mile technology options exist, depending on the environment and geographic location.

Which regulatory solutions are required to enable more operators to support the national deployment of broadband?

- Open Access;
- Spectrum Policy;
- Universal Service Obligations;
- E-Rate and Zero-Rate;
- Responsible/Accountable Entity.

Which implementation and roll out solutions are required for faster and more cost-effective roll out?

- DTPS to develop an SOEs rationalisation plan;
- Aggregation of demand;
- Coordination with DPW;
- DBE and DTPS to coordinate all existing funding;
- Roll-out using RFP method.

By 2020, we want to have the following impact:

- All teachers and learners access learning content through the internet;
- Learners have access to a wide range of educational material;
- Learners are engaged with the digital world;
- Schools have fast, reliable and cost-effective connectivity that can be scaled as demand requires; and
- Learners are not inhibited from accessing digital education content due to costs of bandwidth.

That can be measured by:

- A consolidated network connectivity roll out plan, comprising of analysis, User Requirement Specification (URS), infrastructure plan and finance model;
- 100% of planned implementing agents appointed and trained and a high-level site verification completed;
- Connectivity delivered as per DBE's defined standards.

Budget considerations

- The budget reflected below indicates an estimated cost of supplying all schools that do not currently have connectivity with at least a 3G WiFi modem and a 20GB data bundle per month over the five-year period, in a scaled-up rollout. This is intended to tide schools over whilst waiting for USO or SA Connect.

Financial investment (2017 – 2022)

Major Cost component	2017/18	2018/19	2019/20	2020/21	2021/22	Total ('000)
Capex/Opex	71 884	143 768	215 652	287 537	287 537	1 006 378
Total						1 006 378

We have considered the following funding options:

- USAF/USAO;
- Aggregation of government ICT connectivity spending;
- Provincial infrastructure for building schools/CSI/ donor funding budgets;
- Public Private Partnership funding model;
- Education Infrastructure Grant.

We have considered the following alternative revenue streams:

- The excess capacity provided to schools can be used to provide connectivity to the surrounding community free of charge or at a minimal cost. If provided free of charge, revenues could be

attained through the use of non-intrusive, audience-appropriate advertising;

- If fibre housing is provided in DPW projects, these can be rented to service providers and become a revenue stream.

We aim to implement strategies to reduce the cost of the following cost drivers:

- Capital lay-out of national or provincial connectivity infrastructure projects;
- Monthly rental fees from telecommunications companies;
- The DPW standard infrastructure deployment costs, according to the type of infrastructure provided.

Initiative 10 *continued*

Overview of implementation plans

The high level implementation plan focuses on six phases. In the first year, the plan focuses only on the establishment of an environment where a multi-sector coordination can be achieved for the rollout of connectivity in the country. The second part of the initiative is to establish a regulatory framework for connectivity over the first two years. The rest of the sections focus on the planning, preparation and implementation of a two-phase rollout plan. In phase one, eight education districts will be connected and in phase two, the remaining districts.

The 3ft plan for connectivity comprises two distinct parts:

- 1) Detailed tasks on enabling connectivity through coordination, the regulatory environment and funding; and
- 2) Logistics and the comprehensive process of planning and implementing of connectivity. This part includes a detailed plan on how the DBE, DTPS, other departments and various private sector organisations plans to orchestrate the coordination of a multi-sector connectivity rollout.

We will have to manage the following risks:

- Major restructuring of the sector is required, possibly including the consolidation of operations and changing the mandate of entities;
- Delays of approvals to restructure the public sector as it relates to telecommunications can result in slow deployment of the SA Connect project;
- Open access, e-rated and zero-rated policies can affect the private sector sentiment and impede future infrastructure investments; e.g. the e-rate implies that 50% of the costs of connectivity would be borne by the service provider, and zero-rating implies that 100% of the costs would be borne by the service provider;
- The DPW could refuse to bear additional costs to lay additional required fibre housing infrastructure;
- The private sector is unwilling to rent fibre-housing infrastructure and insists on trenching themselves;
- It is not feasible to trench to far-flung rural areas and will require alternative solutions such as microwave;
- Other risks may include end-user activities such as inappropriate use of network resources. These would have to be monitored and managed through for example traffic prioritisation or firewalling, blacklisting/whitelisting sites, and so on.

How do we plan to make the initiative sustainable after implementation?

- Adequate governance structures comprising senior officers between internal and external business units;
- DBE and DTPS to agree on the optimisation of support: centralisation vs decentralisation, the location of accountability for connectivity to schools and how support is delivered
- Network Maintenance;
- Service costs are continuous and it is unclear who should be covering those costs (schools, provinces, service providers, or DTPS);
- Optimisation of network resources:
 - Continuous monitoring of network utilisation;
 - Monitoring of network utilisation statistics, especially bandwidth usage;
 - Monitoring of the network information flow so as to develop traffic and user profiles;
 - Scalable infrastructure design to avoid network bottlenecks and contention or latency;
 - Gradually scaling up: Evolving the network speeds from 10Mbps, 100Mbps, 1Gbps, and >1Gbps.
- Overall monitoring – dashboard and portfolio view showing interaction of all investments.

Operation Phakisa Delivery Unit

5

Lead delivery unit

The DBE will create an Operation Phakisa delivery unit headed by the Operation Phakisa Programme Manager. The lead delivery unit has three responsibilities: Project Management, Resource Management, and Knowledge Management. This lead unit is responsible for integrating all of the initiatives into a seamless roll-out, getting the buy-in and commitment of all provincial education departments, internal DBE units, external stakeholders, and building strategic partnerships with other lead agencies.

Functions:

- Drives the delivery of an integrated solution;
- Provides the expertise required for the initiatives to succeed in terms of change management, programme management, and fund raising;
- Manages implementation agents that may serve more than one sub-delivery unit;
- Ensures functionality of vertical institutional arrangements, e.g. between DBE and Provinces;
- Ensures functionality of horizontal or cross-cutting responsibilities, e.g. between internal DBE units;
- Reports on the progress of performance to the responsible Deputy Director General, Heads of Education Department Committee (HEDCOM), Council of Education Ministers (CEM), Department of Planning, Monitoring and Evaluation in the Presidency (DPME), and other relevant committees;
- Provides regular feedback to the DG on key issues to be addressed and successes achieved; and
- Resolves issues that have been escalated.

Sub-delivery units

Specialised sub-delivery units

There are five specialised sub-delivery units representing the work streams of the lab. Each sub-delivery unit is staffed by officials in existing directorates within the DBE. In addition, each unit is supported by their respective Implementing Agencies.

These specialised sub-delivery units will report to the Operation Phakisa delivery unit until the implementation is complete. The sub-delivery units are as follows:

- Digital content
- e-Administration, including e-Exams systems, supported by the Government IT Office (GITO)
- Teacher ICT Training
- Connectivity
- Devices and Support.

Functions of a specialised sub-delivery unit:

- Provides strategic direction for their respective initiative and ensures successful progress of implementation;
- Serves as a technical centre of excellence and provides key technical insight on implementation;

- Manages shared resources;
- Manages implementation agents specific to the unit;
- Ensures functionality of horizontal institutional arrangements, e.g. between DBE and DTPS;
- Maintains ongoing commitment of supporting departments and their agencies;
- Reports progress of performance to HEDCOM and representative structures;
- Resolves issues that have been escalated via sub-delivery units (geographical) and escalates where necessary to the Lead Delivery unit.

Geographical sub-delivery units

Each province is led by the Operation Phakisa Provincial Manager who coordinates resources across different branches, chief directorates, and directorates with their support. The Operation Phakisa Provincial Manager is supported by a core team including the specialised sub-delivery units to ensure that the learning and experiences benefits all districts.

The Operation Phakisa Provincial Manager will work with a set of coordinators. Some coordinators will focus on implementation between Provinces, Districts, and Circuits while others will focus on school implementation. As the scale-up plan evolves, e.g., implementation moves to different districts and schools, the location-specific resources that support the geographical sub-delivery units will change.

The Operation Phakisa Provincial Manager will be required to submit regular progress reports to DBE for DPME's perusal.

Functions of the geographical sub-delivery unit:

- Customises implementation according to geographical context, but ensures that quality standards and efficiency are maintained;
- Maintains ongoing commitment of Provinces and their succeeding structures;
- Ensures constant alignment between National plans and that of Provinces and their succeeding structures;
- Builds capacity within provinces, districts, circuits, and schools to sustain initiatives;
- Manages the day-to-day coordination of the implementation teams;
- Ensures that the Operation Phakisa Provincial Manager and their team is well-supported through the Lead Delivery unit and the sub-delivery units;
- Reports progress to the HoD, MEC, and management committees;
- Resolves issues that have been escalated via provinces, districts, and schools; escalates to the Lead Delivery unit, when necessary.

These specialised delivery capabilities are expected to strategically direct the implementation of the lab initiatives based on a combination of technical competency and effective project management. These units will report to the DBE lead delivery unit on an ongoing basis.






Implementation agencies

The implementation agencies are responsible for supporting their respective specialised sub-delivery unit by executing the 3ft plans. These agencies consist of various role players including public and private sectors and full-time employees of the DBE.

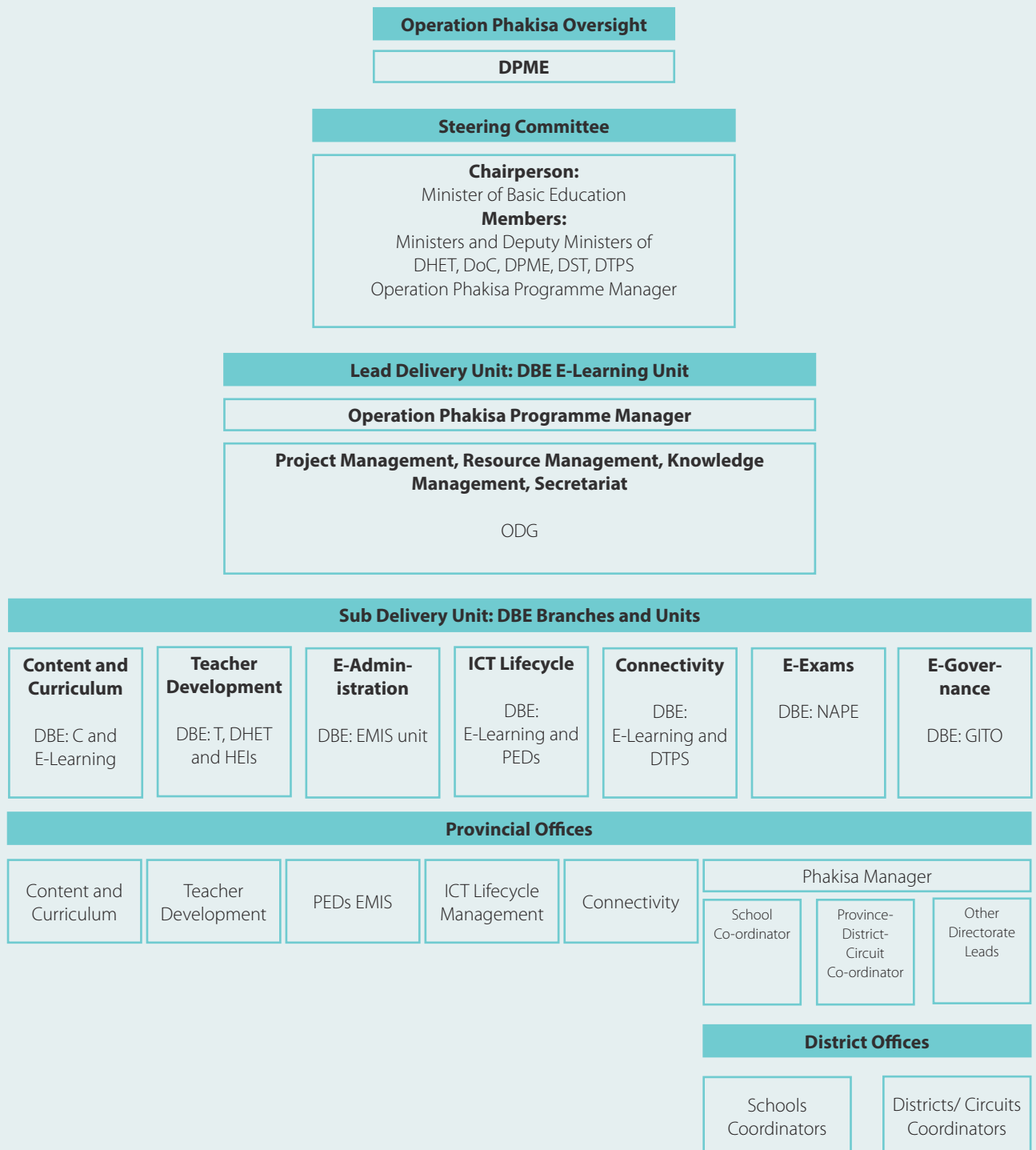
Strengthening the DBE's capacity to deliver

The success of the Operation Phakisa delivery units is highly dependent on the quality of appointed leaders and managers. The officials tasked with the advancing the implementation plans must be outcome driven, self-motivated, and can work with and within teams and governance structures. All managers of the delivery units must have the ability to influence delivery without requiring a title of authority and whereby their role of accountability is acknowledged. Furthermore, the delivery units must have autonomy to operate independently of existing bureaucratic structures, that is, communicate horizontally between implementing units without obstacle, but must be accountable to existing governance structures.

Executing the Operation Phakisa implementation plans will require formal collaboration and strong working relationships with other government agencies and various institutions. Delivery agreements must be prepared and signed off between the following parties:

The level at which institutional arrangement must be developed		Institutions between whom the delivery agreement must be signed
Lead delivery units		DBE and DPME/Presidency
		DBE and implementing agents, e.g. DTPS
		DBE and PEDs
Sub-delivery units		
	Content and Curriculum	DBE, PEDs and Publishers
	Teacher Professional Development	DBE, PEDs, DHET and HEIs
	e-Admin	DBE, NECT and SITA
	IT Lifecycle Management	DBE, PEDs and SITA
	Connectivity	DBE, DoC and DTPS

Delivery Model



6

Costing

Performing the Costing Exercise

Costing the Operation Phakisa implementation plans was conducted by GTAC (Lead), National Treasury, DBE, National Finance and Provincial Finance (Eastern Cape) with input from provincial CFOs. Various aspects of financing and resourcing were considered in the cost calculation. The considerations include, fiscal neutrality, national and provincial budgeting aspects and external sources of funding and financing options. The realities of resource and implementation constraints were included in the cost deliberations, as were cost-saving activities and funding options.

Revising the Budget

The costs presented in this section reflect projections of the pricing of a marginally reduced implementation of all ten initiatives, as envisioned over the implementation period. The largest portion of the projected costs is attributed to the provision of IT infrastructure to all learners, teachers and administrative staff. The reader should note that the costs cited are based on a number of assumptions which may evolve over time, such as the nature and staging of the learner devices rollout.

After the budget was presented, it was determined that the projections were beyond the capacity of the fiscus. As such, the DBE, together with GTAC, produced the following reduced budget. Changes to the original budget were done to bring the costing in line with projected available funding.

Devices: The per-device cost estimate was changed from R 4500.00 per device unit to R 1500.00 per device based on a survey of pricing of equivalent devices.

The DBE also determined that low-cost access point servers can be deployed instead of a wired LAN and high-end servers, resulting in an approximate 25% cost reduction and increased reliability/ease of maintenance, which in turn reduces the need for skilled on-site support at schools.

Furthermore, it was determined that as devices cycle downwards in the refresh cycle, learners can receive devices from higher grades, and as such, a 1:2 device:learner ratio would be sufficient. At present, the DBE is deploying devices in an approximate 1:20 device:learner ratio under USO.

Training of teachers: The target was reduced to 33% based on the following assumptions:

- That within five years, a significant number of teachers would have retired;

- That new recruits would enter the sector annually with ICT skills to replace retirees;
- That many teachers already have skills and have been trained.
- All courses could be set to five days and recognise weekends.

These points also reduced the number of educator laptops to 33%, since it is assumed that only teachers who have undergone training will require laptops. However, upgrading storage facilities for hardware at schools was omitted from the original Lab budget, and this was offset against the saving in teacher training.

Hardware support: No support beyond warranty is deemed necessary for tablets, and it was judged that one technician per school is sufficient (not two). Other HR costs were reduced by reducing call centre costs, and project management costs.

Content: the cost of developing content was revised based on the number of DBE subjects, at a cost calculated per subject based on a quotation obtained for TV studio hire and related personnel, reducing the cost by approximately 90%, allowing approximately R 2 million per year per subject for content development.

Integrated e-Administration: HR costs were reduced by allocating one support person per circuit and per district, rather than per school, reducing costs by approximately 80%.

Connectivity: it was taken that DBE need only provide fallback connectivity, and that DTSPs, through the SA Connect initiative, would provide the primary connectivity to schools. This reduced the cost of the connectivity initiative by approximately 90%.

These changes reduced the budget projection by approximately 117 billion Rands.

These costs are proposed, not actual budgeted costs.

Costs per Initiative

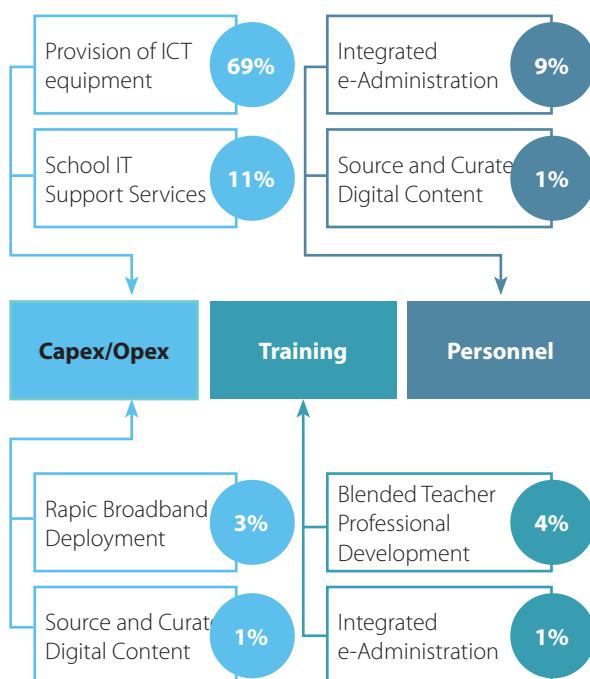
The table below summarises the costs per initiative over a five year period. The budget for the three-year MTEF period is significantly lower even than this budget as it had to meet budget targets.

Not all of the initiatives directly contributed to each of the cost categories. The main cost contributing initiatives per category are indicated in the figure account for 99% of the costs.

Summary of cost per initiative over a five year period

Initiative	2017/18 (Rand, '000)	2018/19 (Rand, '000)	2019/20 (Rand, '000)	2020/21 (Rand, '000)	2021/22 (Rand, '000)	Total (Rand, '000)
Source and Curate Digital Content	155 041	70 875	70 875	70 875	70 875	438 541
Deliver an Online Learning Platform	50 110	19 860	18 860	17 860	17 860	124 551
Data Analytics	23 887	-	-	-	-	23 887
Blended Teacher Professional Development	364 720	297 151	268 761	271 348	114 913	1 316 891
Researched-based Teacher Development for Innovative Teaching	4 230	8 260	11 560	13 650	15 210	52 910
Mobile Application for Teacher Wellness ¹	-	-	-	-	-	-
Integrated e-Administration	685 493	568 514	559 798	559 146	558 913	2 931 863
Provision of ICT equipment	4 457 579	6 471 637	6 471 637	3 252 865	34 092	20 687 809
School IT Support Services	146 925	324 945	638 059	935 625	1 233 192	3 278 746
Accelerated Schools Connectivity Roll-out	71 884	143 768	215 652	287 537	287 537	1 006 378
TOTAL	5 959 868	7 905 009	8 255 202	5 408 906	2 332 592	29 861 576

¹ The costs associated with the Taking Care of Teacher initiative is incorporated within the e-Administration initiative.
Totals may not precisely equal the sum of the columns due to rounding off.



Funding Options

The following funding options have been identified:

- Dedicated government funding and creation of ICT/EMIS specific grant;
- Government-sourced external funding;
- Re-appropriation of existing budgets;
- Public and private partnerships;
- Targeted internal and external donor funding linked to strategic content needs;
- Skills Development Levy and the NECT;
- Research institutes;
- The Funza Lushaka Bursary Scheme by making it involve teacher ICT training;
- Savings on new infrastructure costs;
- Educational discounts by vendors;
- Reappropriation of the LTSM budget - hard copy would be discontinued;
- Tax incentives for increased CSI contributions;
- Universal Service Fund;
- Setup capital to be sourced through SITA, business incubator partnerships.

The major cost components in relation with the total cost:

Initiatives	% of total	Main cost drivers influencing the cost
Source and Curate Digital Content	1.47	<ul style="list-style-type: none"> Initial cost for sourcing of content; Review and upgrading of content; Staff provisioning and remuneration.
Deliver an Online Learning Platform	0.42	<ul style="list-style-type: none"> Establishment of a portal; Broadcasting costs.
Data Analytics	0.08	<ul style="list-style-type: none"> Software and delivery platform development and maintenance; Content sourcing and curation.
Blended Teacher Professional Development	4.41	<ul style="list-style-type: none"> Digitising existing material; Developing new material; Training delivery and online assessment; Provision of training across the sector as required by each initiative; Professional development of teachers.
Research-based Teacher Development for Innovative Teaching	0.18	<ul style="list-style-type: none"> Diagnostic tests; Research projects and reports.
Mobile Application for Teacher Wellness	0.00	<ul style="list-style-type: none"> This cost has been included in the systems development of the e-Administration initiative.
Integrated e-Administration	9.82	<ul style="list-style-type: none"> System development and complexity; Appointment of data officers.
Provision of ICT equipment	69.28	<ul style="list-style-type: none"> The cost drivers in this initiative are primarily based on cyclical infrastructure spend with an approximate five-year lifespan. The main cost drivers include items such as devices, servers, additional backup storage, software licenses, multi-function network printers, VoIP handsets, switches, CAT-5 cabling, sufficient Wi-Fi access points, power backup solutions, projectors, visualisers, projector screens, physical security, installations and charging trolleys.
School IT Support Services	10.98	<ul style="list-style-type: none"> Provision of IT support services across the sector through the use of private companies employing call centre agents, local technicians and higher tiered operational teams.
Accelerated Schools Connectivity Roll-out	3.37	<ul style="list-style-type: none"> Capital lay-out of national or provincial connectivity infrastructure projects; Monthly operational rental fees from Telco's.

* Note: The cost of the initiative Mobile Application for Teacher Wellness was included in the e-Administration costing as part of the system development component.

MTEF Budget 2017-2020: Sector

The MTEF budget was developed specifically to meet Treasury's budgetary constraints for the MTEF period. It was based on an assumption of performing simplified versions of the Operation Phakisa initiatives, relying heavily on the USO, and specifically only distributing devices in a 1:5 device:learner ratio.

Initiative	2017-2018	2018-2019	2019-2020
Capex/Opex	33 231 600	3 081 600	3 081 600
Training	322 299 000	285 067 500	256 677 500
Personnel	9 188 939	9 001 439	9 001 439
Tech Support Capex/Opex	146 924 880	324 944 640	638 058 720
Devices: Capex/Opex	4 423 486 116	6 437 544 463	6 437 544 463
Project Mgmt: Personnel	34 092 399	34 092 399	34 092 399
Capex/Opex	31 378 882	22 684 441	15 000 000
Training	266 304		
Personnel	456 341 456	456 341 456	456 341 456
TOTAL	5 457 209 576	7 572 757 938	7 849 797 577

MTEF Budget 2017-2020: Provinces only*

Province	2017-2018	2018-2019	2019-2020
Eastern Cape	857 327 624	1 189 680 272	1 233 203 199
Free State	296 326 480	411 200 756	426 244 008
Gauteng	865 513 439	1 201 039 409	1 244 977 896
KwaZulu-Natal	1 275 349 878	1 769 753 530	1 834 497 694
Limpopo	757 460 689	1 051 098 802	1 089 551 904
Mpumalanga	467 682 861	648 985 355	672 727 652
Northern Cape	127 152 983	176 445 260	182 900 284
North West	351 990 018	488 442 887	506 311 944
Western Cape	458 405 604	636 111 667	659 382 996
	4 998 803 972	6 936 646 271	7 190 414 581

* Based on percentage of learners in the respective province, taking into account whether the province has existing infrastructure. The PEDs' budgets are primarily for equipment and training; other initiatives, such as e-Administration and content aggregation, reside at DBE.



Monitoring and Evaluation

Monitoring the progress made towards achieving the aspirations of the lab will be an ongoing and iterative process. The lead and provincial Operation Phakisa Delivery Units, with the support of officials from all levels of the basic education sector, will be responsible for providing regular progress reports, as well as incorporate feedback to improve service delivery. The rigorous monitoring process through Operation Phakisa is structured to achieve the education-related Millennium Development Goals and goals outlined in the DBE's Action Plan to 2019.

The Operation Phakisa process outlines the M&E roles and responsibilities for various entities:

Entity	Roles and Responsibilities
President and Cabinet	<ul style="list-style-type: none"> Oversee execution of initiatives through periodic reports; President to intervene where necessary.
Minister in the Presidency	<ul style="list-style-type: none"> Monitor, problem-solve and intervene at Ministerial level.
DPME – Operation Phakisa Unit	<ul style="list-style-type: none"> Support Operation Phakisa processes through a team of project managers; Develop and execute Monitoring Framework and methodology.
Lead Ministers (DBE, DTPS for Connectivity)	<ul style="list-style-type: none"> Lead implementation of 3ft plans; Monitor execution of 3ft plans.
Steering Committees	<ul style="list-style-type: none"> Monitor execution of 3ft plans and performance; Manage delivery units.
Delivery Unit	<ul style="list-style-type: none"> Drive delivery and provide support; Report to DPME unit and SteerCo.
Implementation Agents	<ul style="list-style-type: none"> Implement 3ft plans; Capture progress on reporting system.

What do we need for monitoring and evaluation?

- Performance indicators as outlined in the 3ft plans;
- Efficient system for reporting and obtaining feedback;
- Dedicated M&E functionality in the Operation Phakisa delivery units;
- Accountability through governance structures.

Standards for Performance Indicators

- Indicators must be SMART (specific, measurable, attainable, realistic and timely);
- As far as possible, indicators must use local resources and be cost-effective.

Standards for Reporting System

- Web-based or electronic reporting system;
- Comprehensive functionality for multi-stakeholder reporting;
- Incorporates existing data from EMIS, SA-SAMS;
- Captures feedback and recommendations.

Standards for the Monitoring and Evaluation functions

- Substantive accountability to government, beneficiaries, donors, other partners and stakeholders;
- Prompt corrective action;

- Informed decision-making;
- The promotion of risk management;
- The enhancement of organisational and individual learning.

The functions of the monitoring and evaluation process:

- Cover the progress made on delivering outcomes;
- Report any factors contributing to or impeding progress on the 3ft activities;
- List project managers' contributions to the overall project activities;
- Reflect on lessons learned and knowledge created;
- Ensure continuously updated and approved project targets.

The core outputs of M&E

- Monthly progress reports to DPME and DBE. The report highlights the following:
 - Implementation progress per initiative and per province.
 - Bottlenecks and/or other challenges to implementation;
 - Expenses and cost-savings incurred.
- Formal quarterly and annual reports for stakeholders;
- Annual budget reports to DBE and funding agencies.

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Recommendations

Appoint a dedicated delivery unit and examine political will to implement	Examine and modify the implementation plan to reflect the available implementation capacity and the required political will to make the plan a reality. Appoint a dedicated team of people, which can action the plan and track the progress with respect to targets that were set.
Adopt and elevate a central ICT in Education plan	The plan must be nationally adopted and elevated to become the central ICT in Education architectural authority that supersedes all previous guidelines, plans, and policies.
Adopt and elevate a central ICT in Education plan	The plan must be nationally adopted and elevated to become the central ICT in Education architectural authority that supersedes all previous guidelines, plans, and policies.
Establish commitment and ownership with relevant structures	Relevant owners of each 3ft plan task must commit to its completion. The plans have been presented to MMM, HEDCOM and CEM and approved.
Collaborate with sister departments	The DBE, along with key sister departments should establish a common vision and clearly define ownership and accountability structures.
Revise White Paper	Revise the White Paper due to changes in technology, surrounding practices and terminology and incorporate the Operation Phakisa plans. In particular, draft a Strategy document which defines the vision of the DBE.
Committed and ring-fenced funding	A committed set of funding solutions must be applied to ensure that the initiatives are successfully implemented and sustained.
Adopt ICT in Education Norms and Standards or Guidelines	It is crucial that a definitive guide containing the required definitions of Norms and Standards or Guidelines be drafted and adopted, and that all national and provincial implementation projects be aligned to these.
Fast-track e-readiness of schools	Identify schools that do not meet e-readiness criteria and fast track the required remedies. If the deficiencies in the schools are not addressed timeously, the implementation of the various initiatives will be delayed.
Foster ICT ethics and human element in schools	Social and cultural interactions remain critical to the positive psychosocial development of all members of the school community. Human relationships, as well as ethical uses of ICT in Education, should be strongly advocated and fostered at all schools.
DBE to embrace modernisation	The entire DBE must undergo a cultural shift, where e-Education is embraced, valued, and used. To achieve this, the DBE must adequately prepare for workplace modernisation at all levels, e.g. in e-Governance and digitisation of business processes.
Interrogate SA Connect targets	Revise the SA Connect targets to 1) account for the number of devices that are estimated to simultaneously make use of the connectivity and 2) accommodate the bandwidth requirements of the applications running on such devices. Use multiple service providers to ensure adequate and cost-effective connectivity.
Create incentives for pockets of excellence	Investigate the possible consolidation of government's current connectivity spend to identify cost-saving strategies.

Conclusion

Over the past few decades, the introduction of information technologies, internet connectivity, and other forms of educational technologies has aimed to enhance the teaching and learning process. Globally, ICT in Education initiatives have mirrored the evolving nature of technologies, such as the introduction of overhead projectors into schools in the 1950s, while the first computer terminals appeared in universities in the 1960s. Today we see a rise in the use of mobile devices such as tablets and smartphones.

In South Africa, the education sector has taken some advantage of the value that technology could add to the teaching and learning processes. In 2004, the White Paper on e-Education provided the framework to introduce computers into all government schools and to transform schools into e-Education environments. The White Paper may have appeared to be an ambitious attempt to transform and modernise learning environments only ten years into democracy; yet, it accurately recognised the need for South African education to keep up with the global technological trends and to familiarise learners with a new set of skills to be able to contribute to personal and societal development.

Many of the ICT in Education initiatives that followed aimed to provide learners and teachers with access to information, innovative pedagogical practices, and new forms of literacy and communication. Large provincial initiatives included Gauteng Online and the Western Cape's Khanya Technology in Education Project. Nationally, the development of the Thutong Portal supported the distribution of educational content and information for learners, teachers, and parents. Across the country, there were pockets of ICT project excellence, but these projects were often uncoordinated, unsustainable, and provided limited information on the impact it made on teaching and learning.

To date, Gauteng and the Western Cape have harnessed the political will and finances to implement scalable provincial initiatives. Other provinces continue to progress, albeit less rapidly, in introducing ICTs for teaching and learning. The information gleaned from e-Education policy dialogues, feasibility studies, and audits pointed to several critical factors that impede the progress of the White Paper goals.

These factors include:

- National Norms and Standards or Guidelines for ICT in Education were not determined to serve as guidelines for the implementation of national and provincial initiatives;
- Little or no integration of provincial ICT initiatives. Instead, their roll-out progressed at different rates;
- Absence of a dedicated ICT budget at provincial levels. As a result, competing budgetary needs delayed the implementation of minimum infrastructure requirements;
- Minimal guidance on the integration of ICT in curriculum planning.

The complexity of the factors and the compounding challenges resulted in an ICT implementation plan that lacked the drive and support nationally.

In light of these factors, the notion to "Phakisa" ICT in Education is long overdue. It should be noted that the reach of 'ICT in Education' extends beyond the provision of devices. Rightfully, providing schools electronic devices cannot be seen as a panacea to the challenges in the basic education sector; however, it would be irresponsible to ignore current technological advancements and government initiatives, and the vast opportunities they afford for efficient service delivery, data driven decisionmaking, and equitable learning environments. The ten initiatives that emerged from the Operation Phakisa labs were informed by these realities and, similar to the ideas of the White Paper, the lab aspirations were ambitious and forward thinking.

The Operation Phakisa Education lab approached ICT integration from a different angle. Global trends and best practices were considered, but more importantly, the lab encapsulated the problems and resultant needs that learners, teachers, and administration staff had and then identified what role ICT could play to address needs and add maximum value to the system. Instead of trying to find educational applications that justify the introduction of technology, a holistic e-Education solution was scoped and developed specifically to the South African educational context.

The strategic direction for education in South Africa has been set in the action plan until 2030. It is imperative to focus on implementation frameworks that will ensure the achievement of the valuable planning that has been done thus far.

The Operation Phakisa 3ft plans were scrutinised by ministerial, departmental and industry representatives at regular intervals. Furthermore,

the involvement of national and provincial representatives from the DBE, teachers, learners, sister government departments, union representatives, NGOs, and the private sector ensured a comprehensive analysis of the problem from various stakeholder perspectives. Given the ongoing validation and syndication sessions, the proposed detailed implementation plan presents stability in the strategic direction, as well as appropriate solutions that demonstrates utility and warranty; in other words, fit to purpose and use. The low-level plans enable various stakeholders to focus on eliminating internal bottlenecks and implementing prescribed targets.

In closing, the 3ft plans, costing and delivery models, and holistic view of ICT integration provides insight to the possible future of South African education. The ability of government to advance the transformation and modernisation of the DBE will be determined by the systemic and behavioural changes that are implemented, the policies that are adopted, and the reallocation of funds to make ICT in Education a reality in all schools.

The DBE has secured the approval of the Operation Phakisa plans at HEDCOM, CEM and other decision-making bodies. The DBE has also determined the structure of the Operation Phakisa Delivery Units, and begun the process of identifying resource allocations.

The Operation Phakisa lab emerged with one of largest and most ambitious e-Education projects. If the plans are implemented as proposed, South Africa undoubtedly will assume the reins as the leader in e-Education.

It is time to implement with big, fast results.

Acknowledgements

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- The Minister of Performance Monitoring and Evaluation;
- The Minister of Telecommunication and Postal Services;
- The leadership team of the Department of Basic Education;
- The leadership team of the Department of Planning, Monitoring and Evaluation;
- All participants that have attended the lab with commitment and passion;
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- The provincial CFOs that assisted with the costing;
- Leaders in the industry that participated in steering committees and provided industry insight;
- The Deloitte Consulting: Public Sector professional Services team.

Abbreviation and Acronyms

BFR	Big Fast Result
CEM	Council of Education Ministers
CEO	Chief Executive Officer
CPTD	Continuing Professional Teacher Development
CSI	Corporate Social Investment
DBE	Department of Basic Education
DD	Deputy Director
DDG	Deputy Director-General
DG	Director-General
DHET	Department of Higher Education and Training
Dir	Director/Directorate
DoC	Department of Communication
DPME	Department of Performance Monitoring and Evaluation
DPSA	Department of Public Service and Administration
DTPS	Department of Telecommunications and Postal Services
DTT	Digital Terrestrial Television
e-Admin	Electronic Administration
e-ANA	Electronic Annual National Assessment
ECA	Electronic Communications Act
EMIS	Education Management Information System
FET	Further Education and Training
Ft	Feet
GB	Gigabit is a measure of computer data storage capacity that is roughly equivalent to 1 billion bytes
Gbps	Gigabits per second
GET	General Education and Training
GITO	Government Information Technology Officer
GTAC	Government Technical Advisory Centre
HEDCOM	Heads of Education Departments Committee
HoD	Head of Department
ICT	Information Communication Technology
IP	Internet Protocol
IT	Information Technology
LMS	Learning Management System
LSM	Learner Support Material
LTSM	Learner Teacher Support Material
M&E	Monitoring and Evaluation
Mbps	Megabits per second
MEC	Member of the Executive Council
MOU	Memorandum of Understanding
NDP	National Development Plan
NECT	National Education Collaboration Trust
NGOs	Non-Governmental Organisations
NICPD	National Institute for Curriculum Professional Development
NSC	National Senior Certificate
PED	Provincial Education Department
PMO	Project Management Office
PPP	Public Private Partnership
QA	Quality Assurance
RSA	Republic of South Africa
SASAMS	South African School Administration and Management System
SGB	School Governing Body
SLA	Service Level Agreement
SMT	School Management Team
TB	Terabyte
Thutong	National Education Portal
UPS	Uninterruptible Power Supply
VAT	Value-Added Tax
VoIP	Voice over IP
WiFi	Wireless Fidelity, Wireless Internet

Definitions

Blended learning

This is a formal education approach in which a student learns at least in part through delivery of content and instruction via digital and online media with some element of student control over time, place, path, or pace.

CAPS compatible content

Curriculum Assessment Policy Statements.

Cloud

Used to store and access data and programs over the internet.

Digital Divide

The gap in the access to and usage of information and communication technology, including the skills to make use of the technology within a geographic area, society or community. The divide within countries may refer to inequalities between individuals, households, businesses, or geographic areas, usually at different socio-economic levels or other demographic categories. The divide between differing countries or regions of the world is referred to as the global digital divide, examining this technological gap between developing and developed countries on an international scale.

Education Phases

Foundation Phase: Grade R – 3; Intermediate Phase: Grade 4 – 6; Senior Phase: Grade 7 – 9; Further Education and Training (FET): Grade 10 – 12.

EMIS

The Directorates at PEDs and DBE that are responsible for the collection, storage and distribution of information for educational planning and management purposes.

Lab

Refers to Operation Phakisa Education Laboratory conducted during four weeks from 6 September 2015 to 2 October 2015.

National Broadband Policy

The policy established in terms of section 3(1) of the Electronic Communications Act, 2005 (Act No. 36 of 2005) governing the broadband in South Africa.

National Curriculum Statement

A policy statement for learning and teaching in South African schools.

OERs

Open Educational Resources are documents and media, freely available online, that can be used for teaching, learning, and assessing purposes.

Operation Phakisa

Operation Phakisa for Education addressed a multitude of challenges that the DBE faces in delivering quality education to the nation.

SA Connect

The national broadband policy and the associated strategy and plan.

Virtual Learning Environment (VLE)

A virtual learning environment (VLE) is a platform for the digital aspects of courses of study, usually within educational institutions. VLEs typically allow participants to be organised into cohorts, groups and roles; present resources, activities and interactions within a course structure; provide for the different stages of assessment; report on participation; and have some level of integration with other institutional systems.

High-level Implementation Plan

Task Name	Duration
Source and Curate Digital Content	53.83 months
Formation of task team to manage curation process	6.3 months
Source all available content and develop one single repository	19.4 months
Develop Norms and Standards or Guidelines (checklist)	2.75 months
Determine and document existing content in all formats from all stakeholders	1.1 months
Identify relevant content stakeholders	1.05 months
Convert existing formats of content to make them interactive	13.1 months
Identify and fill content gaps according to database	19.25 months
The sourcing/procurement of peculiar, additional, enrichment and edifying materials	42.3 months
Deliver an Online Learning Platform	54.35 months
Setup portal and LMS	4.1 months
Develop plan and specifications for broadcasting	27.5 months
Develop the LMS and portal	14.9 months
Maintain LMS and portal	54.35 months
Establish teams that will manage the virtual learning environment	13.95 months
Develop digital training material and conduct training sessions for teachers	3.6 months
Develop a plan for setting up to implement the portal, LMS and the broadcasting solution	1.7 months
Develop protocol for off-line deployment and deploy content	50.05 months
Data Analytics	52.15 months
Establish a sub-task team with administrative rights at district, provincial and national levels to collate, analyse, interpret, report on usage, user feedback, learner performance, pedagogic impact and systemic efficiencies	3.25 months
Ensure the sustainability of the VLS	15.25 months
Recruit and appoint the necessary staff for the delivery team	2.85 months
Conduct a baseline study on the current status of digital content and systemic efficiencies, to support future measurement of progress and impact of the Virtual Learning Solution (VLS)	3.35 months
Identify trends, patterns, anomalies, successes and failures in order to improve VLS through a quarterly review process	3.85 months
Identify trends, patterns, anomalies, successes and failures in order to improve VLS through an annual reporting process	42.4 months
Blended Teacher Professional Development	52.15 months
Set up delivery unit/core project team to control development and digitisation of content	3.25 months
Develop training capacity by post provisioning, train current staff and recruit new staff	42.3 months
Establish assessment frameworks for ICT competency and design learning pathways	6.45 months
Preparation for roll-out of L1 training and learning pathway to educators at all levels (teachers, HoDs, principals, deputies, subject advisors, office based)	3.35 months
Develop learning pathway for office-based educators, principals, deputies, HoDs, teachers and admin staff	3.3 months
Identify high priority courses and digitise them	12.05 months
Provide customised ICT learning pathway training to principals and deputies	11 months
Advocacy of online platform (self-assessment tool and online courses)	3.25 months
Provide customised ICT learning pathway training to HODs	9.85 months
Provide customised ICT learning pathway training to teachers	9.85 months
Provide customised ICT learning pathway training to office based educators	8.85 months
Provide customised ICT learning pathway training to school administrative assistants and district/circuit administration assistants	3.25 months
Offer support and incentives to teachers	46.75 months
Identify and digitise phase 2 content	13.1 months

Researched-based Teacher Development for Innovative Teaching	52.15 months
Lobbying, advocacy and communication to get buy-in from all stakeholders	6.5 months
Develop mechanisms and processes to train new teachers entering the education system which are unable to teach with and through ICTs	13.1 months
Reinforce/strengthen ICT Committees within national, provincial, district and school structures to include ICT Innovation into their agendas	9.55 months
Design the centre/structure, identifying the roles and responsibilities of participants and the strategic goals and objectives, activities, inputs, outputs, indicators and outcomes	10.9 months
Incorporate the new roles and responsibilities into the monthly, quarterly and annual reporting templates	2.3 months
Train current teachers to teach with and through ICTs and develop mechanisms to assist teachers to continuously stay current	39.15 months
Create awareness for teachers to take advantage of South Africa's strong and vibrant national system of innovation so that South African innovation is used to solve critical South African problems	38 months
Create training modules for innovative uses of ICTs in the classroom by teachers that can filter into the system to inform and inspire other teachers	34.85 months

Mobile Application for Teacher Wellness	52.15 months
Establish national committee to oversee application development, compilation of service offerings, and to monitor delivery on said service offerings	3.2 months
Establish list of services offered	2.15 months
Establish platform compatibility and communication channels with national and provincial systems	11 months
Develop mobile application	18.5 months
Preparation for roll-out	3.25 months
Distribution of mobile application	0.55 months
Launch advocacy campaign	0.55 months
Monitoring of teacher development process	43.45 months
Service Improvements on teacher development process	43.45 months

Integrated e-Administration	45.55 months
Build human resource capacity at schools and circuits	13.05 months
Develop standardised business processes for data collection, verification and analysis	39.1 months
Remove potential ghost employees or learners from the system	34.85 months
Determine the error margin for the accuracy, completeness and reliability of data in schools through an annual independent audit	17.35 months
Determine external data stakeholders	4.35 months
Perform due diligence on data warehouse and business intelligence systems	7.6 months
Represent the e-Admin Initiative on a functional ICT advisory committee	3.25 months
Establish an operational national DBE structure that is led by the e-Admin	3.15 months
Establish advocacy teams at national, provincial and district level to drive the implementation of Operation Phakisa initiatives at their levels	3.15 months
Publish and announce quick wins from various e-Admin streams	10.85 months
Update existing and formalise new agreements with stakeholders	7.6 months
Accelerate the modernisation of SASAMS	16.25 months
Gather information about data usage perceptions at all levels	8.75 months
Increase the level of e-readiness of users of the e-Admin system	6.55 months
Establish recognition and award scheme for pockets of excellence at the various levels	12.45 months
Reach mutual agreement with identified external stakeholders on submission terms and requirements of data	6.55 months
Ensure that functioning governance structures are in place	9.75 months
Develop all required universes within the BI data warehouse	16.3 months
Prepare users for strategic usage of data	10.85 months
Establish sustainable monitoring and evaluation process	23.85 months
Review the e-administration system at 2019 to determine the future single modernised platform	6.25 months

Provision of ICT equipment	44.6 months
Establish a programme management office	9.85 months
Appoint project staff	9.85 months
Elicit involvement and ownership from stakeholders	44.1 months
Asset register system requirements documented, assessment and gap analysis instrument conceptualised	44.6 months
Physical security infrastructure preparation	16.3 months
Design the IT solution for schools	41.85 months
Specify power solutions	3.25 months
Management of the school infrastructure	7.6 months
Define project scope	5.5 months
Revise the solution specification for each school based on the gap analysis results	9.5 months
Develop process for promoting IT sustainability	3.35 months
Perform post deployment activities	38.1 months
Perform risk management	35.9 months

School IT Support Services	44.6 months
Develop strategic plan for IT support service hubs	44.6 months
Deployment of technical support structure	21.8 months
Develop e-waste management protocol and implement the process	2.65 months
Develop alternative energy solutions	3.25 months

Accelerated Schools Connectivity Roll-out	54.15 months
Enhance the governance arrangements for the roll-out of connectivity	1.15 months
Review of the Universal Service Access Fund	13.4 months
Review of the Universal Service Obligation	13.4 months
Review of open access initiatives currently being undertaken	7.65 months
Review of rapid deployment initiatives currently being undertaken	7.65 months
Review of spectrum policy initiatives currently being undertaken	13.4 months
Recommend alternative funding and delivery models for connectivity	17.15 months
Identify possible additional funding streams for connectivity	3.3 months
Develop user requirements for 1st phase of connectivity (8 districts)	2.3 months
Develop procurement strategy and programme management plan for phase 1 roll-out	0.8 months
Appoint and induct implementing agent(s) for phase 1 roll-out	5.9 months
Undertake programme management for phase 1 roll-out	21.9 months
Analyse supply gap for phase 2 roll-out	1.65 months
Ensure the coordinated roll-out of connectivity	54.15 months
Develop user requirements analyses for phase 2 roll-out	3 months
Undertake high-level network infrastructure planning for 1st phase of connectivity	3.5 months
Engage with stakeholders and verify phase 1 sites	1.3 months
Undertake programme management for phase 2 roll-out	26.25 months
Undertake high-level network infrastructure planning for phase 2 roll-out	3.55 months
Undertake financial and economic modeling of various options for phase 2 roll-out	4.2 months
Undertake project management for phase 1 roll-out	29.95 months
Engage with stakeholders and verify phase 2 sites	1.35 months
Review procurement strategy and develop the programme management plan for phase 2 roll-out	0.8 months
Appoint and induct implementing agent(s) for phase 2 roll-out	5.9 months
Undertake project management for phase 2 roll-out	29.95 months



Early Childhood Development Strategy, which aims to lay a solid foundation for learners in accessing education and providing a head-start in succeeding in their schooling years;



Literacy and Numeracy Strategy, which aims to prepare the ability of learners to read, write and calculate;



Inclusive Education Strategy, which aims to address the learning and teaching needs of learners with disabilities, barriers to learning and curriculum differentiation;



Supply of Workbooks Strategy, which aims to improve performance in the first six grades in numeracy and literacy;



Mathematics, Science and Technology Strategy, which aims to improve participation in and performance of learners in Mathematics, Science and Technology education;



Supply and Utilisation of Textbooks Strategy, which aims to make quality textbooks available for learners in every subject;



National Strategy for Learner Attainment, which aims, among other things, to sustain improvement in learner outcomes; to promote accountability at all levels of the system; to make all schools functional; to protect teaching time and learning; to improve support in teaching and learning; the



Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (2011-2025), which aims to improve the quality of teacher education and development in order to improve the quality of teachers and teaching.

