Tomorrow starts today

Technology in Education

Considerations and Trends for the Education Sector
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Introduction – Technology in Education

The Education sector in South Africa is governed by the Department of Basic Education (DBE), which is responsible for primary and secondary schools, and the Department of Higher Education and Training (DHET), which is responsible for tertiary institutions and vocational training.

The basic education system is comprised of public schools, private schools (also referred to by the department as independent schools), early childhood development (ECD) centres, and special needs schools, and is responsible for educating over 12 million learners at 30 000 schools across the country.

The higher education and training system is comprised of 800 000 students in higher education institutions as well as a further 400 000 students in further education and training (FET) colleges and 200 000 in adult basic education and training (ABET) centres.

Education is a vital sector for the future prosperity of the country and is one of government’s top priorities. Therefore, in order to be an effective tool for the future success of learners, education must keep up with the latest developments in technology. It is becoming ever more important for learners to be able to participate in an increasingly digital world.

Providing ICT capabilities to schools can therefore have a huge impact on both the learners and educators as they give them the ability to tap into better educational content, teaching aids, and administrative systems.

The Application of ICT in Education

The increasing use of technology to improve educational access and methods is becoming key to the growth of all areas within this sector. There is a movement within the educational sector to innovate through technology. Effective and reliable technology can dramatically strengthen teaching and learning. It can also make an enormous positive impact on the internal productivity of educational institutions.

Some of the main applications for ICT in education are:

- **e-Learning**
  e-Learning is about learning and teaching by utilising ICT in the learning environment. e-Learning is important for producing young people who are comfortable with technology as they grow up in an increasingly digital world. e-Learning can build technical skills and enrich educational experiences across the curriculum.

- **Assessment**
  Assessment is an important driver in education and once ICT is embedded in learning and teaching processes, it can be effectively utilised in assessment. ICT can significantly increase efficiency and streamline the labour-intensive assessment administration process. Data analysis, in particular, can also help educators track learner achievements and review their teaching strategies accordingly. They can also give learners more immediate feedback on progress and identify areas of weakness to be mitigated with the necessary support.
Increasing the efficiency and effectiveness of management and administration

ICT allows educational institutions greater access to timely, relevant and detailed information on many functions. This allows for effective management and organisational performance with regard to planning, monitoring, improvement and accountability. This is particularly relevant to management for statistical analysis, record-keeping and reporting.

Trends in education are reflecting the requirements of generations that have and are growing up with technology. It is expected that technology will be fully integrated into educational institutions in the not too distant future. Online education is an example of how technology in education has grown in leaps and bounds and has changed the face of traditional learning. Tablets and e-book readers are fast becoming the norm, replacing textbooks and written work. The benefits of these are immense as work can be updated immediately, and many allow for assessment tools that enable educators to track progress in real time. There is also a move among educational institutions to adopt cloud-based technologies in order to reduce costs and provide anywhere, anytime access to staff and students alike.

In general, teaching with technology changes how content is delivered and requires that all educators are both comfortable using it and adapting content into new methods. Educating using technology is the way of the future, and all educators need to embrace technology in order to provide their learners with a world-class, relevant and effective learning experience.

Every education institution is founded on its own set of principles and policies. It is important to carefully assess your technology requirements and the suitability of certain technologies before implementation takes place. This can ensure that wise and necessary investments are made.
Latest Trends in e-Learning

‘Flipped’ Classrooms

In a traditional classroom model, the educator will generally stand in the front of the classroom and verbally deliver the lesson to learners. This is a model that has persisted for hundreds of years but it does not make allowances for how technology could be utilised to augment or improve this process.

By utilising technology such as connected devices and educational video content, learners are able to experience educational material at their own pace with the ability to pause and repeat it as necessary until they fully understand it.

This led to a trend of ‘flipped’ classrooms where the students learn new concepts through digital tools, at their own pace. They are then able to work through examples, discussions, and assignments in class, applying what they have learned.

This allows the teacher to provide one-on-one coaching to students as they work through practical examples, rather than giving a lecture on the topic and assigning the practical application as homework.

According to a PwC report titled ‘Leveraging Technology in Education’\(^1\) this can have a great positive impact on the learning results of the student as studies show that students who receive one-on-one tutoring perform significantly better than those who were taught through traditional classroom instruction methods.

Assessment and Measurement

Increasing use of technology brings with it increased access to data. Educators who utilise digital technology are better able to track and assess student performance and teaching methods. This can also empower students with a better understanding of their progress and enable them to take more control over their learning. By monitoring students’ performance, educators can easily see their skills levels, strengths, weaknesses, ongoing performance and progress. This will enable them to spot gaps in a student’s knowledge base and identify problem areas in a timely manner.

Communication and Collaboration

Many new technology-based tools for education are increasingly focusing on communication and collaboration between educators, learners and parents. New educational online platforms allow learners to communicate with each other and their educators as well as share educational content, submit assignments and participate in discussions of the material. Many of these applications allow for peer-to-peer feedback and real-time collaboration, enhancing project-based and experiential learning, and helping students to learn to work together on projects.

\(^1\)PwC - Leveraging Technology in Education – 2014
Open Educational Resources

Open Educational Resources are open-source digital platforms that allow educators and schools to upload, share, edit and rate educational content online, enabling an online, curated repository of both content (subject-knowledge materials) and curricula (such as lesson plans and pedagogical materials).

Examples of these platforms include LearnZillion, which features more than 4,000 free open-source videos; Curriki, which offers more than 50,000 educational resources, ranging from individual lessons to complete courses, and BetterLesson, which includes more than 10,000 lessons².

These resources increase the variety, accessibility and availability of content for educators and students.

Gamification

Gamification is the concept of applying game mechanics and game design techniques to engage and motivate people to achieve their goals. Gamification allows learners to engage more closely with the instructional content².

This type of learning allows students to improve their understanding of core concepts and develop skills such as creativity, curiosity and persistence.

For example, a game-based program called STMath uses non-numerical visualisations to develop the learner’s intuitive understanding of mathematical concepts.

¹World Economic Forum - New Vision for Education: Unlocking the Potential of Technology - 2015
²talentims – e-learning Trends to Follow in 2015- 2015
Meeting Technology and Education Needs in South Africa

When implementing a well-rounded ICT programme in a school or other learning environment, there are two distinct benefits. **First, it benefits the learners as the technology can become an invaluable learning tool in the classroom. Second, it benefits the educators and other staff as it provides administrative tools that can streamline the entire running of the educational institution.**

Some of the benefits to students include:
- An increase in motivation
- Increased active participation and creativity
- Improved knowledge and skills
- Increased collaboration
- Increased responsibility and self esteem

Some of the benefits to staff and teachers include:
- Easier record keeping and access
- Fewer records lost due to misfiling
- Lower administrative costs and less paper wastage
- Easier communication between staff
- Curbing exam paper scams

If carefully assessed before implementation, to ensure a solid match between chosen technologies and a particular institution, there is little doubt that **technology can make an enormous and measurable positive impact on the institutions’ quality of teaching and learning.** It can also significantly improve productivity and profitability through increased internal efficiency and associated cost reductions.

According to the e-learning Africa Report 2012, a survey of 447 respondents from 41 countries, which reviewed the e-learning experience in Africa over the last 5 years, the benefits of ICT in teaching and learning include:
- Learners are motivated to learn
- Distance learning is made easier
- Learning is more fun
- Learners are encouraged to learn more independently
- Learners begin to produce knowledge themselves
- Learners realise that they have access to more content via the Internet
- Learners are connected to more experts and have access to global resources
- Learners have access to quality learning material
- Learners show a better understanding of the topic they are studying

In addition to this, it is also noted that e-learning in schools helps learners to acquire skills that are necessary in other areas such as typing, research, word processing and working with spreadsheets. It also enables communication with people across the globe, expanding their horizons and teaching them about other cultures.
Meeting South African Educational Needs

South African educational institutions face their own set of requirements and challenges with regard to the adoption of technology within them. While it is crucial to stay abreast of global trends and to recognise that the technology is a vital resource to education, local considerations must be made. Careful and detailed assessments must be made about whether international technology can be easily transferred into a local institution. Some of the necessary questions to be asked include:

- Does local infrastructure support the opportunity?
- Will SA educators and learners adopt and embrace it?
- Will SA learners be able to deal with the new technology?
- Do local IT suppliers and education advisors have the skills and capability to support this?
- Do pricing and business case factors for schools differ substantially in SA?
- Can these technologies be offered universally or will they be for a select, privileged few?

There are four main components that are essential to implementing a successful e-Learning initiative in a school.

1. **Connectivity** – the school needs the required infrastructure to provide online connectivity to students and educators. This includes any cabling, fibre, modems, routers, etc. that may be needed.

2. **Devices** – the learners and educators need to be provided with devices that can be utilised for learning and access online material and resources. This can include desktop computers, tablets and other mobile devices.

3. **Training** – once the students and educators have been provided with digital learning devices, they must be trained in the best ways to utilise them in order to get the best possible results.

4. **Learner management system** – schools need to be able to track educator and learner performance and usage of the system.

South Africa’s educational needs are unique and have their own set of challenges. It is well understood that Information and Communication Technology can have a profound impact on the growth and development of the country, from both a social and economic point of view. e-Education or online education is no exception to this and can greatly assist in the provision of education to the country as a whole.

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*White Paper on e-Education: Transforming Learning and Teaching through Information and Communication Technologies - Government Gazette - 2004*
Each of these could be successfully supported by effective and reliable technology, and the government is intent on implementing Information and Communication Technology into South Africa’s educational system to support and improve the quality and availability of education and achieve all departmental goals.

There are, however, three main elements that must be considered when looking at using ICT as an effective tool in education. These elements are:

- **Cost** – Any solution that is offered must be cost effective, keeping in mind the limited budgets and diverse requirements of the education sector.
- **Sustainability** – There is no point in having state-of-the-art technology that cannot be sustained. Implementing ICT in schools should be seen as an ongoing project not a once-off endeavour.
- **Efficient utilisation** – In order to make ICT implementation in an educational environment worthwhile, it must be utilised to its full capacity. Ongoing support and training are essential for successful implementation.

An example of an e-Learning Project in South Africa is the Khanya Project. This was a project that was implemented in 2001 to address the need to deliver the curriculum to schools in the Western Cape through ICT. Its goal was to teach educators in the Western Cape how to use the technology that was made available to them to deliver the curriculum. As a result of the project, infrastructure and training were delivered to 613 schools with 241 at various stages of implementation. Overall the project distributed over 24 000 computers to the schools and trained 16 000 educators.

This example shows the importance of combining training with ICT implementation in school environments. It is not enough to just have the infrastructure; the educators and learners must also know how to use it.

The Meraka Institute is another initiative, formed by the Council for Scientific and Industrial Research (CSIR), and is an ICT in Education research body set up to research and support the Department of Education’s goals with regard to the implementation of ICT within the South African education system.

Many challenges will need to be addressed in order to implement ICT effectively in this sector. **Teacher training methods will need to be revisited** in order to ensure that teachers are equipped to use technological teaching tools effectively. **Infrastructure constraints in certain areas within the country** will also need to be addressed in order to enable the use of technology in schools, homes, and support government buildings.

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Telkom Business’s Offering to the Education Sector

Telkom Business’s Relevance

Telkom Business is committed to aiding the improvement of education in South Africa; to this end the company has launched Telkom Business’s Education Solution. The end objective for this programme is to connect every learner and teacher to high-quality educational material and content by employing leading-edge information and communication technologies.

The initial core services that will be offered through Telkom Business’s Education Solution will focus on the needs of the educational institution by offering the following:

- ICT services, for example, Virtual Private Network (VPN), Internet access, Wi-Fi, on-campus and mobile tablet devices.
- Educational content services would be provided through credible business partners.
- A financial services component providing for the ease of electronic purchases via the Telkom education portal.

Telkom Business’s Education Solution is aimed at addressing the educational requirements of the learner and educator and will cater for both fixed broadband access and mobile data bundles for the mobile tablet devices. The three primary goals for Telkom Business’s Education Solution are:

- Connect every learner anywhere, anyhow and anytime
- Empower every teacher/lecturer to master his/her teaching discipline and
- Prepare the student community for the Information Age.

Telkom Business recognises the key enablers of technology within the educational sector that include the following:

- The development and implementation of infrastructure and learning solutions that are immediately relevant to the South African context.
- The implementation of cost-effective and easily scalable cloud services to address the ICT requirements of educational institutions.
- The development of educational platforms and applications that attract learners and make them want to learn.
- The possible implementation of solar powered products and equipment in rural areas with severe infrastructure constraints.
- Mobile ICT platforms that educate communities and inform them of developments within the educational sector.

ICT providers, who can provide these to the sector effectively, will successfully contribute to the resolution of one of South Africa’s most pressing and urgent challenges – the provision of quality education to all citizens.

Telkom Business offers South African educational institutions products and services tailored to meet its specific requirements. Information and technology requirements for this sector are vastly different from what could be implemented in the corporate sector, for example, and Telkom Business constantly stays abreast of trends and designs and develops solutions according to industry needs. An educational institution requires a partner who understands the values that technology can add and who offers a reliable and effective service to ensure that full value is realised.

Telkom Business has embarked on a strategic consultation programme with the educational sector, across all sector levels, and has assessed the needs across connectivity, devices, software applications and practical application within the learning environment.

Using these learnings, it has compiled a solution set for the education sector consisting of Internet services (wireless, mobile, fixed), high-quality hosted educational resources (together with educational content partners) and mobile devices to support its mission to use leading-edge ICT to enable the South African educational sector.
Glossary of Terms

ABET – Adult Basic Education and Training
CSIR – Centre for Scientific and Industrial Research
DBE – Department of Basic Education
DHET – Department of Higher Education and Training
ECD – Early Childhood Development
FET – Further Education and Training
ICT – Information and Communications Technology/ies
VPN – Virtual Private Network
Telkom Business is a division of the Telkom Group organisation. We exist to serve the South African and African corporate; government and SME markets. Our passion is to seamlessly connect every business to a digital future. Our solutions are offered end to end — ensuring that your business benefits from every economy of scale and superior service quality. Our solutions are customised by taking into consideration the role of the relevant technology trends; such as: fixed mobile convergence; mobility; machine to machine; big data; Wi-Fi; broadband; LAN; WAN; cloud computing; Unified Communications; Digital and social media and others.

Migrate your business into the digital future — contact Telkom Business today!

For more information, please email tbsm@telkom.co.za
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