



**Western Cape  
Government**

Education

## WCED vision for e-Education

e-Learning and e-Teaching in schools of the future

August 2012

**WCED vision for e-Education:  
e-Learning and e-Teaching in schools of the future**

**Introduction and Background:**

In the pursuit of 'working better, working smarter' in the Western Cape, ICTs will play a decisive role. This document sets out an e-Education vision for the WCED 5-10 years hence.

The vision for e-Education in the Western Cape is not divorced from social and economic development. The objective is for education to structure systems and learning such that it supports its main and peripheral outcomes. Learners ought to exit a basic education system with relevant knowledge and skills, and be better prepared for higher education and the working environment, so that they may function as active citizens in the world that they find themselves in.

The influx of families into the Western Cape is contributing to a steady increase in school going children. As the Western Cape develops, an increased reliance will be placed on technology by these e-citizens. The reality of education is that there are schools on the outer ends of the spectrum i.e. very affluent to very poor schools. The vision in this document is thus tempered by this reality. Our challenge is to bring quality learning environments into all schools. Funding needs to be re-directed and budgets re-prioritised in order to achieve this.

The innovative nature of the e-Education vision lends itself to critique, especially as much of it is unproven. However this vision should be viewed as evolutionary.

In preparing learners for the future, the WCED will expand on its existing technology base and digital resources and introduce appropriate solutions that are responsive to educational needs. The strategic planning transcends current bounded realities and perceptions of the role of ICTs in education. The vision imagines a metamorphosis of traditional teaching, learning and environments into e-Teaching and e-Learning and virtual learning environments; an ever increasing availability of digital resources and systems, and the emergence of new ways of educational engagement. This vision will thus propel the WCED into a new e-Learning era.

The infusion of ICTs in the educational space sets up a series of chain reactions. The most prevalent of these is the pervasiveness of the push-pull effects of education and technology. This requires a re-conceptualization of the use of technologies to support education. Technologies are constantly evolving with digital devices and connectivity becoming more accessible and affordable and thus more easily self-procured, used and managed than tethered computers. These technologies will become a repertoire among other tools to support education in ways not possible before.

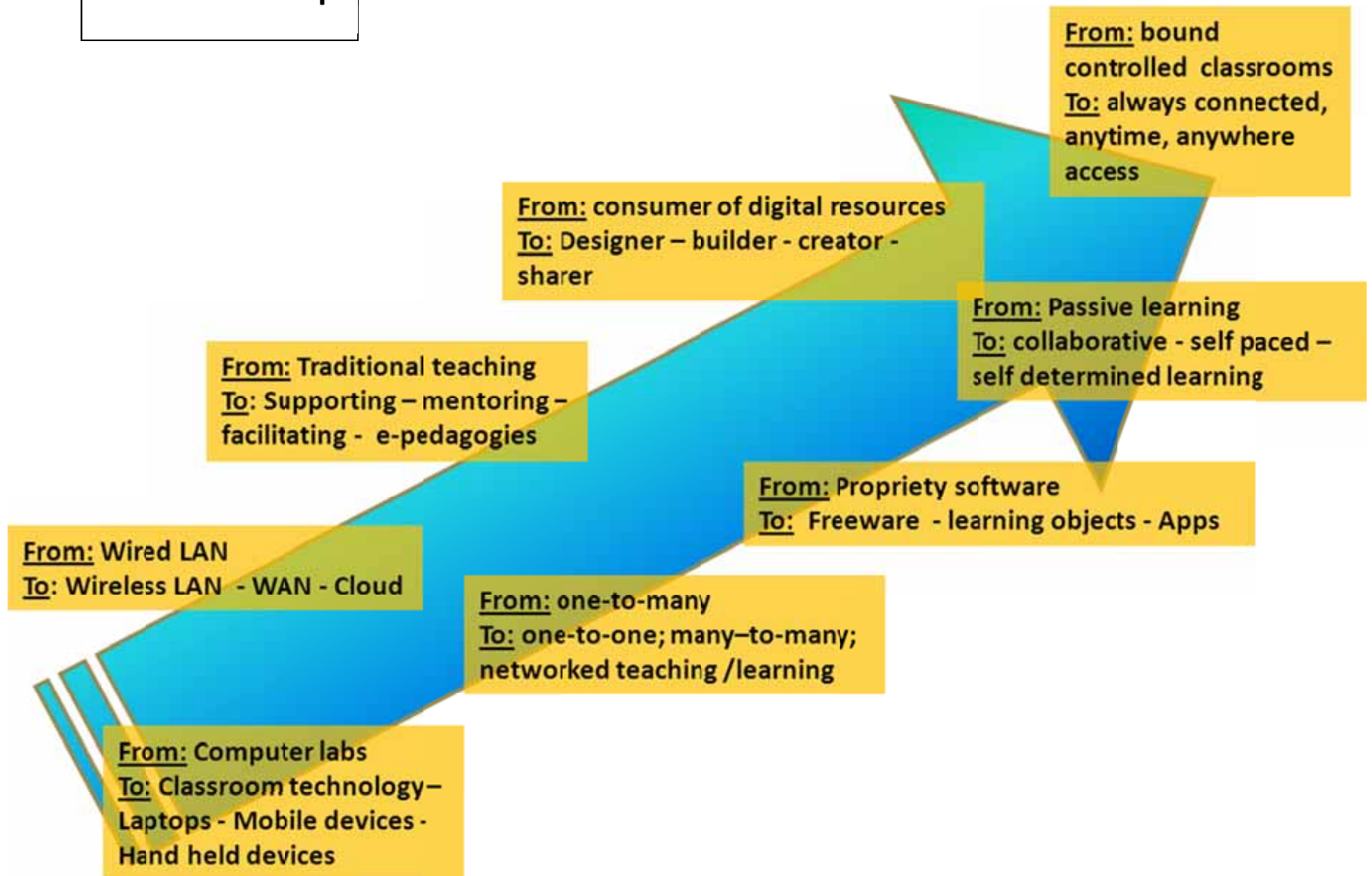
In 2010 Robert Hawkins (published online) wrote about 10 Global Trends in ICT and Education. These provide an indication of the thinking just two years ago and allows insights into the extent that some of these have gained traction. According to Hawkins these trends are expected to continue and challenge many of the delivery models fundamental to formal education. We believe that Social learning should be added to this list.

The trends are:

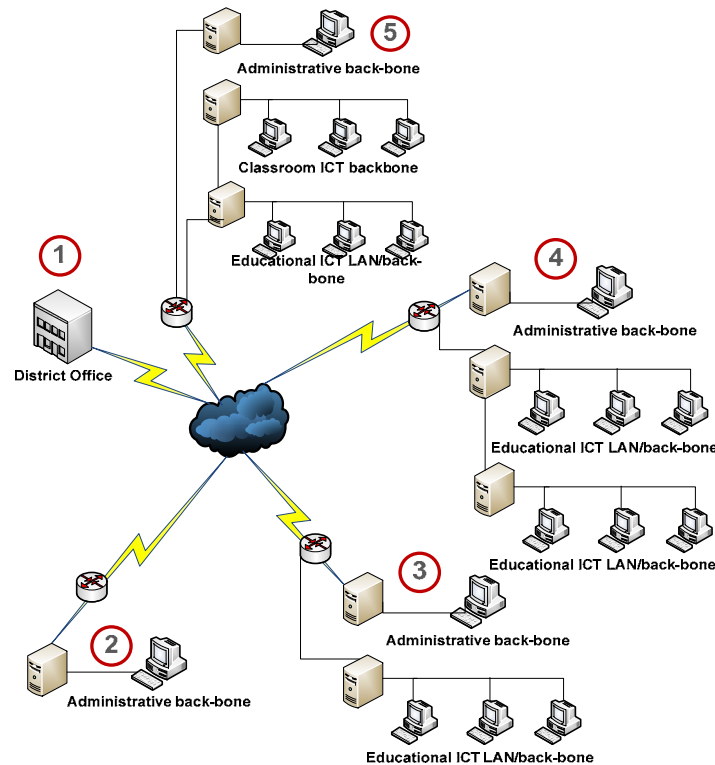
- Mobile Learning.
- Cloud computing
- One-to-One computing.
- Ubiquitous learning.

- Gaming
- Personalized learning
- Redefinition of learning spaces
- Teacher-generated open content
- Smart portfolio assessment
- Teacher managers/mentors

lap



An illustration of the current WCED schools technology landscape is depicted in the below. The permutations range from an administrative back-bone to configurations of ICT laboratories to architectures that include classroom technology.



Source: ICT Vision and Strategic Intent for WCED

There are approximately 1 000 000 learners and 30 000 teachers in the WCED. Technology is available in all 1456 schools in the Western Cape. The table below provides a conservative estimate of basic technology overview.

Computers	Laptops	Data Projectors	Interactive White Boards	Servers
44691	2228	3867 1532 purchased by school themselves	2227 in 641 schools 334 were purchased by school themselves	1501

The current (2012) use of the available technology by learners and teachers may be confined to two separate cells, viz.:

- an e-Learning practice based on a 1970s methodology of CBT (computer based teaching) indicated by the use of closed (propriety) software in computer laboratory configurations primarily for drill and practice, and
- e-Teaching practices using data projectors and interactive boards, through traditional teaching methodologies.

It must however be noted that there are pockets of e-practices that extend beyond those noted above.

The exposure that many teachers and learners have to social media, 24/7 access to information, newer forms of communication and collaboration mean that they have knowledge of, and access to opportunities to shape the teaching and learning environment. This could lead to the break-down of the concept of the traditional class room and learning taking place through a structured formal one-to-many approach.

It is widely accepted that learning can now take place anywhere and anytime. There is also an increase internationally to move technology from the traditional laboratory environment into the classroom and beyond.

Current social attitudes, to a certain degree, dismissed the use of emerging technologies as disruptive and obtrusive in school settings. The introduction of technology into education proposes a technology push and an educational pull. The impact of the push-pull situation could be understood through the process of cause and effect and may be viewed as initial and subsequent i.e. first-order and second-order effects (Kathleen, K., ed. 1997).

Technologies will over time mature and whilst some will endure many will not keep pace with the educational pull. The consumers and users of these technologies will be the push factor that will drive the changes in technology innovations. The technological disconnect that appears to exist between

teachers and learners and, between education and ICTs can, through careful planning, be overcome through sound change management and e-Readiness programs. Change enablement is a transformation journey. In the context of this vision document it is closely aligned with diffusion of innovations.

The WCED recognises that this vision will follow a phased implementation with a blended approach. The transition forward should be progressive as opposed to leapfrogging. Whilst leapfrogging is sometimes a preferred strategy, the risk of missing vital scaffolding stages may prove to be costly, and potentially disastrous. Change is difficult and the aim is not to shift too quickly from the current. Given the realities of our current system such as: diverse schools; average age of teachers; levels of e-maturity; low literacy and numeracy levels; varying levels of technology management; budgetary constraints, etc., the implementation strategy will not necessarily be the same everywhere and at the same time. This is necessary to drive and manage the initiative so as to hedge the chances of success.

### **Vision:**

The vision, translated into six streams, is:

- e-Teaching – Teachers and education managers empowered to use technology effectively and innovatively.
- e-Learning - Learners empowered to use technology effectively and innovatively.
- Curriculum / Education – Models, methodologies, pedagogies and digital content responsive to educational needs.
- Systems - Robust and reliable ICT systems that support e-learning.
- Environment - A technology enriched environment (including ICT infrastructure) that enables effective learner-centered e-learning.



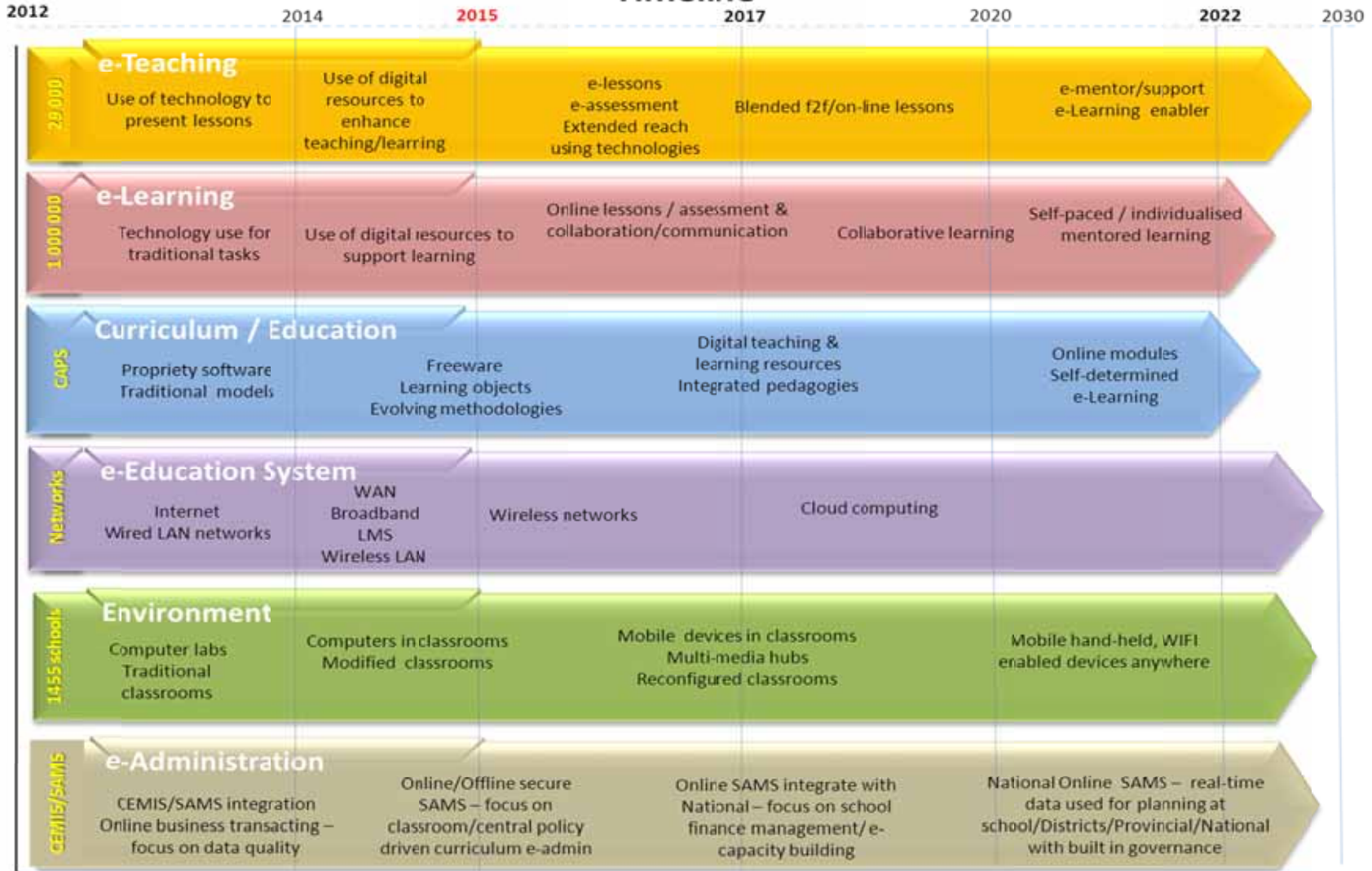
- e-Administration – Robust and reliable ICT systems to reduce manual administration towards more effective and effective planning and management.

The six streams do not necessarily flow at exactly the same pace. Policies, budgets, readiness among other mitigating circumstances will determine the rate and alignment of the streams. For example high schools and mathematics and science teachers may be identified to progress first.

### **Principles of the 5 -10 year vision for e-learning / e-teaching / use of ICTs:**

- The solution should prepare teachers and learners alike to participate in a global knowledge economy as active citizens;
- The solution should be inclusive of individuals and groups;
- The solution should not be technology driven;
- The solution should be scalable and adaptable;
- The strategy should not be vendor or single pedagogy specific;
- Content should be constructed using an “open architecture”;
- The solution should be cost effective; and
- The solution should be safe, secure and reliable.

# Timeline



## 5-10 year e-Teaching

- Increased access to and use of technologies such as laptops, data projectors, interactive boards, tablets, document viewers and other current technologies by teachers to present lessons in their classrooms.
- Teaching will incorporate many-to-many situations through increased use of remote teaching using software that connects classrooms in different locations within a school and across schools and education districts.
- Teachers will use an e-Learning system (LMS) to manage learning in schools, and increasingly use social networking services to complement management of learning.
- Teachers will begin to support learners remotely via a LMS – Absentees, missed lessons, home schooling will benefit from the support of teachers via technology.
- Many teachers will use technology as a constant support to traditional lessons. As levels of e-Maturity increase, a percentage of teachers (early adopters) will exploit the potential of technology by implementing different approaches to lessons.
- The LAN, WAN and local servers will be used by teachers as the repository of resources and a means to remain connected and available to peers and learners.
- Teacher' lessons will draw on rich multi-media resources available from various sources. Lessons will progressively become e-Lessons. Learners will have opportunities to engage with ICTs to support many of their learning experiences.
- Teachers and learners will be designers and co-creators of digital content.

## 5-10 year e-Learning

- Access to technology and connectivity will increase and learners will use these devices (laptops, classmats, netbooks, tablets, other current technologies) in their learning. It is envisaged that approximately 50% of learners will have access to devices 1:1. Devices will be accessible in classrooms all of which will have internet access.
- Learners will increasingly use mobile technologies. These devices provide for ubiquitous access to learning and could initially be used to complete tasks such as listening to a lecture or memorising information at home. This is as part of a changing methodology where learners now have more time to discuss ideas, share alternate interpretations, work collaboratively, and participate in a range of learning activities while at school. Learners will have the options to learn remotely from peers, mentors and by other teachers.
- Learners will be able to access their syllabus for the year via the LAN/WAN – the syllabus will have the course requirements as well as lessons, presentations, assessments all pre-planned and pre-populated.
- As access to digital resources, the capabilities of the WAN, the technological divide between teachers and learners narrows and ways of working mature, learners will be supported by their peers, teachers and other mentors/e-Citizens online
- All learners will have an e-mail address and access to e-mail at school. They will possibly be linked to two or more social networks.
- In high schools learners of gateway subjects will have access to technology and relevant digital resources in specialist classrooms/virtual learning environments.
- An increasing number of learners will do homework and assessments online.
- In some schools BYOD (bring your own device) will apply. These learners will be able to simply connect to the networks.

## **5-10 year e-Learning systems**

- A WAN will exist in the Western Cape
- 100% of WCED schools will have a LAN – 75 % of this will be wireless
- The WCED will have a LMS for teaching, learning and assessment purposes.
- All schools will have at least one server – some will have three or more servers. The servers will have a local instance of the WCED LMS to enable localized e-Learning.
- The WCED and local LMS will house repositories of digital content, syllabus and lessons, collaboration and communication facilities.
- Remote teaching facilities and conferencing will be available in districts.
- The e-Learning systems will provide for easy 24/7 access to a range of digital content through multiple access points.
- Cloud computing, storage and services will streamline education by providing continuous learning opportunities regardless of location, and devices used. Devices will not necessarily need to be high-end and specialized, as the basic need is to be able to connect to the cloud.

## **5-10 year technology / environment**

- Technology in schools will increasingly be available in classrooms and other locations. Some may be fixed and others portable. Examples of these are: laptops; data projectors; interactive boards; classmates; e-Readers; netbooks, tablets, smart phones, data loggers, document viewers, etc.
- Schools will have access the LAN or WAN and internet via network points in each of the classrooms and via Wi-Fi access points around the schools.

- High schools will have specialist subjects rooms with specific technology and relevant digital content
- Specific, specialised and adapted technologies will be available at special schools such as: touch screens, voice activation, adapted controls, etc.
- The environment in schools will allow for personal as well as state provided devices to connect to the school server and the WAN effortlessly.
- The placement of furniture in classrooms will see some changes as the methodologies for e-Learning will require the use of technology in collaborative ways.
- There will be quiet learning spaces in parts of a school (cubical type spaces).
- Areas outside the classroom will increasingly become spaces where learning can be accessed.

## **5-10 year Curriculum / Education / Digital Content**

### **Education – models modes**

- The concept of a traditional classroom will change. Classrooms will become more 'open'. Online and virtual will characterize the classroom of the future.
- Traditional school models will evolve to cater for diversity. E.g. Learning could be modularised and, specialised subjects could be offered online to learners in different schools. School can have certain curriculum foci, and learners will have the option to study a different subject not offered at the school. This may be taught / managed by a district or centrally by the WCED (a model successfully implemented in Sydney, Australia since 2005).

- Schools will have in-house and access to repositories of digital content, syllabuses and lessons.
- It will become possible to do experiments (science, engineering, etc.) remotely and in simulated situations.
- A large percentage of digital resources will be freeware – dependencies on propriety software will begin to wane.
- There will be large amounts of digital resources that will include rich multi-media such as videos, animations, simulations, podcast, etc.
- The curriculum will be available to learners, teachers, and parents electronically: i.e. term by term topics that are mapped to digital content that has hyperlinks and bookmarks and hook into support multi-media.
- The teaching and learning process will be supported by peers, subject heads, principals and departmental officials via the LMS and remote conferencing facilities.
- Online assessment will increasingly become a norm at predetermined places in the curriculum
- Some of the above content will be self-paced and allow for curriculum enrichment as well as for remediation.
- Virtual environments will allow for real life simulations where experimental and discovered learning can take place in “safety”.

## Resources consulted:

1. White Paper 7: e-Education (2004).
2. Hawkins, R: 2010, *10 Global Trends in ICT and Education*, viewed online.
3. Kathleen, K. (ed.): 1997, *The Future of Information Technology in Education*. ISTE publication.
4. WCED e-Education Technology Management Plan 2012 – 2015 (Draft).
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Mr. Schreuder, Dr. Naicker, Ms. Satyo, Ms. Koopman, Mr. Cameron, Mr. Lategan, Mr. Mentz, Dr. Angier and Mr. Sadeck.



Curriculum / Education	System	Technology (e-Teaching)	Technology (e-Learning)	Environment
Active teachers directing learning using digital technology and resources optimally	WAN Cloud connectivity	Data Projectors Interactive Data Projectors	e-Readers	Carpets comfortable, movable furniture
Every child with own laptop for interactivity with content and lessons – for access to communication and collaboration	LAN Wi-Fi Servers Access Points (AP) for wireless connectivity)	Good sound system	Work stations (Computers)	Stackable furniture
Huge range of digital materials accessible  Lots of animations and interactive content material  Books / Freeware resources  Enrichment materials  Virtual portals/tours	e-Learning/ e-Teaching Platform  Learning Management System (LMS): Communication / Collaboration / Learning spaces  Portal / Repository: Digital resources	Interactive White Boards <ul style="list-style-type: none"> <li>• e-Beam Type</li> <li>• Mimio type</li> <li>• interactive surface technology (Digital pens)</li> <li>• Edu-Board Type with portable wireless tablet touch screen</li> </ul> Plain White boards VGA/HDMI/USB capable TV screens	Laptop / Notebook Netbooks Classmates Tablets Smart phones Trolley cupboard for above	Partitioning Learning Spaces
e-Assessments  Real-life curriculum content aligned examples (data banks)	Digital content vending units Content management system	Digital document camera / Visualizers Single and Dual camera Attachments e.g. Microscope, magnifier	Interactive device/clicker Hand held / personal response devices data loggers	Adequate power points Network points
Beamed live real-time lessons shared between classrooms/schools lessons into classrooms  Streamed lessons to classrooms as required	Virtual shared classrooms (Bridget-type software) Skype	Scanners – video conferencing equipment	video conferencing equipment	X nr of video conferencing facilities @ school
Different skills classes		Printers ICT probes	Equipment for learners with special needs	

## Glossary of terms

CBT	Computer based training / teaching
DP	Data projector
e-Learning	The use of ICT for learning. This includes using ICTs for reciprocating learning engagement, active learning through ICTs while using digital resources as a support.
e-Teaching	The use of ICT for teaching. This includes using ICTs for demonstrations, making digital resources available to large audiences, using technologies and relevant software to teach multiple classes, etc. – using ICT to support teaching.
ICT	Information and Communication Technology – this usually includes the physical hardware and equipment, such as computers, tablets, servers, IWB, cameras, scanners, printers, etc.
IT	Information Technology – FET school subject.
IWB	Interactive whiteboard.
LAN	Local Area Network
PC	Personal Computer
WAN	Wide Area Network
WCED	Western Cape Education Department
Wi-Fi	Wireless network connectivity

## NOTES

- **Methodology:** usually a guideline system with specific components such as phases, tasks, methods, techniques and tools.

- **Pedagogy:** is referred to as the use of instructive strategies.

- **e-Maturity / e-Learning maturity**

e-Learning Maturity Model (eMM) - is a quality improvement framework based on the ideas of the Capability Maturity Model (CMM).

A maturity model can be viewed as a set of structured levels that describe how well the behaviours, practices and processes of an organization can reliably and sustainably produce required outcomes.

Capability at the higher dimensions that is not supported by capability at the lower dimensions will not deliver the desired outcomes; capability at the lower dimensions that is not supported by capability in the higher dimensions will be ad-hoc, unsustainable and unresponsive to changing organizational and learner needs.

- **LMS for teaching, learning and assessment purposes**

The LMS has functions that provide opportunities for real time quizzes, short answers, rapid response questions, drill and practice exercises, longer assessment tasks, etc. The online, synchronous and asynchronous options built into LMSs allow for assessment for, and of learning, as well as recording and tracking outcomes. LMSs allow locking in assessment times, secure login, time limitations, and a range of tools to manage online assessment.

- The use of specific software and appropriate technology will provide opportunities to provide districts, possibly in distributed architectures (district office, circuits, urban, rural models, etc.), with video / audio / board / screen sharing. This technology is constantly evolving and applications will adapt to changes.

- **Two factors determine what type a particular decision is:**

Whether the decision is made freely and implemented voluntarily, and who makes the decision. Based on these considerations, three types of innovation-decisions have been identified within diffusion of innovations.

*Optional Innovation-Decision* -This decision is made by an individual who is in some way distinguished from others in a social system.

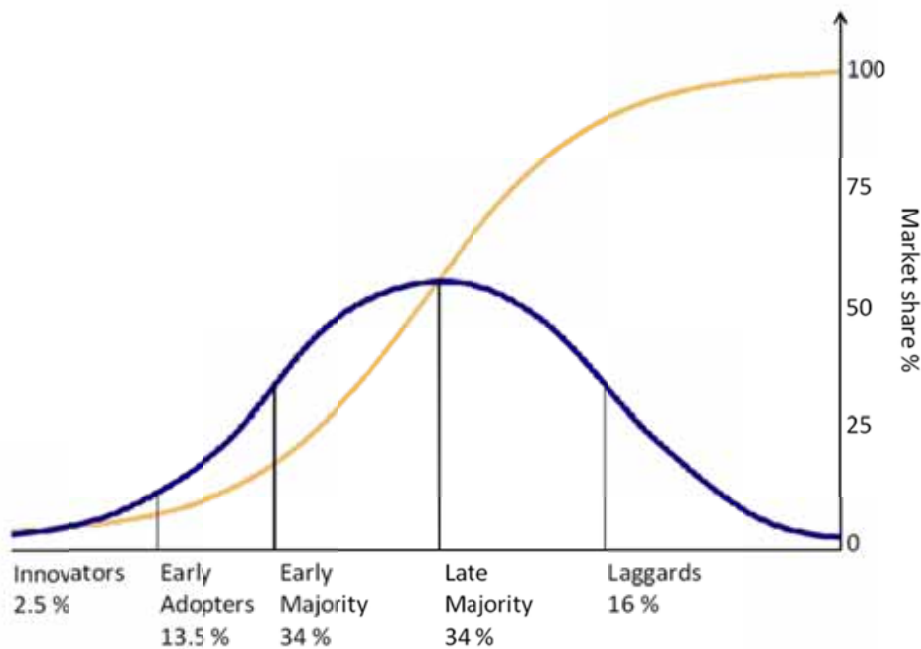
*Collective Innovation-Decision* -This decision is made collectively by all individuals of a social system.

*Authority Innovation-Decision* -This decision is made for the entire social system by few individuals in positions of influence or power.

- **Early adopters**

Adoption refers to the acceptance, implementation, taking in, and taking up, of a new product or innovation. It is commonly referred to from viewpoint of the use of physical technology. However this needs to be considered more widely to include other tools as innovations. Such tools may include the internet, social software, propriety software, learning objects, and, generic learning activities. Adoption may be individual or collective. Teachers' adoption trajectory of the aforementioned will be shaped by their take on its perceived benefits. There are a range of factors that influence individual and collective adoption patterns. These may be individual, technological, or organizational. The benefits may be seen as personal, or may be, learning outcome focuses. Whatever the eventual reasons for adoption, the instantiations of adoption become evident in changing practices (e-Learning practices).

The process of adoption may be seen in the classical normal distribution or "bell curve." below. The model indicates that the first group of people to use a new product is called "innovators," followed by "early adopters." Next come the early and late majority, and the last group to eventually adopt a product are called "laggards." Everett M. Rogers (Diffusion of Innovations) (1962) (Wikipedia)



Rogers' bell curve