

e-Adult Education and Training as a strategic avenue in addressing adult learning in the municipalities - Content Development and Learning Platforms: The relevance of this in relation to challenges of adult literacy learning needs and challenges.

Table of Contents

| 1. | Background to the project2 | | | |
|------------|--|---|--|--|
| 2. | The research3 | | | |
| 2 | .1. | Definitions | | |
| 2 | .2. | The Desktop Review5 | | |
| | 2.2.1 What must an e-learning system look like for people who have low levels literacy or are semi-literate? | | | |
| | 2.2.2 | What technology is innovatively used to overcome literacy issues in the front end experience, e.g. the fact that the learners cannot read in some cases; \dots 9 | | |
| | 2.2.3 | A comparison between standard classroom-based delivery of adult literacy programmes vs. e-learning or blended learning programmes; | | |
| | 2.2.4 | How content and platforms are configured to give the most effective and most efficient education outcomes that can be measured against pedagogical and didactic standards for adult learners; and | | |
| | 2.2.5 | Assessment in e-learning programmes15 | | |
| | 2.2.6 | What is available locally and internationally in respect of Design Standards, Protocols and Guidelines to design and develop good e-learning programmes; | | |
| | 2.2.7 | The availability of policies, practices and guidelines for e-learning24 | | |
| | 2.2.8 | Review existing relevant research and development work that is taking place at municipal level (for example the Learning Cities programme being undertaken by the PASCAL Observatory) and in other workplaces | | |
| 3. | The South | n African Context | | |
| 3 | .1. | South African literacy | | |
| 4. | Conclusion | | | |
| 5. | Recommendations | | | |
| APF | APPENDIX A | | | |
| REFERENCES | | | | |

1. Background to the project

The Local Government Sector Education and Training Authority (LG SETA), a national public entity, was established in terms of section 9(1) of the *Skills Development Act* to promote skills development for the Local Government sector. LG SETA has funded a number of skills development initiatives and programmes in the following areas: Learnerships, Apprenticeships, Adult Basic Education Training (AET), Skills Programs and Bursaries.

The LG SETA entered into a partnership with the Centre for Education Policy Development (CEPD) and ITS Education and Training Institute (ITS) in order to fulfil its mandate to contribute towards the socio economic development and growth of the economy of the Republic of South Africa by enabling training and education in the local government sector to the benefit of employers, employees and the unemployed youth. The CEPD was founded in 1993 and has a long history of conducting research, evaluations and policy development.

In terms of the National Skills Development Strategy (2011- 2016) section 5.3.1.3 which talks about raising the base, programmes are outlined that make it possible for adults and youth to have access to education and training opportunities that enable them to acquire a minimum qualification at Level 4 on the NQF. Foundational Learning Programmes as well as Adult Education and Training Programmes fall under this heading, and are broadly envisaged to fill the learning gaps left by an incomplete or inadequate schooling and to enable learners to enrol on other programmes leading to occupational success. The success indicator for achievement of this objective is said to be where sectoral or national programmes specify an entry requirement of NQF Level 4 or above, these programmes must be complemented by the provision of either Adult Education and Training or Foundational Learning Programmes that enable those who do not meet the requirements to have the opportunity of doing so. The number of learners assisted to access further learning will be counted against programmes entered.

The LG SETA project Terms of Reference however note low participation rates in AET programmes, and also that recommendations for strategies to increase access to these programmes include increased awareness of the importance of AET, holding classes during working hours, introducing computerbased AET programmes, and greater monitoring of learners during the programme to be able to identify possible challenges and address them efficiently.

A survey found that about 2.643 million people in South Africa who have some or a lot of difficulty reading, or are unable to read. This corresponds to almost 7% of the adult population.

In calculating the literacy rate, the General Household Survey (GHS) assumes that anyone with an education level equal to or higher than Grade 7 is literate.

This means that 18 958 million people, who are over the age of 20 and who have a highest education level of between Grade 7 and 11, were not asked if they have any difficulty reading or writing.

Stats SA

Many people in our country and other parts of the world remain illiterate or have very low levels of literacy. Some have not had an opportunity to attend school whilst others have formed part of the statistics of high numbers of school dropouts. The majority of these people are poverty stricken,

unemployed or live on national grants. A number of scholars have noted the increase in the use of ICTs and are in agreement that this can contribute to increased access to literacy and improve the quality of learning.

E-learning has been adopted as a tool in facilitating learning for over three decades. South Africa like most countries has been taken by this latest trend in the market. The concerning issue, however, is that e-learning is driven by commercial interest and the commodity factor is determining the agenda and development pathway of how e-learning is and will be conceived in schools and other educational institutions and, sadly, not by clear pedagogical and didactical principles.

Furthermore, there is an assumption that e-learning is for the young, savvy millennial generation and that the older baby-boomer generation will not cope with the change that e-learning brings to the educational landscape as a new medium of education and training. Yet cell phones, smart phones, iPads and other forms of devices have become common use for everybody and are now by and large age-agnostic.

It is in this context that e-learning for adult literacy will be tested. Our hypothesis is that given the high number people in South Africa with literacy problems, coupled with the low levels of literacy among school drop-outs, the best way to accelerate literacy and address the triple challenge (poverty, unemployment and inequality) in South Africa is through programmes that massively accelerate the levels of literacy. E-learning is the most practical and viable way of addressing literacy challenges and moving poverty stricken people into gainful employment.

2. The research

This desktop review seeks to explore e-AET as a strategic avenue in addressing adult learning in the municipalities by examining content development and learning platforms and their relevance in addressing challenges of adult literacy and learning.

The research focuses on gathering information on how e-learning programmes for adult literacy must be designed and developed, the processes to be used during the technical development process, the suitability of the e-learning platform, the type of learner management systems that must be used as well as what the front-end learner experience must be.

2.1. Definitions

| <u>E- Learning:</u> | Simply stated e-learning means electronic learning. E-learning is also called web- based learning, online learning, distributed learning, computer- assisted instruction or internet based learning using varied devises (smart phones, tablets or any electronic device.) |
|---------------------|---|
| | Stockley (2003) defines it as "the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device in some way to provide training, educational or learning material. In other words it is learning using electronic technologies to access educational curriculum outside of the traditional classroom. |

| Traditionally there have been two common e-learning modes:learning where information technologies are used to deliver instto learners at a remote location from a central site and computassisted instruction where computers are used to deliver stand amultimedia packages for learning and teaching | |
|--|---|
| <u>Blended Learning</u> | A fairly new concept in education but a concept familiar with most educators, is an approach that combines e-learning technology with traditional instructor led training where for example a lecture or a demonstration is supplemented by an online tutorial |

A useful mapping of different examples of provision is offered in Saide's *Concept Framework for an Open Learning System in Post School Education and Training in South Africa* (2013), in which education provision is regarded as a continuum rather than a single 'mode of delivery', and the continuum of extent of direct contact between educators and learners on one dimension is mapped against a wide ranging continuum of technological programme delivery. The resulting grid facilitates analysis of options for provision of learner support as illustrated below.





¹ Taken from South African Institute for Distance Education (2013) Concept Framework for an Open Learning System in Post School Education and Training in South Africa Saide (2013)

The grid illustrates a range of possible implementation options that could be considered. However, in all instances, the option/s selected need to take careful cognizance of the implementation context – national, provincial and institutional.

The options for provision of support can vary greatly - from face-to-face through synchronous online support to asynchronous online support. The grid also exemplifies a range of options pertaining to the mode in which the resources are distributed; these can range from print-based to fully online (recognizing that fully on-line courses could still be campus-based e.g. students access them in a campus-based computer-lab through an institutional intranet or they could be open to anybody anywhere in the world -with consequences for how examples are selected and how activities are designed among other issues).

2.2. The Desktop Review

In exploring the research question a number of topics were identified to assist in the collection of information. The research data has been collected and analysed around the following thematic areas:-

- 1. What must an e-learning system look like for people who have low levels of literacy or are semi-literate?
- 2. What is available locally and internationally in respect of **Design Standards, Protocols** and **Guidelines** to design and develop good e-learning programmes?
- 3. What technology is innovatively used to overcome literacy issues in the front end experience? e.g. the fact that the learners cannot read in some cases;
- 4. A comparison between standard classroom-based delivery of adult literacy programmes vs. elearning or blended learning programmes;
- 5. The availability of LG SETA policies, practices and guidelines for e-learning;
- 6. How content and platforms are configured to give the most effective and most efficient education outcomes that can be measured against pedagogical and didactic standards for adult learners; and
- 7. Review existing relevant research and development work that is taking place at municipal level (for example the Learning Cities programme being undertaken by the PASCAL Observatory).

2.2.1 What must an e-learning system look like for people who have low levels of literacy or are semi-literate?

Trucano (2005) points out that at an initial glance, content issues related to ICT use in education might seem to some to be of minor importance as access to the Internet means access to an entire world of educational resources. However, experience shows that there is a dearth of educational resources in a format that makes them easily accessible and relevant to most teachers and learners especially as they relate to a given country's current curriculum. Experience tells us that, unless electronic educational resources are directly related to the curriculum, and to the assessment methods used to evaluate educational outcomes (especially standardised testing), lack of appropriate and relevant educational content is actually an important barrier to ICT use in educational settings.

UNESCO's *Effective Literacy programmes: options for policy makers* (Oxenham, 2008) points out that attendance in literacy programmes is said to be better if a programme is particularly engaging, and particularly, programmes dealing with areas in which there is a need for literacy, or the uses of literacy can be appreciated, are more likely to be successful. The point is made that 'there is universal agreement that literacy is not an end in itself', and that 'it needs to be oriented to uses, functions and satisfactions'. (p62)

A large scale UNESCO programme in functional work-oriented literacy in the mid-1960s situated its content in daily work of the learners, and this meant that 'the programme required several curricula, each one addressing a quite separate occupation and interest group', but had the benefit of learners being able to see how literacy in their own operational sphere could help them become more productive'.

This programme helped to establish the principle of linking literacy instruction with uses directly relevant to the adult learner, as implied in the term 'functional literacy'. To this end, adult literacy programmes often are based on topics that designers believe are of concern to adults, such as child care and domestic issues, civics, agriculture and environmental issues, savings and credit, business management and social action.

A concise overview of the literacy issue is provided in the UNESCO booklet *Using ICT to develop literacy: UNESCO ICT in education programme* (Wachholz, UNESCO, 2006), together with explanation of how ICT can be used to enhance literacy education. Examples of projects reported in the booklet offer useful suggestions on the uses of ICT in literacy education.

In the initial definitions of literacy, the concept of 'functional literacy' was again observed to have emerged from the need for literacy campaigns to be more than merely the acquisition of technical skills, and to take into account learners' application of literacy skills to their context and motivations. It is also noted that this definition of literacy does not accommodate the diversity of languages, and that literacy development may not necessarily be in a learner's mother tongue.

However whilst there is agreement that literacy programmes need to consist of functional curriculum in AET settings, Oxenham (2008) discusses that there are two disadvantages with this approach. The first being that very seldom is market research done among adult learners to confirm that these topics are of interest or present new knowledge. The second disadvantage is that the topics are presented at a superficial level, with little opportunity for learners to explore greater depth, should this be their interest. He describes some examples of projects that dealt with the curriculum issue by adopting alternative strategies to the development of primers covering prejudged topics.

The issue of programme facilitators has implications for the nature of the programme. The scope of literacy programmes ranges across (1) basic literacy skills, (2) functional information with associated changes in attitudes and practices; and (3) income-generating skills. Demands on facilitators are significantly different across these types of programmes, having corresponding implications for costs of training of facilitators. Difficulties in the supply of facilitators who are expert adult educators with this range of subject specialisations would appear to present an ideal application for e-learning programmes, where the programme facilitator would not necessarily need to be a subject matter expert (Oxenham 2008, p72.)

Language for learning and teaching

The language to be used for e-learning needs to be considered when planning what goes into the programme. The choice of language in which literacy education is offered becomes more of an issue in multilingual countries such as South Africa. Educational research has established that children learn better in their mother tongue, and correspondingly, the current consensus of practitioners is reported to be that diversity should be supported.

Using a language that learners do not know and have not chosen for themselves can make the job of instructors more difficult, slow down learning, increase frustrations of the learners, encourage drop-out and overall make the programme less efficient, less cost effective, and less productive in terms of successful graduates. (Oxenham 2008, p67)

This however raises a number of practical questions, not least of which is the fact that the teaching of language is then incorporated into the requirements of the programme. The use of newer technologies in adult education programmes is referred to as a potential solution, particularly with increasing access to cell-phones, but is not discussed in any substantive way.

Ways in which ICTs can support literacy

Wachholz (UNESCO, 2006), lists the following five key ways in which ICT can support literacy.

1. Firstly, ICTs are seen as **enhancing learning**, with examples provided of radio and television lessons combined with written material. Computers and multimedia computer programmes offer an advantage over radio and TV in that they enable interactive learning, trial and error and manipulation of text, also allowing learners to work independently, and developing oral and aural skills at the same time as learning how to read.

Various software programmes are described and discussed, and examples of projects employing different strategies offered. Additional resources such as audio books, electronic books and online texts are also mentioned, as well as easily accessible computer hardware and software.

- 2. Secondly, ICTS can help to **broaden access to literacy education**, where this may be limited due to social, cultural, political, geographical, economic reasons, or others. Examples of projects aimed at broadening access are offered, with discussion of the strategies employed.
- 3. Thirdly ICTS can support the **creation of local content**, meeting the need for providing socially, culturally and linguistically appropriate learning materials. Examples provided in the booklet include the creation of CD-ROMs with audio material, the use of open source technology, providing materials in languages that have not been nationally integrated, use of digital cameras to create local content.

- 4. A fourth key support for literacy provided by ICT, is that while not replacing teachers, the technology supplements and supports their expertise by reducing workload and enhancing their lessons, thereby contributing to the **professional development of teachers**.
- 5. A final key contribution is that in helping to make written information part of everyday life, ICTs contribute to the cultivation of a **literacy-conducive environment**.

2.2.2 What technology is innovatively used to overcome literacy issues in the front end experience, e.g. the fact that the learners cannot read in some cases;

The need for learners to have appropriate competences and skills in order to be able to benefit from elearning is a primary consideration.

First, recent evidence has unveiled that the digital divide in education goes beyond the issue of access to technology. A new second form of digital divide has been identified: the one existing between those who have the right competences and skills to benefit from computer use, and those who do not. These competences and skills are closely linked to the economic, cultural and social capital of the student. This has important implications for policy and practice (OECD, 2009. P6.)

Dighe in her UNESCO module on the use of ICTs in literacy and lifelong learning shows that often ICTs are associated with high-tech devices such as computers and software, but ICTs also encompass more conventional technologies such as radio, television, DVD, video conferencing and electronic mail. In her module she shares some ways in which these ICTs can be used with those who could not read or write in some cases. These case studies are shared here below².

Khilti Kaliyan

This 24 part serial aimed at women in the age group of 15-35 years. It was made with the intention of encouraging them to recognize the need for literacy and the changes that literacy would initiate in their lives. The serial was based on an experimental literacy primer by the same name. It was developed for women learners, and dealt with themes and issues pertaining to the lives of rural women. In the course of its effort to complement the primer, the TV serial established a link with the real problems of social, economic and political deprivation and oppression faced by women. Thus, the narrative of Khilti Kaliyan forced the audience to consider the position of women in society and the reasons for their unequal status.

Although made with the two main objectives of attracting women learners to adult education centres and enriching the learning process, Khilti Kaliyan went beyond that in its potential 'as a radical new effort to draw women into the mainstream by transforming education into a real tool of development and change.' The TV serial was telecast by Delhi Doordarshan Kendra once a week over 24 weeks. However, it was telecast without adequate preparation to ensure that adequate TV viewing facilities and the literacy primers were available at the adult education centres. Nor were the adult education instructors trained in using the films in conjunction with the primer being taught in class.

Source: Avik Ghosh, Avik 2006. Communication Technology and Human Development, New Delhi: Sage Publications

² Taken from Dighe -use of ICTs in literacy and lifelong learning

Chauraha, an Instructional TV Serial

Chauraha was an ambitious project of the National Literacy Mission. This TV serial attempted to teach reading and writing the Devnagari (Hindi) script. It was based on the belief the instruction through a powerful audio-visual medium like television would quicken the pace of learning and adults could be made literate in a shorter span of time. Chauraha was a set of forty 15-minute TV film episodes that, for the first time in India, used sophisticated computer animation techniques to teach Hindi writing within the overall framework of a narrative storyline. The technique was to show an easily identifiable image from daily life (or a graphic representation) and then superimpose a letter that could be associated with it.

The storyline of Chauraha followed the pattern of a TV serial filled with emotional content as the main characters went through their travails in life. Its theme was woven around the value of education. Chauraha combined direct instruction with awareness on various development issues and did so in an entertaining and enjoyable manner. The lesson from the Chauraha experience was that planning and developing good quality materials were not sufficient for cost-effective application of communication technology using a sophisticated medium like television. Preparing the ground, ensuring availability of the hardware, sustaining learner motivation, providing supplementary print materials, training the instructors to use the materials and design other learning activities had to be an integral part of the planning process.

Source: Avik Ghosh, Avik 2006. Communication Technology and Human Development, New Delhi: Sage Publications

PREAL (Project in Radio Education for Adult Literacy)

PREAL was operational in 16 selected districts of Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan. Weekly programmes under the title Nai Pahal were broadcast from eight AIR (All India Radio) stations that covered these districts. The objective of PREAL was to study the effectiveness of using radio lessons to enrich the learning experience of women learners in adult education centres (AECs) and thereby sustaining their interest in attending the classes regularly and achieving the prescribed literacy norms. Particular emphasis was laid on reinforcement of reading ability through a planned and systematically graded reading drill that was inducted into every lesson that was broadcast. The instructional content was in standard Hindi but the spoken dialect of the particular region was also used to enrich programme content, vocabulary and cultural specificity. In tribal districts, however, literacy was initiated in the local tribal language and vocabulary and then gradually built up to standard Hindi. Five hundred AECs in non-tribal districts and 300 AECs in tribal districts were identified for each AIR station, making a total of 3 800 AECs.

PREAL encountered several problems. The AECs did not function regularly. Sometimes, the literacy instructor was not present and at other times, the learners were not there or the two-in-one sets had problems or the batteries were weak. The organisation and management of listening sessions at the AEC were also poor and therefore exposure to PREAL broadcasts was not regular. Consequently, the effectiveness of PREAL in terms of reinforcing reading ability was limited. In conclusion, it can be said that the management of PREAL was weak in comparison to the magnitude and complexity of the project. The decision-makers in the government, both at the Centre and at the state levels, did not fully appreciate the scale of significance of the project.

Source: Avik Ghosh, Avik 2006. Communication Technology and Human Development, New Delhi: Sage Publications

The Tata Computer-based Functional Literacy Programme

In this programme, computers deliver the lessons in multi-media form, but these are supplemented with textbooks. Audio voiceovers explain how letters combine to give structure and meaning to various words and pronounce the words.

The emphasis is on words rather than alphabets. Lessons are designed to be visually stimulating and entertaining, using elements such as puppets. The lessons are based on material developed by the National Literacy Mission. The lessons focus on different languages, even dialects. Under the project, a number of learning centres have been established. Each centre has a computer and an instructor. Because the project relies on computer programmes, it has less need for highly trained teachers, which is an advantage in areas which lack teachers. A typical class has 15 to 20 people and is held in the evening hours.

Source: http://www.totalliteracy.com

Whilst the examples provided in these case studies may seem outdated in terms of technologies, the same principles can be used with modern technologies. Lesson can be used for audio and visual stimulation for people who are not literate or are semi-literate.

Other examples of national and international developments and initiatives that assist in opening access to learning are discussed in Saide's *Concept Framework for an Open Learning System*, including various mechanisms for sharing open educational resources (OER), open access online courses such as Massive Open Online Courses (MOOCs) (Saide 2013, p10).

2.2.3 A comparison between standard classroom-based delivery of adult literacy programmes vs. e-learning or blended learning programmes;

The guide for designing and developing e-learning courses, developed by the Food and Agriculture Organization of the United Nations (2011) explains that in blended learning traditional instructor-led training is supplemented with electronic formats. Two main models of blended learning are described, being a linear flow of learning activities, and a course core with optional supplemental materials, with examples provided of how these may play out.

A concept closely related to e-learning and used before the birth of the internet was multi-media learning, using two or more modes of learning. These included audio, video, texts and graphics, all of which were intended to enhance learner engagement in the learning process. It is important to note at this point that the introduction of technology alone into the classroom will not change the learning process.

Role of the teacher/educator

There are many similarities between the so called traditional classroom-based delivery of AET programmes and blended learning. Trucano (2005) argues that regardless of delivery model, the teacher (educator) remains central to the learning process. A shift in the role of a teacher utilising ICTs to that of a facilitator does not obviate the need for teachers to serve as leaders in the classroom; traditional teacher leadership skills and practices are still important, especially those related to lesson planning, preparation and follow-up.

Lesson planning

Teacher lesson planning is at least as vital when using blended learning as in the traditional classroom. Lack of planning has been shown by research to hamper learner achievement of learning outcomes in both situations.

Pedagogy

Although blended learning does not change teaching practices, it can be an enhancement given conducive conditions. Trucano (2005) points out that the teacher's pedagogical practices and reasoning influence blended learning, and the nature of their use of ICTs impacts learner achievement. Pedagogical practices of teachers using ICTs can range from small enhancements of teaching practices using what are essentially traditional methods, to more fundamental changes in their approach to teaching. ICTs can reinforce existing pedagogical practices as well as change the way teachers and students interact. ICTs can have positive effects on student achievement when used appropriately to complement a teacher's existing pedagogical philosophies.

Learner centred learning

In OECD countries, research consensus holds that the most effective uses of ICT are those in which the teacher challenges pupils' understanding and thinking, either through whole-class discussions or individual/small group work. Blended learning and teaching are seen as important tools enabling and supporting the move from traditional 'teacher-centric' teaching styles to more 'learner-centric' methods.

Information presentation

The use of ICTs as presentation tools (through overhead and LCD projectors, television, electronic whiteboards, guided "web-tours" where students simultaneously view the same resources on computer screens or other media) is seen to be of mixed effectiveness. While it may promote class understanding of and discussion about difficult concepts (especially through the display of simulations), such uses of ICTs can reinforce traditional pedagogical practices and divert focus from the content of what is being discussed or displayed to the tool being utilised (Trucano, 2005).

General comparison

The British Education Communication and Technology Agency (BECTA) Final Report (Crook, et al, September 2010) details learning practices mediated by ICT in nine secondary schools in which ICT for learning is well embedded. The report argues that ICT use in the project schools has reconfigured classroom practice in important ways, with the following consequent highlights:

- ICT use enabled new forms of classroom practice in three particular respects: (1) the reconfiguration of space such that new patterns of mobility, flexible working and activity management can occur: (2) new ways in which class activities can be triggered, orchestrated and monitored: (3) new experiences associated with the virtualisation of established and routine practices such as using multiple documents in parallel or manipulating spatial representations.
- ICT use created the possibility of a wide variety of learning practices. Overarching this variety are 'three central activities which are significantly enriched by the increasingly ubiquitous availability of technologies: (1) exposition which is animated by the opportunity to invoke rich shared images, video and plans: (2) independent research which is extended by the availability of internet search opportunities: and (3) construction which is made possible by ready-to-hand ICT-based tools.' (Ibid, p4)

It was argued that while efforts are concentrated on understanding the impact of ICT on learning outcome, another area that should be investigated is the effect of integrating technology into ongoing practices of teaching and learning as these are pursued at classroom level. In this regard, it is thought to be as important to acknowledge impact where ICT pervades educational practice as distinct from being a piecemeal addition to the curriculum.

The discussion of the generalised impact of ICT on the space of the classroom includes diagrams and quoted teacher descriptions that bring the difference between ICT use and traditional teaching methods to life. Flexibility of learning spaces was perceived to have accelerated the pace of learning. The section concludes with an observation that participants were generally positive about the nature of the impacts, 'but acknowledged that a comfortable classroom experience depended on good technical support and robust infrastructure' (ibid, p15).

The report further argued that impact can be understood at micro, meso and macro levels, with the micro level addressing how ICT affects motivation and engagement, as well as changing the nature of learning. The meso level relates to curriculum change resulting from ICT, while the macro level takes consideration of why large-scale change is embedded more successfully at some institutions than others.

Teacher /Educator Training in blended learning

Considerable attention is required in methodology and classroom practice related to e-learning for teachers in training.

The BECTA report (2010) argues that significant structural changes involving ICT have a massive impact on the training needs of the staff. Use of various software packages was explored by teachers and learners together, with learners sometimes leading the way. The learning relationship had changed. Although ICT was commonly identified by teachers as a support for managing learning in a way that helped them respond effectively to different student needs capacitation is necessary to help teachers deal with this change in relationship. Trucano (2005) also reported that students used ICTs in much more sophisticated ways than their teachers did. In OECD countries, students themselves are figuring out ways to take advantage of the communication potential of ICTs for learning in a self-organised, ad hoc manner that correlates closely with their own personal uses of ICTs in their daily lives. Communication tools and applications (such as chat, e-mail and SMS) appear to be underutilised by educators in education environments.

These points to the need for in-service training of teachers embracing blended learning to provide for a range of different technological ability levels dealing with the same content within the same class. With technology enabling learners to work at individual paces on the same piece of work, different strategies of classroom management are required. Teachers need on-going and regular support for their professional development and this can be facilitated through the use of ICTs (in the form of web sites, discussion groups, e-mail communities, radio or television broadcasts).

2.2.4 How content and platforms are configured to give the most effective and most efficient education outcomes that can be measured against pedagogical and didactic standards for adult learners; and

The Commonwealth of Learning (COL) Systematic review and meta-analysis of Tablets for Learning and Teaching (Tamim, 2015a) is focused on tablets and smart devices as innovations becoming increasingly popular in educational systems and schools. A range of reported responses to technology

were cited as contributing to the undertaking of the review, including that the use of technology in itself is beneficial for students' performance, that laptops have been found beneficial to aspects of the learning process such as in-class academic and collaborative tasks, note-taking activities, resource accessibility, communication and information sharing, and organisation, as well as other research that indicates that individual laptops may even distract students and their classmates, unless use is properly structured to minimise this distraction.

The review was conducted in a formal educational setting in the field of general education and addressing a general population of students, thus explicitly excluding workplace professional development courses or informal sessions.

The prior COL review report *Large-Scale, Government-Supported Educational Tablet Initiatives* (Tamim et al, 2015) had found that many of these initiatives had been launched without much critical thought and planning to allow for successful implementation, or rationale for why the use of tablets is expected to help achieve articulated objectives. Critically the indication was that 'little attention was given to educational factors that are of the greatest relevance for academics and researchers — namely, pedagogical and theoretical frameworks, accessibility of content, and teacher preparation' (ibid, p5), and while content was mentioned on more than one occasion, concerns were limited to the need to digitise available content or provide it in the official language of the country, rather than to address the nature of its presentation as interactive or to engage students in the production of content.

Major findings from the review were in agreement with previous research outcomes indicating the importance of pedagogy in technology integration, and more particularly that the way in which technological devices are used is more important 'than their mere introduction into the educational context' (ibid, p38). However use of the devices is more effective in a student-centred learning environment than in one that is teacher-led.

An interesting observed outcome was that the effect was greater with post-secondary students than elementary or secondary school learners, which was thought perhaps to relate to the older students' maturity, independence and self-regulation capacities, although literacy skills were not a factor in this survey.

There were some differences found in type of device used, with tablet PCs having a stronger effect than iPads and combination devices, although further research in this regard was recommended. Also, studies of shorter duration were found to have stronger effect. This was interpreted in terms of its novelty effect and that despite students being considered to be 'digital natives', they did not necessarily display intuitive use of the technology in the educational context, and they may still need to be trained on how to use it for educational purposes.

Advantages brought about by the use of the tablets cited by students included the following (ibid, p39):

- improved organisational and note-taking skills;
- enhanced ability to express themselves and their understanding in creative ways;
- supported independence and communication skills;
- increased accessibility to resources while supporting complex visualisation of concepts; and
- improved literacy and maths skills.

Challenges that were reported emphasised the following:

- technical issues that devices can have and the expertise needed for their use;
- the distracting nature of the devices and the plethora of apps; and
- the pressing need for professional development to enable teachers to properly integrate the device into the teaching and learning process.

The findings thus highlight the need for professional development for teachers in regard to integrating technology of whatever type into their teaching, and to creating teaching and learning environments conducive for meaningful learning.

2.2.5 Assessment in e-learning programmes

There is a wide range of computer-assisted and online tests that assess learner achievement of learning outcomes. Many schools and institutions have also invested in educational software programmes for this purpose. The individualised nature of the computer programmes, the immediate feedback on the correctness or otherwise of their responses, along with the visual and auditory dimensions of the software serve to motivate the learners: they enjoy the programmes and teachers report that it improves their concentration and confidence. These programmes allow for the monitoring and evaluation of individual performance data (p: 23)³.

A critical factor in the use of such programmes is the ease with which teachers can quickly establish a baseline position for learners and therefore monitor their progress over time against recognised benchmark data. Learner under-performance is immediately identified and intervention strategies to improve learning and achievement are implemented. Such software facilitates access to the 'value added' input from the school and the setting of targets for improvements on an individual, year group, subject or whole-school basis.

The use of e-portfolios for and by pupils is another trend. Portfolios document achievements and progress in pre-defined areas of competence. They are excellent tools to document the educational career of a learner in different subjects and over the years. Learning Management Systems (LMS) can be used for portfolios as they encourage learners to provide evidence for their stated competences. They can generate a formative profile and a career entry profile. This is an ICT based method of tracking learner progress through the recording of evidence. In addition, e-portfolios are essential for the professional learning of teachers and for the creation of communities of professional practice.

Mateo (2007) in talking about designing on line learning assessments through alternative approaches shows that the use of ICT and, particularly, the internet, offers a very important improvement in learning and, by extension, in assessment: that of the possibility of relationship among the students. Virtual learning environments widen the options for developing a real learning community in cyberspace, in which formative assessment is the most important. This is illustrated in the table below.

| From | Towards |
|--------------------------|---------------------------|
| Tool to certify | Tool to promote learning |
| Academic disciplines | Professional competencies |
| Uniformity of techniques | Diversity of techniques |
| Final assessment | Continuous assessment |

Shifting the paradigm in e-learning assessment

This shift in the role of assessment is also noted by Barrett (2007) who makes a strong distinction between assessment *of* learning and assessment *for* learning in introducing her research into electronic

³ Taken from the ICT cluster (2010) Learning Innovations and ICT Report

portfolios, whether the portfolio is electronic or not. Whereas assessment for learning emphasises the formative value of assessment, assessment of learning is driven by 'the administrator's needs for assessment data'. Barrett tabulates the differences between portfolios for these two different assessment types (ibid, p444) as follows:

| Portfolio differences between assessment types | | | |
|---|--|--|--|
| Portfolios used for assessment of learning | Portfolios that support assessment for | | |
| | learning | | |
| Purpose of portfolio prescribed by institution | Purpose of portfolio agreed upon with learner | | |
| Artifacts mandated by institution to determine | Artifacts selected by learner to tell the story of | | |
| outcomes of instruction | their learning | | |
| Portfolio usually developed at the end of a class, | Portfolio maintained on an ongoing basis | | |
| term> or program - time limited | throughout the class, term, or program - time | | |
| | flexible | | |
| Portfolio and/or artifacts usually "scored" based | Portfolio and artifacts reviewed with learner and | | |
| on a rubric, and quantitative data is collected for | used to provide feedback to improve learning | | |
| external audiences | | | |
| Portfolio is usually structured around a set of | Portfolio organization is determined by learner | | |
| outcomes, goals, or standards | or negotiated with mentor/advisor/teacher | | |
| Sometimes used to make high stakes decisions | Rarely used for high stakes decisions | | |
| Summative - what has been learned to date? | Formative - what are the learning needs in the | | |
| (Past to present) | future? (Present to future) | | |
| Requires extrinsic motivation | Fosters intrinsic motivation - engages the | | |
| | learner | | |
| Audience: external - little choice | Audience: learner, family, friends - learner can | | |
| | choose | | |

D (C 1' 1'CC

A second tabulation that is provided distinguishes between traditional portfolio processes and those utilising technology (ibid, p439)

| Table 1 Portfolio processes and value-added benefit of technology | | | |
|--|--|--|--|
| Traditional portfolio processes include | Adding technology allows enhancement through | | |
| • Collecting | Archiving | | |
| • Selecting | Linking/Thinking | | |
| Reflecting | Storytelling | | |
| • Projecting | Collaborating | | |
| • Celebrating | • Publishing | | |

A more philosophical view of the future of assessment is presented by Behrens and DiCerbo (2014), who rather than focusing on situations that are uniquely created for assessment itself, choose to discuss 'the intersection of assessment theory and evolving practices in the use of digital technologies to understand and advance learning, instruction, and assessment'. Their rationale is that technology provides the opportunity to reconceptualise assessment, away from 'discrete disconnected testing events'.

The capacity of digital technology to extend human ability, and the ability of this technology to translate data of different types into various representational forms are argued to open new possibilities for 'understanding, exploring, simulating and recording activity in the world', consequently opening possibilities for rethinking assessment and learning activities, particularly when combined with radical improvements in data collection capabilities. Digital devices of all kinds, for example cell phones, have the capacity to collect data in ubiquitous and unobtrusive ways, which is a

dramatic shift from previous eras in which physical collection of data was often 'obtrusive and likely to cause reactive effects when inserted into daily activity' (p4). The argument is that with the changes in data collection, individual and social relationships with data change, and correspondingly 'the nature of testing will change as the need for isolated testing occasions fades out in favour of ongoing and unobtrusive data capture'.

Resulting shifts in assessment include 'natural integrated activities rather than decontextualised items, connected social people rather than isolated individuals, and the integration of information gathering into the process of teaching and learning rather than as a separate isolated event'.

The discussion on paradigm shifts in assessment raises questions of the relationships between test questions asked and the inferences drawn from answers; the attributes of interest and concern that are neglected by question constructions; the evidence that is lost in adopting a focus on correctness or incorrectness.

The authors argue that technology has the potential to break down the barriers between learning and assessment.

Of more immediate practical use is Eyal's (2012) discussion of two senses of the term 'assessment literacy', following the use of 'literacy' as that which develops in interaction with the environment'. Firstly is the collection of a teacher's skills in test development, the composition of closed questions, the development of assessment rubrics, and statistical analysis of cumulative data for variety of teaching and learning needs, and the ability to interrogate and interpret the test results. Posed against this is the knowledge of which assessment methods to use to collect information on students' achievements; conducting dialogue about effective assessment results; using the ranking scores, reports, and portfolio; and understanding how to use assessment to increase the motivation of learners and include them in the learning process. However neither of these meets the opportunity or demand of the digital environment.

Eyal argues that traditional assessment literacy based on quantitative data is becoming redundant with advances in technological tools. Instead teachers' assessment literacy must include the alternatives offered above in addition to a knowledge of when to relinquish the responsibility of the role of evaluator to their students 'in order to develop self-regulated and reflective learners' (Eyal, p37). In this regard, Eyal coins the term 'digital assessment literacy', referring to the role of the teacher as an assessor in a technology-rich environment.

In an initial discussion on gathering of assessment data, while asserting that the predictability capacity of testing systems is limited and not applicable to features such as student problem solving ability, teamwork, good work habits and honesty, the usefulness of electronic learning management systems (LMS) in streamlining the testing assessment process is noted. A basic level of Digital Assessment Literacy would require familiarity with Learning Management Systems, including its capacity to

'Develop assessment items (in this case, a test), assign them to students, receive their computerised answers, and edit different segments (e.g., all students' answers to question X) to help identify specific weaknesses in students and manage feedback' (ibid, p38).

These are essential tools for efficient management of the evaluation process as a whole, bringing benefits to learners in the form of information regarding their relative learning progress; to teachers by allowing flexible teaching and responding to learners' progress, and also to education managers.

Computerisation of assessment data allows for the generation of databases of assessment tools; speedy reflection and feedback to students; tracking of data, activities and events; and facilitates teachers' diagnoses of learning problems.

Computerisation of assessment items is by no means restricted to multiple choice items, but may include graphics, sound animation and multimedia with response options at different levels. A taxonomy for e-learning assessment questions and tasks offered by Scalise and Gifford (2006) gives

examples ranging across seven categories of diminishing constraints, with 'presentation/ portfolio' being the least constrained.

The discussion presented by Eyal (2012, p39) describes use of multiple choice tests that promote constructivist learning, as well as computerisation of learning tasks leading to content mastery that provide a range of tools available to teachers who are digitally literate assessors. The argument is developed that the best way to evaluate the digital learning environment is to focus more on the learning process and less on the use of tests.

Discussion covers the use of online tasks, digital portfolio, forums, online peer assessment and finally the need for the teacher to step aside and allow learning environments that foster learning and self-regulation.

The article concludes by advising that a teacher with digital assessment literacy will be able to use various applications and technological systems to advance students, and that the level of literacy moves along a continuum starting with use of learner management systems and progressing to the development of self-targeted learning.

The skills and abilities required by teachers for different levels of digital assessment literacy are listed (See Appendix A).

2.2.6 What is available locally and internationally in respect of Design Standards, Protocols and Guidelines to design and develop good e-learning programmes;

The E-learning methodologies: A guide for designing and developing e-learning courses

(Ghirardini, 2011), developed by the Food and Agriculture Organization (FAO) of the United Nations is intended to provide guidance for designing and developing e-learning courses, providing basic concepts and information on the processes and resources involved in e-learning development. The guide focuses on formal e-learning to meet job-related goals, and has been developed mainly for adult learners who have completed their formal education. Characteristics particular to adult learners are listed as

- needing to know the benefits of learning (why they have to learn something)
- liking to learn experientially
- approaching learning as problem-solving
- learning better where they can see the immediate value and application of content; and
- preferring to study at a time, place and pace convenient for them.

The introduction presents a discussion of situations in which e-learning is appropriate, suggesting that e-learning is most suitable for building cognitive skills, although thinking skills may require more interactive e-learning activities, because these skills are better learned 'by doing' (ibid, p9). E-learning is suggested as a good option for learners who lack effective listening and reading skills, among others, although, the point is clearly stated that it is not ideal for all purposes.

Approaches that enhance the quality of e-learning are listed, as well as a reference to 'Open ECB Check' (with ECB defined as e-capacity building), an international accreditation and quality standard for e-learning programmes, released in 2010 and supported by the German Federal Ministry of Economic Cooperation and Development. Some descriptions are provided of examples of FAO e-learning courses.

The pre-requisites for developing e-learning courses are discussed in detail. While the delivery of training sessions takes the greatest effort in traditional training, the first pre-requisite with e-learning is primarily the design and development of structured materials. A model of instructional design is provided, namely 'ADDIE' (Analysis, Design, Development, Implementation, Evaluation), with detailed description of the five steps of the process.

A second pre-requisite is the e-learning team, representing necessary skills and expertise, some of which are not required for traditional education and training, for example technology and media-related skills. Required roles include instructional designers, subject matter experts, web developers and media editors, online facilitators and tutors, technical support specialists, among others.

Thirdly is the pre-requisite for the technology required to deliver e-learning. This may range from Microsoft PowerPoint or Word, across courseware authoring tools that create interactive e-learning content, to learning platforms providing a set of interactive online services giving access to information, tools and resources. The most important features of learning platforms, of which there are a variety with different levels of complexity, are listed as the following:

- *learning content management*: creation, storage, access to resources;
- *curriculum mapping and planning*: lesson planning, personalized learning paths, assessment;
- *learner engagement and management*: learner information, progress tracking; and
- *tools and services*: forums, messaging system, blogs, group discussions.

The development of a FAO learning initiative is described in detail as a case study example.

Designing an e-learning course

Although guidance is not specifically offered for conducting a needs analysis, the importance of doing so is emphasised, particularly with the aim to establish whether training is required, and if so, whether e-learning is the best means to deliver the training.

Analysis of the target audience is the second step to obtain information that will influence course design. This includes considerations such as where learners reside (language and cultural aspects), employer organisation or institution, previous knowledge or expertise, computer skills or expertise, access to connectivity.

Course content analysis is the most critical step in the instructional design process, combined with learners' previous knowledge and skills, which determine goals, more specific learning objectives and the curriculum outline. Methods for determining these are discussed (ibid, p30), and examples provided, as well as discussion of topic analysis and types of content.

These analyses inform specific learning objectives. The process of developing learning objectives is explained, the nature of these, and range of performance levels that may be expected to result, as well as activities targeting learning and how learner achievement can be assessed.

Different methods of sequencing courses are discussed and overall course structures.

Instructional methods must reflect the best methods and techniques for a specific e-learning course. Discussion is focused on three types of instructional methods, namely expositive, application, and collaborative, and the different formats and media and communication tools appropriate to e-learning for each of these. Summary tabulations of instructional methods and formats are provided (ibid, p51).

Factors affecting selection of the delivery strategy include learner-related factors, technology aspects and organisational requirements. These are elaborated, and some good practices identified.

Definition of an evaluation strategy for the course is mentioned as an important decision to be considered at the design stage.

Creating interactive content

The process of developing e-lessons is illustrated, including preparing the content, applying instructional techniques and media, and creating the final interactive product using appropriate software and authoring tools.

Although existing materials for a specific subject may well be available in the form of user manuals and technical documentation, classroom course handouts and lecture notes and presentations, case studies, images, training materials and reference materials, these cannot be transformed into e-learning materials by simply making them available from a website. Instructional support must be embedded into materials to allow learners to function independently throughout the course. Guidance is provided for incorporating existing material into e-learning courses, or generating appropriate material where this does not exist, as well as for reviewing the resulting lessons. Tips are provided for content development and language style.

The design document for each e-lesson is called its 'storyboard' or script. The storyboard describes screen by screen what will happen in the final lesson. The storyboard is an intermediate product that is used by Web developers to create the final interactive lesson. Guidance is provided in the document on how to use instructional techniques and integrate media elements and interactive questions to create a lesson storyboard. Discussion elaborates the structure of an interactive lesson and its components, techniques (with examples) for presenting content and adding examples to illustrate concepts.

Different media elements that can be combined into e-lessons are described and discussed, with tips provided for each, including text, graphics, animations, audio and video. The use and development of practice and assessment tests is also discussed, with tips and examples provided, including guidance regarding question formats.

Suggestions are made for additional resources that can be supplied to support the lessons or the course.

The last step of the development stage is the creation of the final interactive courseware. The document illustrates authoring tools and guidance for selecting the right authoring tool. Courseware development requires a number of different processes which could include assembling all the course components into the course interface, the creation of graphics and animations, navigation buttons and icons, audio and video editing, coding and programming. The characteristics and differences between use of programming tools as compared to authoring tools are summarised and tabulated. Features of authoring tools are listed and explained.

The features and capabilities of various authoring tools are discussed providing examples and technical detail. Types of authoring tools are categorised and different types described. Guidance is also offered for factors to consider when selecting authoring tools, as well as sources for help in this regard.

Managing and evaluating learning activities

Part IV of the guide deals with implementation and evaluation of the course. The delivery structure of online courses is usually organised into a number of sessions, and the typical components are listed in the guide as follows:

- Kickoff event
- Pre-course learning activity
- Cycle of learning events
- Final assessment

Feedback and conclusion

Points to be taken into consideration for each of these components are discussed and examples provided.

Facilitated and instructor-led courses need documentation to be used by facilitators and shared with learners to guide them through the course. The following documents need to be developed for sharing with learners:

- a course syllabus which describes session topics and learning objectives
- a storyboard specifying the activities that will be carried out and the materials that will be provided to learners in each session.

The facilitator must be available throughout the implementation of the programme, and is crucial in terms of participants' motivation and retention. The responsibilities of the course facilitator during programme implementation are listed as follows:

- provides information on tasks, deadlines and places to upload or download files;
- accompanies participants during their work by checking workflow and individual or group results, composing working groups and interfering if necessary into group dynamics in case of conflicts or production blockades;
- provides summaries at the end of units or phases;
- answers questions concerning tasks, deadlines or use of learning tools;
- motivates participants to produce, reflect, animatedly exchange ideas and initiate discussions;
- assures links to other partners in the process (e.g. administrator, subject matter expert, technician); and
- organises the final evaluation of the e-learning event.

The guide provides lists and explanations for how a range of communication tools can be used to support learning, including e-mail based tools, discussion forums, wikis and other shared writing/editing tools, blogs, webcasting, chat and instant messaging (IM), polling, whiteboard and screen-sharing tools, application sharing and audio and video conferences.

The different purposes and timing of evaluations are described, as well as identifying and explaining the four levels that can be evaluated, namely learners' reactions, learning, behaviour and results. Methods for evaluating learning are discussed.

The final chapter illustrates the different types of learning platforms which can be used to host elearning courses, discusses proprietary and open-source learning management systems, and solutions for limited Internet connectivity. Among the proposed solutions for limited internet connectivity there is discussion of e-learning facilitated by hand-held devices such as mobile phones among others. Some examples are offered.

The guide also provides an appendix of some taxonomies and design tools, including:

- Template for task analysis
- Learning taxonomies
- Types of content
- E-learning methods and delivery formats.

The *Online Course Design and Materials Development Guide* provided by the South African Institute for Distance Education (Saide, 2012) provides comprehensive guidance within the South African context, although this is not specifically targeted at literacy education or at 'e-learning' but deals with open learning, open educational resources and technology-supported teaching and learning, among other considerations. The section on technology-supported teaching and learning provides links to a number of resources addressing new roles entailed for participants, considerations for course structure and design, learner support and virtual learning environments.

Teachers' roles in use of ICT in schools

The UNESCO ICT competency framework for teachers (2011) addresses teachers' roles in e-learning, addressing three different approaches to teaching:

The first is **Technology Literacy**, enabling students to use ICT in order to learn more efficiently. The second is **Knowledge Deepening**, enabling students to acquire in-depth knowledge of their school subjects and apply it to complex, real-world problems. The third is **Knowledge Creation**, enabling students, citizens and the workforce they become, to create the new knowledge required for more harmonious, fulfilling and prosperous societies. (UNESCO, 2011, p3)

| The UNESCO competency framework for teachers | | | |
|--|----------------------|-------------------------------------|--------------------------|
| | Technology literacy | Knowledge deepening | Knowledge creation |
| Understanding ICT in education | Policy awareness | Policy understanding | Policy innovation |
| Curriculum assessment | Basic knowledge | Knowledge application | Knowledge society skills |
| Pedagogy | Integrate technology | Complex problem solving | Self management |
| ICT | Basic tools | Complex tools | Pervasive tools |
| Organisation and administration | Standard classroom | Collaborative groups | Learning organisations |
| Teacher professional learning | Digital literacy | Manage and guide Teacher as learner | |

The intention of this document is to guide teachers in how to make the best use of the ICT available in their schools to improve students' learning. It further represents an important statement on how teacher education can increase the effectiveness of teachers and enable school students to become engaged and productive members of the knowledge society (ibid, p5).

Competency standards for teachers' practice

The UNESCO ICT competency standards for teachers: Implementation Guidelines (2008) are intended to improve teachers' practice in all areas of their work by combining ICT skills with emergent views in pedagogy, curriculum and school organisation. The competency standards aim to provide guidelines for professional teacher development providers, relevant qualifications, and advance skills in pedagogy using ICT, among others.

Taxonomy of forms of interaction

The *Impact of Technology: Value-added classroom practice: Final report* (BECTA: Crook et al, 2010) offered a taxonomy of the variety of forms of interaction that a student might participate in by means of which knowledge may be elaborated. The taxonomy is applicable also to situations where

technology is being used, when the question "Which learning practices is it mediating?" may be asked.

The leftmost column in the table (see below) is an attempt to organise the 19 forms of interaction. '*Instrumental*' items are interactions that do not necessarily involve other people in direct relationship. They involve learners interacting with symbolic or concrete material in a manner that supports the elaboration of knowledge. '*Dialogic*' interactions are those that are one-to-one interpersonal exchanges, involving the learner in an encounter with another individual such that the form taken by that exchange extends thinking and understanding. '*Communal*' interaction involves people in a more diffuse or distributed sense of interpersonal exchange. It may be less intense or intimate and it may be more loosely distributed over time and place. '*Scenarioed*' learning interactions are more formally constructed configurations of some setting for learning. They allow the interaction to take particular shape and direction that is cognitively useful. (Ibid, p69)

| | Learning Practice | Learners mediated interaction |
|--------------|----------------------|---|
| Instrumental | Searching | A directed or improvised exploration of subject materials |
| | Annotation | Record elaborating commentary on subject materials |
| | Rehearsal | Recall and exercise relevant domain elements and processes |
| | Representing | Design and manipulate symbolic formats of subject matter |
| | Ludic | Un-directedly explore materials to generate positive affect |
| | Construction | Build artifacts, knowledge, or representations relevant to |
| | | some subject domain |
| | Reflection | Consciously systematise one's own evolving learning |
| Dialogic | Exposition | Implicit dialogue with authorial voice |
| | Tutorial | Engage in dialogue with more knowledgeable other |
| | Assessing | React to feedback from an authoritative other |
| Communal | Performative | Publically present a domain-relevant construction |
| | Networked | Distributed and intermittent exchange of subject-related understandings |
| | Participative | Integrate with a community of learners who share knowledge- building ambitions |
| | Collaborative | Exchange to deliberately create shared knowledge |
| Scenarios | Cross-contextual | Integrate and manage activities over multiple contexts |
| | Case-based | Engage with the components of a subject-relevant case |
| | Simulation | Manipulate a functional reproduction of subject-relevant system |
| | Problem-focused | Solve a specific problem defined as subject relevant |
| | Scripted enquiry | Execute a scaffold of investigation of articulation |
| | | |

A detailed definition of each of the learning practices is provided with its reference to ICT mediation and example technologies that might be involved in such mediation.

Lesson reports provided strong indications that ICT contributed to the engagement of students, although greater coordination of ICT use across course components was required to ensure that the variety remains fresh.

Digital technology tools for teachers

The Commonwealth of Learning: Commonwealth Educational Media Centre for Asia (CEMCA) document *Technology Tools for Teachers* (Vidya, 2014) describes and explains a sub-set of freely accessible digital tools that can be used to aid the learning of secondary level students. The tools discussed include those for use by teachers for planning and organising, including calendars, journals and mind maps, tools for managing resources. A number of tools are described that can be used to

present material creatively, including text, video and audio, data visualisation and information graphics.

A chapter on online learning provides discussion of learning management systems, based on the example of Moodle, and on tools available for tracking learning. Sites for obtaining rubrics are also referenced. Some categories of subject specific resources are also referenced.

2.2.7 The availability of policies, practices and guidelines for e-learning

A review of literature on functions of policy at institutional level highlights the importance of creating a common vision on the use and development of e-learning within the broader educational strategy. This is because the adoption of e-learning requires a revisiting of existing strategies, especially those associated with e-learning programme development, instructional technology, and crucially, e-learning learner support services. Typically, overall intention is to align e-learning policy with the broader institution's strategic plan Kashorda, M. et.al (2007).

Further Gatimu (2008) shows that aligning e-learning to an overall educational strategy enables top management to stay responsive to need to modernise its e-learning and capacity building. Policy alignment to incorporate e-learning in a mixed mode institution is necessary to create a long term vision and mission of e-learning expected outcomes.

Anderson, et al (2006) completed a comprehensive study on the use of policy in e-learning tertiary institutions in nine countries, five agencies and across various provinces in pursuit of a global discussion on e-learning policy and practice at a national or institutional level. This study suggests that policy serves two main purposes:-

- to document and inform what resources are required to implement the establishment of elearning; and,
- to document how the e-learning will be measured, evaluated and quality assured (ibidm 2006: p3).

In a follow up paper in 2007, Anderson et al provide an analysis of the establishment of an e-learning policy covering the following:-

- Strategies to develop physical infrastructure
- Focusing on building and ensuring quality in e-learning
- Moves to create a system wide approach to e-learning
- Embedding e-learning and aiming for sector efficiencies (ibid, p76).

Quality indicators for e-learning need to specify:-

- Provision of support, information and guidance for learners;
- Professional development and support for tertiary teachers;
- Leadership development;
- Development of high quality e-learning content (ibid, p 77).

Le Grange (2011) argues that these eight criteria could be used for an overall e-learning policy for South Africa as they mirror a study of various countries and represent best practice for e-learning policy development. The eight core criteria are also helpful as a basis for quality assurance of e-learning, combining the "establishment" and "quality" purposes also noted by Anderson et al. These criteria are presented in the table below⁴:

| 1. Policy Statement | Embedding e- learning and aiming for sector efficiencies | Institutions should indicate how they intend to use technology based learning and this should be reflected in the mission, vision and overall objectives of the organisation. |
|--|---|---|
| 2. Quality management systems | Moves to create a system wide approach to e- learning | Institutions should indicate which quality management system and approach they wish to use. The overall quality policy and a policy statement specific to the delivery of technology based learning is suggested. |
| 3. Review mechanisms | Focusing on building and ensuring quality in e-learning | Institutions should explain how often review will take place, preferably bi-annually or annually. The process should also include a review of how learning is delivered as well as the platform from which learning takes place. |
| 4. Programme delivery | Development of high quality e- learning content | Institutions should explain how learning is designed, developed and what delivery mechanism is used. Hours of instruction as well as instructional design methodology relative to technology-based learning should be demonstrated. |
| 5. Staff policies | Professional development and support for tertiary teachers | Institutions should explain the process of developing staff to meet the needs of constantly changing technology and the role of professional development for all tiers of staff from instructors to administrators. |
| 6. Learner policies | Provision of support, information and guidance for learners | Institutions should explain how learners will be supported, how evidence of this support will be generated and how guidance to learners will be monitored if technology forms the only communication mechanism with learners. |
| 7. Assessment policies | (None noted specifically by Anderson, Murray and Brown) | Institutions should explain how technology based assessment meets the principles of validity, authenticity, currency and sufficiency. Assessment design and strategies need to demonstrate that "quality learning" takes place and that the credibility of the exit point for learning either through norm or outcomes-based assessment is met. |
| 8. Management system and policies- | Leadership development; Strategies to develop physical infrastructure | Institutions should explain how they intend to maintain leaders' currency with changing technology, as well as explain how the management of infrastructure will remain current and that learning and cost of delivering this "current learning" will not be compromised. |

In conclusion Le Grange (2011) argues that policy and the framework used to quality assure elearning need to be in place in order to legitimise and transfer e-learning into the "mainstream" of learning. Ideally, this should be at a national level so that practices are standardised and implementation does not conflict with various policies across various regulatory frameworks. A

⁴ Table taken from Le Grange (2011)

quality assurance checklist based on broad quality assurance principles would need to be flexible enough to accommodate the development and evolution of technology.

ICT in Education Toolkit for policy makers, planners and practitioners

Another resource relating to policy for e-learning is to be found is through a collaborative partnership of infoDEV (a global grant programme managed by the World Bank to promote innovative projects on the use of ICT), UNESCO, Academy for Educational Development (AED, now Family Health International – FHI360) and Knowledge Enterprise, an *ICT-in-Education Toolkit* containing six toolboxes with interactive instruments and step-by-step guidelines to assist education policy makers, planners and practitioners in the utilisation of ICT for educational institutions struggling with the challenge of introducing and integrating ICTs into education, among others. The toolkit is available in CD-ROM, downloadable and on-line versions through the project website, <u>www.ICTinEdtoolkit.org</u>. Potential users need to apply for authorisation to use the toolkit by sending an email to a Toolkit User Administrator, as instructed on this site.

The four parts of the toolkit handbook address different users and serve different functions, including policy makers, an analytic review and a discussion of resources.

Key observations made in the Analytical Review include that ICT is not one monolithic entity, but consists of a wide range of technologies differing in properties, scope and potential, including audio and video technologies, multimedia digital content, and considerations of connectivity. Different technologies are used for different purposes, and may be used at different levels.

Many of the factors that constrain the effectiveness of on-site education operate equally forcefully with ICT facilitated education, and in particular, bad ICT education is as much a reality as bad face-to-face education. Effective integration of technology into learning systems is far more complicated than their simple acquisition, and involves a rigorous analysis of educational objectives together with a realistic understanding of the potential of the technologies.

Finally, the guidelines point out that ICTs are not a substitute for schools and teachers, although they can 'expand the potential of a conventional delivery system, complement its existing elements, and empower instructors to become better teachers'.

2.2.8 Review existing relevant research and development work that is taking place at municipal level (for example the Learning Cities programme being undertaken by the PASCAL Observatory) and in other workplaces

In his opening remarks on the policy paper on adult education in Scotland, Mike Russell, Cabinet Secretary for Education and Lifelong Learning in the Scottish Government states that everyone in the country should have 'the right to access high quality learning to meet their needs and aspirations – throughout their lives'. The notion that adult learning should be life-long and life-wide, that it should be learner-centred and informed by the interests and motivations of learners has underpinned policy and practice in adult education for many decades in many countries in Europe and elsewhere (Delors *et al.* 1996, European Commission 2000).

One way that Scotland gets to live this principle is through the learning city concept. Research has demonstrated that there are potentially multiple benefits of adult learning that extend beyond the economic to a range of other outcomes including those relating to health, social care, social cohesion

and civic participation. These wider benefits of learning have been highlighted by the Centre for the Wider Benefits of Learning and more recently in UK policy reviews. Whilst there is a general consensus about the desirability of lifelong learning for individuals and about the wider benefits for society associated with lifelong learning, it is often less clear how policies on lifelong learning relate to, and are integrated with other policy contexts. One aspect of this which is of particular importance is the tying of policies on learning to the resurgent interest in, and recognition of the importance of place, and especially of cities in social, economic and cultural development (see UNESCO 2013).

Sankey and Osborne (2006) show the importance of a 'good place', in securing stronger communities through community planning and community capacity building. Government policies can recognise the importance of the provision of appropriate learning opportunities to place. They further show that there is a need to link the emphasis on the requirement for community planning to the more ambitious notion of the learning city.

The Beijing Declaration (2013) on Building Learning Cities defines a learning city as one which effectively mobilises its resources to:

- promote inclusive learning from basic to higher education;
- re-vitalise learning in families and communities;
- facilitate learning for and in the workplace;
- extend the use of modern learning technologies;
- enhance quality and excellence in learning; and
- nurture a culture of learning throughout life.

In so doing, a learning city will enable and reinforce individual empowerment and social cohesion, economic and cultural prosperity, and sustainable development.

Whilst there may not be a single universal definition of a learning city, what learning cities and regions have in common is an explicit commitment to putting learning and innovation at the centre of their development process. Osborne and Tibbit point out that the 'learning' in a 'learning city' refers to both individual and institutional learning. Individual learning embraces not only initial schooling and training but also participation in lifelong learning, and the acquisition of knowledge, skills and understanding through both formal and informal channels. It is a challenge for learning cities to link opportunities for individual learning to the larger city-wide context in which institutions, both public and private, recognise that they have a need to learn and to innovate if they are to develop the capacity to compete in the knowledge-based economy.

In short, adult education therefore is a fundamental building block, not only of efforts to enable individuals to overcome disadvantage and to strengthen capacity within communities to participate in local development, but also one which enables employers and civic authorities to build the future of towns, cities and regions.

Research undertaken by the PASCAL Observatory identifies five key drivers towards the notion of learning cities and the role of adult education within it. These are:-

- 1. Statutory underpinnings strategic frameworks embedded in statutory regulations
- 2. Networks and Partnerships multi stakeholders creating a sense of common purpose, local identity. Networks sustain continuous exchange and flow of information

- 3. Local capacity for learning development most likely to happen based on local capacity for learning innovation and change, formal, non-formal social inclusive training
- 4. Flexibility take cognisance of own uniqueness and connect with emerging opportunities
- 5. Cutting edge communication technologies accessible information and communication technologies are important facilitation of processes of learning, knowledge exchange and innovation.

Many of the major global companies associated with smart cities development have begun to address the question of how education might need to be re-imagined for such software-smart urban spaces. So too have several local government and academic initiatives. Their underpinning logic is that the economic, cultural and political functioning of smart cities will rely on smart people that can help contribute to the monitoring and management of the city itself. In such projects, the 'smart citizen' is increasingly viewed as responsible for enacting computational and data analysis tasks 'so that smart cities will function optimally' (Gabrys 2013).

The civil society organisation National Endowment for Science, Technology and Arts (NESTA) has become a particularly significant actor in mediating between the coding/making movement and the smart cities agenda.

NESTA has also extensively promoted smart cities thinking and has in particular advocated citizen participation in smart cities. Its manifesto for *Rethinking Smart Cities from the Ground Up* describes how citizens might 'shape the future of their cities' through 'collaborative technologies', 'citizen sensing projects' and 'civic crowdfunding', and it promotes 'people-centred smart cities' which use 'open data and open platforms to mobilize collective knowledge', 'take human behaviour as seriously as technology' and 'invest in smart people, not just smart technology' (Saunders and Baeck, 2015)

The key findings of *E-learning in the workplace: An annotated bibliography* (Guiney, 2015) conducted as a Tertiary Sector Performance Analysis for the New Zealand Ministry of Education are:

- "E-learning can provide flexible learning options for employees and allow them to upskill more rapidly. E-learning in the workplace can decrease the costs of upskilling a workforce through reducing travel and employee time away from work. It is particularly useful for a geographically-dispersed workforce because it can deliver a consistent training experience.
- The uptake of e-learning in the workplace is increasing. Many New Zealand firms have the systems and infrastructure to support e-learning, but often lack the capability to implement it successfully. To overcome design inadequacies in e-learning courses, new skills and personnel are required in the teams charged with developing and delivering it.
- Firms need to have strategies and plans in place to support their e-learning which integrate or align with their overall plans and strategies. Support by managers for e-learning in the workplace (including allocating sufficient time for it) is critical to success.
- Large organisations are more likely to adopt e-learning than small and medium-sized enterprises (SMEs) because they have better infrastructure and systems and can more readily achieve economies of scale and return on investment. SMEs can form collaborative networks to share knowledge, resources, and expertise to overcome the cost and relevance barriers they face when implementing e-learning.

- E-learning is most often used in workplaces to supplement traditional delivery (blended learning). Blended learning can contribute to significant gains in learner achievement.
- The focus in workplace e-learning has moved from 'courses' to learning content that is available to employees as and when needed. E-learning is more effective when people can access it in small 'chunks', reflect on it, and then apply it immediately.
- E-learning supports informal learning in the workplace because it makes it easier to codify information and knowledge and make this available to the organisation and its external stakeholders.
- The most common technologies and systems used to support workplace e-learning are learning management systems, video, mobile devices, social networking tools, wikis, weblogs, simulations/virtual reality, CD-ROMs, and DVDs.

Some of the main barriers to implementing e-learning in the workplace are:

- high up-front costs that include new and/or upgraded systems, training the trainers, and developing interactive and/or personalised content
- employee resistance to e-learning
- organisations not having an appropriate learning culture in place
- lack of management support
- adopting technologies and systems that are difficult to use and access, are unreliable, and/or lack technical support
- employees and trainers lacking the skills and capabilities to teach and learn in e-learning environments
- Irrelevance to real-time work tasks and not integrated with business processes."

3. The South African Context

The development of the White Paper on e-Education in 2004 demonstrated the political will in government to move with the times and embrace the use of ICTs in the educational sector. The then Minister of Education Pandor expressed that:

Government wanted to ensure that every school has access to a wide choice of diverse, highquality communication services which will benefit all learners and local communities. The services provided by the initiative will enhance lifelong learning and provide unlimited opportunities for personal growth and development to all. The challenge of providing modern technologies to schools in order to enhance the quality of learning and teaching will require a significant investment. Given the magnitude of the task ahead, and in the true spirit of Tirisano, the public and private sectors will have to join hands to ensure that our children receive high-quality learning and teaching. This White Paper represents a new framework for the collaboration of Government and the private sector in the provision of ICTs in education. Through this initiative, we hope that we will be able to turn our schools into centres of quality learning and teaching for the twenty-first century⁵ (e-education policy foreword).

The minister noted that technology would be a vital tool to deliver learning at all levels of the national

⁵ Taken from: <u>http://www.education.gov.za/LinkClick.aspx?fileticket=%2BfGxKN%2FCtg0%3D</u>

qualifications framework (NQF) and that there was need to address capacitating of a platform through mobilisation of resources and infrastructure development⁶.

Even though the uptake of e-learning in the country has been slow there are examples that show that impact is being made. Goodman (2014) suggests that because of the many challenges to digital access in South Africa, some educators and experts in the technology field argue that e-learning is not viable in our context. Some examples of what is being done are indicated, and yet some experts believe the divide can be bridged. It is believed the answer to bridging the divide lies in using educational technologies that span the online and offline worlds.

Goodman (2007) further shows that government is also making inroads into overcoming barriers to elearning. The Gauteng Department of Education, for example, recently announced its intention to introduce e-learning to the province's schools, and distribute 88 000 tablets to schools that need them. And it should not be forgotten that broadband technology is also becoming increasingly accessible, with data prices falling steadily.

In the Western Cape, Premier Zille announced the roll out of e-learning in the schools within the province. E-learning was said to be the tool that was going to assist in tackling the following challenges:

- Access to quality education in disadvantaged communities
- Provisioning of support for struggling learners
- Contribute towards teacher training and professional development
- Improve management and administration at schools
- Promote development of skills for active participation of learners in a technology based economy in the future.

The concept of the "smart classroom" linking classrooms to the WAN and LAN has mobile technology in the form of teacher laptops, data projectors and other technological devices for teaching and learning. The benefits of this are listed as follows:-

- Online digital resources for teachers and learners: The department has developed an online catalogue of digital education resources that can be accessed on the WCED website by teachers, learners and parents. This includes a Learning Management System (LMS) that encompasses a central digital resources repository that has curriculum content for teachers, learners and parents
- Teacher training and development in ICT and the use of e-learning in schools: the success is dependent on teachers' ability to use the technologies effectively. As such a comprehensive training programme was instituted.
- Private sector and donor funding: to ensure sustainability of such an initiative various stakeholders must be engaged.⁷

⁶ Address by the Minister of Education, Naledi Pandor MP, "E-Learning in South Africa" at the World Ministerial Seminar on Technology in Education "Moving Young Minds", Queen Elizabeth II Conference Centre in Westminster, London (2007).

⁷ WCED e-learning information taken from: <u>http://www.gov.za/speeches/media-release-wced-announces-details-e-learning-%E2%80%9Csmart-schools%E2%80%9D-project-23-feb-2015-0000</u>

The impact of e-learning in Gauteng and the Western Cape is still to be measured as both have only recently been established.

More recently, the White Paper for Post-School Education and Training (PSET) (DHET, 2013) sketches a vision of a network of providers (p50), encouraged increasingly to make use of available digital technologies where appropriate to enhance access, improve communication and generally optimise student engagement. Recent increases in bandwidth, cloud services and affordability of devices such as laptops, tablets and smart phones are observed as factors that will contribute towards facilitating achievement of the goal of ensuring that ICT infrastructure is extended equitably to all post-school students. The paper notes DHET intentions to develop an integrated ICT plan, collaborate to facilitate increased bandwidth, easier access and reduced costs for educational purposes. The caution is voiced however that 'the success of an educational programme will be determined by its pedagogical strength and not by the integration of ICT, which can sometimes be used poorly or as a gimmick. The intention to build technological capacity of staff and students is noted, including the development of an e-skills plan for the post-school education and training sector that is aligned to the national e-skills plan of the Department of Communication; as well as enabling development of institutional and inter-institutional ICT policies and plans (aligned to national policies) to facilitate appropriate allocation of financial resources.

Guidelines for the delivery of good quality e-learning have been developed by INSETA for application to quality assurance e-learning programmes based on SAQA's eight core quality criteria for ETQAs (Le Grange, 2011 and 2014), but these are not generally available or promoted as best practice, nor are they specifically directed at adult education programmes.

Goodman (2007) in his article "E-learning hard to implement for South Africa, but necessary: iLive" shares some interesting examples of how e-learning is being used effectively. He gives an example of Via Afrika, a company that has developed digital learning tools that require very limited internet connectivity and can be used both online and offline. The example given is that of the living pages app for grade 10, 11, and 12 textbooks which enable learners to interact with these textbooks using smart phones and tablets. The app enhances the book with extra digital content such as video, graphics and audio recordings that can be streamed directly through whatever device the learner is using. This provides the learner with an engaging digital language.

Another example given of creative solutions to bridge the divide is the Via Afrika e-book series for grades 4 to 12. It is important to note that once these e-textbooks are downloaded they can be read in the MobiReader app which allows for learners to engage with digital enhancements such as videos, slide shows and audio, all of which can be done offline.

Riaan Jonck, CEO of Pearson South Africa and Steve Vosloo (2016) show that the future of education in South Africa is blended learning. They explain that while mid and end of year exams will always have a place in our educational system, the stress and pressure surrounding these could be alleviated through the use of blended learning which introduces on-going digital assessment.

Studies show repeatedly that no matter the context, teachers are the fulcrum on which the success or failure of learners largely hinge. If teachers are overworked or cannot really gauge how their learners are coping on a regular basis, they will fall through the gaps and not reach their full potential.

Ongoing digital assessment technology allows teachers to gauge accurately where students are on their learning journeys. The assessments can be conducted at the end of each lesson, module or learning concept that would enable teachers to identify immediately whether or not a learner or a class as a whole understands the work. The teacher could then go over the work

again accordingly. In this way, interventions can be made as and when necessary, and not at the end of the year when it is too late. This would be empowering for teachers (Jonck 2016).

Vosloo (2016) explains that digital assessment technology would also greatly alleviate teachers' workload. Given the nature of the numbers of learners in most of our South African classrooms, such platforms make it possible for work to be marked immediately. This alleviates the marking burden of teachers, thereby allowing them to focus more on teaching interventions. This is a game-changing element that teachers need to be made aware of.

There are other benefits to be gained from ongoing digital assessments, including the fact that learners would find the process empowering and that the information gained could be aggregated and used to inform classroom practice. Jonck (2016) adds that digital assessments would also enable learners to progress at their own pace and the potential exists to adapt learning to individuals. Several 'game-changing' adaptive programmes, such as Pearson's 'Test and Improve' and upgraded 'Pulse' are a case in point.

Whilst the examples given take place in a formal school set up, the application would be the same in an informal setting and can be used in skills and technical vocational training. The same can be true of higher education settings as well. E-learning in secondary and tertiary education is a way of nurturing computer and digital literacy in South Africa to enable equitable competition globally. In an interview with *IT News South Africa*, Chief Technical Engineer at OpenWeb, Athol Wesselink⁸ said: "The use of technology to support education will not only enhance pupils' access to quality tutorials and learning material, but will also develop their digital savvy and computer literacy - a skill that has become increasingly vital when entering the South Africa to ensure that students are adequately equipped with digital skills and a quality education."

In conclusion, one of the great benefits of traditional distance learning has always been that it makes education available in rural areas and to workers who cannot afford full-time classroom-based further education. Evidently South Africa has a huge problem regarding access to quality, affordable tertiary education – as the recent and ongoing student protests have demonstrated. Moreover, the 2014–2015 report by the *Institute of Race Relations* found that an alarming number of students who applied to universities across South Africa were turned away, with institutions like the University of Witwatersrand having accepted only 6 255 of 51 000 first-year applicants.

However the introduction of e-learning in the wake of mobile devices means that this cohort and those who previously had no access at all are now accessible to the wider reach of education. The *Educause* report mentioned earlier concurs with this thinking by further stating that "the greatest benefit of e-learning remains unchanged since its inception: It can increase enrolment by increasing access."

ICTs are one of South Africa's most successful and most rapidly growing sectors. *Research ICT Africa* said in a report that "[ICT] sector growth continues to rise at (at least) double the national growth rate, and is now contributing around 6% to national GDP." With the increase of e-learning, the education sector is bolstering the ICT industry even more as it starts to employ more and more IT professionals: course designers, professional development staff, app designers, and e-learning services management staff. There is also an increase in the number of entrepreneurs who are eager to satisfy

⁸ Taken from the article 'The over looked impact of e-learning'. Oxbridge Academy: <u>http://www.bizcommunity.com/Article/196/659/141381.html</u> Posted on 25 Feb 2016 14:16

the growing market demand for e-learning solutions, with South Africa already boasting a <u>long list of</u> <u>e-learning companies</u>. Multimedia and interactivity greatly contribute to this phenomenon. But new innovations like 'gamification' are also starting to play a role in e-learning, using competitive game mechanics to make learning activities even more engaging (Oxbridge Academy).

Among the Sectoral Education and Training Authorities, INSETA provides a guideline to e-learning. (See reference list).

3.1. South African literacy

After two years of investigation and development, the Kha Ri Gude mass literacy campaign was implemented from 2008 to 2012, launched after the failure of existing national Adult Basic Education and Training system to impact significantly on the number of adult illiterates (McKay, 2015). Following its successes, the programme was relaunched by the Department of Basic Education in 2015 for a further two years. The programme delivery does not include any electronic components, but is significant for consideration here in view of its currency and impact on literacy in South Africa.

The curriculum was levelled as equivalent with Grade 3 of the General Education system (ABET sublevel 1), and constructed to enable learners to record achievements against individual Unit Standards as recorded on the National Qualifications Framework. Learner support materials were developed in the 11 official languages of South Africa by a team of African language academics, linguists and practitioners. Materials were developed with the volunteer teacher and the interests and learning needs of adults in mind, mediating cultures of different language groups, aimed at teaching spoken functional English and including maths materials. Materials were field tested and found user-friendly for campaign volunteer teachers who may have only minimal training. Development of 85 detailed lesson plans provided step-by-step guidelines for the novice teacher.

Materials were evaluated and found to be successful in terms of relevance, support provided to facilitators for motivating learners; interactivity and activity-based learning; acknowledgement of prior learning and experience; and including skills, communication, working with others, problem solving. Activity based learning places the learner at the centre of the learning experience, and this needs mediation of the learning process by a lecturer or tutor. The Commonwealth of Learning reportedly sought partnerships to adapt and customise materials for use in other Commonwealth countries.

Basic training for volunteer programme facilitators included adult-appropriate teaching-learning methods, classroom management, how to use the teaching modules to conduct lessons as well as to moderate the learning process, and how to conduct the assessment activities. The face-to-face delivery structure requires a provincial coordinator to manage a smaller number of supervisors. Each supervisor monitors 20 learning groups, each comprising 15-18 learners. The facilitators are each responsible for the learning groups.

Assessment was by Learner Assessment Portfolio, a strategy aimed at gauging the quality of learning outcomes at various times during the programme, and facilitated the transition of learners into ABET level 2, or other areas of education and training. Facilitators were encouraged to use the assessments as diagnostic, reflexive instruments for providing feedback and for helping learners to see their progress, as well as understanding its being an integral part of the learning and continuous improvement processes of learning. The portfolio system of assessment, with processes tailored to the South African context, also encouraged a learner-centred approach to pedagogy, which was thought to be a factor contributing to high retention and completion rates of over 86%.

Key success factors in the programme are summarised as the provision of well-designed print-based learning materials which encourage independent learning, actively engage the learners, provide regular formative assessment and encourage appropriate group activities.

4. Conclusion

On the basis of country studies that highlight the best practice in the use of ICT for literacy programmes, ICTs have the potential to play the specific following roles:-

- Enhance Learning ICT can be used as a tool for acquisition of literacy skills. Used in combination using different platforms this can aid learner information processing and memory.
- Broaden Access Access to literacy education may be limited for a number of reasons. With the increase in the use of electronic devices especially smart phones access to education can be widened.
- Creating Local Content ICTs can enable a fast locally acceptable and appropriate learning content.
- Professional Development Qualified and trained teachers represent the key to quality teaching and learner motivation. ICTs can also reach areas where there is shortage of qualified teachers.

Studies in other countries show that it should be possible to formulate the following strategies to use ICTs meaningfully in AET programmes:-

- Formulating a policy for integrating ICT in AET programmes ICTs should not be viewed as extra added but rather an integral part of overall educational policy.
- Ensuring community participation through ICT projects physical and socially accessible infrastructure, political willpower and involvement of other key stakeholders with sustained and ongoing consultation
- Developing learner-centred and context-specific ICT tools inclusive, differentiated learning that engages even those previously excluded.
- Ensuring professional development of AET educators
- Ensuring that research, monitoring and evaluation are built into the programme design
- Ensuring sustainability of ICT-based literacy programmes.

5. Recommendations

• Given the lack of an available e-AET model, separate e-learning guidelines and adult education guidelines should be considered, and their potential for collaborative application to the LG sector considered. In respect of e-learning, Ghirardini (2011) and Vidya (2014) provide very practical assistance, among the other useful recommendations mentioned. Saide's *Concept Framework for an Open Learning System* (2013) should be taken into account. Regarding adult literacy programmes, the Kha Ri Gude programme seems to provide a best practice model, and McKay (2015) gives a wealth of practical details for consideration.

• The success of the Kha Ri Gude programme has been noted. This programme addresses only ABET Level 1, but has the strength of doing so in all 11 official South African Languages. The activity based learning materials; portfolio assessment methodologies tailored to develop learner based teaching and learning; cascaded delivery structure utilising volunteer facilitators working under a regime of frequent monitoring in turn supervised; and accredited qualification to be achieved gained from completing the programme are all critical success factors for this programme.

It may be useful to review the LG SETA fast track literacy programme developed in 2009 in the light of these critical success factors, and against the Saide learning grid demonstrating modes of provision (see p4 above, and Saide's 2013 *Concept Framework for an Open Learning System in Post School Education and Training in South Africa*) with a view to possible expansion of e-learning components that can be piloted in contexts where the requisite resources are available.

This would have the advantage of facilitating progression to completion of the ABET levels 1-4 against nationally recognised qualifications, and enabling programme delivery in a wide range of contexts.

As emphasised repeatedly in the literature, learner support is a critical consideration. In this regard it would be essential to ensure that programme facilitators were well trained in regard to the support requirements of the programme, and that implementation benefits from continuous monitoring throughout. In addition, extended development of electronic support components should be considered.

• Consideration should be given to identification of suitable partners with which the LG SETA may collaborate in their work in e-AET. On the one hand the PSET White Paper identifies SETAs as important facilitators of partnerships between the developing community colleges and public programmes such as the EPWP programmes and others, while on the other hand there are organisations that have expertise that will be useful in this development work being contemplated.

APPENDIX A

Abilities and skills required of teachers for digital assessment literacy, as listed by Liat Eyal (2012, p45-46)

Basic Digital Assessment Literacy

• The use of digital tools in all phases of the evaluation process: from design to drawing conclusions.

• The use of an LMS database to enable effective and focused acquisition of information about students, identifying sources of error in the teaching process, identifying difficulties on tests on both personal and class wide levels, and examining various cross-sections of data to draw conclusions and plan instruction.

• Production of relevant assessment reports from within the LMS for various parties involved in the educational process.

• Routine testing of the effectiveness and suitability of the selected technological tools and components.

• Organization and documentation of all the mutual feedback and their efficient use to monitor and promote learning.

• Management of formative and summative assessment scoring and interpretation of results based on a digital database.

• Effective use of assessment data in the digital database for pedagogical decision making and for planning the teaching–learning–assessment processes.

Intermediate Digital Assessment Literacy

· Minimization of the number of computerized tests used for learning assessment.

• Holistic view of teaching and learning integrated with assessment, using alternative methods of web-based assessment and advanced information technologies.

- Ability to diagnose and assess a range of study and developmental areas using performance tasks that incorporate various technological tools.
- The use of variety of methods and digital tools to gather information on the progress of learners.

• The selection of assessment methods and technological tools appropriate to the learning objectives and teaching methods.

• The combination of several technologies for assessing and measuring learning, to increase the validity and cross-check information.

• Development of appropriate criteria for evaluating performance in a digital environment, and using feedback and guidance to promote learning.

• Awareness and ability to cope with the risks and inherent ethical issues associated with the use of digital assessment tools.

Advanced Digital Assessment Literacy

• Share the methods for assessment and the formation of evaluation criteria with learners, using learning systems and applications that enable transparency and collaborative writing.

• Encourage cooperative learning by having students expose their learning outcomes to their peers at all stages of implementation and at the end of the learning process (digital portfolio, personal learning environments, wikis, blogs, podcasts, publishing, multimedia databases, and so on).

• Encourage students to evaluate their peer through continuous integration of collaborative technologies that enable comment and discussion, while developing skills for learners and promoting the giving and receiving of high-quality feedback.

• Collaboration with others as part of the assessment process, by disseminating information, and providing access and permissions to various digital environments.

• Ability to produce rich assessment information about both learners and the learning-teaching process, based on documented data collection and cross-checking a variety of digital tools over time, and the ability to use interpretation to promote learning.

• Encouraging learners to use self-assessment and reflection, using advanced digital technologies such as writing a blog, computerized practice tests.

• The creation of online anonymous feedback and evaluation surveys on the learning-teaching process and the teacher, and the use of the information obtained for self-reflection to improve instruction and assessment.

• The ability to identify situations that require attention and sensitivity to the learner's feelings, identifying the learner's needs in the social and emotional realms, and developing his abilities through a thorough reading of the deliverables, such as personal blog.

• Providing choices for learners with regard to goals, tasks, information sources and products, according to personal preference, while opening their eyes to a variety of options offered by the Internet.

REFERENCES

Anderson, B, Brown, M, Murray, F, Simpson, M and Mentis, M (2006), Global Picture, Local Lessons: E-learning policy and accessibility. Ministry of Education, New Zealand

Anderson, B, Brown, M, Murray, F, (2007) "E-learning policy issues: Global trends, themes and tensions". In ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007 <u>http://www.ascilite.org.au/conferences/singapore07/procs/brown-m.pdf</u>

Barrett, HC. (2007). Researching electronic portfolios and learner engagement: the REFLECT Initiative. *Journal of Adolescent and Adult Literacy* 50(6), 436-448.

Behrens JT, and Dicerbo KE. (November 2014). Technological implications for assessment ecosystems: Opportunities for digital technology to advance assessment. Teachers College Record 116 (110310)

Beijing Declaration on Building Learning Cities Lifelong Learning for All: Promoting Inclusion, Prosperity and Sustainability in Cities. Adopted at the International Conference on Learning Cities Beijing, China, October 21-23

http://www.dvv-international.de/fileadmin/files/beijing_declaration_en.pdf

Crook, C, Harrison, C, Farrington-Flint, L, Tomás, C, Underwood, J. The Impact of Technology: Value-added classroom practice: Final report. *British Educational Communications and Technology Agency (Becta)* 2010

Delors, J *et al.* (1996), *Learning, the treasure within*. Report to UNESCO from International Commission on Education for the 21st century, Paris, UNESCO

Department of Higher Education and Training (2013) White paper for post-school education and training: Building an expanded, effective and integrated post-school system.

European Commission (2000) Memorandum on Lifelong Learning, Brussels, Commission of the European Communities

Eyal, I. (2012). Digital Assessment Literacy-The Core Role of the Teacher in a Digital Environment. *Educational Technology & Society*, *15* (2), *37-49*.

Gabrys, J, (2013) Programming environments: environmentally and citizen sensing in the smart city. Published in 'A New Apparatus: Technology, Government, and the Resilient City," eds. Bruce Braun

and Stephanie Wakefield, Environment and Planning D: Society and Space 32, no.1 (2014) doi:10.1068/d16812:

http://research.gold.ac.uk/5641/1/Gabrys_SmartCity_EPDOnline.pdf

Gatimu, K (2008) E-learning policy making processes: An evidence based application at Kenyatta University Marsabit Distance Learning Centre Taken from http://www.saide.org.za/Portals/8/Kenyatta/kenyatta.pdf Accessed 27/03/2016

Ghirardini, Beatrice. E-learning methodologies a guide for designing and developing e-learning courses Food and Agriculture Organization of the United Nations. 2011

Goodman, M (2014) E-learning hard for SA to implement, but necessary: iLIVE. Taken from <u>http://www.timeslive.co.za/ilive/2014/03/05/e-learning-hard-for-sa-to-implement-but-necessary-ilive</u> Accessed 30/03/2016

Guiney, P. E-learning in the workplace: An annotated bibliography. Tertiary Sector Performance Analysis, Ministry of Education, New Zealand. February, 2015. Accessed from on http://www.educationcounts.govt.nz/publications/ict/e-learning-in-the-workplace, 160314

ICT cluster (2010) Learning Innovations and ICT –Lessons learned by the ICT cluster Education and Training 2010 Programme.

http://erte.dge.mec.pt/sites/default/files/Recursor/ Estudos/key_lessons_ict_cluster_final_report.pdf

INSETA E-learning Guideline 2012 http://www.inseta.org.za/downloads/E_learning_Guideline_2012.pdf

Jonck, R and Vosloo, S (2016) The future of education: hybrid system. Taken from http://www.bizcommunity.com/Article/196/498/140108.html Accessed 30/03/2016

Kashorda, M. Waema, T. Omosa, M. Kyalo V. 2007. E-learning Survey of Higher Education in Kenya 2006. In Gatimu, K (2008) E-learning policy making processes: An evidence based application at Kenyatta University Marsabit Distance Learning Centre Taken from <u>http://www.saide.org.za/Portals/8/Kenyatta/kenyatta.pdf Accessed 27/03/2016</u>

Le Grange, J. (2011). "Interrogating Quality Assurance of e-Learning in Adult Occupational and Vocational Learning in South Africa- The South African Qualifications Authorities 8 core criteria for quality learning delivery." National Institute for Adult Assessment. Conference proceedings Atlantic City, New Jersey (14-16 June 2011).

Le Grange, J. (2014). Quality assuring e-learning: A review of policy and implementation in adult occupational and vocational learning in South Africa. E-Leader Bangkok. 2014.

McKay, V. (2015). *Measuring and monitoring in the South African* Kha Ri Gude *mass literacy campaign*. International Review of Education (2015) 61:365-397.

Mateo, J. (2007) Designing online learning assessment through alternative approaches: facing the concerns. European Journal of Open Distance and e- learning

http://www.eurodl.org/materials/contrib/2007/Mateo_Sangra.htm

Osborne, M and Tibbitt, J Adult education and place: a vital link for learning cities Policy Briefing 5 from PASCAL International Observatory. http://pascalobservatory.org/sites/default/files/adult_education_and_place-pb5.pdf

Oxbridge Academy (2016), The often overlooked impact of e-learning. Taken from <u>http://www.bizcommunity.com/Article/196/659/141381.html Accessed 30/03/2016</u>

Oxenham, J. Effective Literacy programmes: options for policy makers. UNESCO: International Institute for Education Planning. Paris. 2008.

Pandor N (2007) Moving Young Minds - E-learning in South Africa- World Ministerial Seminar on Technology in Education. Taken from <u>http://www.gov.za/n-pandor-world-ministerial-seminar-technology-education-moving-young-minds-e-learning-south-africa</u> Accessed 27/03/2016

Sankey, K. and Osborne, M (2006) 'Lifelong learning reaching regions where other learning doesn't reach' in R. Edwards et al. *Researching Learning Outside the Academy*, London, Routledge Saunders, T. And Baeck, P. (2015) Rethinking Smart Cities from the Ground Up, London: Nesta http://www.nesta.org.uk/sites/default/files/rethinking_smart_cities_from_the_ground_up_2015.pdf

Scalise, K. & Gifford, B. (2006). Computer-Based Assessment in E-Learning: A Framework for Constructing "Intermediate Constraint" Questions and Tasks for Technology Platforms. *Journal of Technology, Learning, and Assessment, 4*(6). Retrieved 29 March 2016 from <u>http://www.jtla.org</u>

Scheuermann, F and Pedro, F (Eds). *Assessing the effects of ICT in education – Indicators, criteria and benchmarks for international comparison*. European Commission – Joint Research Centre. Luxembourg: Publications Office of the European Union, 2009. OECD.

South African Institute for Distance Education (2012) Online Course Design and Materials Development Guide (accessed at <u>http://www.saide.org.za/design-guide on 9/05/2016</u>). Saide (2012)

South African Institute for Distance Education (2013) *Concept Framework for an Open Learning System in Post School Education and Training in South Africa* Saide (2013)

South African Qualifications Authority (2001) Quality Management Systems for Education and Training Providers SAQA, Pretoria.

South African Qualifications Authority (2001) Quality Management Systems for ETQAs. SAQA, Pretoria.

General Household Survey 2014- Statistics South Africa www.statssa.gov.za/publications/P0318/P03182014.pdf

Stockley, D (2003) E-learning Definition and Explanation http://www.derekstockley.com.au/elearning-definition.html

Storper, M (1995) 'The Resurgence of Regional Economics, Ten Years Later: the Region as a Nexus of Untraded Interdependencies', European Urban and Regional Studies 2

Tamim et al. Tablets for teaching and learning: Systematic review and meta analysis. Commonwealth of Learning. Commonwealth of Learning. 2015a

Tamim, RM, Borokhovski, E, Pickup, D and Bernard, RM. Large-scale government-supported educational tabled initiatives. Commonwealth of Learning, 2015

Trucano, Michael. 2005. *Knowledge Maps: ICT in Education*. Washington, DC: infoDev / World Bank. Available at: <u>http://www.infodev.org/en/Publication.8.html</u>

UNESCO (2013) *Key Features of Learning Cities – Introductory Note*, Hamburg, UIL www.learningcities.uil.unesco.org/aboutus/learning

UNESCO ICT Competency Framework for Teachers. 2011. France UNESCO and Microsoft.

UNESCO ICT Competency standards for teachers Implementation Guidelines Version 1.0. UNESCO 2008. Paris

Vidya, MS. Technology Tools for Teachers. Commonwealth Educational Media Centre for Asia (CEMCA) 2014. Accessed from http://oasis.col.org/bitstream/handle/11599/564/TechnologyTools_Teacher 160314

Vorhaus, J, Litster, J, Frearson, M, Johnson, S. Review of Research and Evaluation on Improving Adult Literacy and Numeracy Skills. Research Paper Number 61, Department for Business Innovation & Skills (BIS). <u>www.BIS.gov.uk</u>. December 2011.

Western Cape Education announces details on E-learning "smart schools" project- taken from: <u>http://www.gov.za/speeches/media-release-wced-announces-details-e-learning-%E2%80%9Csmart-schools%E2%80%9D-project-23-feb-2015-0000</u> Accessed 30/03/2016 White Paper on e-Education Transforming Learning and Teaching through Information and Communication Technologies (ICTs) - Taken from <u>http://www.education.gov.za/LinkClick.aspx?fileticket=%2BfGxKN%2FCtg0%3D</u>Accessed 27/03/2016

Yang, J (2012) An overview of building learning cities as a strategy for promoting lifelong learning. Journal of Adult and Continuing Education, 18(2), 107-113.

Wachjholz, C (Editor in Chief). Using ICT to develop literacy: UNESCO ICT in education programme. UNESCO, Bangkok. 2006