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Public Service Sector Education and Training Authority (PSETA)

RESEARCH REPORT

E-LEARNING ASSESSMENT FRAMEWORK FOR THE PUBLIC SERVICE SECTOR

SEPTEMBER 2021

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real centre for researching education and labour

Research conducted by the University of Witwatersrand's Centre for Researching Education and Labour (Wits REAL)

by

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Executive Summary

The purpose of this research project was to develop an understanding of the change drivers and difficulties linked to implementing e-learning in the South African Public Service Sector in line with policy imperatives and global trends. The project aimed to investigate specific challenges and contextual variables that need to be addressed to strengthen skills development within the public sector. It also aimed to explore how to enhance ways in which the public sector utilises e-learning to upskill and re-skill its workforce.

The research was undertaken over a 12-month period, from September 2020 to September 2021, and involved five main phases.

Phase One comprised the inception and orientation of the project. The second phase involved a literature review on e-learning including an analysis of relevant public sector documents, reports, and policies on e-learning practices within the public and private sector. This contextual profile describes e-learning practices in the sector and enabled us to structure the public e-learning system as an activity system.

The third phase consisted of the development of mediating tools including a comprehensive evaluation tool to offer a potential way forward to enhance strategic planning implementation for e-learning. This will assist with addressing the challenges faced by the public sector in terms of training and the processes of change involved in transitioning the conceptualisation of e-learning to contextualised capacity building. The e-learning criteria framework provides basic guidelines for designing an optimum e-learning experience in the public sector. The e-learning review tool (Appendix A) supports and complements the criteria as a tool for analysis of the e-learning programme. The e-learning criteria and tool were sent to ten e-learning experts in the same field of research for comments on further development and improvement.

Phase Four consisted of data analysis. Insights from stakeholder engagement and framework development processes were assessed and key emergent themes to inform the e-learning needs of the public sector were identified. In the final phase the findings were reviewed and recommendations proposed and the final report presented here is based on reviewer feedback.

Key findings

The key change drivers impacting on e-learning implementation in the public sector include new policy direction, the government prioritisation of Fourth Industrial Revolution Technology

and the impact of Covid-19. The policies that guide e-learning in the public sector consist of the Public Service policy on e-learning framework, Department of Higher Education and Training (DHET) Open Source Learning Framework, PSETA e-learning Policy and PSETA e-learning Guidelines. PSETA reports to DHET as the Executive Authority, however PSETA supports the National School of Government, provincial and state academies, universities, TVET , CET institutions and private Skills Development Providers (SDPs) registered under PSETA. There is an urgency to integrate e-learning processes to enable digital transformation within the public sector to ensure the development of digital competencies and the use of digital productivity tools. Various e-learning tools are being utilised by the public training sector. E-learning platforms such as online course websites, LMS systems, mobile learning applications, Zoom, WhatsApp, amongst others, are tools that assist in developing required skills and knowledge.

The public service sector is facing various challenges during the uptake of e-learning. These challenges include:

- conceptualising and uptake of e-learning,
- time, e-learning pedagogy,
- infrastructure and accessibility,
- digital literacy, and
- creating a digital culture.

With the guidance of the e-learning policies, support and research from various institutes, investment in infrastructure and the instilment of a digital culture, these challenges and barriers can be overcome.

Proposed recommendations

The recommendations to support the processes of utilising e-learning as an innovative tool to support successful training in the public sector are listed below.

1. Policy uptake

The sector's change in policy and strategic plans shape and drive the uptake of e-learning at a national and provincial level. The data derived from this study indicates that there is a lack of structural alignment between policy and practice. Alignment and anchoring e-learning in national and institutional strategies and structures is important. It is important to create clear lines of responsibility for implementation in management for these strategies. An e-learning implementation conceptual framework and guidelines aligned with existing policies (listed previously) need to be developed.

1.1 Tools to translate e-learning policy into practice

Develop tools to support policy-based innovations. Resources are needed to ensure that policies are integrated into the e-learning practices of the public sector.

1.2 Innovative e-learning review tools

To ensure that uptake and implementation of e-learning is successful, develop **innovative e-learning review tools**, needs assessment analysis tools, sound strategic plan implementation criteria guides to **support e-learning policy integration.**

1.3 National online review tool platform to support comparative analysis

Various tools (as mentioned above) have been developed by different e-learning stakeholders. However, to support the translation of policy into practice, **standardised online national versions** of these tools need to be developed.

2. Developing an e-learning ecosystem and networks to support e-learning within the public sector

- To provide a better understanding of the processes that enable e-learning uptake, include all departments and other components within the public sector in further network building and transformative change processes.
- Develop specific communication links to ensure **alignment and articulation between national, provincial, training department and other institutions are functioning**.
- Develop **e-learning training networks** within the public sector that aim to understand the processes of e-learning as a training tool and identify how change can be initiated.
- Learning networks between the public service sector, DHET, NSG and PSETA can contribute to upskilling and support digital transformation within the public sector.
- Create and foster involvement in learning networks at international, national, and provincial levels to identify best practices and develop joint regional solutions. Encourage joint development of digital teaching and learning strategies, as well as virtual collaboration.

- Recognise that the use of e-learning in the public sector will require extensive leadership and management support and consider creating additional funding schemes to advance the transformation process.

3. Uptake of e-learning within a public sector digital culture and mindset

3.1 National level

- Launch a campaign on e-learning and digitalisation to inform the public service sector of the positive aspects of this training platform. This kind of campaign can also help individuals to become more responsive and positive about the concept of e-learning.

3.2 Provincial level

- Develop training programmes for all training departments, course developers and trainers in digital literacy skills, e-learning pedagogy and tools to implement e-learning.
- Provide training in the utilisation of new e-learning policy translation and programme review tools.

3.3 E-learning training programmes

- Each e-learning programme should start with a module on digital orientation and digital literacy skills to ensure that participants are familiar with and have the necessary digital literacy levels to complete the e-learning training programme successfully.

4. Infrastructure

As the PSETA Skills Sector Plan (PSETA, 2020) already includes upgrading of infrastructure, other ways to improve accessibility and technological challenges need to be considered.

- Provide an open access learning platform or collaborate with an existing open access platform such as the DHET's platform.
- Make all training platforms data free or zero rated. E-learning programmes can then run on a national level and the infrastructure challenges of Wi-Fi and low connectivity can be minimised.
- Plan online contact sessions on data-reverse communication channels such as Veedo (a data-reverse version of Zoom that works on all mobile networks

and if participants use Veedo on their smartphones, they are not charged for data).

- Develop smartphone mobile-friendly e-learning platforms and design online courses that work on smartphones. This will partly address the geographical infrastructure of poor access to technology in rural areas.

5. Standardise e-learning programmes and feedback on programmes

5.1 National level

- Utilise the proposed national e-learning policy translation and development tools can support the needs analysis process and therefore ensure that e-learning is used to train the public sector in the skills required.

5.2 Provincial level

- Tools can also ensure quality control and evaluation of training programmes. This addresses the issue of poorly designed materials.

5.3 Review of training programmes

- Develop review tools for e-learning programmes to evaluate the programmes and provide feedback on the programme on a national level.
- Initiate communities of practice and learning centred on developing digital pedagogies grounded in insights from learning sciences and digital learning communities to foster skill-building and collaborative approaches.

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Acronyms

4IR	Fourth Industrial Revolution
CET	Community Education and Training
CSIR	Council for Scientific and Industrial Research
DHET	Department of Higher Education and Training
DoE	Department of Education
DPSA	Department of Public Service and Administration
GCIS	Government Communications and Information System
ICT	Information Communication Technology
LGSETA	Local Government Sector Education & Training Authority
LMS	Learning Management System
NPM	New Public Management
NSG	National School of Government
OECD	Organisation for Economic Co-operation and Development
PSETA	Public Service Sector and Education Training Authority
SETA	Sector and Education Training Authority
SITA	State Information Technology Agency
SMEELEARN	SMEs & e-learning
STS	Science and Technology Studies
TVET	Technical and Vocational Education and Training
VR	Virtual Reality
WRC	Water Research Commission

1. Introduction

The vision of the National Skills Development Plan (NSDP) is an educated, skilled, and capable workforce for South Africa. The NSDP seeks to ensure that South Africa has adequate, appropriate, and high-quality skills that contribute towards economic growth, employment creation and social development. One of the vehicles to achieve this is the 21 Sector Education and Training Authorities (SETAs) which, through discretionary funds, promote and support the development of the workforce and the unemployed.

One of the SETAs is the Public Service Sector Education and Training Authority (PSETA), which was formally established in accordance with the Skills Development Act, Act 97 of 1998. The PSETA oversees the provision of quality public service education and training that meets the current and future needs of all stakeholders that are in the business of government, including the following:

- National and provincial departments: There are 38 national departments and 112 provincial departments registered with PSETA
- Legislatures (national/ parliament and provincial): PSETA's scope of coverage within the legislative sub-sector is limited to the administrative component, with the members of parliament function falling within the scope of the Education, Training and Development Practices (ETDP) SETA. A total of the nine legislatures and parliament are registered with PSETA.
- Public entities: This is the smallest sub-sector within the PSETA scope and includes parastatals. These entities have different mandates but the common skills cutting across these entities are transversal skills. A total of 24 public entities are registered with PSETA (PSETA SSP 2019/20), 21 of which are active.

Schwab (2016) proclaimed that the Fourth Industrial Revolution (4IR) "is characterised by a much more ubiquitous and mobile internet, by smaller and more powerful sensors that have become cheaper, and by artificial intelligence and machine learning". In simple terms, 4IR seeks to not only infiltrate the way we live but also the way in which we work and learn. 4IR is rooted in varying technologies which will continue to shape our lives and the way the public sector entities provide services, such as healthcare and education, including internal education and training.

The notion of what constitutes e-learning has been a subject of contestation. In general, it is learning that is underpinned by the learners' use of electronic technology to gain a deeper

understanding or insights, and this is often done by offering courses online (Stoltenkamp, 2012). Therefore, e-learning is a pivotal pillar of 4IR, both in terms of curriculum development, mechanisms of delivery, learner engagement, provider upskilling and training, and assessment in the public service sector. It should also be noted that due to the impact of Covid-19 on training delivery and work-place practices, the use of e-learning will continue to escalate.

In line with the above, PSETA aims to better understand the dimensions of e-learning within the public service sector, with a focus on national and provincial services, the variables and challenges associated with delivering e-learning courses, to inform the development of an e-learning assessment framework to determine the meaningfulness of e-learning provided in the public service sector.

As part of a broader University of Witwatersrand Researching Education and Labour (REAL) Research Chair, this research has been procured by PSETA to investigate this topic further.

The purpose of the study is to:

- Conduct empirical research to identify change drivers and difficulties of implementing e-learning in the South African public service sector (with a focus on national and provincial level) in line with policy imperatives and global trends.
- Investigate the specific challenges and contextual variables that need to be addressed to strengthen skills development within the public service sector and enhance the ways in which the public service sector utilises e-learning to upskill and re-skill its workforce.
- Develop criteria (a framework) for PSETA to assess the impact and ‘meaningfulness’ of public service sector e-learning programmes.

2. Research approach

The purpose of the research project was to develop a concise explanation of the change drivers and difficulties of implementing e-learning in the South African public service sector in line with policy imperatives and global trends. The project aims to investigate:

- Specific challenges and contextual variables that need to be addressed to strengthen skills development within the public sector, and
- How to enhance the ways in which the public sector utilises e-learning to upskill and re-skill its workforce.

2.1. Systems thinking approach

The purpose of this research project was to gain an understanding of the public service sector e-learning system, practices and learning processes. Mkhize (2012) developed a comprehensive conceptual framework to form a foundation for explaining the extent of complexity of the e-learning practices of South Africa's public sector. Figure 1 outlines this framework indicating the various components within e-learning practices in the South African public service sector.

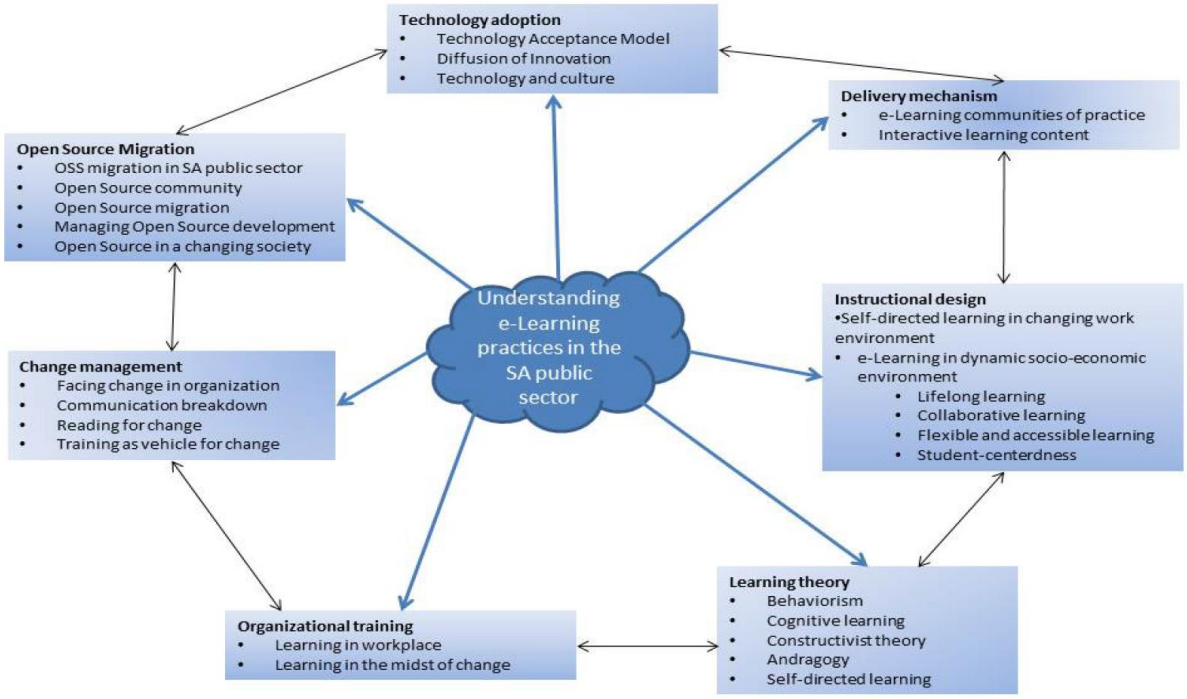

Figure 1: E-learning conceptual framework (Mkhize, 2012)

This study draws on this e-learning conceptual framework (in Figure 1) and examines the public service sector e-learning system through the lenses of systems thinking. The challenges faced by the public sector are complex problems with many interactions with feedback loops and variables that depend on each other (Neumann, 2013). Looking at the public sector from

a systems thinking viewpoint, one moves from the traditional reductionist way of studying problems to a more interactive, network-building approach. Msomi, Munapo and Choga (2018) stated that the South African public sector has conceptualised e-learning as a linear process, which involves predicting expectations, guarantees and which assumes that patterns repeat themselves. For the public sector to be aligned with public needs there has to be a paradigm shift and management must ensure that the behaviour of the system is in line with the organisation's goal (Jackson, 2003). There are various components and actors within the public sector's learning system that affect the learning and innovative processes within the system by increasing competent service delivery through upskilling of the public employees. This approach allows the study to understand the challenges and complexities of the public e-learning system, to identify the stakeholders and role players, to understand their interests and interactions and to identify barriers and contradictions in the long-term innovative learning process. A systems thinking approach can provide tools for a review of current practices and the implementation of responsive change.

Engeström (1999) suggested that activity theory is a useful tool to analyse systems and may be simplified with the help of five principles, namely seeing the object-oriented activity system as the prime unit of analysis, keeping in mind the many voices in and historicity of the system, seeing contradictions as sources of change and development, and lastly, considering the possibility of expansive transformations. By visualising the public sector e-learning and training system as a unit of analysis activity system, one can identify the different contradictions, pathways of innovation and processes needed to achieve the objective of successful reskilling of public sector servants (Davydov, 1999; Engeström, 1987). Reviewing e-learning through 'activity' acknowledges the different constituencies with a stake in these processes, as well as the context of curriculum and public sector needs (Bertelsen and Bodker, 2003; Cole and Engeström, 1993). Activity theory can be used to better understand the goals of e-learning in the public sector training setting and including all the major constituents and the influence of social and cultural norms, values, language, and tools (Jonassen, Tessmer and Hannum, 1999). The activity system structure, as seen in Figure 2, guided the analysis of the public sector e-learning system during this research.

Andersson and Grönlund (2009) also identified the need for a whole-systems perspective on e-learning. As Andersson and Grönlund's literature review shows, there is virtually no whole-systems perspective on e-learning. Factors were "typically studied in isolation and contextual factors are effectively ignored". They make the case for not exclusively looking at one single category or factor when discussing e-learning challenges. Their conceptual framework both

identified the major challenges for e-learning and paid special attention to potential emerging issues or differences concerning challenges for e-learning between developing countries and developed countries. In their literature research, they identified four broad strands that cover the field conceptually (in which there were 30 specific challenges):

- Course – content, design, and delivery (40 papers address challenges in this area),
- Challenges related to characteristics of the individual, student, or the teacher (32 papers),
- Technological challenges (25 papers), and
- Contextual challenges – organisational, cultural, and societal challenges (23 papers address challenges in this area).

Ten years later, Ali, Uppal and Gulliver (2018), building on the work of Andersson and Grönlund (2009), identified additional challenges that did not fit into any of the defined categories. Accordingly, the TIPEC framework was proposed, to facilitate the structuring of all e-learning barrier research into technological, individual, pedagogical barriers and enabling conceptual categories.

Ali et al. (2018) identified a paradox between growing public demand yet failing implementation/acceptance. They considered e-learning implementation barriers and proposed the conceptualisation of the TIPEC framework as an e-learning barrier framework, which highlights the key concepts hindering e-learning implementation and delivery.

The future of education is not only imagined; it is also constructed, made, and unmade in different contexts. Education technology is being normalised, rationalised and legitimised as the appropriate professional development approach by commercial interests. This reimagining of education by private organisations, and its instantiation in commercial technologies needs to be countered with robust, critical and research-informed alternative imaginaries centred on recognising the purpose of public service as a social and public good (Williamson and Hogan, 2021). The work of Ali et al. (2018) and Andersson and Grönlund (2009) was used in this research to construct questions that pertain to stakeholders and role players in the public sector who are responsible for e-learning or are e-learners themselves.

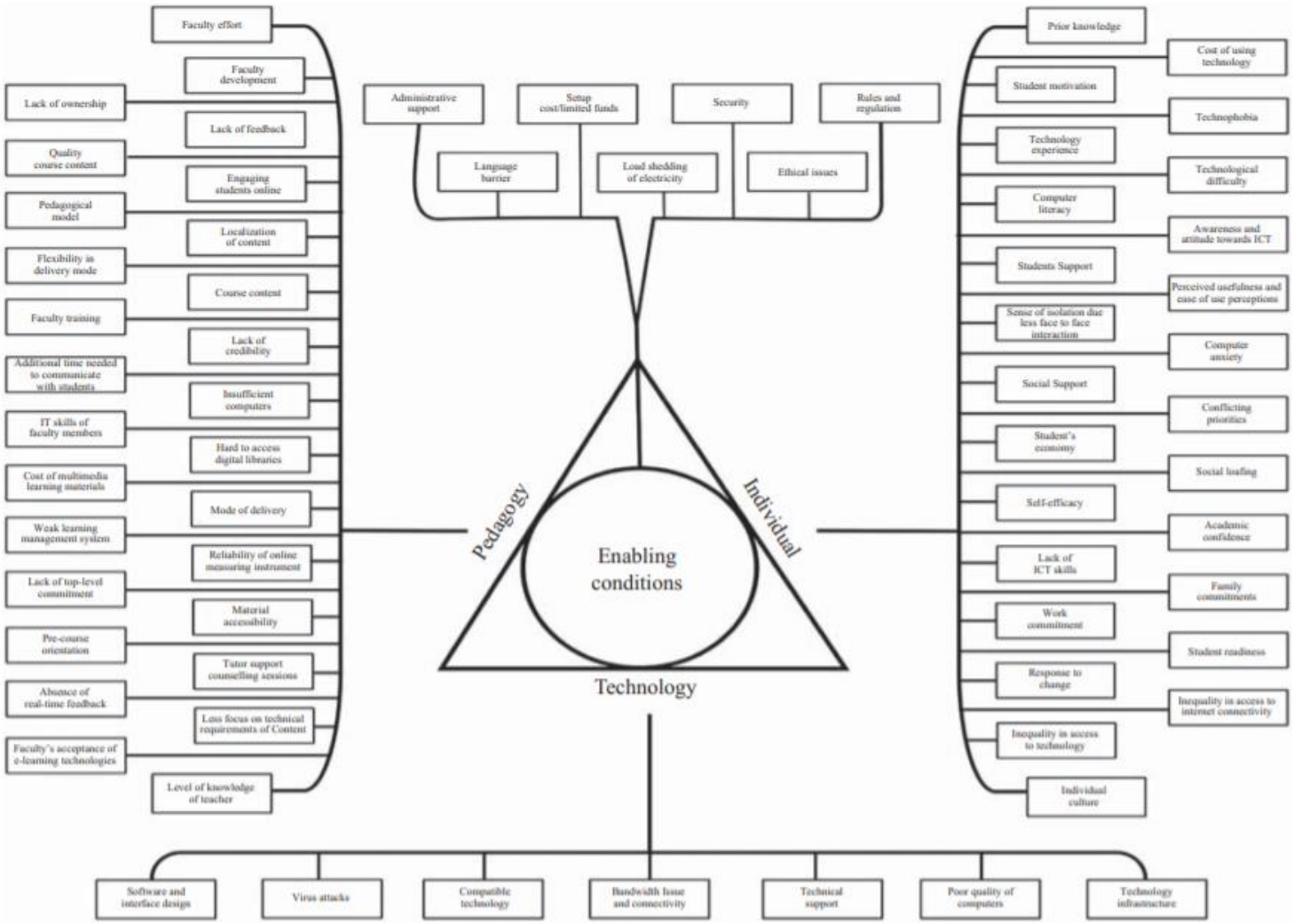

Figure 2: TIPEC framework (an e-learning barrier framework) (Source:)

3. Research methodology

Figure 3 is a diagram that outlines the roadmap of this research. Step one comprised the inception and orientation of the project. The second phase of the research involved a literature review on e-learning including an analysis of relevant public service sector documents, reports, and policies on e-learning practices within the public and private sector. This contextual profile of the e-learning practices in the sector enabled structuring the public service e-learning system as an activity system. It also helped to assess the major trends likely to affect the implementation and processes of e-learning and as well as previous and current challenges.

The third phase consisted of the development of mediating tools including a comprehensive evaluation tool to enhance strategic planning implementation for e-learning. The intention was to address the challenges faced by the public sector in terms of training and the processes of change involved in the transitioning of the conceptualisation of e-learning to contextualised capacity building. The e-learning criteria framework provides basic guidelines for designing an optimum e-learning experience in the public service sector (see section 6). The e-learning Review Tool (Appendix A) supports and complements the criteria as a tool of analysis of an e-learning programme. After the development of the criteria and tool, they were sent to 10 e-learning experts and researchers in the same field of research for comment to support the further development of e-learning criteria and a review tool. Feedback on the criteria and review tool was provided by five of these reviewers. Comments were considered and necessary changes and adjustments were made (see section 6 on ‘Review tool’).

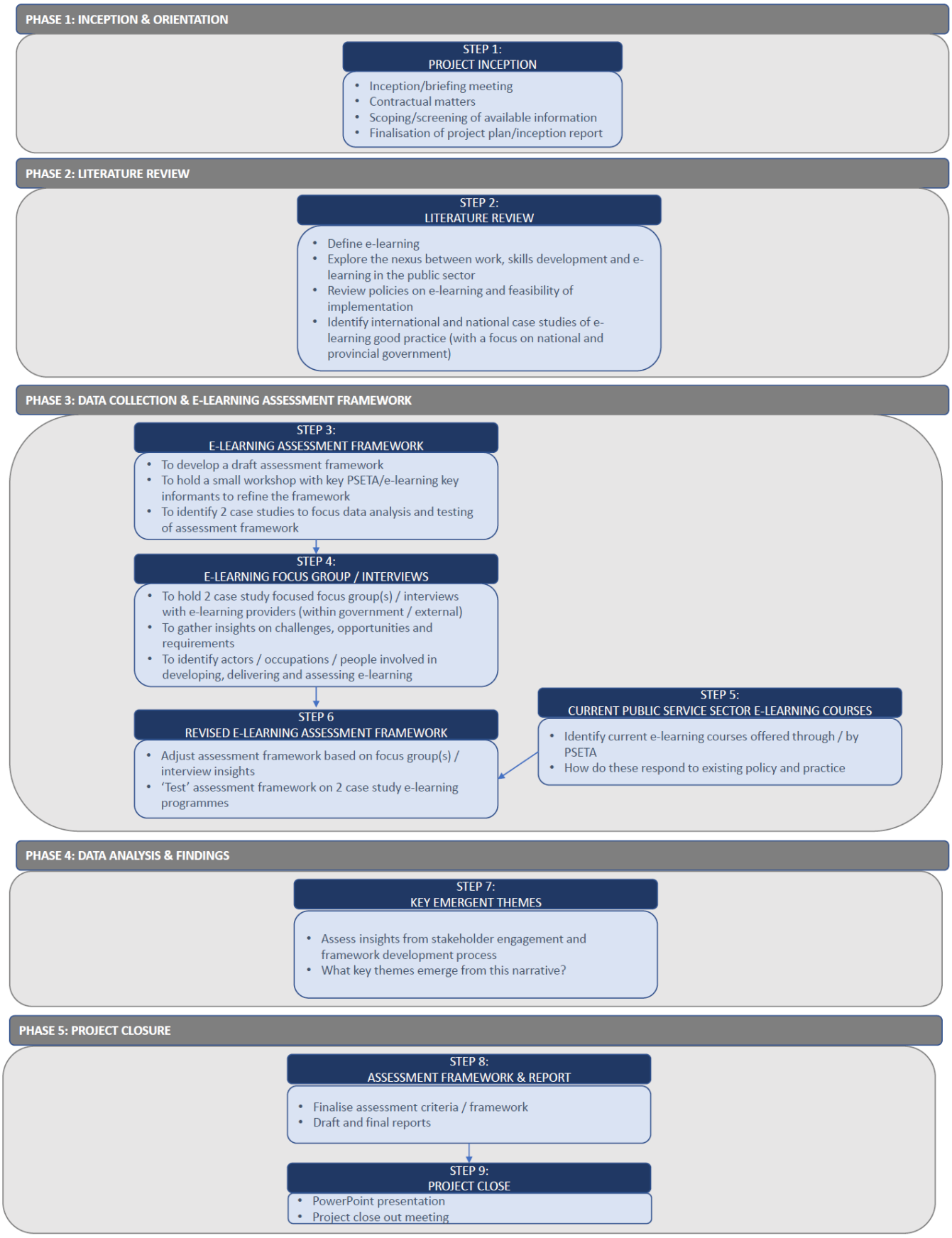

Figure 3: Outline of the project research process

Data collection continued with interviews. Twenty-seven invitations were sent to possible interviewees from the National School of Government, National Treasury, Council for Scientific and Industrial Research (CSIR), Department of Higher Education and Training (DHET), Technical and Vocational Education and Training (TVET) colleges, universities, Capitec and private e-learning service providers to the public sector. Seventeen interviews were conducted as listed below in Table 1.

Table 1: List of interviews

	Role in e-learning	**Organisation**
1	Chief director: e-learning	National School of Government (NSG)
2	E-learning roll out	National School of Government (NSG)
3	Course developer	Open Learning directorate
4	Director	Neil Butcher & Associates
5	Chief director: Social inclusion, equity, access and quality	Department of Higher Education and Training
6	Principal researcher	Council for Scientific and Industrial Research
7	2nd Senior IT Tech	Esayidi TVET College
8	Learning systems analyst	Capitec
9	Head: Distance Learning Campus	False Bay College
10	Director: South Campus	Director: South Campus University of the Free State (UFS)
11	E-learning consultancy and development	The Training Room Online
12	Director: Skills development	E-Learning Consultant for Public Sector
13	Independent e-Learning course developer / implementor	E-Learning Consultant for Public Sector
14	Independent e-Learning course developer / implementor	Web Accessibility Specialist
15	Independent e-Learning course developer / implementor	E-Learning Consultant for Public Sector
16	Trainer	Sumitomo
17	Trainer	IMQS (https://www.imqs.co.za/)

The purpose of the interviews was to gain a better understanding of the e-learning processes, implementation and change drivers. The interviews were structured around the following general questions:

- What variables and criteria inform the use of e-learning?
- What teaching approaches are used?
- What are the main barriers, why?
- What worked well, why?
- What infrastructure and resources are used for delivering e-learning courses?

- Why are these selected?
- Who are the key people (occupations/roles) and/or government actors involved in developing, implementing, or evaluating the courses?
- If outside government, why are they involved?
- Who are the key people (occupations/roles) involved in developing, implementing, or evaluating the courses?
- What do they need and/or is critical for delivering a successful e-learning course for the public service sector (national and provincial)?

During Phase Three, Step 6 of the e-learning review tool was used to review a Water Research Commission (WRC) online course for agricultural trainers including agricultural extension officers (Appendix C). The criteria were tested on one EWSETA online course for engineer trainers (Appendix B). The comments on the criteria and review tool are discussed in the section on the review tool (section 6).

Phase Four consisted of data analysis. The activity system approach was used as a system of analysis to understand the challenges and complexities of the public e-learning systems, to identify the stakeholders and role players, to understand their interests and interactions and to identify barriers and contradictions in the long-term innovative learning process. The insights from stakeholder engagement and framework development processes were assessed to develop key emergent themes. The data analysis phase focused on the key research questions that should be answered by this project. The project was concluded with the development of the final draft report. Feedback was fed into this final report.

4. Setting the context

It is estimated that 1.5 billion students were affected by the rapid shift to remote teaching required by the Covid-19 pandemic. The pandemic and social distancing has caused large scale institutional and behavioural shock effects (Teräs et al., 2020). It has especially exposed the fragility of bureaucratic systems and highlighted the vulnerabilities of education in the public sector. In the specific context of lockdowns and the restrictions imposed on institutions responsible for education and training, we have seen an unprecedented push into emergency remote teaching. The South African public service sector has continued to the best of their ability with service delivery by utilising online platforms and e-learning amidst a context shaped not only by the pandemic but by a socio-ecological context of poverty and inequality.

Stockley (2003) defined e-learning as the delivery of a learning, training, or education programme 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 and skills development outside of traditional learning platforms. Traditionally, there were two common e-learning modes: distance learning where information technologies are used to deliver instruction to learners at a remote location from a central site and computer assisted instruction where computers are used to deliver stand-alone multimedia packages for learning and teaching (LGSETA, 2016). Fry (2001) also defined technology-based e-learning as the traditional use of the internet and technologies to produce materials for learning, teach learners, and regulate courses in an organisation.

Over the years, e-learning has transformed from formal online course delivery to using various technology and applications to deliver content and teach skills online in formal and informal learning settings (Oblinger and Hawkins, 2005). At this time, e-learning is embedded within the broader landscape also known as online learning that includes flexible learning, mix-mode learning, distance learning, blended learning, flipped classrooms, virtual learning environments and more. The term ‘e-learning’ incorporates online and other forms of digitalised learning. E-learning involves a Learning Management System (LMS) that is an electronic educational technology through which courses and training programmes are developed. Internet facilities, forums for online collaboration and virtual libraries that include course materials and resources for training are incorporated in the LMS. Asynchronous e-learning includes courses, test and discussion forums, whereas synchronous learning is integrated with groups working together within virtual classrooms and chats. The LMS consists of two components, namely the software and hardware components. The software component

includes the operating systems for servers, database systems, software platforms for streaming, the application and web servers for online solutions, the content for the platform (courses, teaching, assessments and learning resources) and the logical architecture of the e-learning platform (Gudanescu, 2015).

Since the 1970s Information and Communication Technology (ICT) platforms, devices and programmes to mediate learning continue to reshape the learning landscape with ever-expanding combinations and permutations provided by the functional affordances which make e-learning possible. This multimedia environment of learning and the use of online tools for learning is now a reality on all learning-training platforms. The literature covers defining, measuring and modelling e-learning and different frameworks. Some e-learning frameworks evolved for large-scale online programme evaluation (Charbonneau-Gowdy 2018); others promote isolating learner engagement which is considered a key indicator for success (Halverson and Graham, 2019). Research in e-learning has been focused on linear relationships and there is a call to research the e-learning phenomena as a complex adaptive blended learning system which draws the linkages, impacts and unintended consequences of all stakeholders both human and technology (McGee and Poojary, 2020). Msomi et al. (2018) also agreed that e-learning in the public sector must be conceptualised using a system thinking approach while moving away from the reductionist approach, which fails to solve problems of complexity.

Although the Covid-19 pandemic has accelerated e-learning exponentially, e-learning has been used as a tool for facilitating learning and training for over three decades in South Africa. The South African government has introduced e-learning in the public service sector as a tool to capacitate the sector, decrease skill shortages that in turn will increase the effectiveness of service delivery. One of the reasons for skills shortages is that too many people require training in a short period of time (Msomi et al., 2016). The training of employees face-to-face has become more and more impractical. Face-to-face training takes the employee away from their daily duties; this impacts not only productivity, but also maximises cost. E-learning enables large numbers of government officials to be trained at minimum cost. E-learning also caters to a wide variety of people such as top management and people with families who cannot afford to be away from home or the office for training for a long period of time (Msomi et al., 2016).

Of concern, however, is that e-learning can be driven by commercial interest and the commodity factor could determine the agenda and development pathway of e-learning rather

than clear pedagogical and didactical principles (LGSETA, 2016). E-learning exposes a 'digital divide' as access to devices, data costs and digital literacy are unequally distributed in communities and are embedded in the socio-political powers of society (Isaacs, 2020). The learner, and learning, is often peripheral in e-learning and the user may not be regarded as an individual but more as a neutral user, or a product or even a market (Isaacs, 2020). The challenge is to understand the processes required to utilise e-learning effectively as an innovative tool to allow capacity building within the South African public service sector.

This report thus explores e-learning components, examines the advantages and disadvantages of utilising e-learning in the public sector, highlights the importance of strategic planning for e-learning, and considers the challenges faced by the public sector in terms of training and the processes of change involved in the transitioning of the conceptualisation of e-learning to contextualised capacity building.

4.1. Possible e-learning platforms for the public service sector

There are various e-learning platforms that can be used for training and different platforms and learning methods work for different situations. Below are a few examples of different learning platforms utilised for training within the public service sector and private sector. Specific case studies are discussed later. Some of the e-learning platforms and methods are based on traditional learning styles while other e-learning styles are less conventional including the use of WhatsApp, Facebook, podcasting and Instagram for training purposes.

In the last few years, podcasts have become popular e-learning platforms. Van Staden, Borek and Fergusa (2020) have given an example of an educator at a university shifting from face-to-face teaching to mostly podcasting to ensure participation in the course during the Covid-19 pandemic. The environmental course in the example was asynchronous and involved the class building a podcast series together that was shared publicly for assessment. WhatsApp voice notes can also be used effectively as e-learning tools to support learning. In the 2020 and 2021 UNESCO Sustainability Starts with Teachers online course (https://course.sustainabilityteachers.org/), case studies were recorded as voice notes, instead of pdf documents that the course participants had to read. Positive feedback from the course participants indicated that voice notes and podcasts were excellent e-learning tools (Van Staden, 2020).

Another potential e-learning platform is VirtualSpeech that is built on technology that includes virtual reality, augmented reality and mixed reality. This e-learning technology allows employees to learn through experience and be free from distractions. Retention rates with

virtual reality (VR) learning can be as high as 75% greater compared to traditional online course learning. VirtualSpeech focusses on soft skills including public speaking, leadership and interviews. Employees can complete a course and then practically apply what they have learnt in the virtual reality learning platform as if they are experiencing a real-life situation whilst receiving instant feedback (Cronin, 2020).

Many training providers prefer the traditional online course platform. There are various online course providers to consider, such as Coorpacademy. This is a learning platform via which employees can upskill themselves in their own time (Cronin, 2020). The Water Research Commission (WRC) Amanzi for Food project that trains agricultural trainers also transitioned from a practical course-based training programme where participants learn in a collaborative course while working on a change project in their local settings to an e-learning platform based on the LMS LearnDash. The latter involved interacting with participants via an online course forum, assignments and email correspondence (Van Staden et al., 2020).

Video training is very effective for upskilling a workforce as it is quicker and easier to show someone something than explain it verbally. Panopto is an all-in-one video tool for screen recording, editing, hosting and sharing. Companies can upload their video communications and create a playlist to make content easily accessible (Cronin, 2020). Van Staden et al. (2020) have described how it is possible to offer online learning to a distributed workforce with low levels of digital literacies in an environment with limited connectivity by the introduction of new television-type technology, developed by the Council for Scientific and Industrial Research (CSIR), which supports the use of broadcast video, screen video-on-demand, the production of podcasts, and transmits radio broadcasts as a method of upskilling and reskilling. YouTube videos can also be effective video e-learning platforms. Many conferences now upload all presentations onto YouTube for future watching. Lecturers and teachers can also upload their lessons, so that more people can benefit from these lessons.

Another effective e-learning platform is web-based microlearning where specific topics are covered in short web-training modules of 5 to 10 minutes. Employees can enhance their skills during short workday breaks by working on the microlearning units that interest them, and there can be a reward programme based on each micro-course completed (Cronin, 2020).

4.2. E-learning in the public service sector

The public requires the public service to be agile, user-centred, transparent, secure and data driven, thus its employees need to be constantly learning digital skills on the job. UK research

on upskilling in the public sector shows that public servants are not equipped with the skills needed to solve complex problems in the digital age (Guay, 2019). The study recommends that public sector employees be taught new digital skills by the public sector academies. The UK's Government Digital Service (GDS) Academy has launched a training school for public servants focused on computer science, user-centred design, data, artificial intelligence and other in-demand disciplines (Guay, 2019). Canada has also launched a Digital Academy under Canada's School of Public Service. A government innovation school, Design Academy was established in Argentina in 2015 and public servants earn points for taking classes relating to digital skills and innovation techniques. In July 2018 the Singapore government offered employees free access to over 2 500 classes on an online platform Udemy, at the country's Civil Service College. Australia has focused on shared learning communities where people working in specific areas in the public sector learn from each other and help to solve each other's problems online. The Australian Government also partnered with Microsoft to train 5 000 public servants across the country in cloud computing aiming to transform digital service delivery by making government platforms faster, more reliable and cheaper to operate (Guay, 2019).

The South African Department of Public Service and Administration (DPSA) is responsible for the government's administration that includes the functioning of the public service in relation to organisational structures, creation of departments, labour relations, employee wellness, electronic government, transformation, reform and innovation and integrity, ethics and anti-corruption (DPSA, 2015; Msomi et al., 2018, NPC, 2020). The DPSA is also naturally responsible for the upskilling and reskilling of their employees. The National School of Government (NSG) is responsible for training the public sector by designing learning and development programmes that are responsive to the needs of the country. To ensure performance in the public sector, the NSG introduced e-learning as an upskilling and reskilling learning tool. The departments involved in the conceptualisation of e-learning in the South African Government include the NSG, DPSA, Office of Government Chief Information Officer (OGCIO), State Information Technology Agency (SITA), Department of Communications, Department of Cooperative Governance and provincial agencies such as the Gauteng City Region Academy (Msomi et al., 2018).

There are several e-learning upskilling programmes currently running in the public service sector. During March 2020, Mr Senzo Mchunu, the then-minister for the Public Service and Administration urged public servants to enrol in the compulsory Nyukele Pre-Senior Management Service Course. The course is part of a bigger initiative of the DPSA to build an ethical, capable and developmental public service. The course is compulsory for anyone

wishing to join the senior management service (Interviewee no. 2, NSG, 2020). The NSG also introduced more online courses in April 2020, for self-registration and enrolment. These free courses for the employees of the public sector include:

- Getting Started with E-learning (introduction to prepare learners for e-learning)
- Writing for Government
- Ethics in the Public Service (compulsory course for all public servants)
- Ethics for Internal Auditors
- Policy and Procedure on Incapacity Leave and Ill-Health Retirement (PILIR)
- Generally Recognised Accounting Practice (GRAP)
- Introduction to Strategic Planning and Management
- Introduction to Leading Change
- Introduction to Financial Management and Budgeting

(Interviewee no.2, NSG, 2020)

These courses have learner support activities that need to be submitted online to a facilitator who provides feedback and schedules online discussions. A help-desk provides technical and administrative support.

Similar upskilling public servant e-learning courses are offered in other countries including the UK. Course topics include:

- Confident Communication for Women in the Workplace
- Excelling in Remote Team Leadership
- Developing High-Performing Teams
- Effective Report Writing
- Effective Responses to Complaints in the Public Sector
- Coaching and Mentoring for Managers.

(Govnet Communications, 2020)

According to the Global Learning Platform for Governments, Appolitical, easily accessible international public sector e-learning platforms include UNESCO UniTWin Complex Systems Digital Campus, UN Institute for Training and Research, IMF Online Learning, FutureGove (https://apolitical.co/home). Udemy for Government also provides high-quality content to ensure all public servants have the crucial skills required to stay ahead of global transformation (https://government.udemy.com/).

4.3. Advantages and disadvantages of e-learning in the public service sector

It is important to investigate the advantages and disadvantages of e-learning as an upskilling and reskilling tool for the public service sector. Also, investigating how public servants perceive the advantages and disadvantages of e-learning as a reskilling tool is critical to understanding how they experience and create new patterns of learning-led change and competence (Baran, 2011). The focus should be on e-education rather than simply e-learning. Education is a tool that empowers people by giving them the necessary skills and means so that opportunities can be created for personal and as well as economic growth (Omer et al., 2015). In the South African context, the concept of e-education revolves around the use of ICT to accelerate the achievement of national education and training goals. E-education is more than simply developing computer literacy and the skills necessary to operate various types of information and communication technologies. According to the White Paper on e-education in South Africa, it is the ability to apply ICT skills to access, analyse, evaluate, integrate, present and communicate information; create knowledge and new information by adapting, applying, designing, inventing and authoring information; and function in a knowledge society by using appropriate technology and mastering communication and collaboration skills. (Department of Education [DoE], 2004)

4.3.1. The advantages of e-learning

There are many advantages to general e-learning. Stern (2020) summarised the advantages as:

- Convenience: No time constraints as it is accessible any time of the day or night from any online computer, accommodates busy schedules;
- No commuting and time wasted on travelling, no searching for parking;
- Levelling of the playing field: Students can take more time to think and reflect before communicating;
- Interaction: Increased student-to-teacher and student-to-student interaction and discussion;
- A student-centred learning platform that includes less passive listening and more active learning;
- Innovative teaching that includes a variety and creativity of learning activities; addresses different learning styles and the needs of students through a sense of connectiveness;
- Improved administration: Time to examine student work more thoroughly; ability to document and record online interactions; ability to manage grading online;

- Savings: Accommodate more students; increased student satisfaction, with fewer repeats;
- Maximise physical resources: Lessens demand on limited campus infrastructure and decreases congestion on campus; and
- Outreach: Through e-learning one can reach many students, even students that are situated in remote areas or are not able to attend face-to-face classes.

(Stern, 2020)

Research also indicates that e-learning is 'enhanced learning' as e-learning methods show increased depth of understanding and retention of course content. E- learning enables more meaningful discussions and there is an emphasis on writing skills, technology skills, and life skills like time management, independence, and self-discipline which are also developed through e-learning (Stern, 2020).

Other authors that have identified the advantages of e-learning for upskilling and reskilling in organisations such as the public sector include Sitnikov et al. (2010), Balasubramanian et al. (2014) and Ellis and Kuznia (2014). These advantages include:

- Instructors can identify experts that can add value to the learning process by sharing their knowledge across borders;
- All learning material and tools can be done online, and organisations do not have to hire additional staff;
- Staff do not have to attend classes physically and can study and learn at home or work at their own pace; and
- It is cost saving as it decreases transport, meals and accommodation costs relating to traditional course training.

4.3.2. The disadvantages of e-learning

While offering opportunities for digital transformation to improve access to and provision of skills, e-learning has its own challenges. Ellis and Kuznia (2014) noted that the employees in many organisations might not be fully digitally competent and literate, making it hard to introduce and implement e-learning. Brolpito (2018) described digital literacy as encompassing a set of basic digital skills, covering information and data literacy, online communication and collaboration, digital content creation, safety and problem solving. SMEELEARN (2016) have emphasised digital literacy, reading and writing skills, and effective written communication as main contributors to the success of training via e-learning.

Another challenge that can be experienced in the work force is that employees often resist change, and this makes it difficult for the employer to transition to a digitally literate working environment that utilises e-learning as an upskilling training tool (Ellis and Kuznia, 2014). E-learning might seem like the silver bullet, but it should not replace traditional learning. Stoltenkamp (2012) recommended that traditional and e-learning be blended together for production and better service delivery, leading to better equipped and skilled employees.

4.4. Policy, practices and guidelines supporting e-learning in the public service sector

The past 30 years have witnessed a steady expansion of digital skills and educational technology policy making around the world, with technology-enhanced learning often presented by researchers and policy makers as an essential modernising tool for education and sector skills development to sustain economic growth and competitiveness (Brolpito, 2018). When looking at e-learning policies, it is important to take into consideration that education and training policy reforms are complex, take time and cannot simply be seen as a fast-responding process to meet economic needs. A comparative analysis of policies for the use of digital technologies in education (Kozma, 2008) identified four common objectives. These objectives can also be applied to skills development and upskilling within the public service sector. These objectives include supporting economic growth; promoting social development; supporting education reform; supporting education management.

The Organisation for Economic Co-operation and Development (OECD) highlights that education policy reforms should provide a vision and support the development of an environment in which digital technologies can increase student proficiency, enhance access to and the quality of schooling, and improve the effectiveness of governance (OECD, 2015). The White Paper on E-Education (DoE, 2004) states that other enabling legislative and policy frameworks have been provided by various government departments in support of integrating ICT into teaching and training practices. The goal of the White Paper on E-Education was to use ICTs to help develop South Africans to acquire the skills and knowledge needed to achieve personal goals and to be full participants in the global community (DoE, 2004).

It is clear that more thought should be given to the development of a refined strategic plan specifically for the upskilling of employees in the public service sector via e-learning. However, reskilling should focus on enhancing digital literacy too. A strategic plan provides guidelines that can be used for implementation. The DPSA has developed policy and guidelines on e-learning in the public sector, that advises each government department to develop their own strategic plan drawing on the policy and guidelines on e-learning in the

public sector document (Msomi, 2016). PSETA published their e-learning policy in June 2020 and in July 2020, a set of e-learning guidelines (PSETA, 2020a, 2020b). The PSETA e-learning policy provides the standards regarding educational provision leading to the award of a qualification which is delivered, supported and/or assessed through practices such as e-learning, distance learning, blended learning, flexible learning, instructor-led training and the use of web-based materials (PSETA, 2020a). It also outlines the minimum requirements that needs to be met by the SDPs to be able to deliver learning.

The intention of the PSETA is to integrate e-learning as a tool for skills development and policies focus on increasing digital literacy but this is only possible if South Africa increases internet access delivery. The South African National Development Plan (NDP) identifies ICT as a "critical enabler of economic activity" and an essential tool to fight against poverty. The South African government allocated billions of rand to ensuring greater broadband access and adopted SA Connect as its broadband policy in 2013. The policy aims to enable internet access to 100% of the country's population by 2030; in 2018 the internet was only accessible to 30% of the country's population (Brolpito, 2018). In 2015 the Department of Public Service and Administration published the Public Service eLearning Policy Framework (DPSA, 2015). This policy framework seeks to adopt a wide set of guidelines for capacity building in order to respond to the varying needs and requirements of public sector employees using e-learning as a capacity building tool. The public service e-learning policy framework provides guidelines as to the pedagogy, implementation and utilisation of e-learning in the public service. It also provides an enabling mechanism for public servants to understand their role in e-learning and how to make use of e-learning for capacity building and coordination.

Research shows that aligning e-learning to an overall educational and training strategy enables management to stay responsive to e-learning and capacity building (Gatimu, 2008). Anderson et al. (2006) noted that 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. This aligns with the Department of Public Service and Administration E-learning Policy Framework (DPSA, 2015). This e-learning policy serves two main purposes, namely to document and inform what resources are required to implement the establishment of e-learning; and to document how e-learning will be measured, evaluated and quality assured.

4.5. General challenges and barriers in the integrating of e-learning in South Africa's public service sector for capacity building

To identify the possible future solutions for e-learning as a capacity building tool in the public sector, one must know the present, through linking it with the past (O'Donoghue, Juan Carlos and Unnikrishnan, 2019). Understanding past challenges and gaps in training policies and e-learning practices within the public service sector, future possible solutions can be reimagined for the South African public service sector.

The e-learning approach should provide equal learning and training opportunities for everyone. However, there are many challenges to overcome linked to the digital divide. Brown et al. (2008) suggested that unequal educational and training opportunities can be overcome through collaboration, joint research projects and sharing of good practice and approaches to address the challenges. Bagarukayo and Kalema (2015) evaluated e-learning usage in South African universities and reviewed the challenges of e-learning adoption in South Africa. Here follows a summary of this literature review on the challenges of e-learning adoption in South Africa.

- Jaffer, N'gambi and Czerniewicz (2007) identified that varying learner academic preparedness; large classes; multilingualism, in a first language context; inadequate curriculum design; diversity in (school) background; and academic ability hindered the process of students adopting e-learning.
- Another challenge mentioned continuously was the low bandwidth and unequal access to e-learning platforms (MacGregor, 2008).
- Also mentioned often were a range of organisational contexts; practices and cultures; infrastructural constraints – proportion of internet users to PCs, bandwidth, slowness and internet costs; demographic divides, cell phone subscription LMS instability; lack of use of interactive web potential; access inequality.
- Noted too were negative e-learning perceptions; no management support; lack of time and resources; and oversubscribed internet systems that limit application use (Brown et al., 2008).
- Mlitwa and Van Belle (2011) identified the biggest challenges hampering e-learning uptake as inadequate technical support; limited infrastructure capacity; network capacity; inadequate coordination and limited technological support; technology instability; resistance to change; tedious administrator processes; access issues; literacy limitations; institution users with troubled network systems; and poor user support.

- Isabirye and Dlodlo (2014) noted lack of institutional support; non-integration of e-learning business strategy; no e-learning culture; exclusion of academia from e-learning development programmes; instructor attitudes; technological challenges; lack of pedagogical strategies; cost and quality; lack of university policy, training, motivation, incentive; under preparedness; no facilitating conditions; logistical issues, lack of management; and ICT support.
- OERAfrica (2014) highlighted weak ICT skills; lack of resources; low computer and internet access.

A presentation in 2005 on skills development for transformation called 'Beyond Education and Training in the Public Service' by Ms Diseko acknowledged that even though the uncoordinated nature of education and training was not connected directly to inefficient service delivery by the public service sector, it did contribute to the problems. She also mentioned a general rise in skills requirements in the public service sector and an increasing use of information and complex technologies (NCOP, 2002).

A government report in 2005 raised the issue that training providers were not meeting the demands of a service-orientated public service. The report suggested that this was largely due to the absence of training strategies for the public service (NCOP, 2002). The public service sector also has to manage protest by the public because of lack of proper public service delivery (Msomi, 2016). Therefore, meeting the training needs of public servants and embedding e-learning into training practice can be challenging. There is a critical need for government departments and the public service to optimise the existing skills of staff through e-learning and identify employee development needs that may impact on efficiency and effectiveness. In these circumstances, competency-based management can help ensure employees get targeted training that is required to handle increased service delivery demands in the public service. Current challenges and relevant e-learning case studies are discussed in the next section.

4.6. Case study review: E-learning practices in the public sector

Numerous initiatives have been undertaken to address the skill challenges and built capacity in local government. However, according to the *Public Sector Managers Magazine,* these capacity building programmes generally have limited impact on the skills deficit. These programmes may have filled short-term capacity shortfalls, but pre-evaluation shows that very little, if any, skills transfer took place for a range of reasons (Anon, 2020). The challenges of skills shortages and mismatching persists in the public sector to the detriment of service

delivery. This leads to the problem of poor performance due to lack of competencies required for public sector jobs (Mohlomi and Mutereko, 2019).

According to Mohlomi and Mutereko (2019), little is known about how training and development within the South African public sector takes place and the factors that contribute to its successful implementation is also unclear. Dessler (2006) recommended a four-stage training and development model for the public sector consisting of training needs identification, instructional design, training implementation and training evaluation. During the first phase of assessment of training needs, Human Resources should establish training needs by identifying the skills needed to increase productivity. Human Resources should also assess the potential skills required and develop training objectives accordingly. The OECD has developed a skills assessment framework that identifies four areas, each representing specific tasks and skills required in the relationship between the civil service and the society it serves. The OECD Service Skills for Public Value framework is illustrated in Figure 4 that follows.



Figure 4: Civil service skills for public value: A framework (OECD, 2017)

There is an increasing demand for digital literacy skills in the public sector (Anon, 2016). The digital transformation in governments is resulting in an ever-increasing number of ways in which civil servants can interact with citizens to identify problems and design better policy and service solutions. However, most OECD countries have not developed strategies or plans to train civil servants in digital literacy skills including social media skills (OECD, 2017). In South Africa, many government departments are focussing on the development of e-governments (National Planning Commission [NPC], 2020). A South African Service Delivery Review indicated that South Africa's e-government strategy shows progress, and that Gauteng has positioned itself as a smart province. It also mentioned that Home Affairs are aiming to digitalise all operations (Department of National Treasury [DNT], 2018). This digital transformation and integration for e-governance requires specialised training and development of digital skills by civil servants (DNT, 2018).

A case study of a provincial department in KwaZulu-Natal was conducted with 40 participants consisting of 11 from Levels 1-5 (unskilled and skilled), 11 from Levels 6-8 (highly skilled production), 11 from Levels 9-12 (highly skilled supervision), and five from Levels 13-16 (senior management). The majority of these participants had less than ten years' experience in the department. The study evaluated the implementation of training and development within the department (Mohlomi and Mutereko, 2019). During this case study, participants were asked if training needs analysis was conducted in their department. Of the participants, 16% said that no training analysis was conducted, 34% were unsure, 34% agreed and 16% agreed strongly that training needs are analysed (Mohlomi and Mutereko, 2019). Figure 5 illustrates the perceptions of the participants when they were asked if they received training that was relevant to their specific jobs and tasks.

The next phase in the training and development model for the public service sector is the development of the instructional design of the capacity building programme (Dessler, 2006). The School of Government research found that the preferred method of training by 44% of public service managers was experiential learning. This implies that the public service managers preferred the process of learning though experience, thus learning through the reflection of doing. According to the Government Communication and Information System (Government Communications and Information Systems [GCIS], 2020) that conducted a survey with 1 526 participants, public service managers felt that team learning, departmental learning forums and online courses are not very effective methods of learning. Figure 6 outlines the methods of learning the participants felt was most effective for their individual needs. Only 4% chose online courses as the most effective learning method. The majority, 44%, indicated that practical and applied problem-solving learning with expert input, was the preferred learning method.

Looking at these statistics from three sources, it is clear that more research is needed to understand the implementation of training and development in South Africa's public service sector to ensure comprehensive decision-making going forward. That is why this study was important as it focused on interviewing as many actors as possible to understand the processes involved in e-learning in the public service sector. Other municipality training and development programmes such as Helderberg Municipality (Ntlebi, 2013) and uMzinyathi Municipality (Ngobese, 2017) shared key findings that also indicated that skills development programmes were not implemented correctly and that poor skills development practices are a concern not to be taken lightly. All these findings strengthen the argument that innovative training and development frameworks are needed to ensure that skills development programmes for the public service sector focus on the relevant skills, develop comprehensive

learning programmes, apply the designed training (Stage 3 of Training and Development Model) and assess the success of the capacity building and skill development of the public servants (Stage 4) (Dessler, 2006).

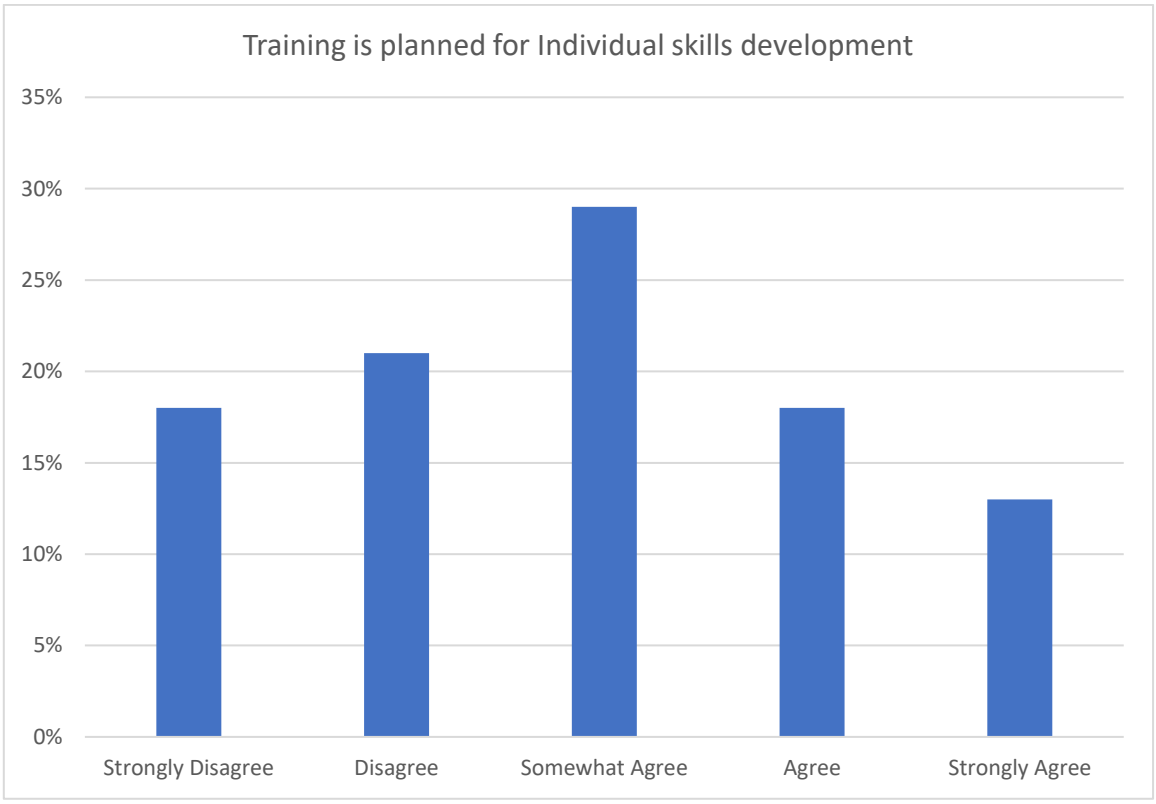

Figure 5: Response within the public service sector to the question "Is training organised for individual needs?" (Mohlomi and Mutereko, 2019)

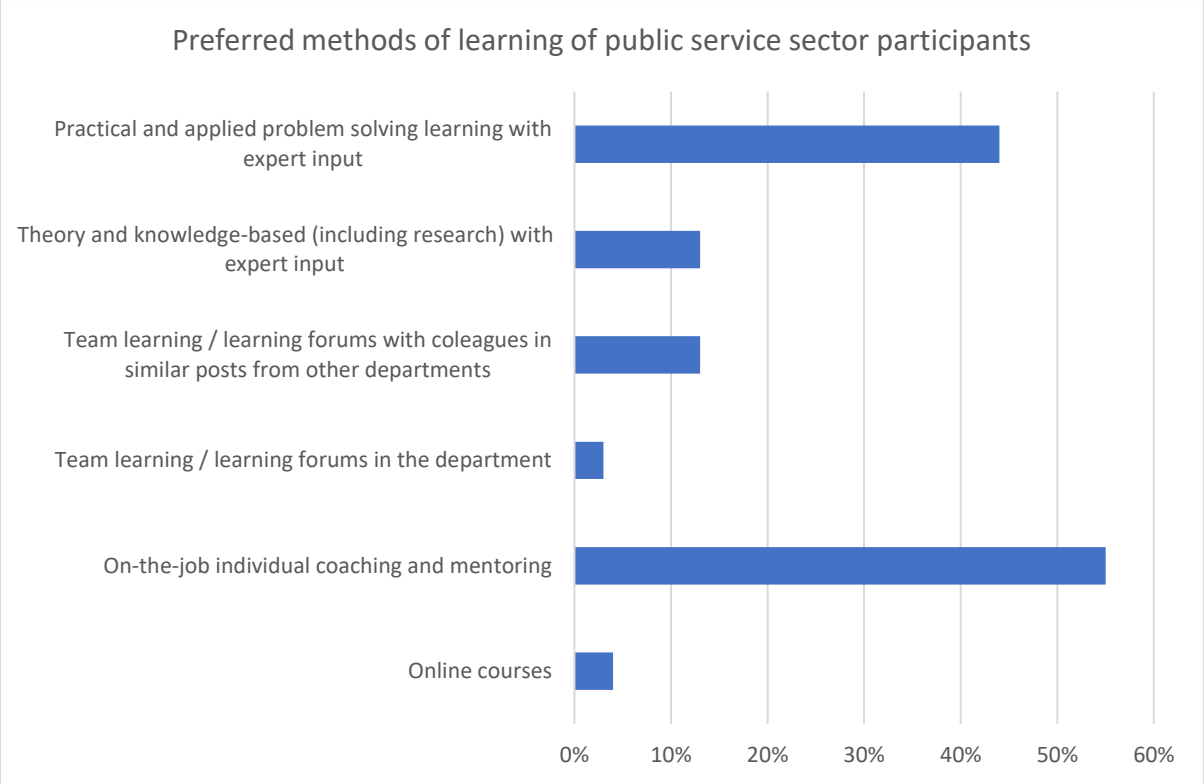

Figure 6: Most effective and preferred learning methods identified by 1 526 survey participants within the South African public service sector

This section continues with illustrative case studies where e-learning was applied as a capacity building and upskilling tool within different components of the public service sector. The case studies were chosen not necessarily for being successful, but to identify the different types of e-learning tools, the various individual needs of public servants that should be considered, the challenges that need to be overcome and the benefits of skills development e-learning programmes. The lessons learnt from these case studies were informative in this study's search for the way forward towards the development of a sustainable digital pedagogy and an e-learning framework that can be applied to the public service sector's training and development programme. The case studies are briefly introduced, but all key findings are listed in Tables 2, 3 and 4.

4.7. Case studies: International e-learning practices towards skills development in the public sector

The first case study describes e-learning practices of the Queensland Ambulance Service, New Zealand, adopted to cater for older workers with low digital literacy levels (see Table 2, first column). Various studies show that the majority of older workers have limited ICT skills, but that e-learning can help increase older workers' confidence. In the public sector, it is

increasingly important to focus on developing older public servants' ICT skills and digital literacy. Studies show that online communities can be used for older public servants who are not familiar with computers (Bowman and Kearn, 2007). Previous studies indicated that older learners prefer informal, self-paced, small group learning. However, where older learners were independent learners, they still valued peer and instructor support. This case study showed that older public servants participate in e-learning to develop skills, to increase income and personal development, to support lifelong learning, and increase the quality of their learning experiences. The critical barriers faced for these learners included the attitudes of employers and younger workers, who felt the older workers do not want to learn as they lack the digital skills, their own negative attitudes towards e-learning, a lack of ICT and digital literacy skills, as well as poorly designed e-learning materials and programmes. Key findings in the case study showed that it is critical to recognise that older learners can and do participate in e-learning, rather than assuming that a lack of familiarity with technology means that they would rather use other methods to undertake their workplace training and learning (Bowman and Kearn, 2007).

Australia's local government also implemented an e-learning programme to overcome problems associated with the isolation of professionals within their organisations and across geographically dispersed localities (Table 2, second column). The study showed that e-learning in the workplace needs to be supported by managers including ensuring time is allocated for employees to engage with e-learning (Ly, 2012). Another critical finding is that e-learning should be better aligned with actual work rather than being targeted at a theoretical level. A discussion board was a successful way to allow users to share, contribute, and discuss their experiences and opinions on e-learning. The study also highlighted that for some learners used to traditional delivery, e-learning initially can be disorienting and daunting (Ly,2012).

The Australian Army has used e-learning since 1987 (Table 2, fourth column). The key findings of an e-learning case study of the Australian Army shows e-learning needs to consider an organisation's culture and be aligned with organisational structures and priorities as well as learners' needs (Wisher, 2012). Courses selected for e-learning development were based on a broad range of criteria including content (which had to be largely information-based), opportunities to reduce operating costs, and requirements to train large numbers of staff. The Technology Training Centre conducts evaluations of its e-learning through pre-delivery testing and post-course questionnaires and forums. These evaluations support continued e-learning development with outcomes comparable to their traditional delivery counterparts. User satisfaction has been positive, especially with the self-paced learning and multimedia features (Wisher, 2012).

A United States Department of Defence e-learning case study focused on methods for training a massive number of personnel, over 3 million (Table 3, first column). Intelligent tutoring was used to supplement training. It overcame the limitations of other virtual training through its ability to provide regular and informative feedback to trainees (Newton and Ellis, 2005). These simulated environments can be used on a very large scale to support joint exercises involving multi-national forces. The Department of Defence focuses on creating a blended learning environment where learners are engaged with interconnected learning activities involving a range of technologies including games, learning objects, and intelligent tutors. This environment is supported by the creation of appropriate content repositories and learning libraries which are underpinned by a learning management system (Newton and Ellis, 2005).

The Turkish public administration uses e-learning to train public servants in ethics (Table 3, second column). The Council of Ethics for Public Officials (CEPS) applies both rules-based and values-based approaches to reduce integrity violations and prevent corruption (OECD, 2013). The programme is run as an online course and focuses on the different viewpoints that may exist within any decision made by a public official, including the decision-maker, the recipient of the decision and the decision-maker organisation. In a Romanian Public Administration case study, blended learning courses were implemented (see Table 3, third column). E-learning was chosen as it was seen as an effective option to deliver training to a large number of people, while considering their particular needs, expectations, and contexts. Benefits in costs and flexibility should not overshadow the concern about the learning effectiveness of such delivery modes. The implementation of a blended learning programme in Romanian public administration offers the opportunity to formulate recommendations concerning trainers' and learners' support to facilitate the transition between traditional and blended learning programmes (Hartescu, 2012).

Table 2: Examples of e-learning implementation in the international public sector (New Zealand and Australia)

Location	New Zealand	Australia	Australia
Sector	Queensland Ambulance Service	Local town councils	Australian Military
Type of trainees/ students	Older workers and volunteers	Isolated professionals dispersed across geographically localities	All army personnel
Skill development	Skill refresher courses	Upskilling and reskilling	First aid, core courses for promotion, and legislated courses
E-learning approach	Blended learning which included a range of learning pathways and approaches using a combination of e-learning methods of delivery	Blended learning approaches with various types of e-learning tools	Blended learning (which combines traditional and e-learning delivery methods) alongside trainee support provided by technical specialists and instructors
Tools government had to provide	Access to computers at work and software to use at home	Access to course at work and ensure alternative access, for employees undertaking home-based learning	Regional e-learning centres
Type of e-learning	Education portal with a broad range of education material available	Learning Management Systems e.g., Blackboard and Moodle	E-learning material developed by specialist at regional technology centres
E-learning tools	PowerPoint presentations and video conferencing	Webinars, e-mentoring, web-based modules, blended learning approaches, wikis, weblogs, mobile devices, Skype, and multimedia (e.g. graphics, audio, video, and animation)	Adopted simulations with supporting strategies and policies. Online tests and questionnaires
Type of learning trainees preferred	Very low tech, flexible and self-paced learning	Self-paced learning at a time and place of the employee's choosing	Simultaneous training of large groups at different locations
Reason for e-learning	To develop skills. Upskilling of older staff and lifelong learning	To upskill public servants in remote and rural areas	To ensure conformance to external standards
Challenges and barriers	Lack of ICT and literacy skills, poorly designed e-learning materials and programmes and attitudes of employers and younger workers	A need for technical skills, access to technology and technical support, limited face-to-face interactions with instructors and peers, the need for motivation and self-discipline, and the need to adapt to a new way of learning	Instructor's role changes from 'leader' to facilitator. The proportion of practical training delivered by e-learning is questionable.
Benefits	Increase income Develop skills Build older workers' confidence	The flexibility of balancing existing personal and professional commitments, the portability of mobile technologies	Reduce cost and greater senior management support. Train large amount of staff at the same time

Table 3: More examples of e-learning implementation in the international public sector (USA, Turkey and Romania)

Location	USA	Turkey	Romania
Sector	US Department of Defence	Council of Ethics for Public Service	Romanian Public Administration Sector
Type of trainees/students	All personnel	Public servants including National Police Administration	Civil servants
Skill development	Peacetime training in weapons, vehicles, aviation and combat situations	Ethics training for the public sector.	Variety of identified new skills required and refresher courses
E-Learning Approach	Blended approach including Intelligent tutoring and web-based technologies	Online learning programme presented management	Blended learning approach
Tools employer had to provide	Simulators in specialised training facilities	Online course	Provided access to the blended learning system within the workplace
Type of e-learning	Simulators, Learning Management System	Online learning with participatory actions	Learning Management System, online learning platform and online Test
E-learning tools	Simulators and virtual environments are also extensively used	Video conferencing with lecturer	Online forum discussion, contact sessions, assignments submitted via online platform
Type of learning trainees preferred	Active participation with virtual training experiences	Learning from mentors	Emphasised flexibility
Reason for e-learning	To train military personnel while reducing the number of accidents and fatalities associated with peacetime training	To incorporate e-learning techniques into general ethical management framework	Make training more accessible to a wide range of civil servants, save in cost and less interruptions to work
Challenges and barriers	Equipment is costly	E-learning had a relatively limited effect on sustainability of efforts	Participants found e-learning to be difficult and trainers required more technical and administrative support
Benefits	These simulated environments can be used on a very large scale to support joint exercises involving multi-national forces. The key objective with these environments is that participants cannot tell the difference between the simulated and actual environments.	Provide a powerful means to convey message to a broader audience	Build networks on the forum. Can upskill more workers remotely

Table 4: Indicative examples of e-learning implementation in the South African public sector

Location	Southern Africa	South Africa	South Africa
Sector	Tertiary Education – Training of Trainers	Agricultural extension and training	Rustenburg Municipality
Type of trainees/students	University lectures within the Education Department	Agricultural extension officers and agriculture college lecturers	Water and Sanitation Department
Skill development	Development of sustainable learning and teaching practices	Reskilling in sustainable agricultural practices for rural farming communities	Understanding and using Integrate Infrastructure Asset Management system (IMQS) software, digital literacy skills
E-learning approach	Blended learning which includes online course with weekly online contact sessions	Online course with supportive resources	Blended learning including initial orientation face-to-face
Tools employer had to provide	Data for participants; data-free version of the online course website	The course is free of charge. Data-free version is available	Install IMQS software solutions to increase accountability and making information accessible and all processes visible.
Type of e-learning	Online course website consisting of five modules. Assignments to be uploaded	Online course with a practical component of developing a demonstration site	Software manual, video conference and videos
E-learning tools	The participants can download the course materials, watch YouTube video links, open PowerPoint presentations, listen to case study podcasts	PowerPoints and downloadable course materials	Help sections embedded in the IMQS software
Type of learning trainees preferred	Supported online learning with weekly webinars and assessment through a community change project	Self-paced learning at a time and place obtaining a university NQF Level 2 certificate	On the job and practical training
Reason for e-Learning	Online capacity building programme for teacher educators on Education for Sustainable Development in Southern Africa	To upskill public servants in remote and rural areas. Promote food security in South Africa	To capacitate the Water and Sanitation Department to use the IMQS system to keep record of all actions
Challenges & Barriers	Participants supplied with mobile data Users forgot passwords and struggled to log-in, low digital literacy Levels in participants and facilitators. Data free website only works for MTN users in Zambia and Zimbabwe	Obtaining participants, data to open the course. building networks within the community, developing demonstration site – all need funds	Need continuous support from the company that installed the software
Benefits	Development of learning networks, capacity building within the Southern African educational departments	Can reach all extension officers and agricultural college lecturers remotely. Provides excellent resources NQF Level 6 Certificate	Upskilling of the department by providing a digital management system reduced overtime expenditure from R1.5 million in 2015 to R328 000 in 2016

4.8. Case studies: South African e-learning practices towards skills development in the national and provincial public service sector

There are numerous studies that discuss and review the implementation of e-learning in South African schools and universities, for example, Brady, Holcomb and Smith (2010), Isabirye and Dlodlo (2014), OERAfrica (2014) and Bagarukayo and Kalema (2015). A teaching and learning with technology study conducted by Tshuma (2016) identified various successful e-learning practices used by Rhodes University lecturers. Some lecturers use podcasting to improve students' reading of academic tests. Chris Upfold connected his students virtually with industry experts to give students practical experience of the type of communication they would need to engage within the workplace. Another e-learning technique used was developing students' writing through peer reviews. When students submit essays online via RUconnected, the drafts are distributed randomly and anonymously to peer reviewers who then provide feedback. The Institute for the Study of English in Africa encouraged collaboration through online reading groups. A doctoral community of practice was also built using a combination of RUconnected, Blackboard Collaboration and Skype. Another means of engaging students was through flipped classroom (a type of blended learning, which aims to increase student engagement and learning with students completing readings at home and working on live problem-solving during class time) and social media such as Twitter (Tshuma, 2016).

There are many public service sector publications such as the *Service Delivery Review Magazine*[1](SDR) that is a learning magazine for the public sector the *Public Sector Manager Magazine*[2] and *Insight*[3], produced by the Government Communication and Information System (GCIS). Various reviews and reports are also published by governmental departments such as the South African Department of Planning, Monitoring and Evaluation (2018). However, little is mentioned in these publications of e-learning possibilities or implementing e-learning as an innovative tool for training and development of skills in the public sector.

Despite the research described above, there is an absence of published case studies on the e-learning practices within the South African public service sector. A detailed literature review in this particular sector could not be conducted therefore due to the absence of available

[1] http://www.dpsa.gov.za/sdr.php
[2] https://www.gcis.gov.za/content/resource_centre/news_and_mags/public_sector_magazine
[3] https://www.gcis.gov.za/content/resourcecentre/newsletters-magazines/insight

information. The absence of data highlights the urgency to develop e-learning active research projects and programmes within South Africa's public service sector.

The first South African case study for review is the **UNESCO Sustainability Starts with Teachers Online Programme** that aims to strengthen education for sustainable development and the implementation of the Sustainable Development Goals in teacher education within southern African countries (Table 4, second column; https://course.sustainabilityteachers.org/). The overall objective is to provide capacity building to support educators to integrate Education for Sustainable Development into all areas of education. The course used a blended learning approach. More than 100 participants are currently enrolled in this course. All participants registering for the online course can attend weekly regional webinars. 'Change projects' are self-defined institutional change initiatives. They include curriculum innovations, pedagogical innovations and whole-institution innovations. The change projects in teacher education can focus on teaching practice improvements, assessment, integration of culture and indigenous knowledge into curriculum, community engagement, and science and technology innovations for sustainability. Each region (South Africa, Mozambique, Lesotho, Zimbabwe and Zambia) has allocated group leaders that facilitate the course for the participants from that region. YouTube videos were developed to train the group leaders on how to manage the WordPress back end of the site. Videos on how to navigate the online course, how to login, how to access the mobile data free site and how to upload assignments were also made available for the participants. At the start, participants were sent data to enable them to access the site; this was a time-consuming process and expensive. Thus, the course was launched on a mobile data free website, which also ensured that it was available for as many participants as possible.

The **Water Research Commission** (WRC) launched an online course for agricultural extension officers and other agricultural trainers in October 2020 (Table 4, second column; http://amanziforfood.co.za). The course is also intended for farmers who work and share information with other farmers, and within their communities. The online course can be undertaken either as an individual activity, or as a group activity. All course materials and resources are available to the public without registering for the course and the course also has a mobile data free website. The online course consists of three modules. The overview section provides key information for each module and guides participants through the module. At the end of each module is an assignment. E-learning tools include PowerPoint presentations and hyperlinks to WRC materials and other resources. The whole course is downloadable for offline use. The course is designed so that any person with little digital literacy can manage the

navigation. The downloadable course text and mobile data free site, makes this a well-designed online course that considers the needs of course participants.

The **Integrated Infrastructure Asset Management System** case study focused on the development of digital literacy skills to increase accountability and decrease overtime expenditure (Table 4, third column; Anon, 2016).

5. Research findings

The purpose of this research project was to describe change drivers and difficulties in implementing e-learning in the South African public service sector in line with policy imperatives and global trends. The project aimed to investigate:

- Specific challenges and contextual variables that need to be addressed to strengthen skills development within the public sector, and
- How to enhance the ways in which the public sector utilises e-learning to upskill and re-skill its workforce.

5.1. The four quadrants of e-learning

Digital technologies have been used extensively for knowledge dissemination, teaching and learning and the promotion of greater efficiency within the education sector. Big technology corporations, , government departments and education providers (amongst others) have been actively promoting an ICT infrastructure across South Africa to address the many challenges facing the country.

E-learning has been positioned as a mechanism to address the skills gap and skills mismatch in the South African public sector. Education technologies (edtech) are being seen as an alternate mechanism to link education with the workplace and allow for on-the-job training, retaining and new skill acquisition. Policymakers assume that e-learning and edtech can level educational opportunities, introduce new flexibilities and include geographies previously excluded.

The PSETA would like to implement these initiatives and accredit skills development providers, monitor their provision and create policy guidance around assessment and certification. E-learning (which includes distance learning blended learning, flexible learning and classroom training that incorporates online materials) seems to be the mode for the development of workplace skills. Expectations are that public service sector skill providers will incorporate edtech into their education and training provision and teach 21st century workplace skills that will enhance the capacity of the public service sector and thus contribute towards industrial and economic development.

Initiatives such as e-government and the Fourth Industrial Revolution (4IR) have amplified messages that promote technology-led change. The 4IR vision is full of bold claims about automation, machine learning, personalisation, artificial intelligence etc. and the future

trajectory of the country. Predictions include societal changes that will require shifts in employment and education and "accelerated workforce reskilling" (Peterson, 2018). Implementing e-learning and edtech in the public service sector is an obvious extension of the e-government and 4IR trajectory.

Media and technology have a long history of being incorporated to supplement teaching and school administration (Black, 2021). Education that is delivered solely via technology is a different matter. In a country such as South Africa, that is known for extreme inequality, a one-size-fits-all approach to the use of ICT for teaching is inappropriate. The delegated mandate to PSETA to accredit, implement and assess should not be seen as only a bureaucratic responsibility or an administrative issue.

Technology itself does not fix problems; it is never neutral and it does not emerge from a vacuum. Technology reifies the beliefs and desires of its creators. The way that e-learning is used reflects a particular agenda that needs to be engaged with by PSETA. Who the beneficiaries and losers of this anticipated rollout of e-learning are, is contested. A more contextually appropriate and citizen informed vision of the anticipated landscape for workforce development, regarding the role of technology, needs to be developed.

Transformation of traditional education provision, by means of e-learning, is a popular theme in advertising, PR materials and corporate responsibility initiatives. Until now, the South African state has been cautious in its approach to the use of e-learning and edtech. But the pandemic and social distancing has catalysed the need for technology-driven change and the public sector is in need of reform with e-learning and education technology contributing to improvements in the workforce.

E-government provides an opportunity to use ICTs for promoting greater accountability of the government, increase efficiency and cost-effectiveness and create greater constituency participation. The e-government approach also strives to contribute to wider economic objectives such as cost savings, fostering innovation in technologies and applications for e-government and promoting growth by fostering a business-friendly environment.

5.1.1. From the Public Service Commission in the report to the National Assembly

4IR has also been positioned by politicians as a mechanism for delivery. Citizens are called to believe that this might lead the country into a global, economic and technologically-

mediated ‘twenty-first century’ future. Hopeful narratives, quoting the World Economic Forum chairperson, Charles Schwab, see the 4IR as enabling Africa to “leapfrog into the future”. Changes in connectivity across the continent are currently being presented as a moment to move forwards and perhaps skip a stage of development. Access to the internet is framed both as an indicator and pathway to modernity, and therefore prosperity (Friederici, 2020). Statistics certainly show increasing penetration of sim cards and connectivity and a 15% growth in e-learning each year suggests a growing demand for digital education. The pandemic has magnified penetration and growth and demonstrated that education provision can be provided via technology. These figures are used to support the notion of ‘short cuts’ and offer reassurance to those concerned about being left behind, as change marches forwards.

Scholars in Science and Technology Studies (STS) have a term for these common and shared assumptions that hold a widespread vision about technology: ‘sociotechnical imaginaries’ (STI). Socio technical imaginaries frame possible ways of imagining the future and exclude alternative ways of envisioning progress (Chang, 2019). STIs are used to represent certain visions of a ‘good society’. They animate, and are animated by, historical actors and new scientific and technological innovations (ibid.).

The 4IR is often spoken about as if it were a natural phenomenon, like a storm or heat wave, over which there is little control. Comparing 4IR to nature conveniently ignores the fact that 4IR is a constructed vision, driven by proprietary, digital products and services, developed and offered by for-profit companies or billionaire philanthropists and their foundations, and supported by Wall Street. Global actors are disproportionality advantaged by the 4IR STI.

For a sense of who 4IR is working for, one can consider senior management and executives. Bryan Merchant (cited in Gismodo, 2019) explained that automation is a top-down phenomena, aimed at cost cutting and improving efficiency. There is a big disparity between executive optimism and widespread worker pessimism which is linked to the growing sense of unease as machines intrude upon our institutions. The impacts of automating various facets of civic life have led to the entrenchment of race, class and gender bias. Tasks once performed by officials are now undertaken by machines.

STS studies try to unhinge the assumptions about technology as being synonymous with progress and invite situated critiques concerning how social actors’ appropriate digital technologies and materialise specific aims (Chang, 2019). And despite the popularity of and ‘hype’ around e-learning, e-government and 4IR, education technology and e-learning can

also broaden achievement and opportunity gaps. Paul Atwell has described the first and second digital divide:

- Divide 1: Access, who can get devices, software, connectivity, and other technical resources
- Divide 2: Social and cultural forces – schools serving privileged students tend to use technologies in more progressive ways (drill and practice or problem solving).

Bureaucracies were once the basic form of rational efficient organisation. The logic of their components could be laid out according to an idealised model. Efficient bureaucracy involved "top-down, hierarchical and rules bound public administration, staffed by neutral professional officials, motivated by the public interest and directly accountable to political leadership." (Chipkin and Lipietz, 2012). The ideal-typical bureaucrat, Max Weber (1946) wrote, was rational, objective, acting only by the rule and "without regard for persons". Effective bureaucrats bolstered the state's capacity and ability to impose order, grow and deliver services on a large scale (Chipkin and Lipietz, 2012). Fairness was embodied in the person of the civil servant, trained to exert his judgment in a highly codified and disinterested manner.

These top-down rules-based organisational structures and roles were filled by people who enjoyed a permanent tenure, were well paid and had elevated social status. Their attention to hierarchies and rules also led to rigid, routinised and process-bound administrations that have been unable to meet the needs of fast-changing societies. New public management (NPM) emerged as a movement to transform bureaucracies with incentive structures that were intended to combat the bureaucratic inefficiencies of the traditional civil service. NPM sought to "introduce results-orientated and performance related operating principles" and become more "customer centred" and responsive. New public management recognised that public managers and civil servants had their own interests and sought to align those personal interests with the organisation they worked for, through a system of rewards and sanctions (Cronin, 2021).

In pre-1994 South Africa, Apartheid bureaucracies had entrenched racial inequality throughout society. In response, resistance movements developed a range of progressive policy perspectives on housing, health, education, energy, the labour market and social security. Missing from the policy perspectives was a coherent and credible model for apartheid bureaucratic reform. Post-1994, the public service adopted new public management techniques to serve a democratic, development agenda. They assumed that

this model would reform apartheid bureaucracy and its bureaucratic tendencies (Cronin, 2021). But clearly, the public service sector has not been able to deliver on its promises.

Progress towards realising the values and principles (in the public sector) has been painfully slow and in many cases, there was a regression as can be seen from levels of corruption and a decline in service delivery. The public service has become increasingly rules- (instead of values-) driven. This does not mean that the public service can operate without rules but that the rules should be commensurate with the values and principles. A group of former directors-general, in their reflections on the state of the public service sector, concluded that "the public sector has lost the ability to be innovative, creative or take risks due to fear of overstepping procurement, human resources, and monitoring and evaluation regulations which have become more rigid and less adaptable in the aftermath of state capture."

5.1.2. From the Public Service Commission in the report to the National Assembly

Under new public management, output targets have had the effect of devaluing the professionalism of the civil service. Inappropriate attempts at achieving accountability through centralised control have resulted in demoralised compliance with delivery outputs determined elsewhere (Cronin, 2021).

Effective and equitable reforms to the public sector are necessary. Plans to reskill and upskill civil servants by various means are important. However, if edtech and e-learning are truly to contribute towards improved performance, then the contested terrain of workforce development in the public sector needs to be understood in a broader context. E-learning is never a silver bullet, and the envisaged improvements can not only depend on education technology, platforms or the 4IR to automatically deliver suitable training for the future.

"The structures, systems and processes within the public sector don't allow for… e-learning…. So, trying to implement effective e-learning solutions in an environment that is not geared for it, and is governed so heavily, the walls just collide. They don't come together" (PSC,2020).

If workforce development via ICT is to be successful and effective, then it is important to understand the culture in the public service sector and how current policies have contributed to the situation. It is also necessary to enquire how local actors (politicians, entrepreneurs) intend to take up, sustain and transform these imaginaries, and whose purposes are suited. Following this, it is essential to synthesise, criticise and reflect on this field of workforce development and ICT into a body of research that offers theoretical, conceptual or

methodological coherence. At present, e-learning research in the public service sector is very limited. Where there are studies, the research is focussed on the micro level and involves individual attitudes and satisfaction with a particular mode of education delivery. To address the attitudes and criticisms, a set of generic quality assurance mechanisms (that are often not pertinent to the context and are not linked to institutional support mechanism), are implemented. While this research is important to understanding a particular context, it ignores the macro level (policy, comparative systems) and how this also shapes learning. Current evaluations of e-learning are also premised on inputs and outputs, instead of addressing the multiple and messy levels of implementation in living communities that are served by the public sector, resulting in large gaps in understanding.

> "ICT is perceived as a key enabler to governments globally in efforts to deliver better services and efficiency while enhancing their relationship with citizens and business. The National Development Plan (NDP) of South Africa stipulates that by 2030, Government will make extensive use of ICT to engage with and provide services to citizens. This will be achieved through 'an enabling coordinated and integrated e-Strategy' that cuts across government departments and sectors"
>
> From the National e-government strategy and roadmap, published by the Department of Telecommunications and Postal Services in the Government Gazette, 10 November 2017.

South Africa has benchmarked itself using the United Nations (UN) four-stage maturity model of e-government.

- The 1st stage is "emerging information" services: In this stage, e-government websites provide static information.
- The 2nd stage is "enhanced information services": In this stage, the presence is enhanced with one-way or simple two-way communication.
- The 3rd stage is "transactional services": In this stage, a two-way interaction with citizens is possible.
- The 4th stage is "connected services": In this stage, websites are proactive in requesting citizens' feedback via Web 2.0 tools. Government agencies are citizen-centric and services are customer centric.

Using this UN e-Government Maturity Model, e-government has been classified at level 2 – enhanced presence. The national Integrated ICT White Paper by Cabinet in October 2016 and the Information Society and Development (ISAD) Plan of 2007 identified several

challenges that negatively affected the progress of e-government in South Africa. Some of the challenges are:

- Lack of synchronisation in approaches to digital transformation adopted by different government departments.
- Duplication of processes, databases, large-scale system incompatibilities and inefficiencies as major e-government hindrances.
- Fragmentation of e-government initiatives within government has been identified as one of the major challenges. The e-government programme has not been directed and managed in a collaborative manner which led to lack of accountability and responsibility due to the overlapping roles between government departments.
- There is no dedicated budget allocation for the specific implementation of e-government in South Africa. A number of initiatives are still run under separate budgets.
- Currently there are still a number of government departments who make use of diverse applications, platforms, software and databases. Most existing ICT systems were not designed to share information across departments. Cross departmental information sharing is essential to the success of e-government, thus there is a need for government to standardise the interchange requirements for the delivery and management of data.
- A major reason for the limited progress of e-government in South Africa is that the e-government programme has not been directed and managed in a collaborative effort. The roles of the OGCIO, SITA and GITOs are not clearly defined or understood. There is no specific entity that takes on the role of leading and managing e-government implementation in the country.
- The South African government is facing challenges in government service delivery and needs to reduce the administrative burden due to growth and mushrooming of population. Technological advantages such as the mobile penetration rate can contribute to eliminating these challenges.
- There is a lack of compliance by sector departments with regard to the identification, execution and implementation of e-government projects. Most government departments view e-government within the ambit of their internal departmental business needs, goals and initiatives. As a result, duplication occurs

and there is no synchronised approach to the implementation of e-government within the public service.

Speculation about what is possible (or preferable) for the future of workplace learning is driven by a range of voices or influences. There are multiple, contested, and commodified trajectories for e-learning and edtech, and they do not necessarily have to be grouped together as 4IR. Socio-technical imaginaries are amplified by Silicon Valley, who take over the imaginative power of shaping future society and are attempting to absorb public institutions' ability to govern these very futures (Mager and Katzenback, 2020). Often, this is done without a realistic understanding of resource requirements or an appreciation of the transformative possibilities for the workforce through digital means.

Modern bureaucracies, whether public or private, derive their power from information (Fourcade, 2020). One might assume that platforms, performance and reporting systems would fit neatly into this constellation of office and field workers, executants and planners, front desk bureaucrats and specially trained experts, who are joined together in one long chain of actions to perform and sustain the functions of government. Public sector management, educational providers, skills development and big tech, while communicating, seem to talk past each other. They seem to speak a different language and use different units for analysis.

Earlier, we established that the current paradigm of leadership in the public sector was a combination of targets and performance management. Senior leaders take a top-down approach to service delivery and their vision for services to be delivered is translated into more and more specific performance targets and measurements for the public service. Numbers are then used to determine the extent to which these targets are met. Dashboards of data offer a global window into the world of the employee. But we also established that numbers have deprofessionalised the public sector and left it unable to address the complex realities of delivering services

Educational systems are increasingly subjected to the dynamics of datafication. Data and their corresponding algorithms transform (1) the way that teaching and learning is organised, and (2) the ways in which future generations (will) construct reality with and through data (Jarke, 2019). The proliferation of data potentially changes all processes of teaching, training, development and educational management. The Dataism gaze promises to hold a department or service provider to account, to measure workforce improvements, to compare achievements. Availability of data raises expectations with regard to accountability, reporting,

transparency and evaluation. This is matched with concerns about digital traces that are intrusive, imperfect and possibly unjust.

E-learning becomes a data platform where a wide range of data tracking, sensing and analytics technologies are mobilised. Machine learning uses the combination of data mining/analysis and designing/modelling (using data from the past), to create and govern both present learning settings (measured and captured live) and, on that basis, to anticipate desired futures (e.g. through algorithmically generated output). A circle of data mining, modelling, prediction and intervention is used to nudge the student back on track and keep them on the generated pathway of learning.

This collected data could be exhaustive in scope, highly detailed and susceptible to aggregation by underlying algorithms. Because of the tendency to centralise data, the organisation that manages large troves of information, no matter how dispersed across agencies, can be oppressive through surveillance, control and invasions of privacy and the propensity for totalitarian control (Forcade, 2020).

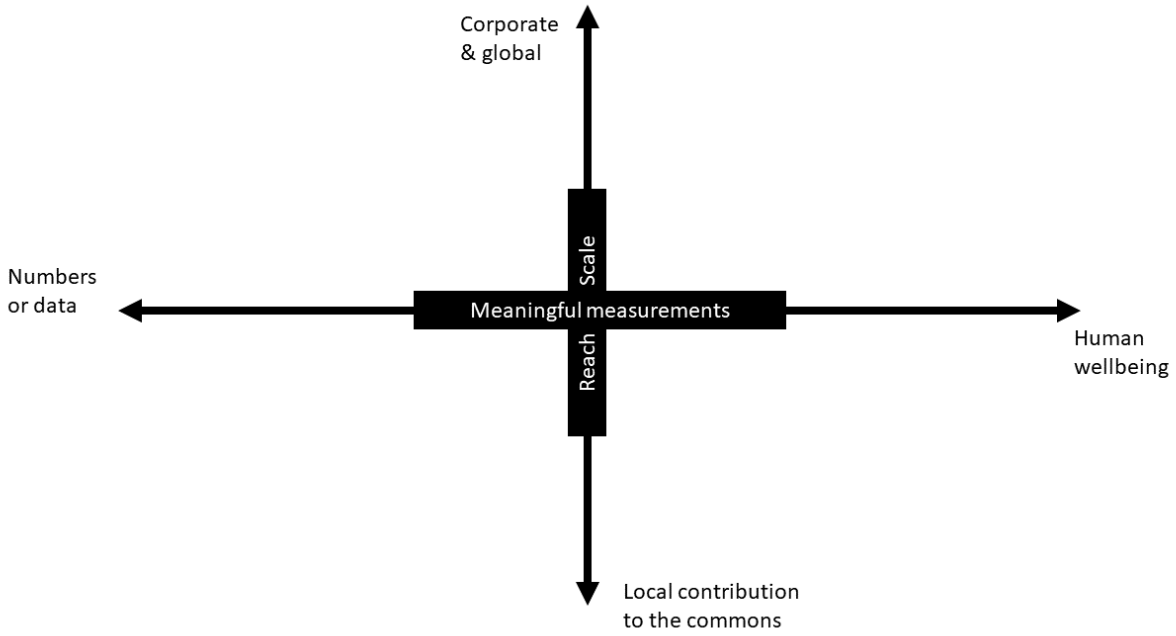

Figure 7: Four lenses describing e-learning

Four competing (but interlinked) lenses (illustrated in Figure 7) may be used to describe near future possibilities for large scale, digitally mediated workforce development programs in South Africa. Figure 7 shows the four lenses on two axes. The horizontal axis is concerned with how public management is validated (with numbers or outcomes) and the vertical access

considers scale and whether the initiative is local or global (and resides in corporate hands or in the commons).

5.1.3. Quadrant 1: The automated state

The automated state is how 4IR envisages the future. This is a popular belief system and a philosophy of governing that looks at society as data flows. The state's responsibility is to collect and process this data, and a well-governed society is one in which events are aligned to the state's models and predictions. Governance by numbers is a prominent characteristic of the automated state. Accountability becomes narrowly associated with budgets and the efficient use of material resources and the monitoring of measured performance (Piattoeva, 2021). Democratic answerability by decision makers is reduced. Audits replace justifications of their actions and power. Education is now seen through an all-encompassing web of individual data flows to be processed (and not understood through broad, manmade categories). Through data-hungry techniques of machine learning algorithms and the availability of ubiquitous data (whose capture is both acknowledged and secretive), the locus of administrative decision-making rests in software. The complexities of 'true life' must fit analytical categories imposed by the machine, whether blunt or precise, to be made relevant. And as the number and complexity of these classifiers grows, human discretion may be seen as increasingly inaccurate or illegitimate.

Dataism is not an inevitable consequence of using data in the public sector. It is an ideology that finds the purpose of government in what can be measured rather than in the will of the people. The "de facto delegation of rulemaking power" (Citron, 2008) to machines imparts their decisions with a mystical aura and apparent intractability that is often hard to question. However, the quality of algorithmic risk predictions is eminently questionable, and their methods are known to be insensitive to essential institutional norms (such as due process in the legal system) (Liu, Lin and Chen, 2019). Not only do databases frequently contain mistakes ("garbage in, garbage out"), but data collection is often tainted by institutional stigmatisation and discriminatory treatment (Benjamin, 2019; O'Neil, 2016; Noble, 2018). The problem is made worse by the difficulty of interpreting outcomes. This 'black box' characteristic of machine learning tends to further fuel magical thinking and institutional obfuscation.

5.1.4. Quadrant 2: Disrupted bureaucracy

'Cyberdelegation' is the delegation of bureaucratic structures and administrative agency decisions to a platform. This dispersed and outsourced human infrastructure results in a government that seems simultaneously more intimate and more remote. The state is now

right at one's fingertips. Anyone with a working internet connection can interact with it through a computer or mobile interface with the platform. The growing proliferation of public-facing government websites and platforms also creates an impression that the state's actions should be more easily knowable, if only by establishing an aesthetics of transparency. 'Open data' initiatives, whereby state agencies make a profusion of information available online in machine-readable format, are often implemented in the name of transparency and accountability.

In this quadrant, civil life is co-opted by large multinational corporations and global governance bodies who have made rules and encode them in the platforms. This has the effect of cementing existing power structures. While government might have framed these changes as innovations, they are a two-edged sword.

5.1.5. Quadrant 3: Bridging the divide

Government, aspiring towards ethics and fairness, sees the need to manage services efficiently and fairly. But the gap between intention and implementation (digital divide) is wide and as exponential change grows, the gap becomes bigger. Many have not questioned whether our measurement paradigm for this divide is flawed (or recognised the possibility that these flaws are a feature of a bureaucratic system). A selective framing of the divide by the market also contributes towards this divide. Teachers, lecturers, facilitators, working uneven terrain or at the margins, will point to both evidence and experience of these problems. Where they have the capacity, measures are taken to address the need.

5.1.6. Quadrant 4: Human learning systems

The last quadrant is the most difficult. It requires the humble acknowledgement that government does not know the right answers. This is followed by a commitment to try and work things out (with technology aiding the process). Instead of trying to control things, civil service is responsive to the situation and is willing to change and develop its services in the process.

This 'humble acknowledgment' does not necessarily imply ceding control to technology or market forces. But rather than focussing on national strategies or specifying skills, the state should support actors at local and national levels to learn together in addressing complex challenges.

5.2. Further findings: Interviews and e-learning tool development

This section focuses and reflects on the themes that emerged from the contextual analysis, interviews and e-learning tool development with and on the change drivers and difficulties implementing e-learning in the South African public service sector. To identify the challenges and contradictions within the e-learning system, one must be able to see all the components and actors within the system. The findings of this research are presented under key themes (see below) that emerged in relation to the current e-learning processes and practices and the way forward. These are discussed in more detail below, and consider the following questions and issues:

- What are the public service sector's e-learning needs?
- What informs respondents' use of e-learning?
- Teaching approaches
- Skills required for e-learning (how successful are these, what are the main barriers?)
- What are the infrastructure and resources used or required for delivering e-learning?
- Who are the key people (occupations) involved in the public sector for implementing / delivering e-learning?
- Who are the key government bodies / departments / ministries pivotal for implementing / delivering e-learning?

Below is a diagram outlining the topics discussed in our findings and how these are connected to the PSETA e-learning system (Figure 8).

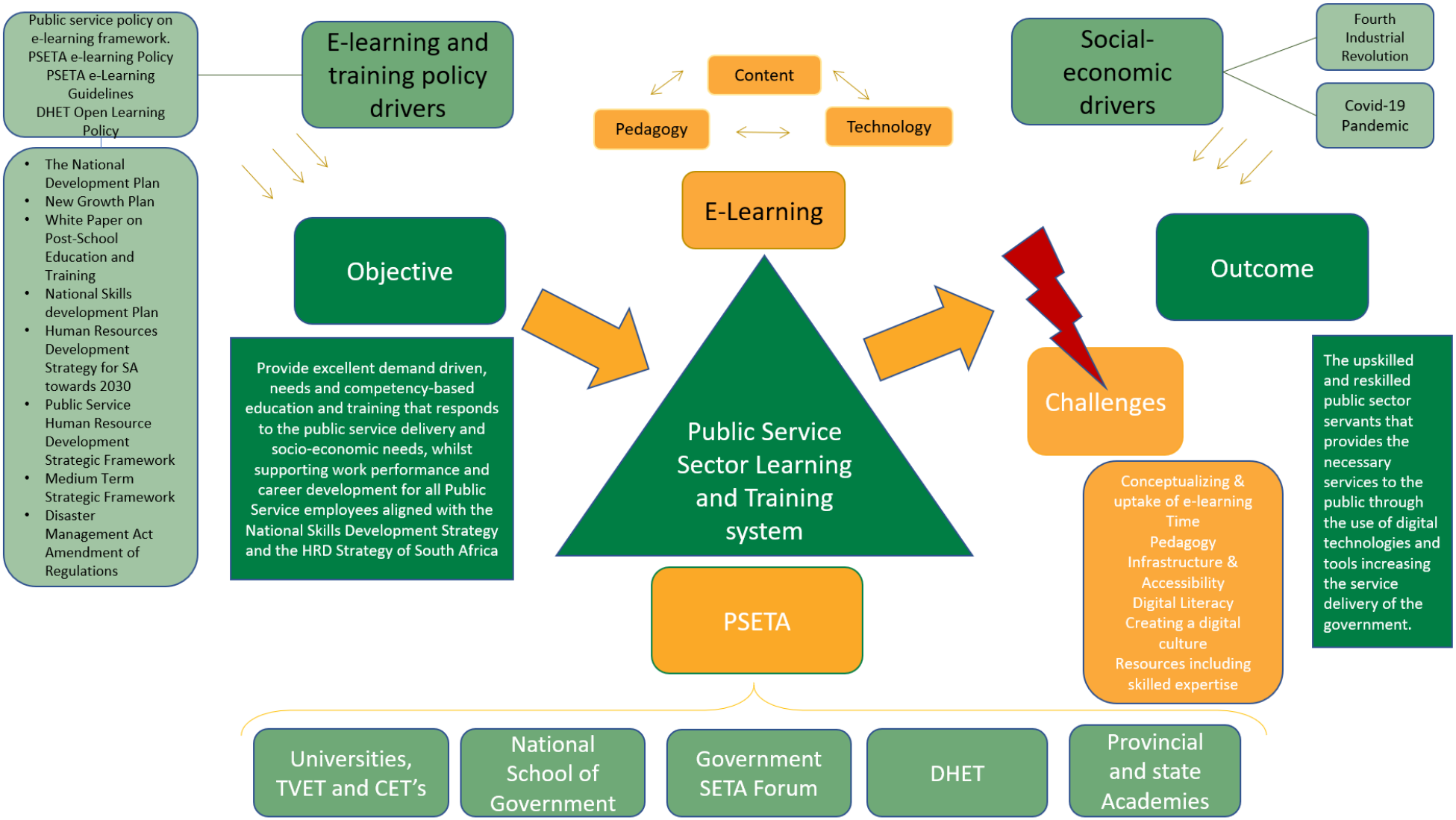

Figure 8: Outline of components and topics discussed within the public service sector e-learning system

5.2.1. Key government bodies pivotal for implementing e-learning delivery

In 2015 the Department of Public Service and Administration published the Public Service eLearning Policy Framework (DPSA, 2015). This policy framework sought to adopt a wide set of guidelines for capacity building in order to respond to the varying needs and requirements to capacitate employees of the public service sector by means of e-learning as a capacity building tool. The Open Learning Policy Framework of DHET published in 2017 also addressed the need for e-learning systems (DHET, 2017). The public service e-learning policy framework provides guidelines as to the pedagogy, implementation and utilisation of e-learning in the public service. It further provides an enabling mechanism for public servants to understand their role in e-learning and to make use of e-learning for capacity building and coordination. The PSETA e-learning policy and PSETA e-learning guidelines published in 2020 are also important tools that inform the implementation of e-learning within the public service sector (PSETA, 2020a, 2020b).

Key players in the implementation of e-learning in the public service sector include the Department of Higher Education and Training, the National School of Government, Provincial and State Academies, Government SETA Forum, universities, TVET and Community Education and Training (CET) programmes (PSETA, 2020a). The training strategic plans are structured by the South African Government, DPSA and PSETA. PSETA also complies with all constitutional and policy mandates. Competency developments are driven by strategic plans such as the National Skills Development Plan. The e-learning courses and assessments are governed by PSETA that guides the syllabus through the South African National Qualifications Framework.

5.2.2. Change drivers influencing e-learning uptake in the public service sector

Two main drivers that fast-tracked the uptake of e-learning in the public service sector on a national level are the Covid-19 pandemic and the Fourth Industrial Revolution (4IR). The Covid-19 pandemic has necessitated emergency changes in our training methods.

Lockdown, in response to the pandemic, was a massive shock for the training sector; our learning methods had to change, often from talk and chalk to blended and online learning. However, the pandemic has also created an opportunity to think differently and set new training mechanisms in place with more technology-based platforms. It has catalysed the requirement to ensure that employees are equipped with skills and knowledge on the use of e-learning tools and platforms. Even before the pandemic, the Fourth Industrial Revolution and technology were identified as drivers of change within the public service sector (PSETA, 2020a). The Fourth Industrial Revolution impacts the nature of the public service sector's

work profoundly by shaping the type of skills required and the modes of service delivery. In the public service space, technology in the form of e-learning has been identified as a crucial mechanism for delivering skills development in a cost-effective and efficient manner. However, the transitioning has been slower than expected. HSRC conducted a PSETA study in 2018 and found that most government departments did not have the human and physical resources to optimise the role of the Information Communication System in the public sector (HSRC, 2019).

As e-governance and working from home became two household topics during the first lockdown, departments and individuals were forced to become more digitally literate and buy the tools required to function in this ever changing system.

For provincial department and individual public sector employees, the e-learning mechanism of delivery allowed skills development to evolve, especially in terms of being more accessible and available to public sector employees. Various online courses became available for public sector employees to utilise. Other drivers mentioned by the respondents included the PSETA e-learning policy and guidelines, as previously discussed, e-governance strategy and availability of smart phones.

The need to upskill the public service sector has become increasingly evident for the government to provide services and to establish e-provinces with better infrastructure and an understanding of the potential function of technology in public service delivery and in enabling staff to be up to date with technological systems.

5.2.3. E-learning needs of the public service sector

PSETA focuses on the transversal skills and functions comprising of administration, management, planning, legislation and policy development, which form the focus to drive the development of skills and competencies in areas that will make the delivery of the business of government more effective and efficient. There are different needs within the public service sector. To understand the e-learning needs, a needs analysis is important.

A well-planned learning and skills strategy is imperative as it gives clear directives. A learning strategy will include how learning programmes are delivered to the people who need them to accomplish specific goals. One of the biggest mistakes organisations make is leading with technology before a strategy is established.

A strategy in line with e-learning policies and PSETA skills development plan is crucial. The objective of the public service sector learning and training system is to provide excellent demand-driven, needs- and competency-based education and training that responds to public service delivery and socio-economic needs, while supporting work performance and career development for all public service employees aligned with the National Skills Development Strategy and the HRD Strategy of South Africa. Integrating e-learning into the public service training system adjusts the object of the system slightly as e-learning:

- opens up new ways to co-produce knowledge, thereby valuing wider knowledge ecologies;
- contributes to the capacity-building of digital literacies and learning-networks for the Fourth Industrial Revolution; and
- increases access to education while reducing the resources required.

The outcome of the system is upskilled and reskilled public sector servants that provide the necessary services to the public in a transparent, ethical, competent, efficient manner, thus increasing the service delivery of the government overall in South Africa.

5.2.4. Teaching approaches used

Education and training delivery, especially in the context of the public service sector, is not necessarily institution-based and can also take place in the workplace and other learning environments. The Department of Higher Education and Training (DHET) aimed to develop a learning management system that in principle supports open learning and online learning that can take place in any place or setting (interview, Gerda Venter). A Post-School Education and Training (PSET) environment has been developed and it is possible for programmes and courses to be offered in a variety of modes. Examples of these courses are listed in Table 4. Even within a programme, module or course, parts may be offered on-site and parts off-site, and rely on the range of technologies and online learning. The South African PSET system has evolved far beyond and exclusive reliance on traditional contact and paper-based technologies (Venter, interviewee no. 3, 2021).

With respect to online modalities, institutions and organisations offering learning opportunities (in South Africa and/or abroad) in the PSET environment, the following need to be considered:

- institutions are making use of online resources to enhance their classroom activities;

- institutions are using online and blended learning approaches within their classrooms/face-to-face activities;
- institutions are offering programmes and courses online as part of their Programme and Qualification Mix (PQM), including massive open online courses (MOOCs);
- Institutions are offering programmes and courses online through sub-contracted companies as part of their PQM;
- Institutions are offering online programmes and courses in partnership with other institutions of organisations as part of their PQM;
- Institutions are offering online programmes and courses through companies owned by the institutions, as part of their PQM; and
- Non-accredited online programmes and courses are offered by institutions, industry, and organisations.

The PSET system is trying to find better ways to implement effective multi-mode, augmented remote learning systems, and to develop methodologies, technologies and platforms in support of public training and upskilling since the pandemic has dramatically changed training within the public sector.

The National School of Government also hosts self-paced e-learning courses online (see Table 5); various training capacity building initiatives for executives in the government and other public entities are also continuing virtually. An example of a virtual training initiative is the Economic Governance Winter School that consist of five themes for national government ministers and provincial mayors. The course was run on Zoom led by subject experts with additional training material provided.

Information on the use of online methodologies in learnerships, apprenticeships and skills development programmes for management, lecturers and students is limited. Two examples are the occupational qualifications offered by the Institute of Certified Bookkeepers (ICB) that are registered with the Financial and Accounting Services Sector Education and Training Authority (FASSET), and the Wealth Management Course offered by iCollege, accredited by the Insurance SETA (INSETA). The Department of Home Affairs (DHA) and the Department of International Relations and Cooperation (DIRCO) have individual learning academies whose function is to provide learning and development interventions, maintain quality and to administer, manage, and support core learning functions within their respective functional areas (Venter, interviewee no. 3, 2021).

This study's interviews suggest that training in the public sector is designed and delivers learning interventions that focus on the distribution and acquisition of knowledge. In an interview with a director of the NSG training department, the researcher emphasised that various e-learning methods were used to ensure that learning needs were addressed and knowledge sharing, and capacitation occurred. Even smart phones were used to access online courses. Discussions with CUT Course Designer also indicated that at a university training level of public sector servants, various e-learning approaches and tools were utilised such as an instant messages platform, forums discussions on Moodle and even learning via emails. However, interviews indicated that all e-learning programmes or sessions should be built on a sound strategic approach after conducting a skills analysis.

E-learning platforms, curriculum and e-learning materials assist learning and reach the set goals of the e-learning programme. E-learning platforms such as online course websites, LMS systems such as LearnDash, mobile learning applications, Zoom, WhatsApp and other e-learning platforms are tools that aid in the delivery of the required skills and knowledge. Teaching and learning practices also contribute to the success of e-learning. 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. Peer e-learning can also play an important role in the public sector training and reform process (Andrews and Manning, 2015).

Table 5: Example of e-learning training courses developed for the public service sector

Institution	e-learning approach	Example of training or course	E-learning audience	Advantages	Barriers or challenges
DHET	Open learning resource via Moodle LMS	Electrician NSC for Adults TVET College Lecturer: Open Learning Material	Various	Advantages of Moodle: • Free of charge • Biggest system in the world • Very reliable • Good technical support system for troubleshooting	Lecturers and online course tutors need training in Moodle LMS
National School of Government	Open e-learning courses	Ethics in the public service (compulsory course) Ethics for internal auditors Generally recognised accounting practice Writing for the government Policy and procedure on incapacity leave and ill health retirement	Public service sector	Self-paced Free of charge	Need adequate bandwidth
University of Cape Town	Online course with practical assignment components that are completed online. Course handbook also provided	Public Management and Governance Certificate: This course is aimed at busy senior government professionals looking to improve their performance in their current leadership role, or those working towards their next promotion.	Management in public service sector	Self-paced 7-week course 10 hours a week	Costly
Water Research Commission	LearnDash learning management system on WordPress supported by tutors	Amanzi for Food Online Training Course for Agricultural Extension Officers	Agricultural extension officers	Easy to navigate Free data website in South Africa. Free with certification from Rhodes University	Practical component that student needs to complete

5.2.5. Skills required for e-learning

Various skills are required for e-learning to be effective. During this research it became clear that digital skills and the creation of a digital culture are essential. OECD has summarised the digital skills required for the public service sector to function and be successful in the adaptation of digital transformation. Figure 9 below outlines these identified digital skills required by the public sector.

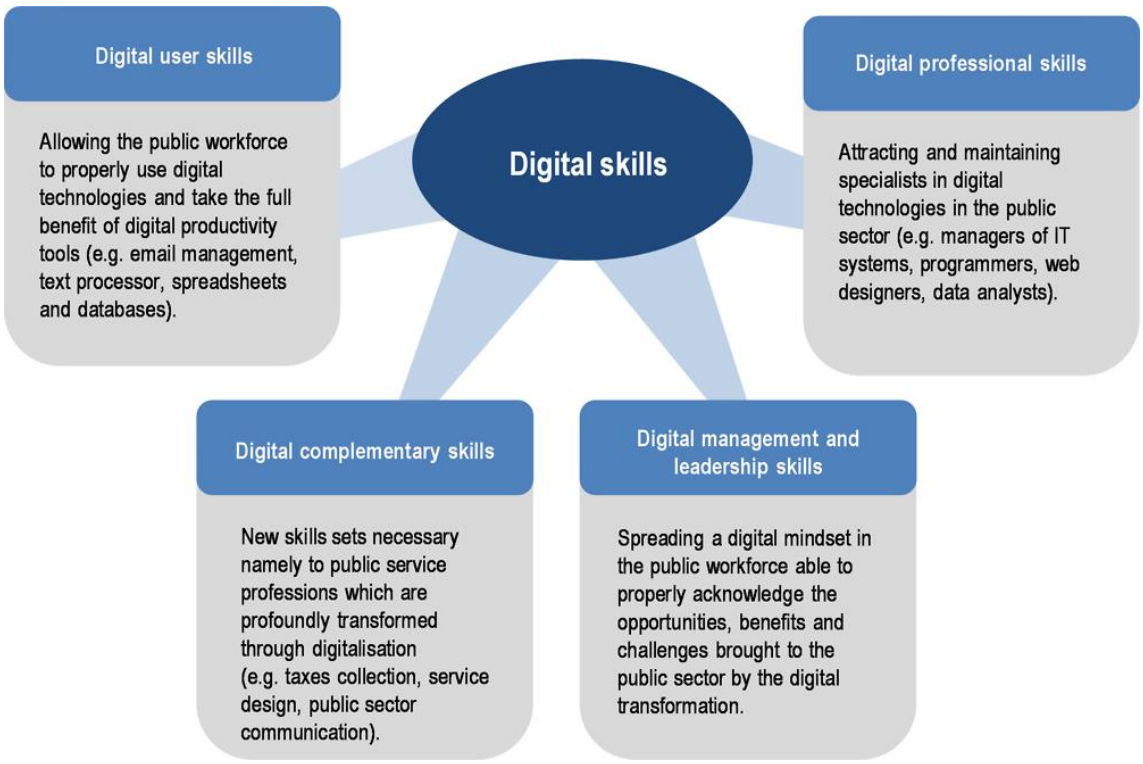

Figure 9: Digital skills required by the public sector (OECD, 2019)

E-learning is a critical building block for the public service sector as part of their efforts to support digital transformation (OECD, 2019). Given the widespread use of digital technologies in administration, competencies are needed to drive the digital change properly.

Technologies are increasingly complex and diverse and their fast-paced evolution requires governments to increase efforts to keep the skillsets of public officers updated, but also to anticipate the needs associated with emerging change.

E-learning skills training should be accompanied with digital learning skills. The public service sector needs to develop capacity to tackle the disruptive challenges of the twenty-first century

and respond to changing needs. The following are key skills: to find and select information, effective communication, e-safety, functional skill and creativity.

During the research interviews, the respondents identified essential skills required for specific roles in the development and presentation of e-learning training programmes within the public service sector. Respondents in executive and managerial roles noted the following skills as being in high demand: learning new technologies, project management, needs analysis and online facilitations. Pedagogical expertise and course designing skills requirement that were deemed essential included instructional design models, class teaching experience, needs analysis and online facilitation. Respondents in support, technical and designer roles found most of the identified skills and expertise important to a certain extent. Assessors and evaluators felt that the needs analysis and online facilitation are essential skills needed. To summarise, all respondents stressed needs analysis and online course facilitation skills as essential expertise.

Respondents recommended that e-learning pre-skills for the public service sector training participant should include a positive attitude and willingness to learn. Two comments in this regard follow:

- “The mindset of people affects their ability to learn online.” (Milly)
- “With a willingness to learn, people can get far with online learning.”

For e-learning to be successful, the trainee also needs to become digitally literate. Digital literacy consists of specific core competencies. These include critical thinking and evaluation, cultural and social understanding and collaboration. Recommended e-learning skills for the public service sector training participant include understanding how to use the learning management system, Microsoft Office, internet searches, effectively making use of online materials, ethically engaging with material, skills to work with software that support leaning, basic computer skills like using a mouse, keyboard etc. People need basic digital skills to navigate online training properly otherwise it makes it difficult for e-learning to even get started.

From interviews with DHET and further reading, it became clear that digital skills should be prioritised at an institutional and national level to ensure e-learning is successful. While there has been recognition at national level of the importance in prioritising digital skills development, DHET might need to lead initiatives or partnering between ministries to optimise synergy in this respect.

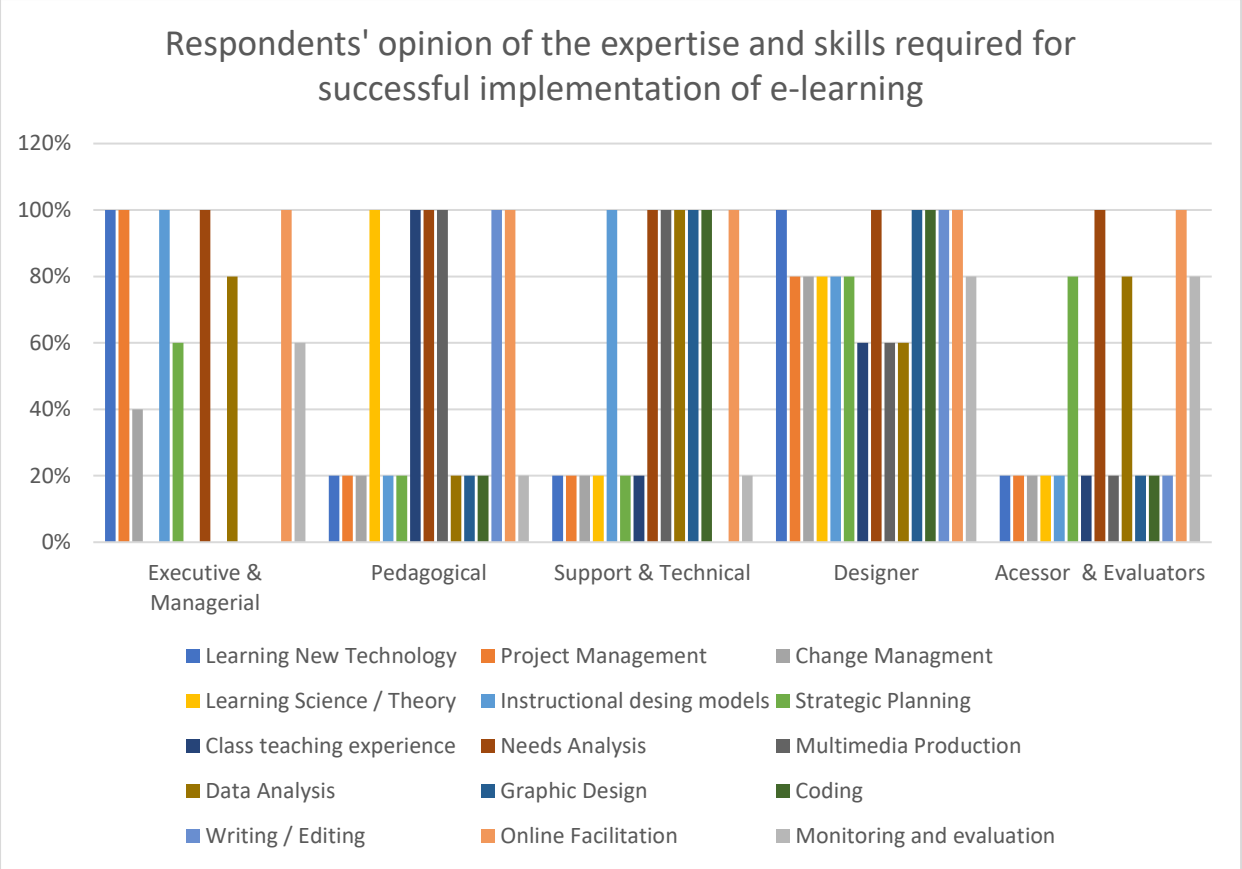

Figure 10: Skills required for the successful implementation of e-learning programmes

5.2.6. Infrastructure required for e-learning

Figure 11 shows the infrastructure element required for e-learning to be supported everywhere anytime. These infrastructure elements include:

- High-speed connectivity;
- Data privacy and security;
- High-speed Wi-Fi;
- High-quality low-cost devices;
- At office and at home internet;
- Digital citizenship and responsible use; and
- Quality digital content and resources.

Tools suggested to complement the e-learning infrastructure includes messaging tools such as WhatsApp, project management tools, concept mapping, and ideas sharing tools combined with e-learning infrastructure elements such as file repository, e-learning platform, and distance communication tools (Becattini et al., 2020).

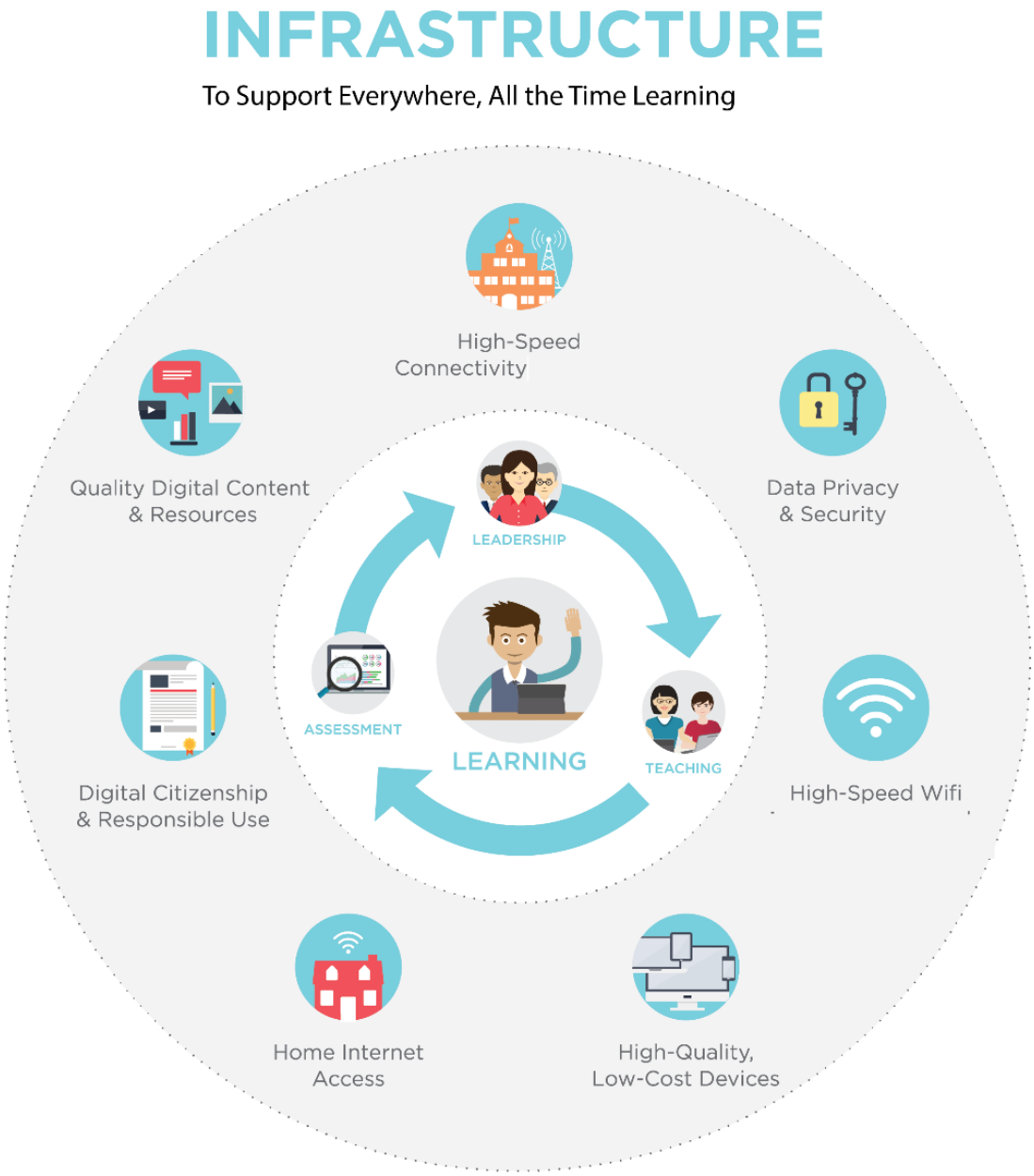

Figure 11: Outline of the e-learning infrastructure necessary for effective learning (Department of Education, United States of America, 2021, https://tech.ed.gov/netp/infrastructure/)

5.2.7. The main barriers and challenges in implementing e-learning in the public service sector

The public service sector experiences common challenges such as infrastructural constraints, demographic divides, staffing issues, organisational issues, learner issues and pedagogical issues. The sector also experiences other challenges such as too many employees to be trained in short periods of time, lack of resources, inadequate curriculum design, shortage of ICT skills among employees and lack of e-learning platforms.

Figure 12 depicts challenges that the public service sector faces linked to e-learning training programmes according to the research respondents' interviews.

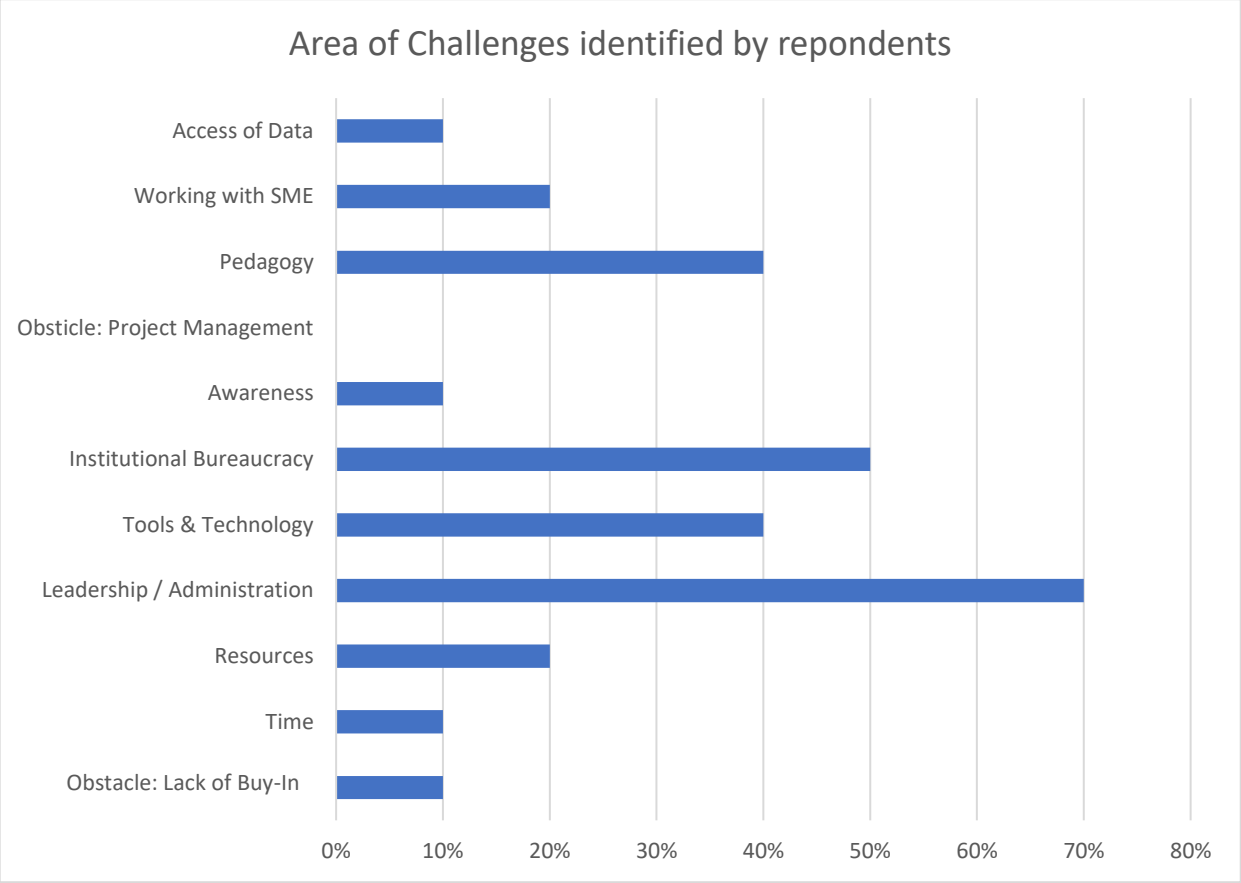

Figure 12: Challenges identified by respondents

Table 6 summarises the challenges faced by the public service sector to implement e-learning according to the research gathered during this study. Some of these challenges are discussed below.

Table 6: Challenges in implementing e-learning successfully in the public sector

National level	Instilling a digital culture and e-learning mindset into the public sector Upskilling for digital transformation and 4IR Implementing e-learning policies and framework Developing an e-learning conceptual framework Developing an e-learning ecosystem Identifying digital skills and public sector skills training is required for.
Provincial level	Poor access to technology by rural areas Struggle to provide infrastructure support Quality control and evaluation of training programmes E-learning strategic planning Needs analysis of public sector skills requirements Develop an e-learning ecosystem and learning networks Human and physical resources to optimise the role of Information Communication Technology
Training department or institution	Poorly designed learning materials E-learning pedagogy Digital literacy levels of facilitators Providing flexible content delivery platform Developing of e-learning networks Developing critical thinking skills and digital literacy levels of participants Designing e-learning programmes
Individual / public service sector employees	Obtaining correct technology to participate in e-learning programme Digital literacy Accessibility including internet connectivity and bandwidth Time Resources Attitude towards e-learning Technology adoption

5.2.8. Digital literacy and culture

Creating a digital mindset in the public sector to achieve South Africa's goal of digital transformation and e-learning uptake is a challenge and requires a sound strategic approach within a learning landscape in a broader sense. Digital literacy is a challenge from national level down and there is always an opportunity to improve e-learning strategies.

Many employees know how to use a smartphone to message and browse using social media, but they do not know how to use smartphones to search for topics, find a job or answer an email. In addition, computer literacy is still a challenge for most public service sector departments.

E-learning pedagogy and e-learning policies

Understanding and implementing an e-learning pedagogy is essential for the success of e-learning. There should be a common conceptual understanding of the integration of Information Communication Technology into teaching and learning. A framework for lecturer competency and skill in ICT is needed. DHET is working on this framework.

Digital tools do not mean trainers now do nothing. They need to work with sound pedagogical learning and teaching processes. Research in e-learning pedagogy and how this can assist in the implementation of e-learning policies is needed.

5.2.9. Uptake of e-learning by participants and trainers

Ly (2012) reported that for first-time participants, e-learning can be disorienting and daunting. Some participants struggle to adapt to the new way of learning. A review of Public Service Managers showed that only 4% felt that online course training is an effective learning method (GCIS, 2018). Mindsets can affect uptake of e-learning. Bowman and Kearns (2007) identified that a negative attitude towards e-learning can affect participants' progress and participation. Often trainers are also not ready to transition from face-to-face to digital learning.

Trainers sometimes think that e-learning will take away their jobs and do not see it as a tool to enhance learning. Some e-learning trainers think that huge amounts of content simply need to be added into a space for students / participants to access.

Trainers are not always familiar with e-learning platforms nor equipped with the necessary tools to implement e-learning pedagogy should facilitate learning and used by trainers in that way.

Digital literacy and information communication technology skills of the participant

Only 37% of South African households have consistent access to the internet through cell phone or computers (Hanekom, 2020). Low digital literacy levels can affect a student's performance, attitude and level of participation. Older civil servants report that employers and younger digital literate co-workers have a negative attitude towards them due to their lack of digital skills (Bowman and Kearns, 2007).

The case study in Bucharest, Romania, revealed interesting feedback from participants on their experience of adapting the traditional delivery mode to a blended learning delivery mode

(Hartescu, 2012). Participants were asked whether they considered it difficult to study online, what kind of problems they encountered and how these problems were solved.

The factors that played a role in the participants' assessment of online learning was the lack of familiarity with e-learning platforms and the time available to invest in courses. During the UNESCO Sustainability Starts with Teachers Online Course continuous technical support had to be provided to the participants. Support included assisting with the registration process and resolving login issues. Instructional videos were made to train participants on how to navigate the site and use the e-learning platform. All the case studies indicated that additional support needs to be provided to participants.

It is important for the trainers to have digital skills. DHET has developed a course to train lecturers and trainers in e-learning and digital skills. It covers a range of skills from how to set up a camera to take training videos to which learning platforms to use and appears to be a very worthwhile course.

5.2.10. Time

It is difficult to assess how much time one should invest in an e-learning programme. Facilitators sometimes miscalculate the time they should allocate to an e-learning programme. Facilitators and group leaders save on travel time, but need to mark online assignments, engage with participants online, comment on forum activities etc. Employers do not always provide time for the employees to engage in e-learning during working hours (Ly, 2012).

Good e-learning experiences require time. Participants should take time to learn how to use the e-learning platform. Tutors should take time to understand e-learning pedagogy. Course designers should take time to develop a sound e-learning conceptual framework.

It takes time to set up a functioning e-learning platform, sometimes several years. There never seems to be enough time to perfect e-learning practices and often these need to be developed as the course unfolds, especially with Covid-19 challenges.

The government needs time to develop a working infrastructure and provide free Wi-Fi to all in South Africa to ensure that e-learning can take place and to enable open-source education.

5.2.11. Poorly designed e-learning materials and programmes

Lack of administrative support, poorly designed e-learning programmes and incompetent facilitators are the main reason why participants are not successful with e-learning. Course designers must have sound understanding of how to design a course, add content and maintain the course. They will also have to work with the host and developer of the course site.

An e-learning course needs facilitators, administrators, subject matter experts as well as course designers and graphic designers. There are many factors to consider in the process of developing a successful e-learning course.

5.2.12. Develop an e-learning ecosystem and e-learning network

It is important to develop a culture of e-learning and not only provide support for e-learning participants, but also for trainers. Facilitation, checking of progress and checking in with students is important, as are group learning and working in groups.

5.3. Lessons learnt

5.3.1. Practice and programme

- Blended learning needs to integrate different tools of e-delivery, such as online videos, downloadable resources, forum discussions and webinars.
- E-learning is an effective option to deliver training to large number of people, while still being able to focus on individual needs, expectations and content (Hartescu, 2012; Newton & Ellis, 2005).
- E-learning should consider the culture, the structure of the institution as well as individual needs (Wisher, 2012).
- E-learning should be aligned with actual work rather than being based on theoretical practices.
- E-learning platforms need to be data free in order to provide better access to participants.
- Employers must also provide e-learning facilities in the workplace and preferably also for public servants training from home.

5.3.2. Participants and facilitators

- E-learning should be linked to older learners' workplaces through appropriate strategies. It should not be assumed that public servants with low literacy levels would prefer to use other methods for workplace training. Employers should provide support for older workers who are involved with e-learning. Embedding

innovative e-learning is a lengthy process that requires organisation-wide vision, will, determination and drive (Stoffregen, 2017).

- All public servants should be treated with respect and should be supported by managers. This includes allocating time to engage in e-learning practices (Bowman and Kearns, 2012).
- There is still a need to moderate forum discussions, offer feedback on projects, evaluate open-ended test questions, and all these activities typically take more time than expected.
- A short course to train the facilitators and group leaders before an online course begins can ensure that the course runs smoothly. Once the group leaders understand the layout of the course, their duties, how to download the participants' assignments, how to comment on participants' comments in the forum, the experience for the participants is likely to improve and adequate support can be provided.
- Course facilitators need ongoing support and training. They need to be able to work with the back end of online course programmes and have sufficient computer literacy to manage student forums and upload assignments. They have to manage webinars, participate in the forum and support participants. An online course facilitator's role differs significantly from that of a face-to-face educator. Sound online education pedagogical knowledge, being able to facilitate active learning, coordinate social interaction and manage the course are all important. Sometimes, participants work on an online course outside normal working hours, and facilitators may need to provide support at unexpected times.
- Another important component of an online course is administration. A course administrator is responsible for administration which can include finances as well as data distribution and registration. Good communication with participants and facilitators is essential.

5.3.3. E-learning practices

- People often enjoy contact sessions and companionship. A discussion forum is an ideal way to allow participants to share, contribute and discuss their experiences and opinions.
- Problem-solving learning practices should be included that are supported by experts and that are practically relevant to specific skills building (GCIS, 2008).
- Continuous feedback should be provided by the facilitator or course leader (Newton and Ellis, 2005).

- An orientation session before the start of the course should explain how to use and navigate the e-learning packages. This is also an opportunity to familiarise the participants with peer, instructor and technical support (Newton and Ellis, 2005).
- Pre-delivery testing as well as post-course questionnaires and forums are essential to benchmark the success of the course (Newton and Ellis, 2005).
- To ensure e-learning is long-lasting, follow-up sessions and refresher courses should be included in the planning of the e-learning programme. It is important to ensure active learning led change and the conceptualisation of skills leads to contextualisation and then to application of skills.
- The development of a community of practice for the blended learning trainers needs to be facilitated, where they can reflect upon and discuss situations and develop innovative and shared solutions.

5.4. Conclusion

The key change drivers impacting e-learning implementation in the public service sector include new policy direction, government prioritisation of Fourth Industrial Revolution technology and the impact of Covid-19. The policies that guide e-learning in the public service sector include the public service policy on e-learning framework, DHET Open-Source Learning Framework, PSETA e-learning policy and PSETA e-learning guidelines. PSETA is supported by the Department of Higher Education and Training, the National School of Government, provincial and state academies, Government SETA Forum, universities, TVET and CET institutions. The objective of the public service learning and training sector is to provide excellent demand-driven, needs and competency-based education and training, including via e-learning platforms, that responds to the public service delivery and socio-economic needs, while supporting work performance and career development for all public service employees aligned with the National Skills Development Strategy and the HRD Strategy of South Africa (Paterson, 2008). There is an urgency to integrate e-learning processes to enable digital transformation within the public sector to ensure the development of digital competencies and the use of digital productivity tools. Various e-learning tools are being utilised by the public training sector including e-learning platforms such as online course websites, LMS systems such as LearnDash, mobile learning applications, Zoom, WhatsApp and other e-learning platforms. Various challenges face the public sector in terms of e-learning which include conceptualising and uptake of e-learning, time, pedagogy, infrastructure and accessibility, digital literacy, creating a digital culture. With the guidance of e-learning policies, support and research from various supporting institutes, investment in infrastructure and the instilment of a digital culture, these challenges can be overcome.

Incorporating e-learning and implementing the South African e-government strategy guided by the policy framework for incorporating Information Communication Technology can increase services and improve accessibility and convenience.

6. Public sector e-learning evaluation criteria and review tool

Various e-learning platforms can be used for training and learning methods for different situations. However, evaluating these e-learning programmes for the national and provincial departments within the public service sector and developing quality assurance systems has been a challenge. This section introduces e-learning criteria as well as a comprehensive evaluation tool to offer a potential way forward to enhance strategic planning implementation for e-learning, to address the challenges faced by the public service sector in terms of training and the processes of change in the transitioning of the conceptualisation of e-learning to contextualised capacity building. The e-learning criteria framework provides basic guidelines for designing an optimum e-learning experience in the public sector (see Figure 13). The e-Learning Review Tool (Appendix A) supports and complements the criteria as a tool of analysis of the e-learning programme and short courses developed or identified by public academics, provincial academies and PSETA accredited / registered skills development providers.

6.1. Feedback and adjustments to the e-learning evaluation criteria and review tool

The initial tool consisted of only a review tool. However, after comments from the reviewers, it became clear that an additional criterion that links to a specific section of the e-learning review tool would be helpful. This has been added.

A summary follows in Table 7 of the some of the comments from the reviewers that informed the redesigning of the review tool.

Table 7: Comments from the reviewers that informed redesigning of review tool

General aspects of the e-learning programme		
A1 to A4 and A10	The evaluator requires access to the national / provincial department's Skills Development Plan to answer these questions	
A11 and A12	Very few programmes indicate what digital literacy is required to successfully complete the e-learning programme	
Technology and resources		
B13	Mobiles should not be used for learning	
E-learning programme content		
C3	Why have content online if it is to be printed? Content that is sufficiently integrated into the learning (as in the case of a good online programme) is NOT easy to print.	
C5	Preparation and policies are clearly articulated. Institutional policies and resources relevant to student's success are available on the e-learning	Yes, it is another requirement that is outside the evaluation of the programme itself. *Question deleted*

	programme site, clearly labelled and easy to find.	
E-learning programme design		
D8	If it is not possible to include various technology and e-learning tools, what are the alternatives? Do not disqualify or mark a programme down which does not support synchronous learning.	
Communication, cooperation and interactivity		
E5	E-learning is all about social-learning, a very important point to consider.	
Student feedback and post-training support		
G1	*A benchmark test is provided after the completion of the course to see if the students have actually obtained the skills required from the course.*	Can the benchmark test be constructed in such as way as to see if work and performance are improved?
G2	*Student feedback: Students have the opportunity to give feedback to the instructor about the e-learning programme design, course content and course delivery via anonymous feedback mechanisms at the end of the course*	Ratings depend on timing: before results are out, HIGH; after results are out, LOW.

In other feedback existing e-learning review tools were discussed. An example is the Draft National Open Learning System Content Review/ Moderation Checklist developed by Mrs G. Venter for DHET. This checklist consists of specific categories, namely Content Development, Analysis, Interactivity, Interface and Navigation, Photographs and Graphics, Learner Assessment, Content Outline / Framework. The e-learning evaluation criteria and review tool developed during this study was compared to this checklist and various others. See Appendix A for further details.

6.2. E-learning evaluation criteria

This study draws on the online learning framework of the United Nations that consists of five steps as outlined in Figure 13 (United Nations, 2021). This framework is based on the ADDIE instructional design model. The online learning framework provides tools and recommendations on the different phases involved in developing and delivering learning programmes.

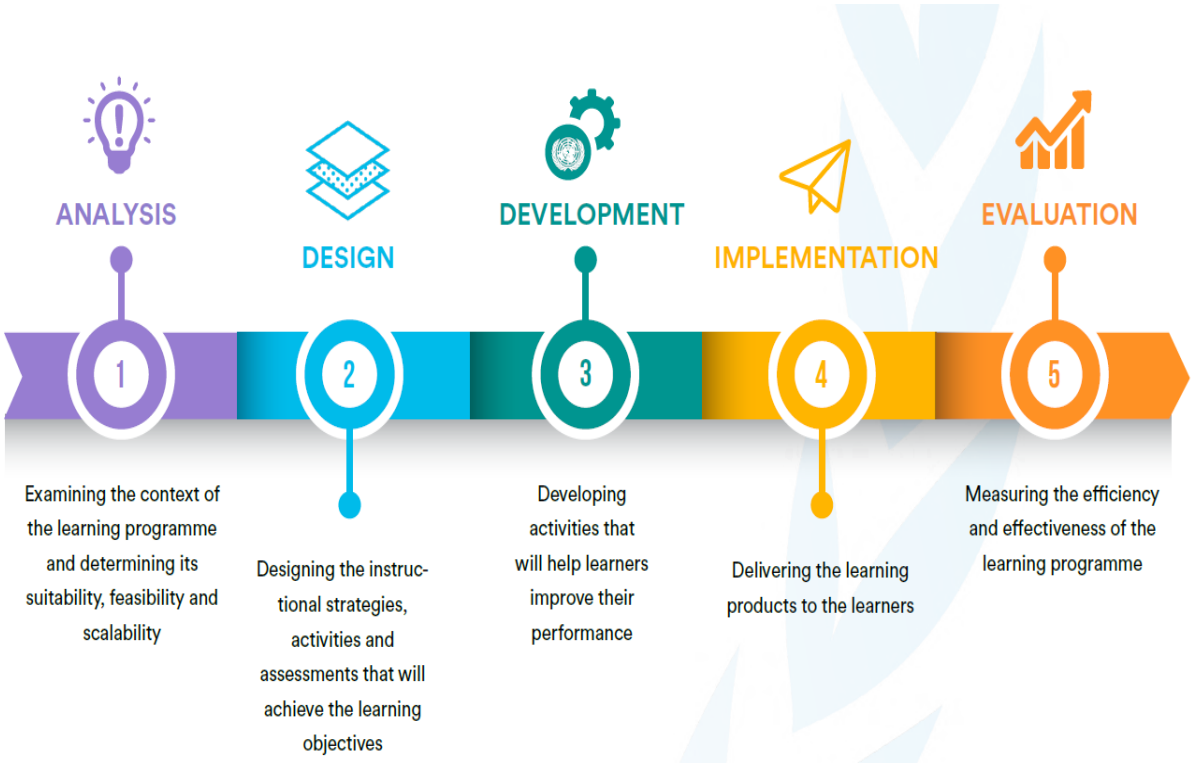

Figure 13: The United Nation's proposed e-learning framework (UN, 2020)

Blass and Davis (2003) identified eight generic areas which can form the basis of criteria for both design parameters and evaluation tools for public service sector e-learning. This study has adjusted these eight parameters slightly to align with the objectives of the criteria (Blass and Davis, 2003). These generic areas are the foundation for guiding principles that can be tailored to the needs of a particular group of students (public servants), national or provincial departments and specific skills development needs. These principles are identified and grouped into four criteria, namely appropriateness, design, interactional and evaluation, with the central concerns of each of these criteria identified and then linked to the relevant section of the e-learning review tool and aligned with the e-learning framework guidelines guided by the United Nations Framework (UN, 2020). Table 7 lists the guideline principles and higher order criteria to provide criteria to evaluate a proposed e-learning programme's relevance and appropriateness. Figure 13 shows the e-learning criteria steps to follow. The first criteria linked to appropriateness are essential. Each e-learning proposal must be able to answer 'yes' to the appropriateness of the e-learning programme, or it would be wrong to proceed. The e-learning evaluation criteria for the public sector are outlined in Figure 15.

Table 8: The identified guideline principles and higher order criteria for evaluation of an e-learning programme

Guideline principles	Higher order criteria	E-learning framework phases	Summative question	Section in e-learning Review Tool
Appropriateness of the provider and content	Appropriateness	Analysis	Is e-learning appropriate and suitable?	Section A Section B Section C
Appropriateness of the market and students			Is e-learning appropriate and sustainable?	
Learning aspirations	Design	Design	What is the target skills development and processes of e-learning?	Section D
Cognitive ergonomics				
Department-student interaction or trainer-student interaction	Interactions	Development	How will students, trainers and the department interact?	Section E
Student-student interactions		Implementation		
Reinforcement strategy	Evaluation	Evaluation	How are both student learning and product effectiveness assessed?	Section F Section G
Achievement of purpose				

6.2.1. Appropriateness criteria

The appropriateness criteria align with the analysis phase of the United Nations e-learning framework that examines the context of the learning programme and determines its suitability, feasibility, and scalability (Figure 16). This phase also recommends a training needs assessment and analysis. There are a number of questions regarding the aims and purpose of e-learning which need to be answered in the affirmative before considering an e-learning programme. For further in-depth analysis of the appropriateness of the e-learning programme or proposed programme, one can use the E-learning Review Tool's Section A, B and C to review the e-learning programme (Appendix A). Section A of the tool deals with the objectives and outcomes of the e-learning programme. It focusses on the relevance of the programme to the national and provincial department Skills Development Plan, the relevance of the course and the certification process. It also allows the reviewer to identify the pre-requisites of the course, the minimum skills requirements and the mode of delivery. Section B pays attention to the technology and resources required for the e-learning programme. Indicators under Section B are meant to establish if the department has the necessary resources such as adequate bandwidth, specific hardware, software and technical support to ensure the success of their identified personnel once they enrol in the training programme.

Finally, Section C reviews the e-learning programme content. It focusses on the relevance and alignment of the content to the national and provincial department within the Public Sector's Skills Development Plan (Appendix A). Some generic questions relating to the appropriateness criteria that should be answered before one decides on a learning programme include:

- Is the subject material suitable for e-learning?
- Is there an appropriate technical environment and support available?
- Does the department have the resources to implement the e-learning programme?

6.2.2. Design criteria

The design criteria focus on the learning objectives and consider the design of the e-learning experience. This is shaped primarily by the learning objectives; what should the course achieve, what should the students know or be able to do on completing it and what should the experience be like for the student and trainer? The design phase is used to create an outline of the learning process and determine the instructional strategies, activities and assessments that will be used to achieve the goals of the learning programme. This phase typically includes evaluating the objectives, identifying the delivery modality, sequencing the learning process, conceptualising activities and determining how learning will be measured. Section D of the e-learning Review Tool enables one to analyse this section of the learning programme more in-depth as it identifies the type of media used to present the content and the methods to keep the student actively involved in the learning process. It also focusses on the general functionality and accessibility of the e-learning programme design. The generic questions that can be asked in the evaluation according to the design criteria derived from Blass and Davis (2003) include:

- What are the educational objectives for the e-learning programme?
- Who is going to structure the path through the e-learning environment?
- How is enquiry and problem solving to be managed?
- What is the most appropriate balance between modalities of presentation and interaction?
- What is the 'look and feel' of the interface as a whole?

6.2.3. Interactional criteria

E-learning does not mean learning entirely in isolation, interacting only with a computer. There is no reason why e-learning should not include either real or virtual learning environments to facilitate interaction, whether or not the tutor is involved in the interaction.

The interactional criteria also align with the development phase as it involves the developing activities and assessments that are both accessible for all learners and that focusses on social learning in all areas of online learning programmes. It further aligns with the implementation phase that aims to provide efficient and effective learning experiences that support learners' mastery of objectives and promote the desired change in behaviour and performance. Section E, e-learning programme design, deals with the student involvement and interaction with the course material, fellow students and the tutor. It focusses on the building of supportive peer learning networks and inter-departmental supportive communities. This criterion focusses on student-trainer interaction and the student-student interaction. The following generic questions in relation to the interactional criteria can be helpful:

- Are there mechanisms in place that allow the student to interact with trainers?
- Is the student drawn into the learning environment and socially supported?
- Are students to interact with each other and, if so, how, and which departments?

6.2.4. Evaluation criteria

In terms of evaluation, there are issues related to evaluating the students as well as evaluating the e-learning environment. The evaluation phase is the last phase in the e-learning framework that measures the efficiency and effectiveness of the learning programme (Figure 17). Its purpose is to ensure that the learning process meets the identified needs, resolves the identified problem and results in improved performance. The most important question to ask is are the student learning, product effectiveness and outcome achieved assessed to satisfactory levels? Section F in the e-learning Review Tool reviews the role of the students and the e-learning programme means of assessment. Section G concludes with an evaluation of the skills obtained through the course and the post-training support provided for the students. Basically, this section assesses if the e-learning programme will truly allow participants to utilise and practise skills obtained via the training within their national or provincial departments setting and if the employees' performance has improved after completion of the course. The reinforcement strategy includes the setting of milestones, giving of feedback, maintenance of deadlines, spoon-feeding and assessment. Reinforcement strategies help students to progress and continue with their studies (Blass and Davis, 2003). There is a range of key concerns in relation to reinforcement strategies; these are reviewed by the tool in Appendix A. The achievement of purpose is the final guiding principle that links closely with assessment as it is concerned with evaluation, and a valid and reliable assessment strategy. Here the question of primary concern is whether or not the e-learning initiative has achieved its purpose. Figure 14 illustrates the public sector e-learning programme evaluation criteria.

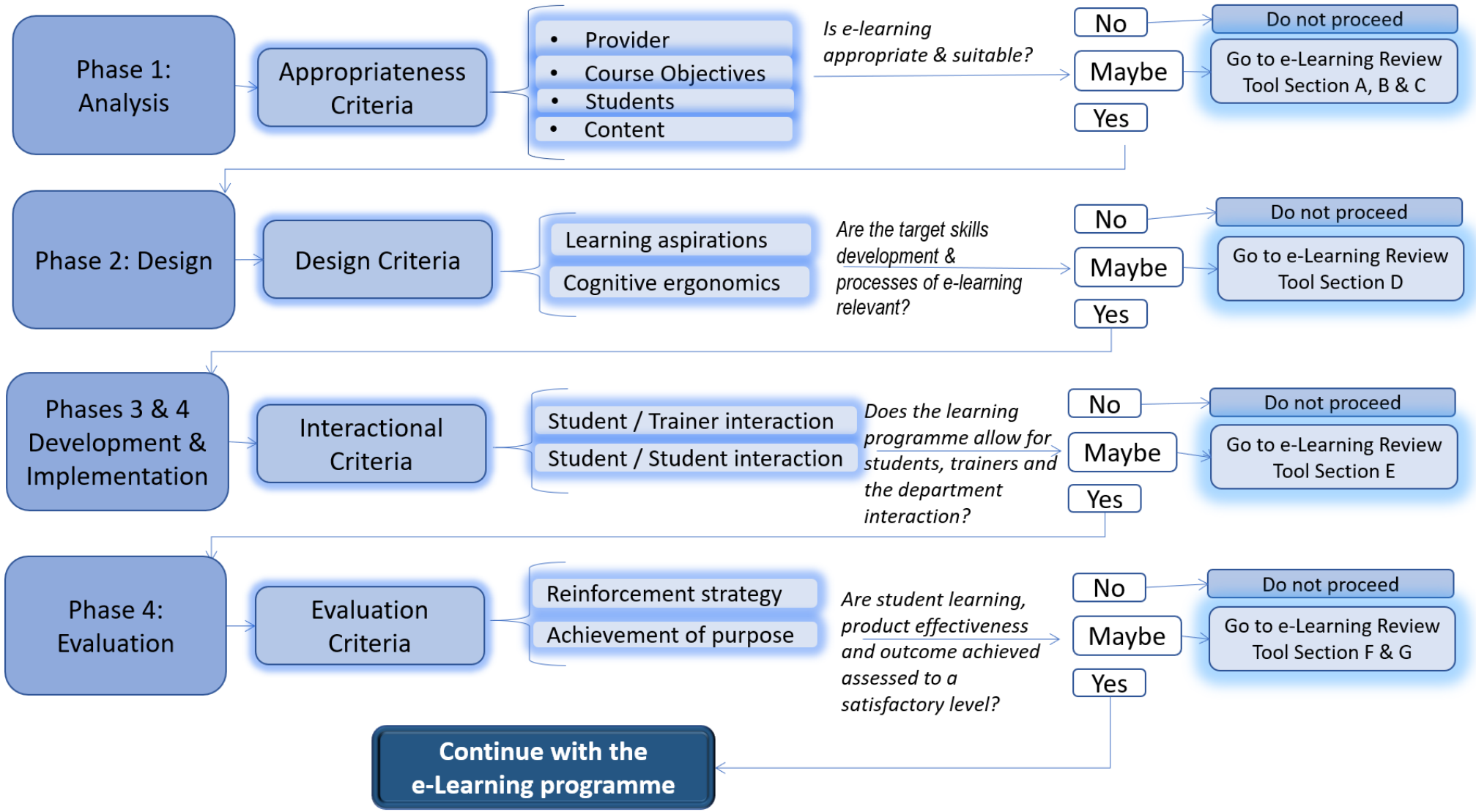

Figure 14: E-learning criteria for the public service sector

6.3. Test case study: Amanzi for Food online course

The Amanzi for Food Online course (https://amanziforfood.co.za) is an open access course designed for agricultural trainers and other actors within the agricultural system. The course caters for public sector employees such as agricultural extension officers, agricultural lecturers and teachers, employees of national parks and any community centred part of the public sector who needs to provide feeding schemes. This course's functionality and relevance was reviewed with the e-learning criteria and review tool. Below are the summative results of the review in Table 9.

Table 9: Summary of results of e-learning review for Amanzi for Food course

Score analysis for the E-Learning Review Tool				
Section	Topic	Score	Total score	% alignment to department's training needs
A	General aspect of the e-learning programme	20	/33	60%
B	Technology and resources	12	/21	57%
C	E-learning programme content	14	/18	78%
D	E-learning programme design	13	/30	43%
E	Communication, cooperation and interactivity	12	/24	50%
F	Students and assessments	15	/21	71%
G	Feedback and post training support	8	/15	53%
Total Score				59%

The general aspects of the e-learning programme, content and student assessment scored adequately. Section B (Technology and resources) scored low as the course caters for the trainers in rural communities with lack of good quality bandwidth on smartphones. The online course does not use various e-learning tools, different mediums, or videos, to ensure an easy, simple learning platform. As noted during the review of the tool, for section B, one cannot disqualify or mark a programme down which does not support synchronous learning or does not include various e-learning tools. Section G was expected to be low as the course is a self-guided online course. To conclude, using the e-learning criteria supported by the e-learning Review Tool can assist to evaluate the relevance of an e-learning programme.

7. Recommendations

The purpose of this study was to develop a clearer understanding of the processes and actors involved in the implementation of e-learning in the public sector and how the challenges of e-learning within the public sector can be addressed. The recommendations to support the processes of utilising e-learning as an innovative tool to support training successfully in the public sector is as follows. Figure 15 summarises our recommendations.

7.1. Policy uptake

The sector's change in policy and strategic plans shapes and drives the uptake of e-learning at a national and provincial level. The key policies and supporting documents that guide the uptake of e-learning include the public service policy framework on e-learning, PSETA e-learning policy, PSETA e-learning guidelines and the DHET open learning policy. The data derived from this study indicates that there is a lack of structural alignment between policy and practice. There is a need to develop an e-learning implementation conceptual framework and guidelines aligned with the polices mentioned.

7.1.1. Tool to translate e-learning policy to practice

- This study recommends the development of tools to support policy-based innovations. Resources are needed to ensure that policies are integrated into the e-learning practices of the public sector. Developing a tool to translate the relevant e-learning policies into practice would assist the public sector to understand what concepts need urgent attention and what suggested pathways can be taken to integrate e-learning successfully into practice. The tool can thus enable policy-based innovations and successful training of the public sector.

7.1.2. Innovative e-learning review tools

- The development of **innovative e-learning review tools**, needs assessment analysis tools, sound strategic plan implementation criteria guides to **support e-learning policy integration** will ensure that uptake and implementation of e-learning are successful. Examples of these e-learning tools are the tool that was developed during this project, the public sector e-learning evaluation criteria (Appendix A) and review tool and the DHET's national open learning system content and moderation checklist (DHET, 2021).

7.1.3. National online review tool platform to support comparative analysis

- There are various tools as mentioned above developed by different e-learning stakeholders; however, to support the translation of policy to practice,

standardised online national versions of the above recommended tools need to be developed. This will ensure that e-learning policy implementation can occur on a national level. It is important to further develop these supportive tools online and make them available on a national online platform. **Developing a database** of individuals and organisations completing these tools can create a **contact database** that can be used as a means to enquire and **identify the needs** of each e-learning programme department. This online platform and these online tools can be used for **comparative analysis** and **ongoing evaluation** to develop clearer understanding of how to support individuals and departments in their uptake of e-learning as a supporting training tool that can lead to the development of a national digital ecosystem.

7.2. Developing an e-learning ecosystem and networks to support e-learning within the public sector

- Platforms such as the above-mentioned evaluation tool can support the development of networks where the contact database can not only supply comparative data analysis and evaluation but also connect various department to confront their challenges together. To provide a better understanding of the processes that enable e-learning uptake, all departments and other components within the public sector need to be included in further network building and transformative change processes. Specific links of communication should be developed to make sure that **alignment and articulation between national, provincial, training department and other institutions are functioning**.
- Time should be invested in the development of **e-learning training networks** within the public sector that aim to understand the processes of e-learning as a training tool and identify how change can be initiated.
- Learning networks between the public service sector, DHET, NSG and PSETA can ensure upskilling and support digital transformation within the public sector. Making use of each other's existing e-learning platforms can also built networks, save time and support the digital culture and e-learning mindset of the public sector.
- Create and support **learning networks for individuals and trainers** during e-learning training via WhatsApp groups and online forums. This will ensure that participants motivate each other and can also promote knowledge dissemination within the learning community.

7.3. Uptake of e-learning within a public sector digital culture and mindset

National level

- Launch a campaign on e-learning and digitalisation to inform the public sector of the positive aspects of this training platform. Such a campaign can also help individuals to become more responsive and positive about the concept of e-learning.

Provincial level

- Develop training programmes for all training departments, course developers and trainers in digital literacy skills, e-learning pedagogy and tools to implement e-learning.
- Provide training in the utilisation of newly e-learning policy translation and programme review tools.

E-learning training programmes

- Ensure that each e-learning programme starts with a module on digital orientation and digital literacy skills to ensure participants are familiar and have the digital literacy levels to successfully complete the e-learning training programme.

7.4. Infrastructure

As the PSETA Skill Sector Plan (PSETA, 2020) already includes upgrading of infrastructure, we should be looking at other ways to improve accessibility and technological challenges.

- Provide an open access learning platform or collaborate with an existing open access platform such as the DHET's platform.
- Make all training platforms data free or zero rated. E-learning programmes can then run on a national level and the infrastructure challenges of Wi-Fi and low connectivity can be minimised.
- Plan online contact session on data reverse communication channels such as Veedo instead of Zoom. Veedo works on all mobile networks and if participants use Veedo on their smartphones, they are not charged for this data.
- Develop smartphone mobile-friendly e-learning platforms and design smartphone-friendly online courses. This will also illuminate the geographical infrastructure of poor access to technology in rural areas.

7.5. Standardising e-learning programmes and feedback on programmes

National level

- Utilise the proposed national e-learning policy translation and development tools to support the needs analysis process and therefore ensure that e-learning is used to train the public sector in the skills required.

Provincial level

- Tools can also ensure quality control and evaluation of training programmes. This is the issue of poorly addressed designed materials.

Review of training programmes

- The tools platform can also include review tools for e-learning programmes to evaluate the programmes and provide feedback on the programme on a national level.

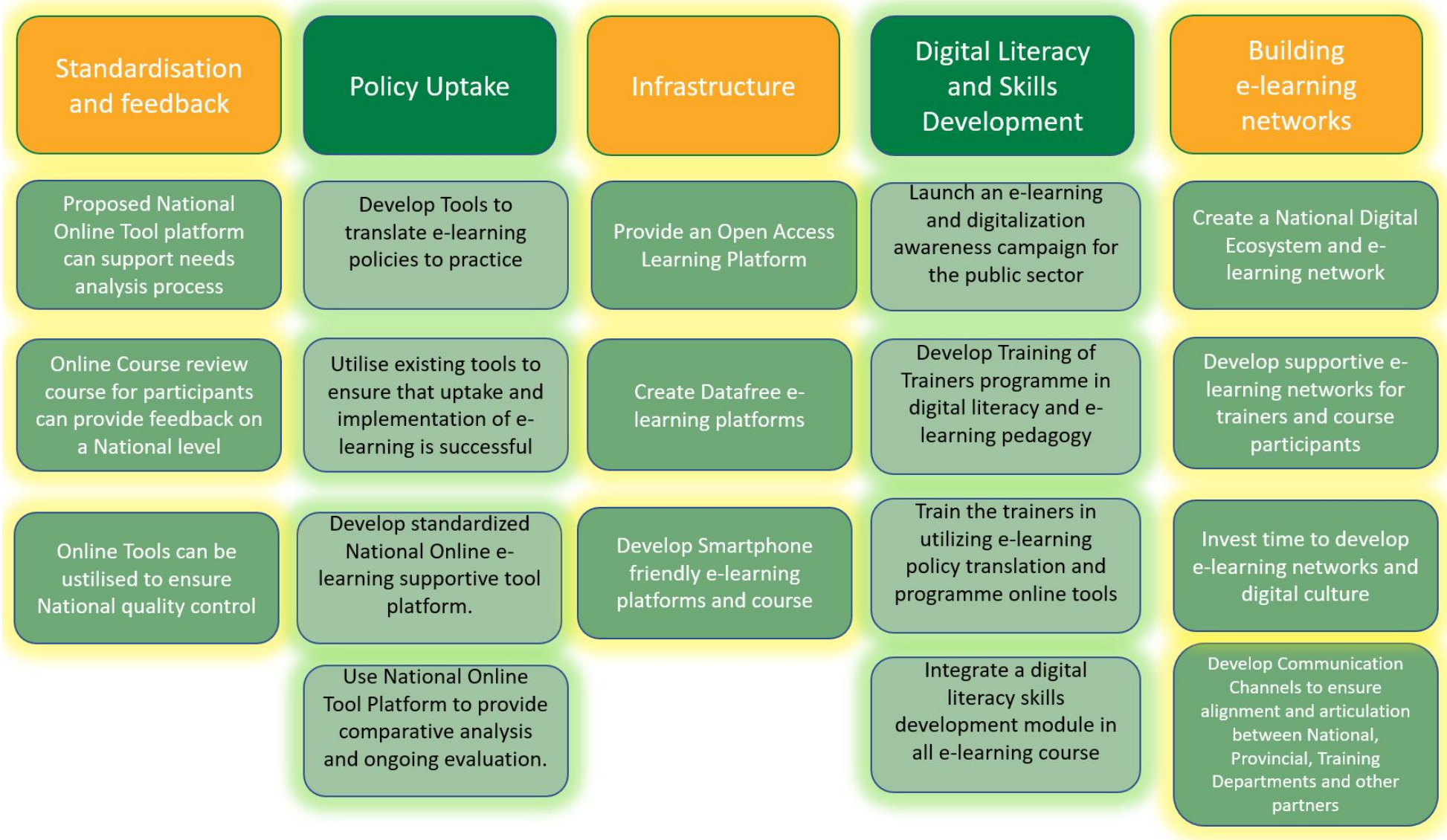

Figure 15: Summary of recommendations

7.6. Further recommendations and research questions

South Africa has benchmarked progress towards e-government by following the four-stage maturity model. E-learning adoption is also a gradual process of adoption. E-learning within institutions is divided by Graham, Woodfield and Buckly into three stages of implementation

- **Stage 1: Awareness / exploration**

  There is an awareness of the organisational challenges in using e-learning and limited support for individual staff exploring ways in which they may employ technology to teach their courses. But there is no co-ordinated strategy regarding the institution's approach.

- **Stage 2: Adoption / early implementation**

  The institution has adopted e-learning and recognises the need to modify organisational and governance structures to make the initiative a success. Introduction of new policies, training, and new academic practices support its implementation.

- **Stage 3: Mature implementation / growth**

  The institution's operations are well-established and routines are clear. Research, quality improvement and data driven decision making are a regular part of the institutional operations.

7.6.1. Strategy, structure, and support

These stages are intended for management and leadership to recognise and gauge their progress towards institutionalising e-learning. Mature e-learning can be seen by the combination of strategies, structures, and support. Mihai et al. has outlined some of the issues that fall under these headings.

Strategy

Successful e-learning will assist an institution to realise its mission and goals. Institutional direction and policy are vital to successfully adopting an e-learning initiative (Graham, 2013). An e-learning strategy should look at the overall design of e-learning and examine the link between the e-learning programme and the overall mission of the institution. Within e-learning literature, there are three main goals that are usually stated for adopting e-learning.

- Increased access and flexibility;
- Enhanced pedagogy; and
- Improved cost effectiveness and resource use.

Among immature institutions, e-learning is often positioned either as a mechanism to teach audiences which otherwise would not have access to education or to address budget costs

and reduce spending on education. Improved teaching and learning, however, is often ignored. When this link between programme and mission is consistent with its organisational capacity, there is increased likelihood of an enhanced pedagogy.

Management is seen as a catalyst for change and through its actions or inaction can either facilitate or impede the development of e-learning in an institution. Equally, changes in leadership or complex internal politics also challenge the coherent implementation and institutionalisation of e-learning.

Change can be effected in many ways (incremental or disruptive, building on existing features, fully reshaping them, or even introducing new ones). A gradual approach can ultimately be more successful, as it provides the implementation team with the time and space they need to experiment.

Structure

The second pillar of Graham's framework is structure. The "educational model" of e-learning consists of learning environments, organisation of information and pedagogical strategies. Three structural elements support the functioning of this educational model.

- Technological;
- Administrative; and
- Pedagogical.

Information technology infrastructure is an obvious component of the learning environment, and the availability and management of IT is a critical factor in determining the maturity of a learning initiative. Data collection and analysis falls somewhere between technology and pedagogy, as the information provide insights into the functioning of a programme as well as its suitability to the initial goals and this feeds back into future development. Use of data to close the loop is usually an indicator of mature implementation.

Administrative and governance structures such as internal organisation, quality assurance and evaluation can be relevant indicators of the stage of institutionalisation. Because materials are so easily shared online, administration should also make clear the parameters regarding ownership and accessibility of materials.

E-learning and edtech is often managed by interdisciplinary teams including designers, media developers, IT specialists and subject matter experts who are in the institution or are linked to it. These teams are responsible for curriculum design, course design and delivery.

Support

The third pillar of Graham's framework is support. This pertains to the way an institution facilitates the implementation and maintenance of its online design, incorporating technical support, pedagogical support, and teaching incentives. There are two aspects to support:

- Staff support
- Student support

Staff can benefit from technological and pedagogical support in the form of instructional design that addresses the challenges of teaching with technology. A set of quality standards and accountability measures for designing and delivering e-learning programmes can assist educators to determine the scope of the work. Alongside support, institutional incentives (financial compensation, equipment, recognition, promotion, salary) increase the perceived value of online teaching and motivate teaching online.

Student support involves technology literacy and timely technical support:

> *E-learning policy is often seen as something separate from normal education. This is a mistake. E-learning should never be seen as something separate. It doesn't matter what mode of delivery you use … when you write policy e-learning should not be separate from your education, training, and development practices because the fundamentals never change.*

At one time, academic institutions held the monopoly on knowledge. With the internet, access to knowledge has become far less restricted and the role of the academic community was challenged. Traditional structures, bound in tradition, have had to shift and adjust. There is a limited amount of literature on the topic of widescale e-learning adoption and the strategic management aspect of implementing e-learning programmes, as most is focused on the level of individual courses or on small scale implementations. Here are a few recommendations, however:

- Recognise that the use of e-learning in the public sector will require extensive leadership and management support and consider creating additional funding schemes to advance the transformation process.
- Align and anchor e-learning in national and institutional strategies and structures. Create a clear responsibility for implementation among management for these strategies.
- Encourage short innovation cycles within departments and allow for the continuous monitoring, evaluation, and implementation of digitalisation efforts, to encourage ongoing maturity.

- Address systemic inequalities in technology and infrastructure with a frugal approach. Build structures to promote with open source and open education resources and address these affordability issues.
- Challenge commercial interests to address the systemic inequalities affecting disadvantaged socio-economic groups (e.g. low-income earners, women, and minority groups). Design support structures to monitor progress and create pathways for these disadvantaged groups to practice their fluency.
- Create and foster involvement in learning networks at international, national, and provincial levels to identify best practices and develop joint regional solutions. Encourage joint development of digital teaching and learning strategies as well as virtual collaboration.
- Initiate communities of practice and learning centred on developing digital pedagogies grounded in insights from learning sciences and digital learning communities to foster skill-building and collaborative approaches.

(Adapted from the Global Learning Council)

7.6.2. Managing the scaling up process

E-learning implementation is much more than a technological fix.

E-learning was described by an interviewee as *"building a learning ecosystem are all requests.…I think if you if you were to ask us and is what's important, I'd say the well-rounded sort of team or skill sets within a team. That's I think, how you're going to get to a professional ecosystem."*

"… people don't understand the intricacies of the (e-learning) space, whether that's on a content or programme level, or even on a technology level. [They don't know] what good e-learning looks like."

E-learning management and leadership are two subsets of e-learning implementation.
E-learning management is about co-ordinating the proper functioning of a system in which others participate. These people handle complexity by planning and organising the work. eLearning leadership is the act of influencing others in educational setting to achieve goals and it necessitates actions of some kind. E-learning leadership is about influence to achieve a shared vision and real change. E-learning leadership does not necessarily entail carrying out the tasks necessary for the functioning of the e-learning system. Influence is exercised and mediated via ICT tools. E-learning leadership is about supporting a culture to manage the change.

The notion of responsibility and accountability for the functioning of the e-learning system is under researched. We think that paralysis in organisations comes from having too many managers and not enough leaders. This distinction between leadership and management is important, especially for ensuring e-learning responsibility and accountability. This needs to play a more prominent role in the analysis of e-learning success.

To be effective, an e-learning administrator must both manage and lead. Building relationships with the network of people and departments responsible for different elements of e-learning requires an e-learning administration that can work across the many layers or organisation silos and co-ordinate various personnel.

- **Senior leadership barriers**: Lack of strategic direction and open communication among middle and senior management, Incentives seem to favour the individual, not the collective. Tasks may be passed onto staff, but not with any decision making.
- **Systems barriers**. Not enough horizontal culture changes to sustain any change. Pockets of change do not enable systems-wide change.
- **Departmental barriers**: Restructuring and a collection of fiefdoms results in a loss of cohesion or collaboration.
- **Engagement barriers:** Engagement and external communications are controlled. Public servants cannot easily engage with the public on service or policy
- **Personal barriers:** A quagmire of incomprehensible and opaque process spaghetti.

Scaling up

- **How convincing is the strategy to scale up learning?** Scaling is more challenging across diverse settings, target groups, etc. Is there a scaling plan that exists in the simplest form that offers guidance on the different tasks involved in building a full-blown scaling strategy?

- **Is the initiative credible?** To what extent is there is evidence in support of the education initiative at hand?

- **How strong is the support for the initiative and the change it entails?** Strong coalition for change is needed if the scaling is to overcome common tendencies toward inaction

and backsliding. This requires mobilising distinct constituencies in favour of the specific changes needed to make the education initiative work.

- **Does the initiative have relative advantage over the current situation and alternative solutions?** When it comes to scaling education initiatives, the greatest resistance is expected to come from systemic inertia and from the status quo (which may be the absence of a solution). What are the comparative advantages of the e-learning initiative?

- **How easy is the initiative to transfer and adopt by the education system, particularly the adopting government institutions?** How simple is it to transfer ownership of the initiative to the existing education system?

- **How good is the fit between the initiative and the education system, particularly the adopting government institutions?** What presence and relationships between the originating, intermediary and adopting organisations and the match between the initiative and the existing education system. How good is the fit between the initiative and the education system, particularly the adopting government institutions?
- **Is there a sustainable source of funding?** What availability of sustainable funding is there beyond the pilot phase as the costs are taken up by the adopting organisation(s) or through funding that is generated by the initiative itself.

PSETA's intent to institutionalise e-learning may be premature. Work in e-learning and edtech, at present, is still at an initial phase and its base is relatively small. There is very little information available about the various levels of successes of these initiatives. The decisions about e-learning and the accreditation of skills development providers, the monitoring of standards of educational provision and the learner assessment and certifications are likely to reinforce traditional teaching and learning. We suggest that organisations see the institutionalisation of e-learning as a process with structures, strategy, and support as markers on this journey. When e-learning is divided into different phases, then PSET can determine the maturity of an organisation, and offer guidance and assistance as they move forwards.

8. Conclusion

The public service sector has made the leap to e-learning and various components are already working towards the successful implementation of e-learning as a training tool. However, it is evident that to initiate institutional change and ensure the uptake of e-learning at a policy and practice level, the public sector needs to be supported within a national and provincial e-learning network and by partners also striving for digital transformation. For e-learning to be successful, alignment with the e-learning policies and guidelines is essential. Recommendations included a provincial online platform where various tools to inform e-learning can be utilised. These tools include tools to translate policy to practice, e-learning course review tool and post e-learning programme review tools. This type of platform can also ensure that e-learning can be standardised and tracked as information obtained from these tool assessments can be used to inform the e-learning system and used for comparative analysis. the current state of e-learning programmes to e-learning training progress. Developing a digital ecosystem and e-learning networks can also enhance the productivity and success of uptake of e-learning in practice.

It can be concluded that the catalysing of the uptake and implementation of e-learning within the public sector requires specific tools, time, understanding of the e-learning pedagogical processes, upskilling digital literacy at all levels and workable data free, smartphone friendly training and communication platforms.

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Appendix A: Public Service sector e-Learning evaluation criteria and review tool

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Introduction

The driving factor for the development of the tool was the need to establish a criteria to review the level of quality standards and benchmarking for the e-Learning Programmes within the National and Provincial Public Sector Departments. These standards are essential to assure good quality e-Learning training programmes. The aim was to develop a tool that could enable users to gain an insight into the 'whole' picture of the e-Learning programme and how the e-Learning programme can be best utilised within the department to support and track innovative training and skills development. The tool and criteria framework support the National and Provincial Public Sector Head of Department or the Training Manager to evaluate the relevance and quality of the e-Learning programme identified for implementation within the department. The tool is designed in a way that the Head of Department, Head of Personnel Development Training or even an employee can evaluate and identify the key components and relevance of an e-Learning programme.

The tool is mainly based on and supported by the inductive analytical processes that examined the drivers and conversion factors of the e-Learning Programme conceptual framework and all the variables that combined ensures a successfully e-Learning experience. It is an indicative based tool that includes both qualitative and quantitative measures needed to evaluate not only the e-Learning Programme, but also if the skills and knowledge obtained during the programme can be applied in practice after the completion of the e-Learning Programme. During the development of the tool other examples of E-Learning evaluation frameworks, tools and rubrics were investigated and relevant dimensions adapted to produce a tool that could be used within the National and Provincial Public Sector Departments to support and track innovation learning and skills development by the utilisation of e-Learning Programmes and tools. To ensure quality e-practices towards sustainable e-governance within the public sector.

E-Learning Evaluation Tools

Other examples of E-Learning evaluation tools were investigated, and relevant aspects were adapted to produce this E-Learning evaluation criteria and tool. The study drew mainly upon the Attwell (2006) recommendations, as well as on the E-Learning Evaluation Framework concept developed within the USA (WestEnd, 2008); Europe (FAO, 2011; Äström, 2008), South America (Kollias, 2007) and Sub-Sahara African Case studies (Alluri and Zachman, 2008). The study also drew upon E-Learning Programme evaluation tools and rubrics such as the Quality online curriculum development (Alberta, 2017), Rubric for Evaluating E-Learning Tools (Anstey and Watson, 2018) and a Comprehensive rubric for instructional design in e-Learning (Debattista, 2017). E-Learning Evaluation Recommendations and Analysis tools were also taken into consideration during the development of this E-Learning Evaluation Criteria Framework (Bates and Poole, 2003).

E-Learning programmes Evaluation approaches including Objective, Management, Consumer, Expertise and Participants oriented approaches were also considered during the development of this criteria and tool (Fitzpatic, Sanders and Worthen, 2004). This study recognises that no single E-Learning Criteria, Evaluation model or Tool can address every variable. Therefore, the E-Learning Evaluation Variables outlined by Attwell (2006) were also included in the tool. These evaluation variables include:

- Individual Learner Variables, such as learner attitude (positive/negative), learner motivation (high/low), familiarity with the technology);

- Learning Environment Variables, the immediate (physical) learning environment, the organisational or institutional environment and the subject environment.
- Contextual variables such as time availability, how highly is learning/e-learning valued, relevance of training programme, skills requirement within the National or Provincial Department
- Technology variables include hardware, software, connectivity, the media, mode of delivery.
- Pedagogic variables such as Level and nature of learner support systems, accessibility issues, Methodologies, Flexibility, Learner autonomy, Assessment and examination and Accreditation and certification.

The in-depth literature review on E-Learning Practices within the Public Sector were conducted during the development of the tool (van Staden, 2021) This study also drew upon Attwell (2006) E-Learning Evaluation literature review and Valverde-Berrocosa, Garrido-Arroya, Burgaos-Videla and Morales-Cevallos's (2020) comprehensive e-Learning evaluation literature review including studies between 2009 and 2018.

Background

The Covid-19 Pandemic has promoted e-learning, nevertheless it has been adopted as a tool for facilitating learning for over three decades in South Africa. The South African government has chosen to introduce e-learning in public sectors as a tool to capacitate the sector, decrease skill shortages that in turn will increase the effectiveness of service delivery. There are various e-learning platforms that can be used for training and learning methods for different situation. However, evaluating these e-Learning programmes for the National and Provincial Departments within the public sector and developing quality assurance systems has been a challenge.

This e-Learning Review Tool was developed to potentially offer a way forward to enhance strategic planning implementation for e-learning, to address the challenges faced by the public sector when it comes to training and the processes of change involved in the transitioning of the conceptualisation of e-learning to contextualised capacity building.

e-Learning Review Tool

The tool is designed to review and support the implementation and success of e-Learning programmes within the National and Provincial Departments of the Public Sector. The reviewer, Head of Department or Head of Personnel Training can use the tool to review the major dimensions of any e-Learning programme on generalised criteria. The tool can be used by management to assess the relevance, the practical application and compatibility of the suggested E-Learning programme.

The different parts of the criteria and tool evaluate different aspects of the program including; the general aspects of the programme, Technology Resources, E-Learning Programme Content, Programme Design, Communication, Co-operation and interaction, Students, Assessments, Feedback, follow-up and the actual capacity building of the course. Section A of the tool focusses on the course objectives and outcome, the pre-requisite of the course and the accreditation of the course. In Section B the tool facilitates a quick identification of the technological requirements and resources needed to implement the e-Learning programme successfully. Section C and D focusses on the E-Learning Programme Content and Design. Section E focusses on the community engagement, learning network building of the capacity building programme and the promotion of peer learning between students. It also identifies the level of interaction between the student and tutor/facilitator. Section F evaluates the student's

role and focusses on the assessment and quality stands of the e-Learning programme. The criteria and tool conclude with a short Section G that queries the feedback process of the programme, the practical application and post-training support.

The tool is designed to detect, through the tool indicators, specific areas of strengths and possible limitations of an e-Learning programme designed for the National and Provincial Departments of the Public Sector. It therefore simplifies more complex emergent properties but helps to identify areas of limitations, the relevance of the course and the possible capacity building that can be expected by the utilisation of the E-learning programme. Thus, the tool is a type of “rapid assessment” that allows for catalysing reflexive investigation with specific relevant findings to assist Departmental Heads and Managers of the Personnel training in the identification of the various components of an e-Learning programme.

The E-Learning Review Tool is divided into 7 parts for ease of administration

- **Section A** deals with the objectives and outcomes of the e-Learning programme. It focusses on the alignment of the programme to the National and Department Skills Development Plan, the relevance of the course and the certification process. It also allows the reviewer to identify the pre-requisites of the course, the minimum skills requirement and the mode of delivery.
- **Section B** of the E-Learning Evaluation Criteria Tool pays attention to the Technology and resources required to undertake the E-Learning programme. Indicators under Section B are meant to establish if the Department has the necessary resources such as adequate bandwidth, specific hardware, software and technical support to ensure the success of their identified personnel once they enrol in the training programme.
- **Section C** reviews the E-Learning Programme Content. It focusses on the relevance and alignment of the content to the National and Provincial Department within the Public Sector’s Skills Development Plan.
- **Section D** identifies the type of media used to present the content and the methods to keep the student actively involved in the learning process. It also focusses on the general functionality and accessibility of the E-Learning programme design.
- **Section F** reviews the role of the students, and the e-Learning programme means of assessment
- **Section G** concludes with the evaluation of the skills obtained through the course and the post-training support provided for the students. Basically, is identifies if the e-Learning programme will truly allow participants to utilise and practice their skills obtained via the training within their National or Provincial Departments setting and if the employees performance has increased after the completion of course.

Assessment Criteria

Rating		
0	None	There is no evidence of this indicator
1	Unsatisfactory	The indicator does not meet the necessary requirements
2	Needs Development	The indicator is present in the e-Learning programme, but needs clarity and development
3	Meet requirements	Evidence indicates that the indicator meets the necessary requirements

Instructions

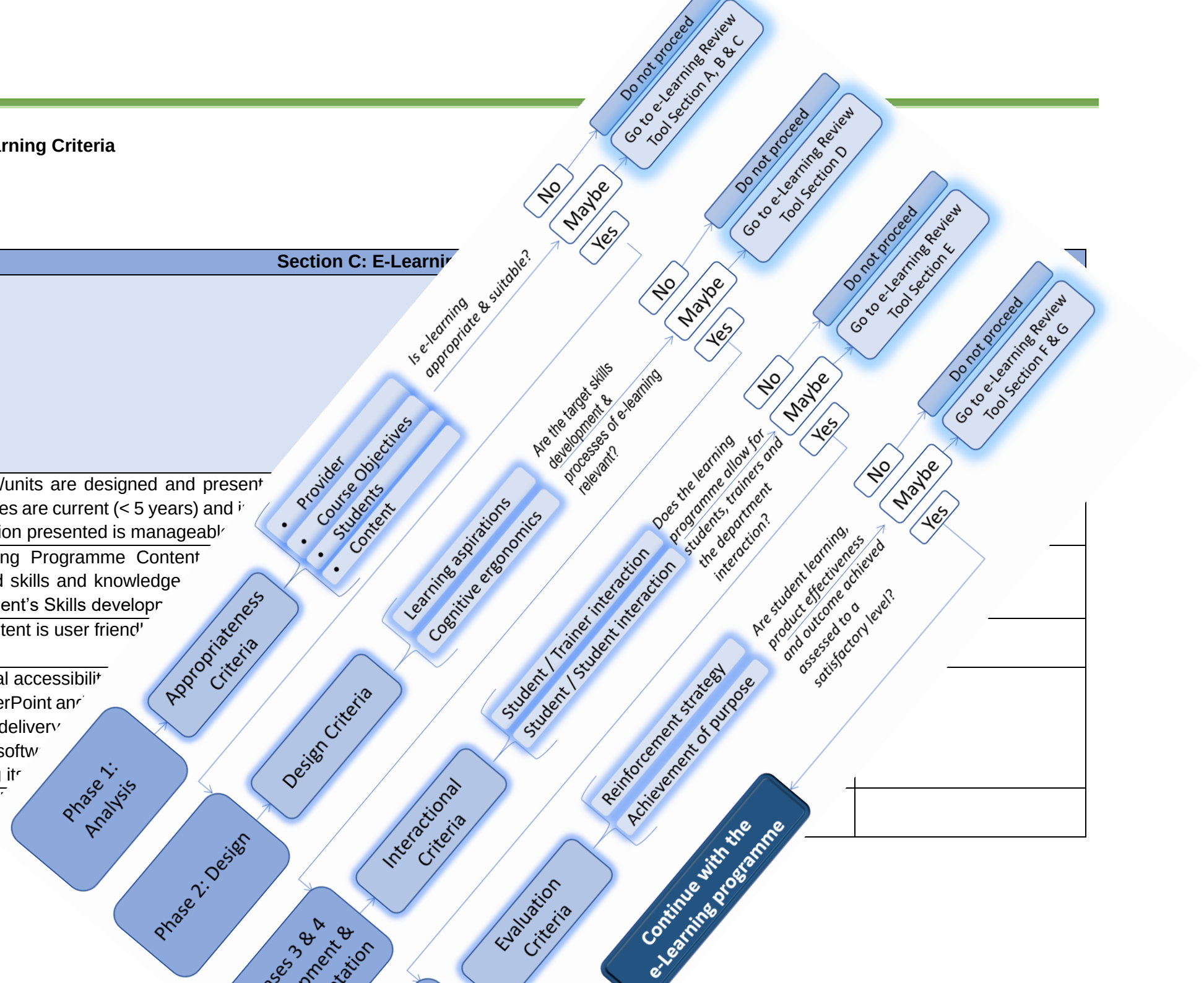
- Use the **e-Learning Criteria** to guide you to which section of the e-Learning Review Tool is most relevant to you need
- **Complete** the e-Learning Review Tool by rating each cluster indicator's relevance and evidence indicating the presence of the identified indicator and relevant practices by choosing between four options ranging from 0 to 3.
- After completion of tool use the **score analysis sheets** to enter your scores and calculate the relevance and responsiveness of the particular e-Learning programme evaluated.[4]
- **Interpret** your score analysis.[5]

[4] See Pages 22 & 23

[5] See Page 24 for guidelines

e-Learning Criteria

Section C: E-Learni	
C 1	Modules/units are designed and present Resources are current (< 5 years) and i Information presented is manageabl
C 2	E-Learning Programme Content identified skills and knowledge Department's Skills develop
C 3	The Content is user friend
C 4	Technical accessibili i.e. PowerPoint an for web deliver specific softw requiring it
C 5	Content in a !



	external links, embeds, etc. Content is fully developed, explained, and integrated in supporting course outcomes.					
C 6	Multimedia (Photos, Images, Video, Audio, etc.) and Metaphors Within the Context of the Content and Learning Experience - Multimedia used throughout the course along with a developed metaphor that reflects a progression of course content					
		TOTAL				/18
Section D: E-Learning Programme Design						
		None (0)	Unsatisfactory (1)	Needs development	Adequately (3)	Comment
D 1	Segmenting of Content: modules are self-contained and have varying lengths depending on the learning objectives, with apparent progression to facilitate learning					
D 2	Framework for delivery is apparent and ensure ease of navigation throughout the E-Learning Programme					
D 3	Student progress is tracked, and student cannot continue to the next section before completing the previous section. Time student spends on the course is also tracked.					
D 4	Continuous interaction from the student is required such as listening to an audio file, watching a video, commenting on a statement, evaluating a Case study by completing a questionnaire or task.					
D 5	Appearance of material is appealing and easy to read. Appropriate colour choice that is easy to the eye, all icons are uniform in style and colour					
D 6	Scrolling within the materials and content: Information is appropriately framed within minimal scrolling requirements					

D 7	Learning resources: Learning resource links are comprehensive, clearly articulated, current / active and with instructions what to do if unavailable					
D 8	Various Technology/ E-Learning Course Tools (i.e., Email, Asynchronous Discussions, Synchronous Chat Rooms/ Virtual Classes, Calendar, Gradebook, External Links, Quizzes/Surveys, Group Areas, Student Home Pages and Presentations) are used.					
D9	Use of Instructional Media (i.e. Media Presentations, Animated/ Voiceover Presentations, Learning Modules, Notes, Streaming Video, Internet Links, Case Studies, etc.)					
D10	There is a “Getting Started” and “Welcome” information page is provided to orient the students to the E-Learning programme layout and expectations. Students are provided with clear instructions for where they should seek help if needed. Links to further assistance and resources allow easy navigation. Tutorials, help and resources are found easily with a few clicks whether internal or external					
		TOTAL				**/30**

Section E: Communication, cooperation and interactivity						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
E1	Clear guidelines are established for the learner that include learner and instructor responsibilities, online communication/ etiquette, and techniques to support the online learner					
E2	The course is designed to allow students to interact with the material in meaningful ways. Higher order thinking (e.g., analysis, problem solving, or critical reflection) is encouraged. The learning activities promote the achievement of the stated learning					

	objectives. They foster instructor-student, content-student, and where appropriate to the course, student-student interaction.						
E3	Learners are aware of the technical competences needed to successfully reach learning outcomes and these are aligned with the student's personal learning outcomes						
E4	An e-Learning programme Community is developed and supported by opportunities for frequent communication among students and the instructor. Student-to-student interactions are meaningful.						
E5	e-Learning programme promotes interaction within and between different National and Provincial Departments						
E6	Communication Strategies are used to provide opportunities for synchronous and/or asynchronous interaction, as appropriate. The instructor actively participates in communication activities; provides feedback to students; and uses communication tools to provide course updates, reminders, special announcements, etc.						
E7	Instructional Support: The E-Learning programme provide multiple ways of contacting the instructor. The instructor's methods of collecting and returning work are clearly explained. The instructor's role within the course (e.g., duties, teaching philosophy, will the instructor provide tech. support) is clearly explained.						
E8	Interpersonal reactions: Dynamic and thoughtful interactions are evident in student-to-student and student-to-faculty interactions, adding to a quality learning experience						
			TOTAL				**/24**

Section F: Students and Assessments						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
F1	Students overall progress and actual time spent on course is recorded and can be reported on to the National or Provincial Government Department's head of Skills Development					
F2	There is a follow-up session on the E-Learning Programme and there is an opportunity to engage and keep contact with the learning community whilst sharing knowledge after completion of course					
F3	Specific and descriptive criteria are provided for the evaluation of students' work and participation.					
F4	The course grading policy is stated clearly with a full explanation of the relationship between points, percentages, weights, and letter grades. The marking rubric or criteria is made available for the participants to use to guide their work.					
F5	The E-Learning programme provide multiple types of assessments (projects, papers, presentations, discussions, tests, etc.) Assessments are designed to measure higher order thinking skills and mimic authentic environments to facilitate transfer.					
F6	Robust courses provide students with constructive, meaningful feedback					
F7	Assignments are easily navigated to within the E-Learning Programme					
E8	Guidelines are established for the learner that include learner and instructor responsibilities, online communication/ etiquette, and techniques to support the online learner					

F9	Assessment is set out in such a way that the application of skills and knowledge in the practical setting of National or Provincial Department is the main focus of the assessment.					
		TOTAL				**/27**

Section G: Student Feedback & Post-training support						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
G1	A benchmark test is provided after the completion of the course to see if the students have actually obtained the skills required from the course. To see if the objectives of the skills were completed.					
G2	Student Feedback: Students have the opportunity to give feedback to the instructor about the E-Learning programme design, course content and course delivery via anonymous feedback mechanisms at the end of the course					
G3	Follow up discussion and touch-up sessions are held to ensure that skills obtained can be practically applied					
G4	Are Students capable and able to train other members of their department on the course topic.					
G5	Has the e-Learning programme lead to the student's improved performance within the Departmental work setting					
		TOTAL				**/15**

Score analysis for the E-Learning Review Tool				
Section	Topic	Score	Total Score	% Alignment to Departments Training Needs
A	General Aspect of the E-Learning Programme		/33	
B	Technology and Resources		/21	
C	E-Learning Programme Content		/18	
D	E-Learning Programme Design		/30	
E	Communication, cooperation and interactivity		/24	
F	Students and Assessments		/21	
G	Feedback and Post training support		/15	
Total Score		*(%A+%B+%C+%D +%E+%F+%G) ÷ 7*[6]		

[6] Formula to calculate the total responsiveness of the e-Learning programme

Interpreting the score analysis

The calculated score rating can be interpreted easily according to the Rating Table below.

Rating		
0%	None	There is no evidence on the indicator
≤ 20%	Unsatisfactory	The indicator does not meet the necessary requirements.
≤ 40%	Needs Development	Indicates performance, but improvement is required.
≤ 60%	Adequately	Evidence that the E-Learning programme is adequate and is aligned with some of the specific National and Provincial Department within the Public Sector's Training and Development Plan.
≤ 80%	Meets requirements	Evidence indicates that the National and Provincial Department within the Public Sector's Training and Development Plan's standard has been met.
≤ 100%	Exceed requirements	Evidence indicate that expectations has been exceeded and the e-learning programme is responsive to the National and Provincial Department within the Public Sector's Training and Development Plan's standard.

The table below list the scoring sheet outlining the cluster indicators and recommendations on service provider, type of eLearning, resources needed and other aspects to consider.

SECTION A: Curriculum, teaching approach and student-community engagements	
Score below 60% on any of the Cluster Indicators shows that some aspects of the eLearning programme evaluated needs to be reconsidered and investigated more clearly.	
Section A: General Aspect of the E-Learning Programme	This section focuses on the reviewer's views on the clarity of the goals and objectives of the E-Learning Program, the alignment of the course with the Skills Development Plan, the accreditation, prerequisites and the basic resources to complete the E-Learning Program. A low score rating for Section A shows that the E-Learning Programme aims and objectives are not clearly laid out or well explained. Further investigation is needed before a decision can be made.
Section B: Technology and Resources	Section B focusses on identifying if the necessary resources required by the e-Learning Programme are available such as the necessary bandwidth and connectivity, Computers or laptops, headphones, cameras and if it's mobile friendly. This section also highlights the practicality of the tuition time and location. Rating score below 60% indicates that the resource availability needs to be established and that clarity on the E-Learning intuition time and convenience is needed.

Section C: E-Learning Programme Content	This section reviews the E-Learning Programmes content and structure. It focusses on the design, presentation, the user-friendliness, types of multimedia used and the relevance of the skills and knowledge requirements set out by the National / Provincial Department's Skills development Plan A low score indicates that the E-Learning Programme might not be as user friendly and relevant as needed
Section D: E-Learning Programme Design	Section D focusses on the structure of the course, the type of tutor and technical support provided and other interactive activities that can ensure a successful course. A low rating hears shows that the student might not be supported as expected and that more self-discipline will be needed to complete the course without support
Section E: Communication, cooperation and interactivity	Section E focusses on the community engagement, learning network building of the capacity building programme and the promotion of peer learning between students. It also identifies the level of interaction between the student and tutor/facilitator
Section F: Students and Assessments	This section evaluates the assessment process and track progress of students.
Section G: Feedback & Post-training support	This section reviews the e-Learning programme's support after completion of the course and if the objectives are truly met. A high score is important in this section.

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Appendix B: Review of tool feedback

The review tool was sent to five e-learning experts and researcher in the same field. Feedback was positive and suggestions for changes was noted. These reviewers included

Reviewers of the e-Learning criteria and review tool:

Johannes Möller	University of the Free State
Derek Maree	Independent consultant
Trudi van Wyk	Department of Higher Education and Training
Gerda Venter	Department of Higher Education and Training
Izabella du Preez	University of the Free State

Section A: General Aspect of the E-Learning Programme						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
A1	The Goals and Objectives of the E-Learning Program are clearly communicated and the outcome that the students can expect to achieve is systematically set out.			2		
A2	The Goals and Objective of the E-Learning Programme is aligned with the relevant National / Provincial Department's skills Development Plan				3	
A3	The skills that the student will acquire after completion of the E-Learning Programme is clearly set out and is aligned with the National / Provincial Department's Skills Development Plan			2		
A4	The skills obtained through the E-Learning Programme is aligned with the required skills identified by the skills evaluation of the prospective student.	0				
A5	Duration of the E-Learning Programme is clearly stated and is aligned with the available time stipulated by the prospective students.				3	
A6	The E-Learning Programme accreditation meets the requirements set out by the National / Provincial Department's Skills development Plan				3	
A7	The certification or qualification the prospective student obtains after completing the E-Learning Programme is clearly explained and also meets the requirements set out by the National / Provincial Department's Skills development Plan				3	
A8	The E-Learning Programme outlines the pre-requisite knowledge and skills that the prospective student requires to complete the training.			2		
A9	Mode of Delivery of the e-Learning Programme is clearly explained and is aligned with the requirements set out by the National / Provincial Department's Skills development Plan		1			
A10	The Digital literacy level needed by the prospective student is clearly outlined.	0				
A11	There is a support system and training available for students that do not meet the minimum Digital literacy requirements.		1			
		TOTAL			**20**	**/33**

Section B: Technology and Resources						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
B1	The National / Provincial Department has the necessary bandwidth and connectivity specifications required by the e-Learning Programme	0				
B2	The E-Learning Programme has a data free version available for course participants				3	
B3	The E-Learning Programme is mobile friendly				3	
B4	Permission has been granted for the E-Learning Programme to be completed within work hours on office equipment	0				
B5	The prospective students can complete the E-Learning Programme at home and have all the necessary resources available to complete the course outside working hours.				3	
B6	There is technical support available for prospective students via the National / Provincial Departments Information Technology Department or the E-Learning programme service provider.				3	
B7	All extra equipment such as a camera and headphones needed for the E-Learning programme are available for prospective students	0				
		TOTAL			12	/21

Section C: E-Learning Programme Content						
		None (0)	Unsatisf	Needs	Adequat	**Comment**
C1	Modules/units are designed and presented in a uniform and consistent manner Resources are current (< 5 years) and information is relevant to learning objectives Information presented is manageable with both an introduction and a conclusion				3	
C2	E-Learning Programme Content is completely relevant and aligned with the identified skills and knowledge requirements set out by the National / Provincial Department's Skills development Plan				3	
C3	The Content is user friendly and available to download to use offline				3	
C4	Technical accessibility is assured through the use of web ready-standard formats, i.e. PowerPoint and Word documents are converted to PDF Graphics are optimized for web delivery and display. Video are embedded in the site and Files requiring specific software are avoided. Links and instructions are located near the materials requiring its use. Any additional cost for the software is made explicit.			2		
C5	Content Presentation: Navigation is structured for clarity and "chunked" and flows in a logical progression using appropriate mechanisms such as internal and external links, embeds, etc. Content is fully developed, explained, and integrated in supporting course outcomes.			2		
C6	Multimedia (Photos, Images, Video, Audio, etc.) and Metaphors Within the Context of the Content and Learning Experience - Multimedia used throughout the course along with a developed metaphor that reflects a progression of course content		1			
		TOTAL			**14**	**/18**

Section D: E-Learning Programme Design						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
D1	Segmenting of Content: modules are self-contained and have varying lengths depending on the learning objectives, with apparent progression to facilitate learning			2		
D2	Framework for delivery is apparent and ensure ease of navigation throughout the E-Learning Programme			2		
D3	Student progress is tracked and student cannot continue to the next section before completing the previous section. Time student spends on the course is also tracked.	0				
D4	Continuous interaction from the student is required such as listening to an audio file, watching a video, commenting on a statement, evaluating a Case study by completing a questionnaire or task.	0				
D5	Appearance of material is appealing and easy to read. Appropriate colour choice that is easy to the eye, all icons are uniform in style and colour				3	
D6	Scrolling within the materials and content: Information is appropriately framed within minimal scrolling requirements	0				
D7	Learning resources: Learning resource links are comprehensive, clearly articulated, current / active and with instructions what to do if unavailable				3	
D8	Various Technology/ E-Learning Course Tools (i.e., Email, Asynchronous Discussions, Synchronous Chat Rooms/ Virtual Classes, Calendar, Gradebook, External Links, Quizzes/Surveys, Group Areas, Student Home Pages and Presentations) are used.	0				
D9	Use of Instructional Media (i.e. Media Presentations, Animated/ Voiceover Presentations, Learning Modules, Notes, Streaming Video, Internet Links, Case Studies, etc.)	0				

D10	There is a “Getting Started” and “Welcome” information page is provided to orient the students to the E-Learning programme layout and expectations. Students are provided with clear instructions for where they should seek help if needed. Links to further assistance and resources allow easy navigation. Tutorials, help and resources are found easily with a few clicks whether internal or external				3	
		TOTAL			**13**	**/30**

Section E: Communication, cooperation and interactivity						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
E1	Clear guidelines are established for the learner that include learner and instructor responsibilities, online communication/ etiquette, and techniques to support the online learner	0				
E2	The course is designed to allow students to interact with the material in meaningful ways. Higher order thinking (e.g., analysis, problem solving, or critical reflection) is encouraged. The learning activities promote the achievement of the stated learning objectives. They foster instructor-student, content-student, and where appropriate to the course, student-student interaction.				3	
E3	Learners are aware of the technical competences needed to successfully reach learning outcomes and these are aligned with the student’s personal learning outcomes		1			
E4	An e-Learning programme Community is developed and supported by opportunities for frequent communication among students and the instructor. Student-to-student interactions are meaningful.	0				
E5	e-Learning programme promotes interaction within and between different National and Provincial Departments				3	
E6	Communication Strategies are used to provide opportunities for synchronous and/or asynchronous interaction, as appropriate. The instructor actively			2		

	participates in communication activities; provides feedback to students; and uses communication tools to provide course updates, reminders, special announcements, etc.					
E7	Instructional Support: The E-Learning programme provide multiple ways of contacting the instructor. The instructor's methods of collecting and returning work are clearly explained. The instructor's role within the course (e.g., duties, teaching philosophy, will the instructor provide tech. support) is clearly explained.				3	
E8	Interpersonal reactions: Dynamic and thoughtful interactions are evident in student-to-student and student-to-faculty interactions, adding to a quality learning experience	0				
		TOTAL			**12**	**/24**

Section F: Students and Assessments						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
F1	Students overall progress and actual time spent on course is recorded and can be reported on to the National or Provincial Government Department's head of Skills Development		1			
F2	There is a follow-up session on the E-Learning Programme and there is an opportunity to engage and keep contact with the learning community whilst sharing knowledge after completion of course			2		
F3	Specific and descriptive criteria are provided for the evaluation of students' work and participation.				3	
F4	The course grading policy is stated clearly with a full explanation of the relationship between points, percentages, weights, and letter grades. The marking rubric or criteria is made available for the participants to use to guide their work.				3	

F5	The E-Learning programme provide multiple types of assessments (projects, papers, presentations, discussions, tests, etc.) Assessments are designed to measure higher order thinking skills and mimic authentic environments to facilitate transfer.	0				
F6	Robust courses provide students with constructive, meaningful feedback				3	
F7	Assignments are easily navigated to within the E-Learning Programme				3	
E8	Instructor and student Responsibilities & Guidelines for Online Learning Clear guidelines are established for the learner that include learner and instructor responsibilities, online communication/ etiquette, and techniques to support the online learner					
F9	Assessment is set out in such a way that the application of skills and knowledge in the practical setting of National or Provincial Department is the main focus of the assessment.					
		TOTAL			**15**	**/27**

Section G: Student Feedback & Post-training support						
		None (0)	Unsatisfactory (1)	Needs development (2)	Adequately (3)	**Comment**
G1	A benchmark test is provided after the completion of the course to see if the students have actually obtained the skills required from the course. To see if the objectives of the skills were completed.	0				
G2	Student Feedback: Students have the opportunity to give feedback to the instructor about the E-Learning programme design, course content and course delivery via anonymous feedback mechanisms at the end of the course		1			
G3	Follow up discussion and touch-up sessions are held to ensure that skills obtained can be practically applied		1			
G4	Are Students capable and able to train other members of their department on the course topic.				3	
G5	Has the e-Learning programme lead to the student's improved performance within the Departmental work setting				3	
		TOTAL			**8**	**/15**

Score analysis for the E-Learning Review Tool				
Section	Topic	Score	Total Score	% Alignment to Departments Training Needs
A	General Aspect of the E-Learning Programme	20	/33	60%
B	Technology and Resources	12	/21	57%
C	E-Learning Programme Content	14	/18	78%
D	E-Learning Programme Design	13	/30	43%
E	Communication, cooperation and interactivity	12	/24	50%
F	Students and Assessments	15	/21	71%
G	Feedback and Post training support	8	/15	53%
Total Score		*(%A+%B+%C+%D +%E+%F+%G) ÷ 7*[7]		59%

Interpreting the score analysis

The calculated score rating can be interpreted easily according to the Rating Table below.

Rating		
0%	None	There is no evidence on the indicator
≤ 20%	Unsatisfactory	The indicator does not meet the necessary requirements.
≤ 40%	Needs Development	Indicates performance, but improvement is required.
≤ 60%	Adequately	Evidence that the E-Learning programme is adequate and is aligned with some of the specific National and Provincial Department within the Public Sector's Training and Development Plan.
≤ 80%	Meets requirements	Evidence indicates that the National and Provincial Department within the Public Sector's Training and Development Plan's standard has been met.
≤ 100%	Exceed requirements	Evidence indicate that expectations has been exceeded and the e-learning programme is responsive to the National and Provincial

[7] Formula to calculate the total responsiveness of the e-Learning programme

		Department within the Public Sector's Training and Development Plan's standard.

The table below list the scoring sheet outlining the cluster indicators and recommendations on service provider, type of eLearning, resources needed and other aspects to consider.

SECTION A: Curriculum, teaching approach and student-community engagements	
Score below 60% on any of the Cluster Indicators shows that some aspects of the eLearning programme evaluated needs to be reconsidered and investigated more clearly.	
Section A: General Aspect of the E-Learning Programme	This section focuses on the reviewer's views on the clarity of the goals and objectives of the E-Learning Program, the alignment of the course with the Skills Development Plan, the accreditation, prerequisites and the basic resources to complete the E-Learning Program. A low score rating for Section A shows that the E-Learning Programme aims and objectives are not clearly laid out or well explained. Further investigation is needed before a decision can be made.
Section B: Technology and Resources	Section B focusses on identifying if the necessary resources required by the e-Learning Programme are available such as the necessary bandwidth and connectivity, Computers or laptops, headphones, cameras and if it's mobile friendly. This section also highlights the practicality of the tuition time and location. Rating score below 60% indicates that the resource availability needs to be established and that clarity on the E-Learning intuition time and convenience is needed.
Section C: E-Learning Programme Content	This section reviews the E-Learning Programmes content and structure. It focusses on the design, presentation, the user-friendliness, types of multimedia used and the relevance of the skills and knowledge requirements set out by the National / Provincial Department's Skills development Plan A low score indicates that the E-Learning Programme might not be as user friendly and relevant as needed
Section D: E-Learning Programme Design	Section D focusses on the structure of the course, the type of tutor and technical support provided and other interactive activities that can ensure a successful course. A low rating hears shows that the student might not be supported as expected and that more self-discipline will be needed to complete the course without support
Section E: Communication, cooperation and interactivity	Section E focusses on the community engagement, learning network building of the capacity building programme and the promotion of peer learning between students. It also identifies the level of interaction between the student and tutor/facilitator

Section F: Students and Assessments	This section evaluates the assessment process and track progress of students.
Section G: Feedback & Post-training support	This section reviews the e-Learning programme's support after completion of the course and if the objectives are truly met. A high score is important in this section.

Appendix C: Strategy, structures and support

1. Strategy
    a. Purpose
        i. What is your institutional purpose for adopting e-learning?
        ii. Can this purpose be encapsulated in a single, uniform policy across the department or unit?
        iii. Has this purpose for eLearning been published and shared widely with the management, workforce, and other intended beneficiaries?
        iv. If your department has published its purpose for using e-eLearning sometimes ago, have you reviewed and determined whether to revise the purpose?
        v. What is your next step toward improving your departmental purpose on e-learning?
    b. Advocacy
        i. What role does the management take in advocating e-learning in your department or institution?
        ii. What role do subject matter experts play in advocating for e-learning?
        iii. What role do departments play in advocating for e-learning?
        iv. Is there advocacy occurring for e-learning in institutional communications?
        v. What is your next step to increasing advocacy for e-learning?
    c. Implementation
        i. What groups are the driving forces of e-learning implementation (e.g., administrators, faculty, departments/colleges)? How are they going about implementing E-learning?
            1. Instructors are involved in e-learning implementation.
            2. Administrators are involved in e-learning implementation.
            3. Departments and colleges are involved in e-learning implementation.
        ii. What is your next step toward widespread implementation?
2. Structure / Products
    a. Administration and governance
        i. Currently, who in your institution oversees e-learning approval and implementation?
        ii. Are staff (academic and support) aware of the approval process for e-learning?
        iii. Is e-learning implementation regulated by the department or whole institution?
        iv. What is the next step to robust governance structures?
    b. Delivery Models
        i. We have adopted an e-learning delivery model
        ii. What is your current policy on e-learning delivery models?
        iii. Is your e-learning delivery policy on models published to the faculty?
        iv. Does your institution encourage utilization of the approved e-learning delivery models?
        v. If your institution has developed and encouraged e-learning delivery, does it use evaluation data to review and, if necessary, revise approved e-learning models?
        vi. What is the next step to creating a formal e-learning policy on models?
    c. Scheduling
        i. Do students understand what e-learning course designations signify?
        ii. What is the source of their understanding?
        iii. Does your institution's course catalogue/registration system designate courses as such?
        iv. What is your next step in developing a e-learning friendly scheduling system?

d. Technical
    i. What technical support does your institution feature?
    ii. Does your institution offer technical support specifically for instructors implementing e-learning?
    iii. Does your institution offer technical support to students using e-learning?
    iv. Is technical support well-established for instructors and students?
    v. What is the next step to improve your technical support?
e. Pedagogical
    i. What is your institutions e-learning developmental process?
    ii. Who oversees the e-learning course development process (e.g., colleges/ departments, administration)?
    iii. Are instructors aware of the process?
    iv. If your institution has developed a e-learning developmental process, do you regularly review and improve the process?
    v. What is your next step to improve this process?

3. Support / services
    a. Incentives
        i. What types of incentives are available to faculty for implementing a e-learning ended course (e.g., monetary incentive, reduction in course load)?
        ii. Workload frameworks in place to support this adopted model and online forms of teaching.
        iii. Reward structures are in place to support this adopted model and online forms of teaching.
        iv. Are instructors aware of those incentives?
        v. If your institution established those incentives sometimes ago, have you reviewed and made any necessary updates/revisions to the incentives?
        vi. What is your next step to improve your incentive structure?
    b. Student Support
        i. Is technology support pro-active. What does it cover?
            1. Access to computers and the internet?
            2. Experience with software application?
            3. Troubleshooting skills?
        ii. Can students access the help desk for tech support directly from the e-learning system?
        iii. Are innovative mechanisms for support encouraged (study buddy, peer support etc)?
        iv. Can at-risk students be flagged and identified on the e-learning system?
    c. Evaluation
        i. What evaluation process is currently used for your e-learning ended courses
        ii. Who conducts the evaluation?
        iii. How is the evaluation data used?
        iv. Are the evaluations uniform?
        v. What is your next step to develop a systematic evaluation process?

APPROVAL OF RESEARCH REPORT BY CEO

Research conducted by the Research conducted by the University of Witwatersrand's Centre for Researching Education and Labour (Wits REAL)

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APPROVAL OF RESEARCH REPORT BY CEO	
Recommendation(s)	Approved/~~Not Approved~~
Comments: Report approved	
Signature	
Name and surname	**Ms Bontle Lerumo**
Date	**30 September 2021**

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