

SUPPORTING THE SUCCESSFUL IMPLEMENTATION OF E-LEARNING IN THE SOUTH AFRICAN PUBLIC SECTOR

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ABSTRACT

This paper examines 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 question of e-learning arose in a context of a project which aimed to investigate specific contextual variables that need to be addressed to strengthen skills development within the public sector. The study drew upon systems thinking to analyse the South African public service training system as different units within a system. Insights from stakeholder engagement and framework development processes were assessed, and critical emergent themes to inform the e-learning needs of the public sector were identified. The study shows 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 of digital literacy at all levels, and workable data-free, smartphone friendly training, and communication platforms.

Keywords: Public Sector Training, E-learning, E-learning review tool, Digital Ecosystem

INTRODUCTION

The Covid-19 Pandemic has promoted e-learning as a tool for facilitating learning in the public sector of South Africa. The South African government introduced E-Learning in public sectors as a tool to capacitate the sector and 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, which impacts productivity and maximises cost. E-learning is a way to ensure that large numbers of government officials are trained at minimum costs and also ensures that training reaches people with different possibilities, such as top management and people with families who cannot afford to be away from home or the office for training for an extended period of time (Msomi et al., 2016).

However, the concerning issue is that e-learning is driven by commercial interest. The commodity factor determines the agenda and development pathway of how e-learning is and will be conceived in public sectors, including educational institutes, and not by clear pedagogical principles. E-learning exposes a 'digital divide' as access to devices, data costs, and digital literacy are unequally distributed in communities and embedded in society's socio-political powers (Isaacs, 2020). The learner and learning are often peripheral in e-learning, and the user is not regarded as an individual but more as a neutral user, a product, or 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 Sector.

In South Africa, as part of its attempt to increase the effectiveness of service delivery, the Public Service Sector - Education & Training Authority (PSETA) commissioned this study to ensure that e-learning becomes a tool to capacitate the public sector and decrease skill shortages. 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 services sector (focusing on the 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 how the public service sector utilises e-learning to upskill and reskill its workforce.
- Develop criteria and online course review tool for PSETA to assess the impact and ‘meaningfulness’ of public service sector e-learning programmes, not discussed in depth in this article.

This study draws upon systems thinking approaches focused on the process of innovative capacity building to examine the South African public service sector e-learning system (See Figure ii). An innovation system generates new knowledge, produces interactive learning, and actively shares knowledge within the system. This innovation framework focuses on behaviours and practices that influence institutional innovation of e-learning uptake and implementation (Sumberg, 2005). The public sector faces complex problems with many interactions with feedback loops and variables that depend on each other (Neumann, 2013). Looking at the public sector from a system’s thinking viewpoint, one moves from the traditional reductionist way of studying problems to a more interactive, network-building approach. This approach allows the study to understand the challenges and complexities of the public e-learning system, identify the stakeholders and role players, understand their interests and interactions, and identify barriers and contradictions in the long-term innovative learning process. A system thinking approach can provide tools for reviewing current practices and the implementation of responsive change.

Msomi, Munapo and Choga (2018) state that the South African public sector has conceptualised e-learning as a linear process that predicts expectations and assumes that patterns repeat themselves. For the public sector to align 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). Various components and actors within the public sector's learning system affect the uptake of online learning and other innovative processes.

Engeström (1999) suggested that activity system theory is a valuable tool to analyse systems and may be summarised 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 an analysis unit of the 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 and the context of curriculum and public sector needs (Bertelsen & Bodker, 2003; Cole & Engeström, 1993).

LITERATURE REVIEW

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 online tools for learning is now a reality on all learning-training platforms. The literature covers defining, measuring and modeling 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 of success (Halverson & Graham, 2019). Research in e-learning focuses on linear relationships. There is a call to research the e-learning phenomena as a complex adaptive blended learning system that draws the linkages, impacts and unintended consequences of all stakeholders, both human and technology (McGee & Poojary, 2020). Msomi et al. (2018) also agreed that e-learning in the South African public sector must be conceptualised using a system thinking approach while moving away from the reductionist approach, which fails to solve complex problems.

Although the Covid-19 pandemic has accelerated e-learning exponentially, e-learning has been used as a tool to facilitate 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 and 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 the employee's productivity and 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 an extended period of time (Msomi et al., 2016).

Of concern, however, is that e-learning exposes a 'digital divide' as access to devices, data costs, and digital literacy is unequally distributed in communities and embedded in society's socio-political powers (Isaacs, 2020). The learner, and learning, are often peripheral in e-learning, and the user may not be regarded as an individual but more as a neutral user, 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 literature review thus explores public sector e-learning components, outlines case studies in the public sector, identifies the policies that drive e-learning uptake in the public sector, and highlights the importance of strategic planning for e-learning.

E-learning in the public service sector

The public requires the public service to be agile, user-centered, transparent, secure, and data-driven; thus, its employees need to continuously learn digital skills on the job. UK research on upskilling in the public sector shows that public servants are not equipped with the skills and competencies needed to solve complex problems in the digital age (Guay, 2019). The study recommends that the public sector academies teach public sector employees new digital skills. The UK's Government Digital Service (GDS) Academy has launched a training school for public servants focused on computer science, user-centered 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 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 including the functioning of the public service concerning 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 its employees. The National School of Government (NSG) is responsible for training the public sector by designing learning and development of training programmes that are responsive to the country's needs. The departments involved in the conceptualisation of e-learning in the South African Government include the NSG, DPSA, Office of Government Chief Information Officer, State Information Technology Agency, 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. In 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 an initiative of the DPSA to build an honest, capable, and developmental public service. The course is compulsory for anyone that would like a promotion to the senior management service (Interviewee no. 2, NSG, 2020). The NSG also introduced more online courses in April 2020 for self-registration and enrolment. (Interviewee no.2, NSG, 2020)

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

The past 30 years have witnessed a constant expansion of digital skills and educational technology policy making worldwide, with technology-enhanced learning often presented by researchers and policymakers 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 crucial to consider 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 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, and 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 various government departments

have provided other enabling legislative and policy frameworks 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 total participants in the global community (DoE, 2004).

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 its strategic plan drawing on the policy and guidelines on e-learning in the public sector document (Msomi, 2016). PSETA published its 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 that is delivered, supported and assessed through 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 of the Skills Development Provider.

The PSETA intends 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 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 ensure 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 comprehensive set of guidelines for capacity building 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 for 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 use 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 expected e-learning outcomes. This aligns with the Department of Public Service and Administration E-learning Policy Framework (DPSA, 2015). This e-learning policy serves two primary 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.

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

Future possible solutions can be reimagined for the South African public service sector by understanding past challenges and gaps in training policies and e-learning practices within the public service sector. 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 the lack of 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 the

increasing use of information and complex technologies (NCOP, 2002). A South African 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 primarily due to the absence of training strategies for the public service (NCOP, 2002). The public service sector also has to manage protests by the public because of the 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.

Numerous initiatives have addressed the skill challenges and built capacity in local government. However, according to the Public Sector Managers Magazine, these capacity-building programmes generally have a limited impact on the skills deficit. These programmes may have filled short-term capacity shortfalls, but pre-evaluation shows that minimal skills transfer took place for various reasons (Anon, 2020). The challenges of skills shortages and mismatching persist in the public sector to the detriment of service delivery. This leads to the problem of poor performance due to the lack of competencies required for public sector jobs (Mohlomi & Mutereko, 2019).

According to Mohlomi and Mutereko (2019), little is known about how training and development within the South African public sector occur, and the factors that contribute to its successful implementation are 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 assessing 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.

In South Africa, many government departments focus on developing 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 aims to digitalise all operations (Department of National Treasury [DNT], 2018). This digital transformation and integration for e-governance require specialised training and the 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 of experience in the Department. The study evaluated the implementation of training and development within the Department (Mohlomi & Mutereko, 2019). During this case study, participants were asked if training needs analysis was conducted in their Department. Of the participants, 16% said no training analysis was conducted, 34% were unsure, 34% agreed, and 16% agreed strongly that training needs are analysed (Mohlomi & Mutereko, 2019).

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 training method by 44% of public service managers was experiential learning. This implies that the public service managers preferred the process of learning through experience, thus learning through the reflection of doing. According to the Government Communication and Information System (Government Communications and Information Systems [GCIS], 2020), which surveyed 1

526 participants, public service managers felt that team learning, departmental learning forums, and online courses are ineffective teaching-learning methods. Figure 6 outlines the methods of learning the participants felt were most effective for their individual needs. Only 4% chose online courses as the most effective learning method. 44% indicated that practical and applied problem-solving learning with expert input was the preferred learning method.

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. This study was critical because 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 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 and assess the success of the capacity building and skill development of the public servants (Dessler, 2006).

RESEARCH METHODOLOGY

The research was undertaken over a twelfth-month period, from September 2020 to September 2021, and involved five main phases. Figure i is a diagram that outlines the roadmap of this research. Phase one comprised the inception and orientation of the project. The second phase of the research involved desktop research on e-learning, including a literature review and an analysis of relevant public service sector documents, reports, and policies on e-learning practices within the public and private sectors. This contextual profile of the e-learning practices in the sector enabled the structuring of the public service e-learning system as an activity system, focusing on implementation processes of e-learning and previous and current challenges.

Phase three included data collection in the form of interviews. Twenty-seven invitations were sent to possible interviewees to various stakeholders in the e-learning Public Sector system. The purpose of the interviews was to understand better the e-learning processes, implementation, and change drivers. All the interviewees were involved in the e-learning uptake of the public sector directly or indirectly.

Phase Four consisted of data analysis. The cultural-historical activity theory is used as a system of analysis to understand the challenges and complexities of the public e-learning systems, identify the stakeholders and role players, understand their interests and interactions, and 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 this project should answer. A video presentation summarising the report findings is also available on YouTube (https://youtu.be/GPA6g_DV_1s).

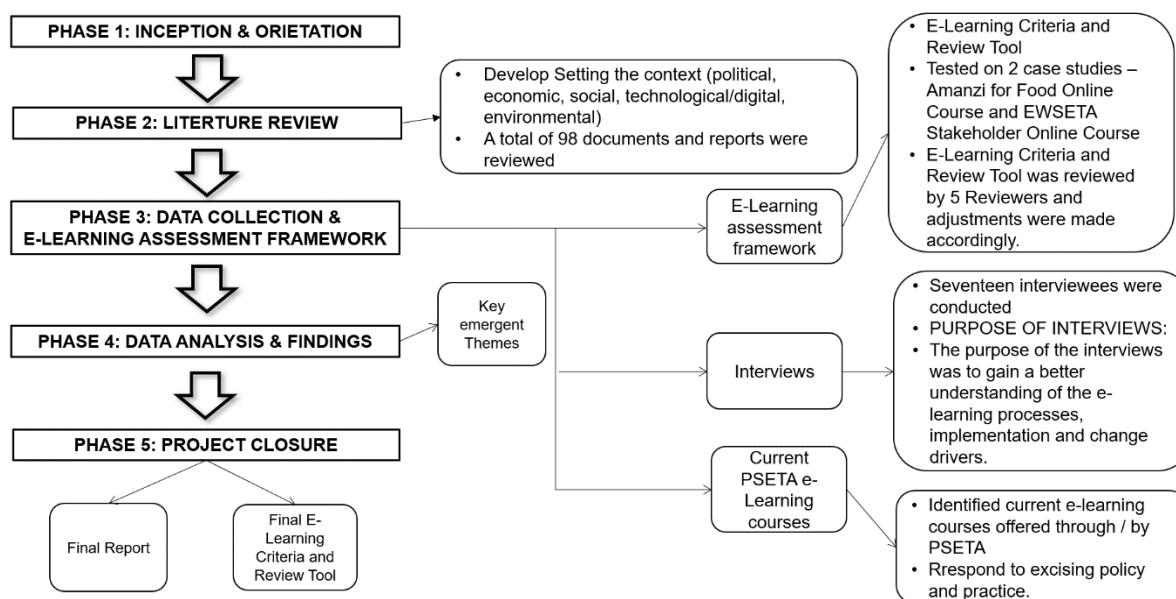


Figure i: Outline of the project research process

DATA ANALYSIS AND INTERPRETATION

These results were compiled from the interviews with the research participants and the literature review. This section focuses on understanding the public sector learning and training innovation system better and analysing the change drivers, the difficulties, and contradictions that transpired in implementing e-learning programs in the South African public service sector. To identify the challenges and contradictions within the e-learning system, one must see all the components and actors within the system. Below is a diagram outlining the components and actors within the system and how these are connected to the PSETA e-learning system (Figure ii).

Digital transformation in the public sector is a priority for the government and a driver for training within the public sector (PSETA, 2020a). The system's social-political and e-learning drivers include the specific policies and government agencies that play an essential role in the success of the public sector learning and training system implementation of e-learning. The National Development Plan for South Africa states that by 2030, the government will make extensive use of Information Communication Technology (ICT) to engage with and provide services to citizens. The South African National Development Plan identifies information and communication technologies as a “critical enabler of economic activity” and an essential tool to fight against poverty. 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 comprehensive set of guidelines for capacity building to respond to the varying needs and requirements to capacitate public service sector employees utilising e-learning as a capacity-building tool. The service e-learning policy framework provides guidelines for 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 use e-learning for capacity building and coordination. The PSETA e-learning policy and PSETA e-learning guidelines published in 2020 are also essential tools that inform the implementation of e-learning within the public service sector. These include the Public service policy on e-learning framework, PSETA e-learning Policy, PSETA e-Learning Guidelines, and DHET Open Learning Policy (DHET, 2017; PSETA, 2020b). Strategic plans and implementation plans include The National Development Plan, New

Growth Plan, White Paper on Post-School Education and Training, National Skills development Plan, Human Resources Development Strategy for SA towards 2030, Public Service Human Resource Development Strategic Framework, Medium Term Strategic Framework, Disaster Management Act Amendment of Regulations (PSETA, 2020a, 2020b).

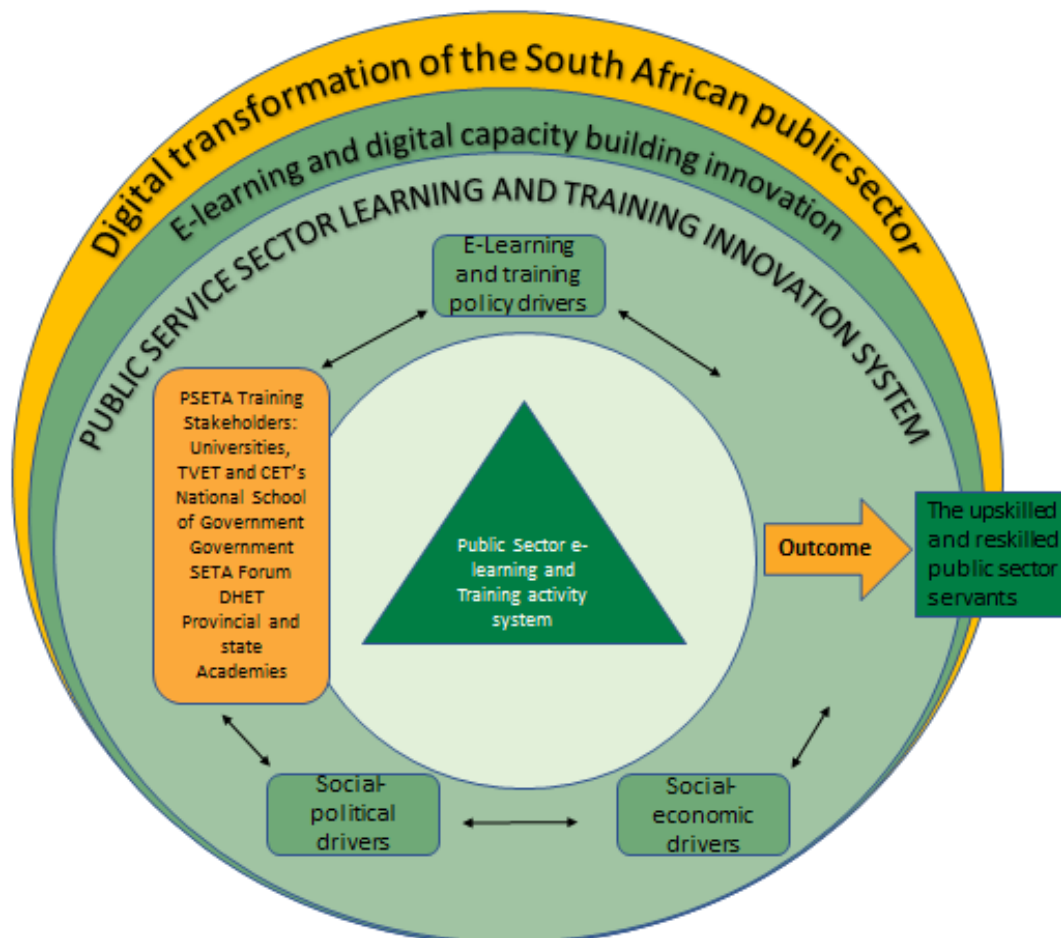


Figure ii The South African public service sector learning and training innovation system. (Adapted for this study from Aerni, Nichterlein, Rudgard&Sannino, 2015, p. 834)

Two main social-economic 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 the public sector's training methods. In response to the pandemic, Lockdown was a massive shock for the training sector; South Africa's public sector's learning methods had to change, often from talk and chalk to blended and online learning. However, the pandemic has also provided opportunities 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.

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 impacted the 56 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 cost-effectively and efficiently. However, the transition has been slower than predicted. 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 ICT 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 departments 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 (Interviewee no. 2). Various online courses became available for public sector employees (Interviewee no. 3). Other drivers mentioned by the respondents included the PSETA e-learning policy and guidelines, as previously discussed, e-governance strategy and the availability of smartphones.

Historical review of the public sector-learning and training activity system

Historically the activity system has changed drastically. Mainly, the mode of delivery has changed the way learning, and teaching processes occur. The system's rules were updated, policies were revised to include e-learning, and ICT training was implemented. Policies implemented that included ICT skills and e-learning from the White Paper on E-Education in South Africa (Department of Education, 2004), the National e-Government Strategy and roadmap (Department of Telecommunications and postal services, 2017), and PSETA e-learning policy, guidelines, and assessment framework (2020a, 2020b, 2021).

The mediating tools also changed from face-to-face courses with manuals to online learning with Learning Management Systems. The delivery and knowledge dissemination method also needed to be updated. Since the 1970's ICT (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 (Charbonneau-Gowdy, 2018). The community adapted, and the trainer's role shifted to include more tutoring and facilitation. The trainers needed to rethink their pedagogical approach and training materials. Where communication and learning used to take place face to face, trainers need to make more effort to ensure the success of courses via digital communication and facilitation. The subject's role has also historically changed from where training was provided face to face, and skills required to complete most job tasks did not include any digitised processes and equipment (Interviewee no. 5). With the e-government approach, the subject requires not only to be digital literate but also competent to work with specific e-governance programmes and equipment. The subject requires a lifelong learning approach as the knowledge and skills are changing rapidly. The object of the activity system has also changed as many Government Departments are focussing on the development of e-Governments (NPC, 2020). The outcome has transitioned and focuses now on ICT skills to ensure e-Government for the future. It is evident that the public sector training system's objectives and components are transforming rapidly, which can also lead to contradictions within the system.

Public sector e-learning and training activity system analysis

The PSETA and other private sector training institutes are involved in the e-learning innovation of the activity system and act as actors or subjects of analysis and intervention (Engeström, 1987). When interviewed, a DPSA government official said that the public sector has coordinated with the private sector in terms of consultation in the past, but no

formal partnerships were formed. When the National School of Governance had its first e-learning indaba, ETD specialists from Absa were invited to see how they do compulsory training by means of e-learning (Msumi et al., 2018). 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, and TVET.

Figure iii outlines the Public sector learning and training activity system, which informs the analytical framework. Taking a closer look at the public sector learning and training activity system allows one to understand better the goals of e-learning in the public sector training setting and in a way that includes all of the major constituents and the influence of social and cultural norms, values, language, and tools (Jonassen, Tessmer, & Hannum, 1999).

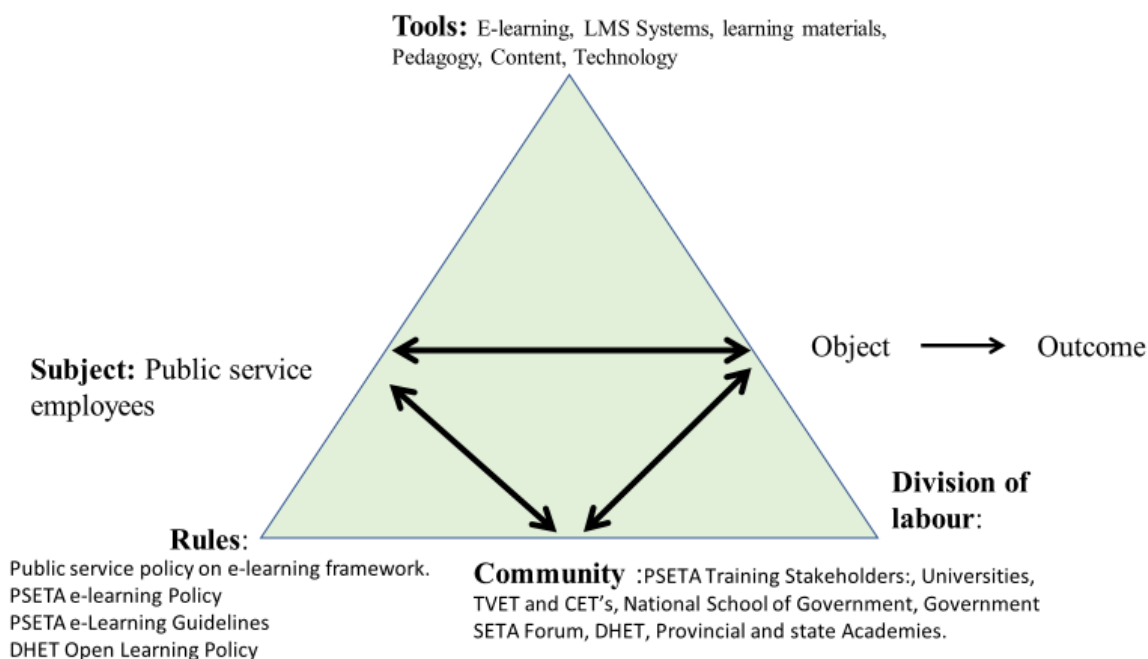


Figure iii Public Sector e-learning and training activity system adapted from Engeström, 1987:78)

The rules of the activity system are structured by the South African Government, DPSA and PSETA. PSETA must also comply with all the constitutional and policy mandates. Competency development is driven by strategic plans such as the National Skills Development Plan. The activity system's courses and assessments are governed by PSETA, which guides the syllabus through the South African National Qualifications Framework.

The community comprises the public and the individuals who expect service delivery from the public sector. Division of labour involves PSETA and Public Sector management that develops e-learning pathways to upskill and reskill the public servants and provides support and focuses on knowledge dissemination. Public servants need to train themselves and learn and apply new knowledge and skills to provide better competent services to the public. The users are all different in the public sector, and their learning needs can also vary. The digital literacy level of the user needs to be taken into consideration and e-learning content needs to be adjusted accordingly. Stoffregen (2017) states that not understanding the socio-cultural background of users can hamper the e-learning process in public administration and needs to be taken into consideration.

The tools are the e-learning platforms, curriculum and e-learning materials, and content that assist the subjects in completing the object of the activity and reaching the set goals of the activity system. E-learning platforms such as Online Course Websites, Learning Management Systems such as LearnDash, mobile learning applications, zoom, WhatsApp, and other e-learning platforms are tools that aid in the delivery of the object. Teaching and learning practices also contribute to the success of e-learning teaching and learning practices. Blended learning and teaching are essential tools that enable and support the move from traditional 'teacher-centered' teaching styles to more 'learner-centric' methods. Peer e-learning can also play an essential role in the public sector training and reform process (Andrews & Manning, 2015)

The object of the Public Sector Learning and Training activity system is to provide excellent demand-driven needs and competency-based education and training that responds to the public service delivery and socio-economic needs. The system also supports 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). Integrating e-learning into the public sector training system adjusts the object of the system slightly as e-learning opens up new ways to co-produce knowledge, thereby valuing broader 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, and efficient manner, thus increasing the service delivery of the government overall in South Africa. In order for the object of the activity system to become a reality, various e-learning barriers and challenges affecting the Public Sector need to be considered. These barriers and contradictions are discussed in the next section. Engeström (1987) noted that within this model of process, a variety of things such as the community, rules, tools, and division of labour could impact the object of activity and the outcome of an activity. As the activity system becomes fragmented by its inner contradictions, the initial object of the activity can get blurred or lost.

Contradictions within the system.

Through the interviews and discussions of the study's participants, it became clear that there are contradictions within the system that affect the success of e-learning within the public sector. These contradictions are discussed below.

E-learning as an abstract concept versus e-learning as a responsive training tool.

E-learning was intended to be articulated across the whole public sector; however, e-learning as an abstract concept needed to be taken up and translated by the trainers and management within the system. Ly (2012) reported that e-learning could be disorienting and daunting for first-time participants. Some participants struggle to adapt to the new way of learning. The review of Public Service Managers showed that only 4% of them felt that online course training is an effective learning method. Bowman & Kearns (2007) also identified that the negative attitude toward e-learning could affect the participant's progress and participation. However, as identified during this study, even the trainers who have to transition from face-to-face to digital are also not always ready for the transition.

"The mindset of the people affects their uptake of e-learning."

"Trainers think that e-learning will take away their jobs and do not see it as a tool to enhance learning."

"In some cases, the e-learning trainers just think you should dump huge amounts of content into a space for participants to access. E-learning platform should facilitate learning and be used by trainers in that way."

"Trainers are not equipped with the necessary tools to implement e-learning pedagogy."

The infrastructure required for e-learning versus infrastructure available for e-learning

The infrastructure elements required for e-learning to be supported everywhere at any time include High-speed connectivity, Data privacy, and security; High-speed Wi-Fi; High-quality, low-cost devices. Tools suggested by respondents to complement the e-learning infrastructure include 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. However, these tools are not always available, and other options to complete the training online are needed.

Community: Stakeholder implementing strategy vs. uptake and creation of digital mindset.

Creating a digital mindset in the public sector to achieve South Africa's digital transformation and e-learning uptake goal is a challenge and requires a sound strategic approach looking at a learning landscape in a broader sense. For the e-learning uptake to be successful, stakeholders that are part of the community should not see e-learning as a policy and strategy but as a way of life and focus on the community's digital literacy as this is a challenge from National down to each individual within the public sector.

"Developing e-learning strategies and skills are an imperfect work in progress; there is always room to improve."

"Many employees know how to use a smartphone to message and browse social media, but they do not know how to use smartphones to search for topics, find a job, answer an email or any of those skills."

"Computer Literacy is still a challenge for most public sector departments."

E-learning as a technical tool or a pedagogical extension.

Understanding and implementing an e-learning pedagogy is essential for the success of e-learning, but it has been identified as a contradiction within the system. There should be a shared conceptual understanding of the integration of ICT into teaching and learning. A framework for lecturer competency and skill in ICT is needed. The DHET is working on such a framework (Interviewee no. 5). However, e-learning should not be seen as replacing the trainer, only extending and complementing the trainer's pedagogy.

"Digital tools should not let trainers think they can now do nothing. They still have to follow sound pedagogical learning and teaching processes."

"Much research in e-learning pedagogy and how this can assist in the implementation of e-learning policies are needed."

Subject's digital skills vs. subject's digital literacy information and technology communication skills.

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

Romania, also revealed interesting feedback from the participants on their experience of adapting from the traditional delivery mode to a blended learning delivery mode (Harescu, 2012).

The factors that played a role in the participants' assessment of online learning to be of medium difficulty where the lack of familiarity with e-learning platforms and the time they had to invest in the course.

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 login issues. Instructional videos were made to train participants to navigate the site and use the e-learning platform. It is essential for the trainers to have digital skills. The Department of higher education provides a course to train lecturers and trainers in e-learning and digital skills. (Interviewee no. 5).

Time for face to face courses vs. time for online courses

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

“Everything takes 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. It took us five years to really develop our Open Source Learning Platform where it is now accessible for everyone.”

“There is never enough time to perfect e-learning practices and we build as we go, especially with Covid-19.”

The expectation for online courses versus the reality of poorly designed programmes

Lack of administrative support, poorly designed e-learning programmes, and incompetent facilitators are the main reasons participants are not successful in e-learning (DHET, 2020). The course designer must have a clear and sound understanding of designing the course, adding the content, and maintaining the course. He or she will also have to work with the Company that hosts and develops the site.

“We train the trainers to develop sound e-learning material. However, an e-learning course needs facilitators, administrators, subject matter experts, course designers, and graphic designers. There are many factors to consider in the process of developing a successful e-learning course.”

“A poorly designed course or trainers that are themselves not familiar with the e-learning platform can be disheartening to participants and lead to failure and disengagement from the participants' sides.”

E-learning needs of the public service sector versus needs of the public servants

PSETA focuses on the transversal skills and functions comprising 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. However, the needs of public servants

are not always identified correctly. There are different needs within the public service sector. A needs analysis is required to understand e-learning requirements. A well-planned learning and skills strategy is imperative as it gives clear directives. A learning and skills strategy includes guidelines on how learning programmes are delivered. The strategy was developed according to e-learning policies and the PSETA skills development plan.

Respondents identified essential skills required for specific roles in developing and presenting e-learning training programmes within the public service sector. Respondents in executive and managerial roles noted the following skills in high demand: learning new technologies, project management, needs analysis, and online facilitation. Pedagogical expertise and course designing skills requirements 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 essential to a certain extent. Assessors and evaluators felt that the needs analysis and online facilitation are essential skills needed. To summarise, all respondents stressed the needs analysis and online course facilitation skills as essential expertise. Respondents recommended that soft e-learning 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.”

“With a willingness to learn, people can get far with online learning.”

For e-learning to succeed, 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. 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 the national level of prioritising digital skills development, DHET might need to lead initiatives or partner between ministries to optimise synergy in this respect.

E-learning pedagogy versus implementation pedagogy

Education and training delivery, especially in the context of the public service sector, is not necessarily institution-based; it 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 context or setting and be delivered in various modes. 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 an exclusive reliance on traditional contact and paper-based technologies (interviewee no. 3, 2021).

From the interviews, it was clear that the National School of Governance also hosts self-paced e-learning courses online and various training capacity-building initiatives for executives in the government. An example of a virtual training initiative is the Economic Governance Winter School, which consists of five themes developed specifically for national government ministers and provincial mayors. The course was run on Zoom and led by subject experts with additional training material.

In terms of pedagogy and mode of delivery, in an interview with a director of the National School of Governance training department, it was emphasised that various e-learning methods were used to ensure that learning needs were addressed and knowledge sharing and capacitation occurred. Even smartphones 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, an online pedagogy needs to be outlined and implemented (DHET, 2020).

The barriers and challenges in implementing e-learning in the South African public service sector

The above contradictions are based on interviews, specific barriers, and challenges that the activity system is experiencing. The public service sector experiences common challenges such as infrastructural constraints, demographic divides, staffing issues, organisational issues, a vast differentiation of learners based on social and economic inequalities, and slow change from traditional forms of pedagogy. The sector also experiences other challenges such as too many employees to be trained in short periods, lack of resources, inadequate curriculum design, shortage of ICT skills among employees, and lack of e-learning platforms.

The challenges that the respondents identified during this study include on a 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 requirements

The challenges face on a Provincial level include:

- Poor access to technology in 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 ICT

The challenges identified by the analysis of contradictions and discussion with interviewees that the individual public service sector employees are facing include:

- Obtaining the correct technology to participate in an e-learning programme
- Digital literacy
- Accessibility including internet connectivity and bandwidth
- Time
- Resources
- Attitude towards e-learning
- Technology adoption

DISCUSSION

This study aimed to identify specific contradictions and challenges experienced on a National, Provincial, and individual level within the public sector e-learning and training system. 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 public service sector training system has undergone a drastic transition within the last 20 years to keep up with new policy and service demands. The mode of training delivery and skills required by public servants have drastically changed from working with paper and motorised equipment to digital paperless record systems and automated e-government systems.

This study shows 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. Even though e-learning is available for training in the public sector, the uptake of e-learning as a training tool is not as expected due to the processes from conceptualising to contextualising e-learning. Another factor is that 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 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 policies mentioned.

The PSETA development plan includes upgrading infrastructure to improve the public sector's digitalisation and e-learning application. However, at the moment, other solutions that are available need to be utilised, such as making all training platforms data-free or zero rated. E-learning programmes can then run on a national level, and Wi-Fi and low connectivity infrastructure challenges can be minimised. Plan online contact sessions 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.

Another contradiction identified is that one cannot implement policy without integrating the policy into the community's mindset. A National digital mindset is needed to improve e-learning uptake and improve digital skills development. A National campaign on e-learning and digitalisation to inform the public sector of the positive aspects of this training platform can also support the overall uptake of e-learning. Focus on digital literacy is essential. Therefore a module on digital orientation and digital literacy skills to ensure public servants are familiar with and have the digital literacy levels to complete the e-learning training programme and perform their tasks successfully. This study addresses the idea that e-learning is a replacement for teaching instead of a pedagogical extent of the trainer. Therefore, it is essential to ensure that the public servant participants and the trainers are upskilled to better understand e-learning as a pedagogical process and learning framework. Poorly designed courses developed by trainers who are unsure or not familiar with the Learning Management System and e-learning pedagogy are also factors that affect an e-learning programme's success rate. During this study, it became evident that even though many public sector servants are digitally skilled in basic computer skills and mobile phone use, they lack the digital literacy and ICT skills required for the public sector, including the e-governance system. Support and training are essential.

CONCLUSION AND RECOMMENDATIONS

The objective of the public service sector learning and training system is to provide excellent demand-driven, needs- and competency-based education and training. This training 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. The public service sector has leaped in e-learning, and various components are already working towards successfully implementing 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. The need to upskill the public service sector has become increasingly evident for the government to provide services and 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.

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 tools 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. 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 of digital literacy at all levels, and workable data-free smartphone friendly training and communication platforms.

REFERENCES

- Aerni, P., Nichterlein, K., Rudgard, S., & Sannino, A. (2015). Making Agricultural Innovation Systems (AIS) work for Development in Tropical Countries. *Sustainability (Basel)*, 7(1), 831–850. <https://doi.org/10.3390/su7010831>
- Anderson, B., Brown, M., Murray, F., Simpson, M., & Mentis, M. (2006). Global Picture, Local Lessons: e-learning policy and accessibility. Ministry of Education.
- Andrews, M., & Manning, N. (2014). A study of peer learning in the public sector: Experience, experiments, and ideas to guide future practice. Effective Institution Platform.
- Anon. (2020). Addressing the skills mismatch in the public sector. *Public Sector Manager Magazine* October: 40-42. Available at: https://issuu.com/topcomedia/docs/psm_october_2020digital
- Bertelsen, O. W., & Bodker, S. (2003). Activity theory. In J. M. Carroll (Ed.), *HCI models theories, and frameworks: Toward a multidisciplinary science* (pp. 291–324). Morgan Kaufmann., retrieved from <https://doi.org/10.1016/B978-155860808-5/50011-3>
- Bowman, K., & Kearns, P. (2007). E-learning for the mature age worker. Department of Education, Science and Training., retrieved from http://flexiblelearning.net.au/wp-content/uploads/Report_Mature_Aged_Workers1.pdf
- Brolpito, A. (2018). Digital skills and competence, and digital and online learning. European Training Foundation. ETF.

- Charbonneau-Gowdy, P. (2018). Beyond stalemate: Seeking solutions to challenges in online and blended learning programs. *Electronic Journal of e-Learning*, 16(1), 56–66.
- Cole, M., & Engeström, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 1–46). Cambridge University Press.
- Davydov, E. E. (1999). The content and unsolved problems of activity theory. In Y. Engeström., R. Miettinen & R. Punamäki (Eds.). *Perspectives on Activity Theory* (pp.39-52). Cambridge University Press., retrieved from <https://doi.org/10.1017/CBO9780511812774.004>
- Department of Education. (2004). White Paper on e-Education. Transforming Learning and Teaching through Information and Communication Technologies. Staatskoerant, 2 September 2004. No. 26762. South Africa
- Department of Higher Education and Training (DHET). (2017). Open Learning Policy Framework of Post-School Education and Training. Government Gazette, 7 April 2017. No.40772.
- Department of Higher Education and Training (DHET). (2021). National Open Learning System Content Review / Moderation.
- Department of Public Service and Administration (DPSA). (2015). Policy and guidelines on eLearning in the public sector, ver. 5.0
- Department of telecommunications and postal services (2017) Electronic communications and transaction Act, 2002 (Act No 25 of 2002) National e-Government strategy and Roadman. *Government Gazette*, 10(November No), 41241.
- Dessler, G. (2006). *A Framework for Human Resource Management*. Pearson Education.
- Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. Orienta-Konsultit.
- Engeström, Y. (1999). Activity theory and transformation. In Y. Engeström, R. Miettinen, & R. Punamäki (Eds.), *Perspectives on Activity Theory* (pp. 19–52). Cambridge University Press. <https://doi.org/10.1017/CBO9780511812774.003>
- Gatimu, K. (2008). Learning policy-making processes: An evidence-based application at Kenyatta University Marsabit Distance Learning Centre. Available at: <http://www.saide.org.za/Portals/8/Kenyatta/kenyatta.pdf>
- Guay, J. (2020) Overcoming the challenges. Available from https://apolitical.co/en/solution_article/public-servants-need-digital-skills-heres-how-to-teach-them
- Halverson, L., & Graham, C. (2019). Learner engagement in blended learning environments: A conceptual framework. *Online Learning*, 23. Advance online publication. <https://doi.org/10.24059/olj.v23i2.1481>
- Hanekom, P. (2020). Covid-19 exposes South Africa’s digital literacy divide. *Mail and Guardian*. 8 September 2020. Available at: <https://mg.co.za/opinion/2020-09-08-covid-19-exposes-south-africas-digital-literacy-divide/>
- Hartescu, I. (2012). A case study of implementing blended learning courses in public administration. Conference Paper. The 8th International Scientific Conference eLearning and Software for education. Bucharest, Romani. April 2012.
- HSRC. (2019). Key Skills Issues in the Public Service Sector: Change drivers and their impact on skills development. HSRC.
- Isaacs, S. (2020). EESSA Conference. In *Rethinking Learning and Teaching Under COVID-19 & Beyond Emerging Approaches to Remote and Digital Learning in Africa*
- Jackson, M. C. (2003). *Systems thinking: Creative holism for managers*. John Wiley.

- Jonassen, D. H., Tessmer, M., & Hannum, W. H. (1999). Task analysis methods for instructional design. Erlbaum.
- Kozma, R. B. (2008). Comparative analysis of policies for ICT in education., In J.Voogtand G. Knezek (Eds), *International Handbook of Information Technology in Primary and Secondary Education* (pp. 1083-1096). USA: Springer.
- Ly, N. (2012). E-learning in local government. Australian Centre of Excellence for Local Government.
- McGee, E., & Poojary, P. (2020). Exploring blended learning relationships in higher education using a systems-based framework'. *Turkish Online Journal of Distance Education*, (October), 1–13. <https://doi.org/10.17718/tojde.803343>
- Mohlomi, N., & Mutereko, S. (2019). Training and Development in the Public Sector: A case study of a provincial department in KwaZulu-Natal. Available from: [/www.researchgate.net/publication/333292758 Training and Development in the Public Sector A Case Study of a Provincial Department in KwaZulu-Natal](http://www.researchgate.net/publication/333292758_Training_and_Development_in_the_Public_Sector_A_Case_Study_of_a_Provincial_Department_in_KwaZulu-Natal)
- Msomi, A. P., Munapo, E., & Choga, I. (2016). The conceptualisation of e-learning in the public sector. *Problems and Perspectives in Management*, 14(4), 41–53. [https://doi.org/10.21511/ppm.14\(4\).2016.05](https://doi.org/10.21511/ppm.14(4).2016.05)
- National Planning Commission (NPC). (2020). Digital Futures: South Africa's digital readiness for the fourth industrial revolution. Available at: <https://www.tralac.org/documents/resources/by-country/south-africa/3902-draft-digital-futures-south-africas-digital-readiness-for-the-fourth-industrial-revolution-npc-july-2020.html>
- National School of Governance (NSG). (2020). Media Release: National School of Government on online courses for public servants during Coronavirus COVID-lockdown. Available at: <https://www.gov.za/speeches/national-school-government-online-courses-public-servants-during-coronavirus-covid-19>
- NCOP. (2002). Skills Development in the Public Service: briefing by the Department of Public Service and Administration. Available at: uncoordinated nature of education and training
- Neumann, K. (2013). 'Know why' thinking as a new approach to systems thinking. *Emergence*, 15(3), 81–93.
- Oblinger, D. G., & Hawkins, B. L. (2005). The myth about e-learning. *Educause review of Roy Bhaskar's Onto-axiological Chain. Journal of Critical Realism*, 16(2), 163–183.
- Paterson, A. (2008). Training in the South African public sector. Human resources development review 2008: Education, employment and skills in South Africa. Available at: <http://www.hscrepress.ac.za/product.php?productid=2218&cat=1&page=1>
- PSETA. (2020a). PSETA e-learning policy. Document Reference: COO/ETQA-EL/01
- PSETA. (2020b). PSETA e-learning Guidelines. Document Reference: QAP/E-L/01
- PSETA. (2021). PSETA Research Report. E-learning assessment framework for the public service sector.
- Stoffregen, J. D. (2017). Barriers to open e-learning in public administrations. Unpublished Ph.D. thesis, University of Jyväskylä
- Stoltenkamp, J. (2012). Show-casing indicators to a changing organizational culture through the development of an integrated learning model: Indications of a changing organizational culture at the University of the Western Cape (UCW), *Problems of education in the 2nd century*, 39, pp. 145-159.
- Sumberg, J. (2005). Systems of innovation theory and the changing architecture of agricultural research in Africa. *Food Policy*, 30, 21–41. <https://doi.org/10.1016/j.foodpol.2004.11.001>