

Reconceptualising an e-Learning framework for South African public sector training

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ABSTRACT

Reconceptualising an e-Learning framework for South African public sector training

The emerging knowledge economy necessitates rapid skills development, to ensure that organisations sustain a competitive edge. Rapid skills acquisition would enable organisations, whether public or private sector, to take advantage of new emerging opportunities and improve performance by ensuring that their employees are well equipped with relevant skills. The South African labour market has, however, been engulfed by both a skills shortage and a brain drain, which has worsened performance in the public sector – as is evident from the widespread public protests. In this study, the researcher conducted an explorative investigation to gain an in-depth understanding of factors that could influence e-Learning diffusion as an innovative way of facilitating rapid skills acquisition.

In order to conduct this investigation, the researcher employed qualitative techniques in the form of a case study, using grounded theory analysis techniques. Grounded theory analysis results enabled the researcher to formulate propositions. Furthermore, these propositions were used to formulate important factors and questionnaire items that were used to test proposed findings, using a survey research design.

Findings revealed that the public sector, as with society at large, is adopting socially-orientated computing practices, to open up social platform integration into the employee learning experience. Findings reveal that social platform integration would be fruitful, if the entire instructional design was based on social constructivist, epistemological principles, with the appropriate social technology.

Keywords: Socially orientated instructional strategy, socially orientated instructional technology, diffusion of innovation, e-Learning, and skills development

OPSOMMING

Reconceptualising an e-Learning framework for South African public sector training

Die opkomende inligtingseconomie vereis die handhawing in die ontwikkeling van vaardighede in 'n organisasie ten einde kompetend te bly. Dit sal organisasies, hetsy in die private- of openbare sektor, instaat stel om voordeel te trek uit die nuwe opkomende geleenthede, hulle werknemers toe te rus met die nodige vaardighede en sodoende hulle posisie in die mark versterk. Soos blyk uit die wydverspreide openbare protesaksies, word die Suid-Afrikaanse arbeidsmark verswelg deur 'n tekort aan beide vaardighede en die uitvloei van kennis uit die land wat weer die prestasie in die openbare sektor verswak. In hierdie studie het die navorser 'n verkennende ondersoek gedoen om 'n deeglike begrip te kry van die faktore wat e-Leer diffusie kan beïnvloed as 'n innoverende wyse in die fasilitering in die verkryging van vaardighede.

Ten einde hierdie ondersoek uit te voer, het die navorser kwalitatiewe tegnieke in die vorm van 'n gevallestudie gebruik, met behulp van gegronde teorie-analisetegnieke. Resultate van hierdie analise het die navorser instaat gestel om stellings te formuleer. Hierdie stellings is gebruik in die samestelling van belangrike faktore en die vraelystitems wat gebruik is om die opname navorsingsontwerp te formuleer.

Bevindinge toon dat die openbare sektor, soos met die samelewing in die algemeen, sosiaal-georiënteerde rekenaarapplikasies aanneem en daardeur die sosialeplatform integreer in die leerervaring van die werknemer.

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STATEMENT

With the signature below, I, Peter L'hlonono Mkhize, hereby declare that the work that I present in this thesis is based on my own research, and that I have not submitted this thesis to any other institution of higher education to obtain an academic qualification.

PL Mkhize 23280468

2013-05-07
Date

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CHAPTER 1

INTRODUCTION TO THE THESIS

1.1 INTRODUCTION

e-Learning is said to be a solution to challenges related to skills training in the workplace, such as travel and accommodation costs, time out from workplace, and other administration costs (Asgarkhani & Zealand, 2004). Common concepts that emerge from many different definitions of e-Learning are: ‘just-in-time’, ‘just-in-context’, ‘flexible’, and ‘collaborative learning’ (Hunter & Carr, 2002; Cross & Hamilton, 2002; Asgarkhani & Zealand, 2004). These concepts seem to be prospect solutions, if applied properly.

In this study, the researcher seeks to understand how e-Learning would be used to facilitate skills training during and after open source migration, cited as one of the skills training mechanisms for open source migration (Department of Public Service and Administration, 2006). In the study, the researcher is investigating a means of making e-Learning work, especially in the fight against skills shortages.

1.2 PROBLEM STATEMENT AND SUBSTANTIATION

After a parliamentary decision to migrate all public sector information systems to an open source platform in 2001, implications involved change and new skills requirements for new systems users (Walker, 2004). The migration project is championed by the State Information Technology Agency (Visser, 2004). Project sponsors and leaders have put skills training initiatives in place, in order to ensure that the new platform is used efficiently and effectively. According to the Public Service and Administration (2006), among other training methods in place is e-Learning, alongside other traditional training methods. However, the researcher’s concern about the open source platform’s rapid development lifecycle, is due to the open source community’s culture of intrinsic rewards for contribution through attribution, that leads to constant improvement of software versions for open source community members to maintain respect (Ulhøi, 2004).

e-Learning is just one of the training methods used to facilitate skills training during and after open source migration. The researcher will focus the investigation on e-Learning

as one of the training methods that will be used, without claiming that, on its own, it is the solution to the skills problem in South Africa. Hence, the researcher could not find evidence to suggest that the South African higher education and training industry, as a whole, is capable of handling the huge skills demand through e-Learning or any other skills transfer mechanism. According to Read and Kleiner (1996), many organisations are faced with the challenge to respond to ever-changing skills demands, attributed to rapid technological innovations, which render traditional ways of doing business obsolete, and thereby forcing organisations to find and implement training methods that allow for just-in-time, just-in-context, collaborative, and learner/employee centric learning environments – which is possible through e-Learning.

In the meantime, the absence of published evidence suggests that at least a certain sector in the South African higher education and training industry is successfully implementing e-Learning, making it difficult to think that e-Learning practices, as they are, would enable just-in-time, just-in-context, collaborative, flexible, lifelong learning. Therefore, this study will investigate ways of optimising e-Learning practices in the public sector, in order to support skills training and development. Otherwise, e-Learning would remain another good concept that might not be practically implementable in the South African workplace, and, that way, miss out on the opportunity to develop capacity to instantaneously respond to an ever-changing, increasing need for technological skills in the workplace.

1.3 AIMS AND OBJECTIVES OF THE STUDY

The aim of this study is to investigate how e-Learning could be used optimally, in the workplace, to facilitate skills acquisition and transfer, in the light of the serious skills shortages reported in the popular press, and, thereby, develop a conceptual model that could stimulate debate, as well as a contribution (both in academia and in practice) to the development and design of effective and efficient e-Learning-based training programmes.

There are three key issues to be explored in this research:

- to define factors affecting e-Learning diffusion in the workplace;
- to evaluate the effect of such factors on instructional technology and instructional strategy, alignment strategy in designing an e-Learning experience; and

- to propose a conceptual framework that could provide guidelines for designing an optimum e-Learning experience in the public sector.

The above objectives will guide the research activities to be carried out by the researcher, in trying to find answers to research questions that are directly aligned to these research objectives. These objectives will be pursued within the confines of research design guidelines.

1.4 RESEARCH QUESTIONS

The research problem indicates that migration to an open source platform in the public sector brings about a skills gap, as government employees would have to constantly learn new application skills due to a rapid change of open source platforms. e-Learning is used as a training tool to facilitate skills transfer during implementation of the migration project (Department of Public Service and Administration, 2006). The following research questions will be used to guide the research process, as some of the questions might be answered by theoretical research, and others by empirical research.

1.4.1 MAIN RESEARCH QUESTION

How can the public sector optimise e-Learning practices during information systems migration, in order to improve skills transfer in the South African workplace, and thereby improve the skill inventory in the labour market?

1.4.2 SUB-QUESTIONS

- What factors are affecting e-Learning diffusion in the South African public sector?
- How do these factors impact on instructional strategy and instructional technology alignment?
- What are the relationships between the proposed framework constructs?

The researcher can foresee that the first two research questions would be answered theoretically by literature. In order to answer the rest of the questions, the researcher will conduct an empirical research, in order to gather detailed descriptive data, so that he can gain an in-depth insight into the research problem.

1.5 RESEARCH METHODOLOGY, DATA ANALYSIS AND ETHICS

In order to answer the research questions in this study, the researcher chose a qualitative approach within the social constructivist paradigm, so that he could gain an in-depth understanding of skills problems in the workplace, and thereby co-create or develop a model with research participants who could provide solutions to some aspects of, if not to the entire problem. Due to a lack of literature and theories that specifically address e-Learning development and design in the South African context, the researcher will apply the grounded theory analysis technique within a case study design (Glaser & Strauss, 1967).

Grounded theory analysis principles will be applied in a case study, in order to generate theory in relation to the above problem statement. According to Charmaz (2003), grounded theory principles are not prescriptive, but provide guidelines for detailed analysis of qualitative data and generation of theory. In applying grounded theory, the researcher would be preparing to conduct data collection and analysis concurrently, because subsequent interview probing is dependent on the analysis results of the previous interview.

The researcher has developed a case study protocol, including an interview schedule, based on the research questions of the study (Remenyi & Williams, 1998). Questions in the interview schedule could change slightly from one interview to another as the researcher becomes more theoretically sensitive, and he will then apply theoretical sampling to find prospective participants who are more likely to give more information or clarity to the question, which might not have been answered by the initial sample (McCallin, 2003). All interviews will be transcribed by a qualified transcriber, and then uploaded into AtlasTI, qualitative data analysis software.

Grounded theory analysis techniques will be applied, by conducting open coding to identify codes as they emerge from data. A bracketing technique will be used to suppress the researcher's preconceived ideas about the researched subject (McGhee et al., 2007). A second step would be Axial coding, that will allow for categorising codes into families in AtlasTI, and then conducting the following interview with new categories in mind. This process will be repeated until data saturation. A third step is selective coding, where code and family networks will be formed, to determine relationships and create a story.

In conjunction with grounded theory analysis, a quantitative survey will be used to test propositions made, after qualitative analysis. The researcher will draw items both from literature and the propositions, and then test the associations between the dependent and independent variables. In order to address the second research sub-question, the researcher would test predictability by performing regression testing.

With regard to ethical issues, the researcher will apply for permission to collect data, from the Director General of Public Administration Leadership and Management Academy (PALAMA), as is the requirement for this department, and ask for permission from the open source migration project manager in State Information Technology Agency (SITA), who also acts as gatekeeper (Hamel et al., 1993). The researcher will comply with the ethical stipulations of each department, to the satisfaction of the participants, as some participants would prefer to remain anonymous, and maintain confidentiality. A letter of informed consent will be given to each participant to sign, with relevant information about their involvement in the study, as well as their rights.

1.6 PROVISIONAL CHAPTERS

The researcher foresees this study being completed within seven chapters. The following chapters will be written:

1. Introduction to the thesis
2. Literature review
3. Research methodology
4. Description of case study
5. Qualitative analysis and results
6. Quantitative analysis and results
7. Recommendation and conclusion

1.7 CONCLUSION

The proposition discussed above is outlined according to what the researcher sees at this stage of the research as activities aimed at successfully completing the study. The research methodology proposed for this study provides the researcher with guidelines and procedures to carry out this study, but it is not adopted as a recipe book or as packaged rules

(Charmaz, 2006). It will be used as long as it enables the researcher to achieve the research objectives as outlined above.

Case study design, as discussed above, will enable the researcher to focus his research activities within a defined unit of analysis, as case study design helps in defining the boundaries of the case. On the other hand, grounded theory analysis techniques allow the researcher to direct, manage and streamline data collection, and further enable him to construct an original analysis of data (Charmaz, 2006).

The researcher hopes that once all research activities for this study have been completed, he will be able to solve the research problem, achieve the research objectives, and thereby answer the research questions. Once the research questions have been answered, the researcher should be able to formulate a conceptual framework that will suggest guidelines for solving whatever obstacles are prohibiting e-Learning, as a training tool, from delivering on what it is capable of facilitating.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Au, Carpenter et al., (2009) argue that the virtual approach ensures that many people from all over can work together on a task, regardless of time or organisational affiliation. This virtual approach forms the basis for open source software (OSS) development. The open source paradigm is gaining recognition as the foundation for information systems of the future, as many big cities and countries in the world have adopted OSS as the basis for their preferred information systems (IS). This is evident in the way countries such as China released a Linux version in Chinese. This is because they felt that relying on Windows was tantamount to leaving the keys to the country's computerised economy in the hands of a potential enemy (Walker, 2004).

Countries such as the UK, Germany and South Korea have already announced the OSS road map, with the aim of developing the local software industry and avoiding lock-in by vendors. The South African (SA) software industry is in a position to prosper, due to the paradigm shift from proprietary software to OSS. This is because local developers will have an opportunity to be involved in the development of OSS, together with an international developer.

However, the change-over process should be coupled with much-needed training in the usability of OSS (Kabbar & Crump, 2006) and change management issues (Smith, 2005). Failure to train employees could result in resistance and rejection of new technology, despite the potential benefits foreseen. The SA public sector is enjoying a diverse composition of its workforce. Response to technology change is influenced by a cultural factor, and effort is required to step up to the challenge presented by the change.

The researcher consulted various literature sources to collect relevant books and articles about the topic. The interrelationships of the concepts identified during the literature survey are explored, and reformulated into a theoretical framework. In order to identify litera-

ture from existing sources, the researcher used a South African publications catalogue (Sabinet) as primary indicator of the availability of relevant books and journal publications, and their location. Google Scholar proved to be helpful in identifying relevant sources and their location. It was also a helpful indicator of contributing authors in the subjects around the concepts, by showing the number of occurrences where each author was *cited*. The researcher used keywords and phrases such as ‘change management’, ‘open source software’, ‘e-Learning’ and ‘e-Learning conceptual framework’. Each of these keywords returned more than 100 article results when used alone – with the exception of ‘e-Learning conceptual framework’ which returned no results from the Sabinet e-Publications. Combinations of the abovementioned keywords returned nothing when the researcher used the “AND” logic operator and searched by keywords.

This is a literature survey chapter – a discussion on the collection of material for the literature review. The researcher will discuss the main concepts that relate to the problem. The first concept is OSS migration, which is discussed in detail. The second concept is change dynamics, as reflected in change management. The third concept is e-Learning. The theory will be critically reviewed.

2.2 LITERATURE CONCEPTS

The literature review provides an insight into the key concepts investigated in this study. Due to a lack of scholarly literature and theories that explain the problem to its full extent, the researcher intends to apply an inductive approach to explore the investigated subject, and then use literature to verify the conceptualisation of the theory that will emerge from the data analysis. This is even though an inductive approach will be used in this study, to gather insight on the underlying philosophy underpinning the concepts identified during the problem statement formulation (Chapter 1).

The researcher will use a bracketing technique to avoid imposition of his preconceived notions, and let concepts emerge from the data (McGhee et al., 2007). The researcher acknowledges that there are different opinions on the relevance and importance of literature in an inductive study, such as grounded theory, that will be used in this study. One of the founding members of grounded theory (Corbin & Strauss, 1990), argues that a literature review stimulates theoretical sensitivity and relevant questioning, and provides sup-

plementary validity, whereas the other founding member of grounded theory (Glaser, 1992) holds the opinion that a researcher should refrain from studying literature until data has been collected and concepts begin to emerge.

McGhee et al., (2007) suggest a continuum to indicate the level of literature review application in relation to the researcher's standpoint towards, and familiarity with, the subject under study. They suggest three positions for a researcher: 'outsider', 'hybrid' or 'insider', where 'outsider' will do literature control to gain an insight into the main concept in the subject of study, and 'insider' would be more familiar with the subject. In the following sections of this chapter, the researcher will conceptualise relevant concepts in relation to the problem statement, in order to develop a conceptual framework before engaging in empirical research.

2.3 CONCEPTUAL FRAMEWORK

In attempting to formulate a theoretical framework that will help in explaining and working out some prediction formula into the solution of the research problem, the researcher struggled to find theories that at least attempted to explain or solve the research problem explicitly (Smith, 2006). The researcher decided to formulate a conceptual framework that would enable him to form a foundation for explaining the extent and complexity of the problem (Mouton, 2002). Some of the theories in the field of teaching and learning, especially adult learning, will be discussed in relation to the application of learning.

The complexity of the problem as defined in the problem statement, requires articulation of the theories and concepts that might even partly attempt to provide solutions to the problem, thereby answering the research question as articulated in Chapter 1. The problem statement cuts across more than one discipline, which means that the researcher will have to familiarise himself with a number of theories – specifically, learning theories, diffusion of innovation, and technology acceptance models. The heading of this section is 'Conceptual framework', due to the fact that the concepts and theories that will be discussed in this chapter are in the middle of a strong categorisation debate, as critiques of each dispute their standing as theories or concepts that explain practical problems (Blondy, 2007).

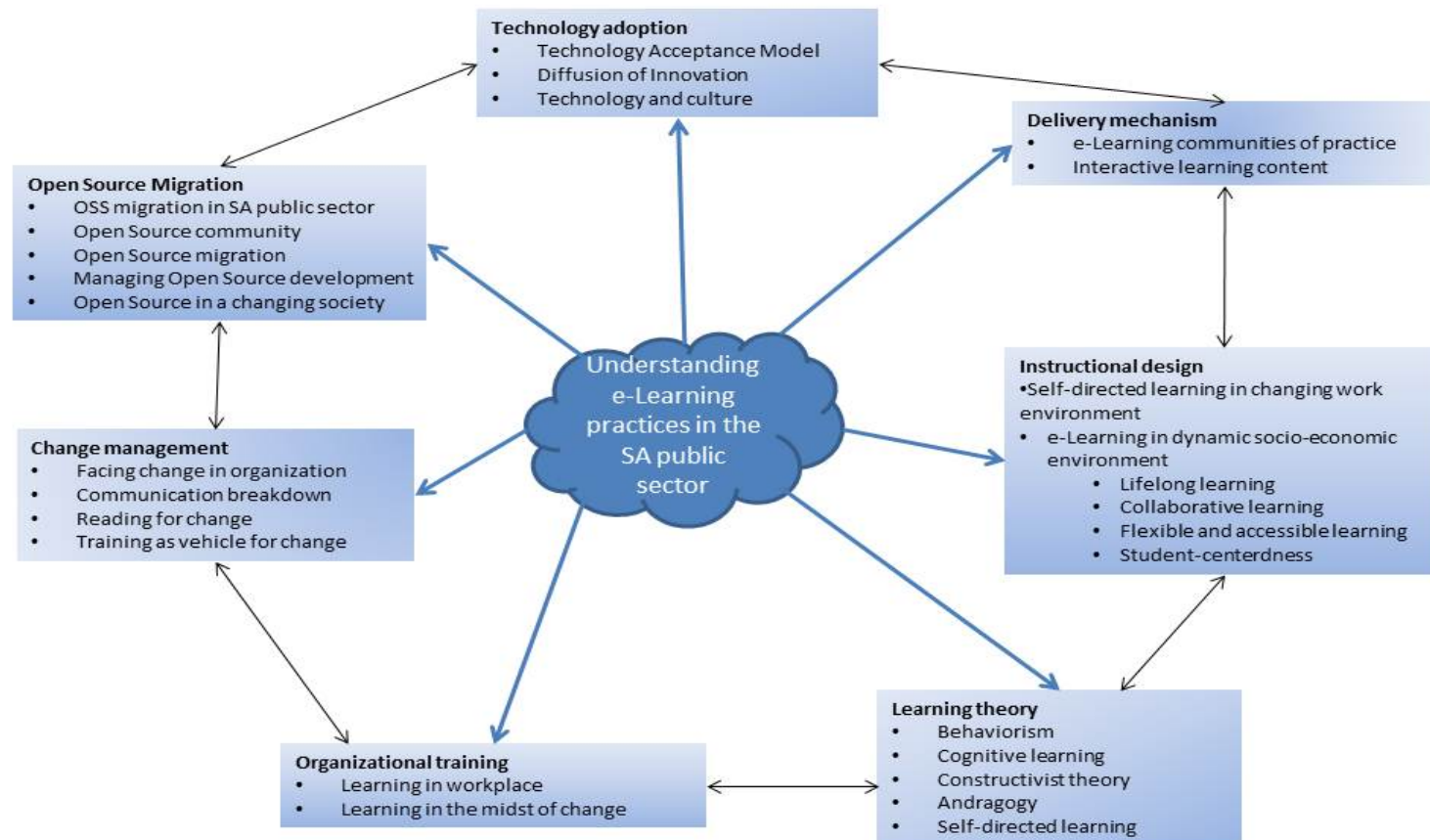


FIGURE 2.1: CONCEPTUAL FRAMEWORK

The main concepts that could be explicated from the problem statement are ‘e-Learning’, ‘open source software’ (OSS), ‘development methodology’, ‘learning theories’, ‘organisational training technology adoption’ and ‘instructional design’, as depicted in Figure 2.1. Some of these concepts are barely developed into theories in themselves. In the context of this study, the researcher intends to conceptualise the development of a conceptual framework that will provide guidelines for the development of an e-Learning based training programme during and after the OSS migration process in the South African public sector (Department of Public Service and Administration , 2006). The following theories or concepts, depending on one’s viewpoint about the maturity of a concept to theory, provide a framework from which the problem could be explained and solved, if possible, or, at least, partly solved.

2.4 OPEN SOURCE MIGRATION

The success of open source migration is partly dependent on understanding what migration means, in terms of systems and processes that should be in place, in order to ensure that the migration process takes place smoothly. This could be achieved by investigating concepts such as ‘open source community’, and ‘managing open source development’, which will be done in the following subsections.

2.4.1 OPEN SOURCE SOFTWARE MIGRATION IN THE SOUTH AFRICAN PUBLIC SECTOR

Ulhøi (2004) defines OSS as free distribution and redistribution of software and source code, open licences that allow the distribution of modifications and derived works, and non-discrimination against persons, groups or fields of endeavour. OSS has gained a considerable market share in the software market, because of its reliability, security and lower cost (Walker, 2004). As a result, many governments around the world (such as China, Brazil, UK, etc.) have made the decision to migrate from proprietary software to OSS, in an attempt to alleviate a burden of debt for proprietary software, and avoid lock-in by proprietary software vendors (Walker, 2004).

Likewise, the SA government has also decided to adopt OSS as a preferred platform for government departments’ and institutions’ information systems (Visser, 2004). This is a

result of a parliamentary suggestion made in the SA parliament in 2001. Then, the Government IT Officers' Council (GITOC) was established, which was commissioned to investigate alternatives and opportunities available for the government (Walker, 2004).

Basically, OSS became an integral part of the SA government's IT strategy, which led to the State Information Technology Agency (SITA) becoming a logical custodian of the OSS migration project. According to Walker (2004), the findings of the investigation into the opportunities of migration to OSS, revealed that challenges regarding the implementation, security and end-user support, were unrealistically high. He further suggests that this should not be a reason to discard the migration process, because benefits of migrating outweigh the challenges, and that GITOC should carry its mandate to ensure that the migration decision is justifiable. GITOC also has to ensure that investment in the development and implementation of OSS, produces returns that will directly contribute to effective and efficient delivery of services in the public sector.

2.4.2 OPEN SOURCE COMMUNITY

In order to model the success of OSS migration, it is important to understand the dynamics of the OSS community. Indeed, the fact that OSS executable files and source code is distributed for free to users, affects the profitability of the work done by software developers. It is, however, a deliberate model of development, even though it might be seen as a threat to the sustainability of the open source community of developers. Sorenson and Takle (2002) assert that sustainment of the open source community of developers is highly dependent on effective management of the development process. The management of the development process should be in line with two values that have kept the open source community of developers going, as suggested by Millar et al., (2005). These are of economic and social value to the community of developers.

Millar et al. (2005) assert that economic value is the lowest motivational factor for innovation in the open source community. Economic value is contrary to the principle of sharing value and culture, kept within the community of OSS developers. OSS developers do not seek financial gain for their creativity, but are bound by the psychological contract that keeps them together and contributes positively to the development project (Garzarelli, 2004).

Meanwhile, social values advocate the principles of shared values and culture, where developers do not expect monetary rewards for their innovative contribution to the software industry. They derive gratification from attribution – the highest reward for their participation in the development of software. Most of the project team members apply their creativity so that they can be recognised by their peers (Garzarelli, 2004).

The open source movement is guided by the principle of sharing. That means sharing source code with the entire industry, so that software development experts can freely access the source code and modify or improve the software (Morgan & Ribbens, 2006). This is unlike proprietary software vendors, who only distribute executable programs without the source code that supports the software. The new open source paradigm provides South African developers with an opportunity to advance their software development careers. South African developers would, for example, be able to share ideas and keep abreast with technological changes and innovations around the world. In this manner, local developers would not have to duplicate work already done, or rewrite code that have been written by their colleagues elsewhere in the world. The only challenge would be to customise the application to suit the functional requirements of the South African public sector.

Members of the open source community seek only intrinsic, not extrinsic, motivation. Intrinsic motivation is not determined by quantifiable physical rewards (Sorenson & Takle, 2002). It is underpinned by trust, shared values, and a professional background that propels developers to dedicate productive time and effort in ensuring that the development projects are completed successfully (Millar et al., 2005). Being a member of the community that has the opportunity to contribute to the shared wealth of innovative movement, is a primary motivational factor that is in direct contrast with the economic point of view. The economic viewpoint advocates pursuing monetary reward for innovative contributions as a motivator, if the project is to be sustainable. However, open source developers gain recognition by means of attribution as an intrinsic reward that opens the market for lucrative projects. Monetary reward does not hold much value in the open source community of developers, as they intend to widely distribute the open source software and obtain recognition as the best developers, so that they can be invited to bigger and better projects.

2.4.3 MANAGING OSS DEVELOPMENT

The economic point of view in issues of software development, is that the project should be carried out behind closed doors, to ensure that freeloaders do not have the slightest chance of copying the source or stealing the idea. Intellectual property is protected by the law (Stairs & Reynolds, 2008). On the other hand, the sharing of ideas among the community of developers is the thrust of the open source movement. Sceptics argue that the open source development model is not controlled, and is so chaotic that it may result in complete disaster.

Open source advocates (Von Krogh et al., 2003) argue for the robustness and dependability of the open source development model. Grodzinsky and Wolf (2008) outline an open source development model that explains how the open source development process is managed by the open source community and factors that influence the project. The following section will discuss the open source development model.

2.4.4 OPEN SOURCE METHODOLOGY

Naughton (2000) compares the OSS development project to the building of a cathedral, where scores of expert programmers are subsumed within a single, grand, overall design. Each programmer is voluntarily bound by a contract to commit his/her innovative ability to the success of the development project. Millar et al. (2005) assert that innovators design and produce innovative work themselves, and freely share with their respective development communities and other interested parties.

According to Ulhøi (2004), the innovation processes among the development groups starts with a creative innovator producing a prototype. The prototype will go through a series of tests and modifications in subjection to the scrutiny of the developers' community. The membership of this developers' group is self-selected, based on self-interest and the desire to be recognised by peer developers. Bonaccoris and Rossi (2004) point out the fact that there is a degree of hierarchical structure within the development teams, even though the roles of the members in the hierarchy are not assigned from the start of the project. However, it is important to have a supervisory structure that will ensure that the project is completed in time.

The supervisory structure for an open source development project is peer-based, and allows members of the group to learn from one another as the development process is progressing to the advanced stages of the software development (Garzarelli, 2004). Different parts of the development are decentralised to skilled contributing programmers within the group of peer-developers. After a series of tests and modifications, the prototype is made available to the community for scrutiny, and released onto the market. The market constitutes everybody who is interested in the new software or new version.

Once the software development is distributed to the users, expert users can initiate another development cycle where they suggest improvements to the current version. MacFarlane (2003) warns that OSS developers do not know about end-users' needs when they develop OSS. However, Ulhøi (2004) suggests that once the software has been released, it is open to modification by anyone interested in the software. The last contributor to the software does not duplicate work done by the peer-programmer. The openness of OSS allows for customisation of the OSS; this is among the underlying philosophies of OSS. The development process is iterative, where any member of the open source community can access the source code of any existing OSS, add new features to the existing OSS, and then subject the new version to the scrutiny of the open source community.

The admission of a new member to the community is always open; anyone can join the project at any stage of the software development, as long as they are going to make a meaningful contribution. This is determined by the project leader, who has the authority in the hierarchy of leadership. The dynamic nature of the OSS development keeps the OSS environment in evolution. This will force organisations that are using OSS, to keep up with rapid changes. Developing countries such as South Africa, and other countries in the South African Development Community (SADC) region, might find the continual change to new versions of OSS challenging, due to the shortage of human capital resources in Africa as a whole (Habiyaemye & Soete, 2009). As rapid changes in the OSS environment occur, users should be willing, and prepared, to keep up with technological change as contingencies in the operational environment. In the following section, open source in the dynamic society will be discussed.

2.4.5 OPEN SOURCE IN A CHANGING SOCIETY

South Africa has been through a transformation process from 1994 to date (2010). Businesses and non-profit organisations led the transformation process through the transformation vehicles such as Affirmation Action (AA) and Black Economic Empowerment (BEE) and, later on, Broad-Based Black Economic Empowerment (B-BBEE) (Denton & Vloeberghs, 2003). This had to be done in a way that is sensitive to socio-cultural, global competition, and political environment characteristics that prevail in South Africa. Consequently, businesses struggled to adapt to new methods of doing business and to new policies and regulations that were passed on to business by the government.

OSS migration is also a policy decision from parliament, in an attempt to alleviate the software debt burden, and, more importantly, to expose South African developers to the global community of developers, and participate in the OSS development project (Denton & Vloeberghs, 2003; Walker, 2004). After 1994, South Africa was re-accepted to participate in world trade; therefore, it was important that South Africa join the information society, and participate in the sharing of knowledge and information between individuals, societies, countries – and even across continents.

The fact that OSS migration was a policy decision for change and improvement, made in parliament, definitely plays a crucial role in the management of the public sector. This ascertains the public sector's preparedness or willingness to transform its IS, as OSS models are different from those of proprietary software (Visser, 2004). As the OSS definition implies, OSS is constantly improved, and redistributed freely to the open source community – even to those who prefer to use proprietary software (Walker, 2004; Ulhøi, 2004). The openness and development of OSS enables South Africa, along with other countries who have adopted open source, to ride the wave of technological innovation that necessitates change in the workplace. This is in line with an attempt to keep up with the change brought about by globalisation, that forces organisations to embrace change. This is done by adopting new business processes and methods, to ensure adaptability, flexibility, responsiveness, decisiveness and speed, in order to remain afloat in the global market (Misra, et al., 2006).

It is important for South Africa's emerging developers to be part of the developers' community, so that they can benefit from sharing ideas with skilled developers from other countries, and thereby remain afloat in the global market (Visser, 2004). Therefore, the

South African software market can be free from vendors' lock-in strategy. In turn, the public sector, and other software consumers, avoid long-term software support contracts that restrict flexibility of implementation (Surman & Diceman, 2005).

The success of OSS is predictable, as many advocates of open source recommend that it be adopted and used by countries (Walker, 2004; Visser, 2004; Surman & Diceman, 2005). Those who foresee the success of OSS adoption, are silent with regard to change management issues that deal with employee involvement in the migration process. This is important, because there must be a mechanism in place to ensure that employees buy in to the inevitable change in their workflow (Self et al., 2007).

The migration process will prompt a demand for workflow alteration, or a complete change, as employees would have to change their work routines. The migration initiative can either be embraced by employees as an opportunity to develop, or be rejected as a threat to employee job security (Hamlin et al., 2001). The following section will elaborate on organisational change and change management, and then discuss the impact of change on employee productivity in the organisation, after the introduction of new technology.

2.4.6 CHANGE MANAGEMENT DURING OSS MIGRATION

According to Donovan, Tully and Wortman (1998), a change in an organisation is an indication of development in many aspects of the business, and so is migration from proprietary software to OSS in the SA public sector. However, the 'hype' and attention should not be directed only to the technical benefits and challenges of the migration process. Change agents in the organisation should recognise the fact that change also affects employees, who have to learn to use new technology and new ways of doing business. Donovan et al., (1998) contend that change agents should also pay attention to the human factor of the change – especially to the employees' attitude toward the change in the organisation.

The migration to OSS by the SA government can be perceived as a threat to employees' stability and job security. This could engender resistance to change from employees (Self et al., 2007). Meanwhile, the inverse is true, where employees can see the change initiative as an opportunity for development. In this case, employees would embrace the change initiative, and try to ensure that change is successful (Smith, 2005).

South Africa has seen tremendous change, both on the political and economic front, together with changes in the policies governing socioeconomic relations in the country since the inception of the government of national unity in 1994 (Department of Public Service and Administration, 2006). This has also brought about new expectations from the workforce, in a stride towards renewal and development of the country. It has also seen the return of the multinational companies that are investing in the South African economy. Elving (2005) suggests that change should be embraced, in order to identify opportunities and then take advantage of the benefits that come with re-entry into the global marketplace. Change on its own is not sufficient to boost morale and equip employees with the skills necessary to successfully function, and be productive, in the workplace. According to Denton and Vloeberghs (2003), South African organisations are faced with new challenges, so new solutions are required to adequately match the challenges brought about by the new skills demand. This is in response to change which, in South Africa, is being brought about by the government's decision to migrate all IS in the public sector to OSS.

2.4.7 CHANGE AS AN OPPORTUNITY FOR DEVELOPMENT

Organisations go through change to improve efficiency, and to develop innovative capacity that should enable them to face the ever-changing demands in the global marketplace (Hall & Fourie, 2007). Business and governmental operational departments are operating in a complex and continuously changing environment, posing new challenges. Accelerated learning programmes would be required to address change in the complex business environment, thereby enhancing the organisational competitive advantage by specifically focusing on the retention, optimisation and competitiveness of talented human capital (Morris & Snell, 2009). e-Learning is still the most effective learning mechanism to facilitate training in demand, that directly addresses the skills gap (Kraak 2005; Bisschoff & Govender, 2007).

Smith (2005) supports the view of dedicating substantial investment towards the development of human capital, in addressing organisational change issues. Human capital development is in line with the view of Self et al. (2007), that change involves moving from the known to the unknown state. Change is an ongoing process characterised by uncertainty, instability and unsettlement; therefore, employees would need to be kept up to date with new developments. This can be achieved by employing a learning mechanism that will ef-

fectively respond to the urgency of the learning needs of employees, so that they would know what is expected of them and how they would be affected by change.

Smith (2005) argues that employees are the vehicles for change, as they determine the success or failure of the change initiatives in an organisation, because they gain new insights and perspectives about change after they have undergone training. Organisations have to commit their effort and resources to educating employees about the migration through e-Learning-based training programmes, to influence their mindset into accepting change. According to Cross and Hamilton (2002), employees have to be in favour of change, see change as an opportunity for self-development, and also see their role in setting new boundaries for their potential. Kotter (1995) ascertains that a well-managed change initiative yields innovation, creativity, efficiency and effectiveness for the development of an organisation as a whole. Proper training would bring employees into the same understanding of the eminent change, as it is expected to bring efficiency and development into the organisation (Smith, 2006).

Meisinger (2007) maintains that the overall motive for change could be the main determinant of success, as in most cases some employees see change as rationalisation of work processes, instead of developmental purposes. Matlhape and Lessing (2002) affirm that employees would be disgruntled if they were not certain about their future in the organisation. Meanwhile, they do not have time to go through training programmes, as they want to prove to be productive in their workplace (Cross & Hamilton, 2004). The above-listed steps are applied differently in different circumstances, as organisations have diverse needs. In the case of the SA public sector, different ministerial entities would have different requirements from one another.

It is apparent that organisations in SA have to succumb to change, as they are struggling to keep up with rapid global economic change (Denton & Vloeberghs, 2003). It is then becoming more important than ever for the SA public sector, and private organisations, to address changing conditions in the external environment by skilfully sharpening the readiness for the changes, from inside. Organisational training programmes should also address what is outlined in Hussey's (2002) mnemonic six steps for managing change. This allows for the shifting of attention from specific production skills to organisational development learning, where learning is used to enforce commitment and dedication to the organisa-

tion's mission and vision. However, there is a serious lack of literature that could give evidence for the use of e-Learning for this purpose. Below are Hussey's mnemonic six steps for managing change:

- Envisioning – the process of developing a coherent view of the future (a vision) in order to form an overarching objective for the organisation;
- Activating – the task of ensuring that others in the organisation understand, support and eventually share the vision;
- Supporting – the helping of others to play a key part in the implementation process;
- Implementation – the process of developing detailed plans to enable the (change) strategy to be implemented and controlled;
- Ensuring – the process of checking that existing monitoring and controlling processes are adequate, and establishing supplementary controls as required; and
- Recognising – the giving of recognition, either positive or negative, to those involved in the (organisational change) process.

Hamlin et al. (2001) report that change programmes still fail, even though models such as Hussey's exist. This could be a lack of attention to training of employees, and ensuring that they know and understand change.

2.5 CHANGE MANAGEMENT

Migration in the public sector implies change, which could result in disastrous circumstances. In order to facilitate smooth migration from a familiar IS platform, change agents have to manage change in such a way that every stakeholder in the migration process is better off than before the change. Otherwise, employees would resist the change. In the subsequent section, the researcher will discuss relevant change management concepts that are prominent in the current context.

2.5.1 FACING CHANGE IN ORGANISATION

Despite Hussey's (2002) stages for managing change in organisations, change agents could still face challenges if human resource issues that contribute to change resistance, are not addressed. Smith (2005) presents issues that should be taken into account, in order to prevent resistance to change from employees, such as cultivating readiness for change, and

facilitating good communication. The human element in change management should be recognised and adequately attended to, because humans play a critical role in the change process.

Experts in the change management field refer to the practice of change management as an addition to organisational complexity by applying sophisticated tools, concepts and models (Stacey, 2003; Shaw, 2002; Streatfield, 2001). This is when change agents should focus their attention and effort on training employees in the significance of change to the sustained development of the organisation, thereby addressing uncertainty, vagueness and ambiguity, so as to eradicate employee resentment.

In addition, Karp and Helgø (2009) propose that organisations should find alternative ways of making sense of organisational life and change. Such an alternative involves curbing anxiety among employees affected by change. In addition to that, Karp and Helgø (2009) acknowledge the fact that change in organisations is so complex, that a complexity science principle such as 'heuristic' should be considered to solve and adequately address organisational change problems. Cautionary measures should be in place, because the heuristic approach could contribute to further chaos in the organisation, especially if the reasons for change are not addressed properly.

Basically, employees' involvement in the change process is imperative, because their reaction to change could also vary according to the situation at hand that warrants attention to each incident (Meisinger, 2007). According to Karp and Helgø (2009), an organisation's management and change agents have to control the reaction and perceptions of employees, by retraining their mind-set, emotions, values and assumptions. Meanwhile, et al., (2004) stress the fact that attempts to retrain employees' mind-sets should be approached gradually, in order to change their way of thinking and doing work. However, this might be impossible to observe at all times, as some situations require rapid change, but require change agents to communicate with everyone affected by the change.

2.5.2 COMMUNICATION BREAKDOWN

According to Meisinger (2007), change management initiatives are characterised by communication breakdown, and conflicting information and knowledge about the benefits that could come about during and after the change. Employees then become uncomfortable

about the change, which is filled with uncertainty, apprehension over job security and the future (Society of Human Resource Management, 2007). On the other hand, Hunter and Carr (2002) suggest the application of an e-Learning model in facilitating skills acquisition and information sharing between the members of a specific community of practice, to encourage comprehension of the skills demand, as change is forcing organisations, as well as individual employees, to change ways of doing business.

According to Simmonds and Pedersen (2006), change programmes reside in the human resources department (HRD), which has an important role in facilitating communication between top management's requirements for skilled employees and employees' better working conditions. This match can be achieved by training employees in the vision and mission of the organisation, by providing flexible and accessible learning programmes such as e-Learning-based programmes, that would allow the learning process to take place any time and anywhere (Hunter & Carr, 2002).

2.5.3 READINESS FOR CHANGE

On the other hand, Hardy et al., (2003) note that learning in the organisation underlies improved performance and sustained competitive advantage. This can be achieved if the employees are ready and able to adapt and adjust to changing circumstances in which the organisation find itself at a given point in time (Hardy et al., 2003; Hardy et al., 2005). The organisation's ability to respond to global economic environment changes is determined by the organisation's ability to facilitate learning quicker than others (Habiyaemye & Soete, 2009). Readiness to change could determine the survival of the organisation, which could be facilitated by providing flexible and accessible learning programmes.

It is therefore important for a management team to take change and migration-related changes seriously, even though the management team could be convinced that the change is developmental in nature and would result in improved organisational effectiveness and efficiency. This view might not necessarily be shared by employees, who might not be ready for the change process, and who, in turn, might resist change (Simmonds & Pedersen, 2006; Self et al., 2007). Although change may present an opportunity for acquisition of new skills, some of the employees may feel that they are too old to learn new skills, and, perhaps, the previous change programme did not deliver on its promises (Matlhape & Les-

sing, 2002). Then, change agents in the organisation should ensure that every change initiative is well managed, because it may serve as a reference for the next change initiative.

2.5.4 TRAINING AS VEHICLE FOR CHANGE

Successful change is dependent on employee attitudes, which is evident in the comments and assertions made by various researchers in the field of change management (Smith, 2005; Self et al., 2007; Moitra & Herbsleb, 2001). Even though reasons for change could be clear and objective in the eyes and minds of top management, it is essential to take into account the possibility of negative reaction from employees. Hamlin et al. (2001) support control or open access to knowledge, the application of attitude-altering mechanisms, and new skills acquisition and exercises that form habits that could influence employees favourably towards the intentions of the organisation. According to Carbery and Garavan (2005), learning facilitates behavioural change which then leads to improved employee performance. Appropriate learning mechanisms would enable employees to make educated change responses.

Moitra and Herbsleb (2001) add that change is a transition from one state or situation to another, in which all people are required to (i) change their attitude, and (ii) acquire and practice new behaviours and skills aimed at improved and better performance. This view is supported by Karp and Helgø (2009), who further suggest that training programmes designed to support change should be conveniently placed, to ensure that employees' mind-sets and attitudes are managed.

Training programmes designed to support change, should be developed in conjunction with HRD, to ensure that the right people get the necessary training opportunities that will enable them to cope with change (Society of Human Resources Management, 2007). Technology training is a challenge, with respect to frequency and scheduling of the training programmes, in an age where technology evolves rapidly (Simmonds & Pedersen, 2006; Darkwa & Mazibuko, 2000). The information age has brought about changes and challenges to many organisations that operate, or aspire to operate, in the global marketplace (Denton & Vloeberghs, 2003).

The SA public sector's migration from proprietary software to OSS is in view of the technological advancement to support the spirit of service excellence, stipulated in the

Batho Pele document (Department of Public Service and Administration, 2006; Walker, 2004; Visser, 2004). In line with the spirit of service excellence, is the requirement to train employees in the new technology, so that new technology does not become an obstacle to change and development, but an instrument for change and improved performance.

Giles and Campbell (2003) argue that management should continuously assess skills gaps brought about by change in the organisation's production processes. They can do this by examining the differences between skills needed by the employer and the skills inventory currently available in the organisation. In their attempts to bridge this gap by training employees, organisations have to sustain the productive ability they had before the beginning of the training programmes.

The technological advancement in the whole world has made automation of business activities possible and accessible to ordinary citizens, in the form of electronic commerce – popularly referred to as e-Commerce. This comes with various adaptations of the e-Commerce model in different sectors such as education. In the education sector there is electronic learning, popularly referred to as e-Learning. Advocates of e-Learning (Cross & Hamilton, 2002; Fry, 2001) claim that e-Learning is an effective tool for distributing learning material anywhere, any time, to anybody using internet interconnectivity. In an attempt to understand e-Learning and its impact on human resource development (HRD) during times of change, it is worthwhile to analyse underlying theories and relevant concepts in the subsequent sections of this chapter.

2.6 ORGANISATIONAL TRAINING

Organisational training is catching researchers' attention, addressing many different HRD issues. The popular press is constantly reporting issues that are related to incompetence and lack of skills in the public sector. The following subsections discuss contextualised learning and training issues in the public sector.

2.6.1 LEARNING IN THE WORKPLACE

Wenger and Snyder (2000) proclaim that the e-Learning model is a resurrection of the apprenticeship and work-related learning that was developed as a social learning framework, which included community, identity, meaning and practice. Learning programmes

that respond to a specific situation are made possible by an e-Learning model, where learning practice is extended beyond the boundaries of the brick-and-mortar classroom, and learning material is accessible on demand (Cross & Hamilton, 2002). An employee who is undergoing training through that e-Learning programme, can actually engage in the social learning processes of his/her trade community and its tools of the trade and artefacts (Roberts, 2004; Moule, 2006).

Learning in the workplace is a way of orientating or retraining employees in new ways of doing business activities, as specified by the employer. Jashapara (2003) adds that an organisation must be able to learn faster than its competition, in order to gain competitive advantage. This is essential for an organisation that wants to outperform its competition in the global marketplace (Meisinger, 2007). In trying to bolster a learning and training drive in the workplace, relatively new concepts such as 'learning organisation' and 'organisational learning' were introduced in model learning practices in the workplace.

2.6.2 LEARNING ORGANISATION IN THE MIDST OF CHANGE

Gorelick (2005) proclaims that the learning organisation is the kind of organisation that learns continuously, with the view of improving performance, which may bring about change in the business processes and the employees' perceptions about new business processes. Therefore, change and learning concepts are intertwined, in the sense that change must be accompanied by learning, to facilitate the transition from a state of skills lack to a new state of changed attitude, new knowledge, efficient habits and new skills (Karp & Helgø, 2009). El-Khatib et al., (2003) asserts that employee training is meant to improve skills levels and increase the variety of skills competencies that, in turn, improve productivity and quality of products and service. This can be achieved by applying, among others, e-Learning principles, to promote just-in-time and just-in-context learning in the organisation.

Advocates of Senge's (1991) learning organisation concept (Gorelick, 2005; Jashapara, 2003) emphasise the importance of keeping the momentum of the learning spirit going, in the sense that the organisation should take advantage of new opportunities presented by the rapidly changing information era. Jashapara (2003) states that learning organisation activities are not sufficient in themselves. However, the organisation should be able to motivate

employees to continuously participate in training programmes, so that employees and the organisation itself would be efficient enough to out-perform competitors.

Perse and Courtright (1993) note that management should establish an alignment between the skills requirements brought about by change, in the form of technology change-over, and the human capital available, that is willing and able to learning new work processes. The concept of 'learning organisation', like the concept of 'change management', advocate for dedication of effort to human value, thereby avoiding employees' resistance to change, and then ensuring that the organisation succeeds in its business strategy.

Additionally, Nisar (2002) points out the fact that traditional training methods have failed to achieve the objective of effective utilisation of the workplace environment for training. However, e-Learning popularity has grown to the extent that it has become a buzzword in the education sector. According to Pantazis (2002), e-Learning has been an effective contributor to skills development and progress towards economic competitiveness, in many organisations.

The flexible nature of e-Learning enables more organisations to build learning organisation models. This is to ensure that the organisation is continuously acquiring new skills, by integrating pedagogic elements, and the organisational need, in their e-Learning designs, to ensure successful training programmes. Tavangarian et al., (2004) advise that the pedagogical element should be central to the development and implementation of e-Learning-based training, instead of emphasising the technology application over pedagogy. e-Learning is still the learning system of choice for many organisations – even those that are not claiming to be learning organisations (Laurillard, 1995). In order to understand the development of the learning organisation through e-Learning, it is important to first understand the learning theories that should form part of the underpinnings of e-Learning instructional design. This will be covered in the following sections.

2.7 LEARNING THEORY

Learning theories are covered in most writings, in a pack of grand theories that date back to Pavlov's stimulus response theory of the 1890s, which explains mechanical learning through experience, to behaviourism, to cognitive, to constructivism and many other

mid-range theories (Ertmer & Newby, 1993). The mid-range theories are those that are still under scrutiny in the field of education and learning, such as andragogy and self-directed learning. Incidentally, it is these theories that, to a certain extent, capture the frame in which the research problem for this study is contextualised (Knowles, 1984). It is for this reason that the researcher will focus his discussions on andragogy and self-directed learning, instead the grand theories already mentioned (Esposito, 2005; Zmeyov, 1998). However they will not be discarded completely, but will be discussed briefly in the following section.

2.7.1 BEHAVIOURISM

This theory of learning is traced back from Pavlov's experiment with a dog that responded to a bell ringing – a stimulus – by producing saliva (Luthans et al., 2008). This theory was further developed by Skinner into a theory of learning, which played a major role in explaining how people learn. Behaviourists' viewpoint on how people learn is that it takes a series of sequential stimuli and response actions for an individual to learn (Williams, 2002). This view neglected the element of mental processes applied in conceptualisation of the subject learnt.

In the context of this study, behaviourist principles are appropriate in explaining the reasons why employees in the South African public sector would go through e-Learning-based training programmes. In line with stimulus and response principles, employees might be motivated by the rewards of using an e-Learning training programme instead of a traditional training mode. The stimulus might still not lead to the expected response – that of accepting e-Learning and actually applying it to learning and development in the workplace (Cross & Hamilton, 2002). The instructional designer will have to find a balance in ensuring that the stimulus is in the form of promotion, once an employee acquires the needed skills, and has actually enrolled for learning in the e-Learning programme. However, these theories cannot suggest an explanation of how to engage the intellectual process in the learning process, which could be integral stimuli for engaging in learning processes.

2.7.2 COGNITIVE LEARNING

Cognitive learning theory emerged as an improvement on behaviourism over the years, and it presented a shift of focus from learning portrayed by change in behaviour, to internal

mental processes (Taylor, 2004). Cognitivist theory is the pioneering work of Jean Piaget, who suggested developmental stages of the learning path, such as information storage and retrieval, which forms part of the mental structures (Kohlberg, 1969).

A cognitivist approach focuses on the internal processes, namely memory, thinking, reflection, obstruction, motivation and meta-cognition (Jackendoff, 2007). Unlike behaviourism, cognitive theorists also pay attention to the path leading to the solution, as opposed to merely change in behaviour. Learners develop conceptual reasoning as they experience more physical interaction with the environment around them (Taylor, 2004). This can be seen in the way learners exhibit logic and thinking patterns, in finding solutions to the problems at hand.

It is then crucial for instructional designers to understand the ways in which learners process information and create their own meanings, based on their experiences and interaction with their physical environment. In fact, instructional designers should be able to build training programmes based on the learners' previous experiences and knowledge, pulling them from the known world of experience to an unknown, new world of experiences. In this sense, adult learners might seem a difficult group to cater for; however, their experience and knowledge can be easily gathered, as most of the time they know what they want to learn (Sun & Williams, 2004). This is also true for employees who want to acquire new skills and knowledge, in order to fulfil their work obligations proficiently. Cognitivists explain the learning process as an internal mental process, rather than an external display of changed behaviour. It is a progressive step towards understanding how people learn, which also does not sufficiently explain the research problem. In the following section the researcher will discuss constructivist theory and the understanding of learning processes.

2.7.3 CONSTRUCTIVISM THEORY

Constructivist theory is much exhibited in many learning theories such as pedagogy, andragogy, self-directed learning and experiential learning (Esposito, 2005; Taylor et al., 2002; Sun & Williams, 2004). Constructivism is based on the premise that learners construct their own perspective of the world, through individual experiences and schema (Mergel, 1998). The idea behind constructivism is that people learn better by active en-

agement in learning, and reconciling new information with previous schemas of stored information (Smerdon et al., 1999). The overarching idea in this theory is that the learning process is generative, where learners draw from their experience, and then generate their own understanding of the world around them. They learn by discovering new knowledge as they encounter many new experiences relating to what they want to know and learn (Cox et al., 2004). This could provide insight into the development of instruction design for SA public sector employee training after OSS migration.

The SA public sector employees carry with them vast experience, either good or bad, in the workplace, given the socio-cultural diversity in the public sector as workplace. In the light of the constructivist perspective, one can assert that employees' previous experiences with proprietary software has an effect on their learning to use OSS. The effect is still not known – until empirical research has been conducted by the researcher.

Notwithstanding the uncertainty about the effect of e-Learning as training, it is also crucial to understand how adults learn, and what motivates them to learn to pass their formal tertiary qualifications – specifically, learning in the workplace. Constructivism is the umbrella body for many theories that attempt to explain adult and workplace learning. The researcher intends to focus on andragogy and self-directed learning (Sun & Williams, 2004). Even though these learning theories discussed are key to understanding how perspectives on learning have evolved to this day, the researcher still has to find more relevant theories that will help him explain, or even solve, some aspects of the research problem.

2.7.4. ANDRAGOGY

Inasmuch as the above discussed theories explain learning, the researcher stumbled upon andragogy, which he knew very little about, during his literature survey. There is still contention about the legitimacy of andragogy to be classified as a theory of adult learning (Davenport & Davenport, 1985). Advocates of andragogy refer to it as “the art and science of helping adults learn” (Knowles, 1984). Based on five underlying assumptions, andragogy describes the adult learner as someone who (1) has an independent self-concept and who can direct his or her own learning, (2) has accumulated a reservoir of life experiences that is a rich resource for learning, (3) has learning needs closely related to changing social roles, (4) is problem centred, and interested in immediate application of knowledge, and

(5) is motivated to learn by internal, rather than external, factors. These five assumptions better explain how adults learn, and relate mainly to most aspects of the research problem.

These assumptions will be adapted into the context of the study, to find out how some of the research questions can be answered – if not all of them. The first assumption stipulates that adult learners are self-directed to pursue learning concepts that will enable them to solve the problem at hand. In this case, migration of the application software platform actuates the need for training, which can be better facilitated by e-Learning as a delivery tool (Conrad & Donaldson, 2011). This means that instructional designers have to develop learning solutions that will be conducive to self-directed learning, where learners can directly access context-specific content (Zmeyov, 1998).

The second assumption acknowledges the experiences learners bring into the learning environment. This might be difficult where learners bring different levels and types of experience into the learning environment, for the facilitator of the learning process to coordinate (Blondy, 2007). It is, however, possible, if the facilitator trusts the adult learning process and allows the learning process to take place without forcing in his/her methods, but creates a learning environment that allows discovery of knowledge and collaborative sharing of experience, and introducing new knowledge, as learners are exposed to a new environment or new knowledge. The OSS environment is rapidly changing because of the openness of the OSS development lifecycle (Millar et al., 2005). Given the assumption that adult learners bring their experiences into the learning environment, learning subsequent versions of OSS could be almost automatic, if a collaborative learning environment is afforded (Anklam, 2009).

The third assumption allows employees to progress in their careers, as they enter the learning environment, ready to learn (Knowles, 1984). Although andragogic theory and assumptions attempt to explain how adults learn, Knowles (1984) admits that some child learners enter the learning environment, ready to learn, depending on their circumstances such as culture, upbringing and previous exposure to learning. Whether a child or adult is learning, if they are ready to learn, the facilitator should make the learning environment conducive to learners to pursue their learning goals. This is even more important where a learner has determined a specific learning goal, in order to fill a skills gap in the workplace (Burgess et al., 2010).

Even though an online learning environment is created that allows learners to develop their curriculum, it could prove difficult where each class has hundreds of students. However, it is worth an effort, because learners discover new meanings in the process (Cross & Hamilton, 2002). This enables problem-oriented learners to directly access learning material that immediately answers or solves their problem. This learning process gives the learners ownership of the learning process, as they learn by discovery. It is, however, puzzling why skills gaps and shortages still prevail in the SA labour market – which is evident in the insurmountable unemployment rate in the country (Kraak, 2005).

Knowles (1984) argues that adult learners are intrinsically motivated to learn – unlike child learners who are sent to learning institutions and go through the learning process without any input into the delivery process. Adult learners need to be appreciated and respected for the effort they make towards learning. In doing so, their self-esteem is enhanced through acknowledgement of the contribution to the learning process. In line with the third assumption, the facilitator of the online course or e-Learning module should be open to learner involvement in course development.

Andragogy, among other learning theories, provides insight into understanding how adults learn. However, it does not explain why skills shortages prevail in South Africa, despite understanding how skills and knowledge could be imparted to those who need skills and knowledge. Branching from andragogy is self-directed learning, which is closely related to the first assumption, and it might shed light into understanding employees as adult learners.

2.7.5 SELF-DIRECTED LEARNING

Employees in the workplace are faced with ever-changing technology, and also consumer preference, which leads to change in demand and production methods (Habiyaemye & Soete, 2009). Even the businesses and organisations from all industries strive to survive in the competitive global marketplace. In that quest for survival, employees try to equip themselves with the skills necessary to remain effective in their workplace. Skills needs and acquisition arise at different times for different employees. In line with the andragogic assumption that adult learners are self-directed, employees are then expected to engage in

the learning process willingly, without external persuasion, where each employee accesses the learning environment when the need arises (Alsultanny, 2006;).

Lave and Wenger (1991) argue that employees can regulate their skills acquisition programme in an e-Learning environment. This is enabled by just-context and just-in time learning (Zuber-Skerritt, 1995). Consequently, e-Learning enables learning and skills acquisition, in order to address skills demands in the revolutionary global economy. These skills demands could be attributed to organisational goals to be up to date with global technological trends, and also sustaining a global competitive edge (Mutula, 2008).

Incidentally, the ability to respond more quickly than other organisations, to global competition demand, is the key to sustaining competitive advantage and relevance in the market. According to Jashapara (2003), learning or training programmes should be aligned with what the organisation considers being a competitive advantage for the organisation. A self-directed learning culture has to be encouraged by the management of organisations, so that employees would identify gaps in the skills inventory, and then pursue training programmes that address that skills gap. This could be supported by just-in-time and just-in-context instructional design.

2.8 INSTRUCTIONAL DESIGN

Berger and Kam (1996) define instructional design as ‘the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction’. Instructional design is directly related to learning theories, in a sense that instruction should be designed according to the philosophical underpinning of the underlying learning theory (Taylor, 2004). This is even more important where technology is applied as the delivery mechanism. Figure 2.2 depicts phases of instructional design development:

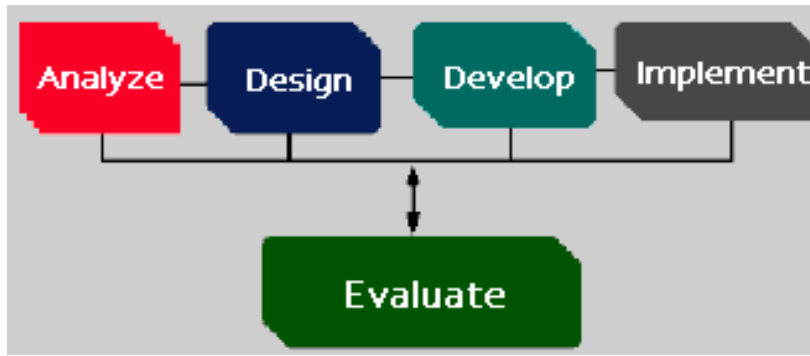


FIGURE 2.2: INSTRUCTIONAL DESIGN PHASES (TAYLOR, 2004).

Williams (2002) views instructional design from the constructivist perspective, thereby suggesting that instructional design should specify methods and strategies that will assist learners to actively explore complex topics. The content should be designed so that information can be contextualised in ways that will lead to advancement of knowledge, given learners' previous experiences.

Instructional design will be more effective, if appropriate instructional technology is used to deliver a specific learning outcome. It is also important to take note of the fact that the learning and delivery mechanism should be in line with a specific educational principle, instead of dedicating design to technological efficiency (Cross & Hamilton, 2002). Meanwhile, it is equally important to ensure that the learning content is compatible with, or adaptable to, different instructional technologies that could be used as a result of learner profiling (Subotzky & Prinsloo, 2011).

The planning of instructional design should be carried out in such a way that content can be viewed clearly from any display device that is likely to be used by current and prospective students. The designers should also take into account that the e-Learning-based content will not be presented as it would for traditional learning media. The content should be adaptable to the medium of delivery, by enabling easy navigation and interaction with learning material (Hoffman, 2009). For example, a web-based application would be visual-intensive, and contain visual effects that are not seen in the traditional methods of delivering learning material. Web-based e-Learning is characterised by hyperlinks and graphics, to increase the visual effects of the learning material – especially for the visual learner.

e-Learning-based designs should also be as pedagogically or andragogically efficacious as traditional methods of delivery, and maintain technology intensiveness. Engelbrecht

(2003) maintains that paying attention to pedagogical aspects of e-Learning would help maintain the educational quality of the e-Learning process. Taking care of the pedagogic issues during instructional design, would enable designers to accommodate learner/employees from different backgrounds, with different learning styles and preferences (Allsopp, 2002; Akdemir & Koszalka, 2008).

Ideally, instructional designers should be experts in technology and content development, to ensure that the content is compatible with the technology used to access the learning material (Leacock, 2005). A good instructional design is sensitive to dehumanisation of the learning process. Instructional designers strive towards developing a learning environment that allows for improvement of learning through technology, instead of trying to replace good learning models with technology.

Participants in the learning process do not have to miss the human element in the learning process, which could be caused by an inability to interact with peers (Engelbrecht, 2003). Learning experiences could be shared by participants in a collaborative environment that should have been set during the development of instructional design. Even though students do not interact with that lecturer as often, they interact with each other in a collaborative setting in such a way that students feel part of the community of learnership.

Moule (2006) asserts that an effective instructional design allows participants to engage with learning material freely, and to use any communication device anywhere and at any time where participants can interact with another participant. This will promote self-directed learning, where students take charge of the learning process, and direct the learning process towards achieving the learners' intended objectives with regard to the skills demand in the organisation. These will be in line with the demand for change in the workplace, where employees are expected to perform in accordance with organisational requirements.

2.8.1 SELF-DIRECTED LEARNING IN THE CHANGING WORK ENVIRONMENT

Asgarkhani and Zealand (2004) maintain that e-Learning has gone beyond employee training, and has become a provider of critical information and improved performance in the workplace. Smith (2005) asserts that individual employees should be well equipped with self-directed learning activities, such as setting their own learning goals, and pursuing

their learning independently; therefore, individual employees should also be able to monitor and evaluate their own learning progress.

Skills acquisition mechanisms are made easy to access, as individual employees access specific learning objectives directly in order to address a specific skills gap. The learning process then becomes a lifelong phenomenon, where everyone who wants to remain productive in the dynamic economy can update their skills and contributions positively in the global economy (Habiyaemye & Soete, 2009; Bloodgood & Salisbury, 2001). Employees become initiators of the learning process.

As the SA public sector is in the process of migrating from proprietary software to OSS, there will be a need for change, or to revise the way the public sector is doing business (Department of Public Service and Administration, 2006). This will have an impact on public sector employees' job stability, that might invoke resistance from employees; however, equipping employees with tools to enhance their skills, in order to contribute positively, could ease the tensions (Smith, 2005; Self et al., 2007; Asgarkhani & Zealand, 2004).

Employers therefore have to manage change by ensuring that employees are educated about imminent change, and that they are aware of the self-service training programme that addresses information gaps in relation to the change. As Karp and Helgø (2009) suggest that organisations must adopt a training programme that will change employees' knowledge, attitudes, habit and behaviour around proposed change, self-directed learning would be an appropriate learning enabler. Self-directed learning supports self-driven development for employees, who take the initiative in making organisational, strategic decisions work. As a result, everybody benefits (Alsultanny, 2006). Consequently, employees who are actively involved in self-directed learning, enjoy job satisfaction as they learn the advantages of the proposed change. They can also put themselves in a strategic position to be on the receiving end of the change initiative.

Even though the public sector does not strive to make a profit, it strives for effectiveness and efficiency in service delivery programmes. The public sector is then compelled to join in the wave of technology, in order to keep up the demands of the ever-changing and challenging global marketplace (Sambrook, 2003). The adoption of OSS in the public sector will bolster the initiative to catch up with the leading nations in technology infusion.

However, this should be coupled with self-directed learning that will enable those employees who want to lead in their trade, to learn the skills required. They should be able to learn, at their own pace, just what they require in order to fulfil a specific job specification demand at that specific time (Walker, 2004).

2.8.2 E-LEARNING IN A DYNAMIC SOCIOECONOMIC ENVIRONMENT

Cross and Hamilton (2002) define e-Learning as a learning process that takes place anywhere, anytime, at learners' own pace. Drucker (2006) adds that e-Learning is just-in-time education integrated with a high-velocity value chain. Asgarkhani and Zealand (2004), however, maintain that e-Learning aims at replacing old, traditional, time/place/content, predetermined learning with a just-in-time/artwork place/customised/on demand process of learning. This is learning made easy. According to Maurer et al., (2001), e-Learning programmes should be supported by management, in order to define and align vision, and plan for learning within organisational strategy, so that learning can be integrated to the organisation's daily activities. They further suggest that e-Learning should be used to cultivate a culture of learning in the morning, then doing in the afternoon (Acton & Golden, 2003).

Dimensions	Training	e-Learning
Delivery	Push – Instructor determines agenda	Pull – Student determines agenda
Responsive-ness	Anticipatory – Assume to know the problem	Reactionary – Responds to problem
Access	Linear – Has defined progression of knowledge	Non-linear – Allows direct access to knowledge in whatever sequence makes sense to the situation at hand
Symmetry	Asymmetric – Training occurs as a separate activity	Symmetric – Learning occurs as an integrated activity
Modality	Discrete – Training takes place in dedicated chunks with defined starts and stops	Continuous – Learning runs in the parallel to business tasks and never stops

Table 2.1: Difference Between Training And E-Learning Adopted From

Basically, organisational training has been at the heart of organisational development, used to support skills acquisition and development for employees, and thereby facilitating the shift from traditional or old methods to new methods of doing business (Taran, 2006). Alsultanny (2006) argues that training should be flexible in terms of place, time, and pace, in order to accommodate different learning styles preferred by learners/employees with

different educational backgrounds. It is necessary for an organisation to respond to the demands of the knowledge-based global economy, with an ever-growing demand for learning new skills (Onay, 1999). e-Learning is a solution to training problems that relate to flexibility and access to developmental training programmes that are supporting organisational growth, while sustaining productivity during training.

Therefore, the learning process should no longer be confined to the lecture hall or training room, as long as the student or trainee has access to internet connectivity. This is affirmed by Hunter and Carr (2002), who argue that learning is easily accessible to those who have time constraints with respect to attending full-time, class-bound learning programmes.

Even though e-Learning is growing in popularity, Nisar (2002) argues that it dehumanises the learning process, because students or trainees do not come into contact with the facilitator. Meanwhile, Alsultanny (2006) emphasises the relevance and benefits of using e-Learning in the training programme, where e-Learning can be a reactionary measure in dealing with the skills problems, as e-Learning is delivered in a non-linear manner. Training programmes can then be accessible to employees in times of need, at their own pace.

The authority dimension of e-Learning is seen in the decentralisation of learning content, where content is developed interactively by the facilitator and the student/trainee, together (Maurer & Sapper, 2001). e-Learning is underpinned by the principles of lifelong learning, flexibility of the learning process, collaborative learning, and easy access to learning. These principles will be discussed in the following section.

2.8.2.1 LIFELONG LEARNING

El-Khatib et al. (2003) reiterate the fact that the sustainment of the information economy is highly dependent on lifelong learning. Organisations and employees have to keep on learning to survive the revolutionary global competition and the explosion of information technology that incites the need to acquire new skills, knowledge and training. The prevalence of technology in the dynamic information economy, necessitates change in the workplace; likewise, skills have to be up to date (Karp & Helgø, 2009; Hall & Fourie, 2007). This means that employees have to improve their skills levels with the latest skills necessary to face the challenges of the new economic conditions and demands. Employees who

want to be productive in their area of expertise, must have access to a training or learning programme that will allow for just-in-time and just-in-context learning, to address the specific skills shortage when necessary. However, the employer has to provide such an environment by investing in e-Learning-based training systems that will allow employees to learn as long as they are still with the organisation.

Sambrook (2003) insists on a continuous learning process to ensure personal development for every employee in the organisation, to keep up with the changing work environment. Re-skilling becomes important, as less technology intensive industries decline and more new technology intensive industries emerge. Lifelong learning is a maturing topic in Europe (Woodrow, 1999), as many organisations recognise the need to engage in ongoing learning. In order to realise the benefits of lifelong learning, organisations utilise e-Learning-based training programmes that are flexible enough to accommodate personalised learning styles – unlike the traditional training model (Allsopp, 2002).

Engelbrecht (2003) affirms that lifelong learning is becoming the only way to survive in the ever-changing global economy, for organisations who want to sustain competitiveness and maintain employee productivity. This is effective where the knowledge and skills lifespan is rapidly diminishing in the advent of new technology, which is compelling organisations to change their production methods (Arabee and Mansur, 2006). Employers have to provide a lifelong learning environment that is timely, accessible and affordable for employees who want to upgrade their skills and knowledge in order to successfully fulfil their job responsibilities. The e-Learning model makes lifelong learning possible, as it is a part of the interrelated, underpinning principles of e-Learning. Again, lifelong learning is more effective in a collaborative learning environment, which will be discussed in the following section.

2.8.2.2 COLLABORATIVE LEARNING

The internet has enabled interconnectivity between users from distant places, both asynchronously and synchronously (Hunter & Carr, 2002; Arabee & Mansur, 2006). This allows for global communications between students and experts in their field of specialisation (Onay, 1999; Mehra et al., 2012). In their pursuit of career opportunities, they need to exchange information and knowledge about new developments in the industry and their field of specialisation, with their peers (Mkhize et al., 2011). It is then apparent that stu-

dents need to share information and knowledge within the community of practice, and within the field of specialisation (Wenger & Snyder, 2000).

Mutula (2008) reports that e-Learning has been instrumental in dealing with the declining education standards that are partly attributed to weak collaborative partnerships. A collaborative learning environment encourages situational learning that grants students access to the relevant training programmes, to address a particular skills deficiency directly. Brown and Duguid (2002) assert that situational learning is knowing how to act in practice, rather than knowing about practice. This is imperative for a learning organisation in the midst of technological changes in the global marketplace.

Leacock (2005) suggests that organisations should create an environment for skills development and training, that is continuously improved through open sharing of ideas, and also frequent and regular evaluation of processes across different areas of the organisation. The facilitators and learners/employees engaging in a learning process, should be encouraged to develop or subscribe to a community of practice, where employees can share relevant information about a technology-driven development in their industry.

Collaborative learning provides opportunities to critically engage with the learning material that has to be discussed within collaborative groups (Drinkwater et al., 2004). Even though some of the e-Learning programmes are not designed to accommodate collaborative principles of overall online learning, students nevertheless still enjoy some level of online interaction with the facilitator, experts in the industry, and other students. Cox et al. (2004) argue that learning in the collaborative learning design is student centred, rather than lecturer centred – prevalent in the traditional learning model. In addition, students learn by discovery, where they investigate learning material to discover implied meaning, and interpret it to formulate valid conclusions.

In the collaborative learning setting, the facilitator has to pay attention to an on-going discussion. The facilitator's role would be to monitor diversion from the topic of discussion in a specific session. Discussions must make a valuable contribution towards achieving a specific outcome of the module (Sorensen & Takle, 2002). The facilitator should be able to detect slowly emerging concepts that may be detracting from the planned learning objectives during the session (Levinsen, 2006). Collaborative learning is independent of time and space; it is more convenient for students when they need support from other stu-

dents and facilitators in their communities of practice, and are, meanwhile, managing a day-to-day workload in their workplace. This extends to the principle of flexibility and accessibility of learning for those who have time and money constraints.

2.8.2.3 FLEXIBLE AND ACCESSIBLE LEARNING

Traditional classrooms have been, and still are, convenient and suitable for learning in the residential institutions. A traditional learning setting is said to be unresponsive to urgent training needs that might require just-in-time and just-in-context learning aimed at solving specific problems. In a flexible learning environment, students would be able to set their own learning goals and pursue their learning objectives independently (Smith, 2005). The students also have to learn to construct their own meanings by interpreting and making knowledge claims based on the learning material provided to them, thereby contributing to generation of knowledge. These students must have access to communication technologies, to be able to fully participate in the e-Learning programmes.

Asgarkhani and Zealand (2004) acknowledge the importance of technology integration into supporting flexible learning design, so that learning material can be distributed to students using technology, and, specifically, web-based technology. Flexible learning design is technology intensive, because technology plays an integral role in facilitating asynchronous and synchronous modes of delivering learning material. This makes learning material accessible to students who cannot attend classes in real time because of other daily commitments (Hunter & Carr, 2002). According to Asgarkhani and Zealand (2004), companies are focusing training investments more on online-based learning systems than on traditional classroom learning, in order to boost turnaround time from learning to performing. This could be made possible by open access to a learning environment such as e-Learning, which is developed with the student, instead of the content, in mind.

2.8.2.4 STUDENT CENTEREDNESS

Asgarkhani and Zealand (2004) maintain that e-Learning systems provide continuous flexible access to learning programmes that are accessible at any time and anywhere, meeting diverse students' requirements, as they have varying preferences in terms of time and location of learning delivery. This helps to meet diverse learning needs, using student-

driven learning mechanisms. This is in line with the andragogic point of view, which advocates student involvement during the design phase of the learning process.

In a changing work environment, it becomes even more important for an organisation to develop training programmes that are sensitive to employees' skills needs, as they may even reject change if it is characterised by uncertainty and insecurity. e-Learning provides a flexible and student-centred learning environment, where the learning process is responsive to employee or student skills training, where gaps are caused by change (Hunter & Carr, 2002). In a student-centred learning environment, a student would be able to directly access the learning process at any time of the year. The modules should also be directed at addressing specific skills deficiencies.

According to Henry (2001), e-Learning solutions were regarded as killer applications, as many businesses entered into lucrative e-Learning markets, selling e-Learning solutions, boasting about the customisation of e-Learning. The fact that e-Learning solutions are customisable according to students' learning styles, makes it even more popular, especially with those who want to learn at their own pace. Cross and Hamilton (2002) assert that student centric learning programmes are developmental and enriching, as students gain a competitive edge in the labour market over those who do not update their skills.

Developers of e-Learning programmes need to assess student profiles in order to customise their offering. Customisation of e-Learning solutions enables the student to learn in his/her learning style (Allsopp, 2002). The student becomes the centre of the learning process, as the facilitator should be there to facilitate the learning process, and all the learning material is designed around the student (Asgarkhani & Zealand, 2004, Cross & Hamilton, 2002; Allsopp, 2002). Wasonga (2007) assures that students will be interested in engaging learning material to learn even more concepts on their own, by taking charge of the learning process.

Students are encouraged to engage learning material, as they would like to create new meanings by deduction from the learning experience, which enables them to learn through discovery. Roberts (2004) asserts that learning by discovery increases the sense of ownership of the learning process. The facilitator won't have to push students to learn new concepts on their own. By promoting and encouraging an enthusiastic learning process, the pass rate is bound to increase – as well as throughput, which might also increase in an edu-

cational institution or a training service provider. This could be the case with training programmes commissioned and funded by the Sector Education and Training Authority (SETA).

Student centeredness is complementary to collaborative learning as an advocate for students' ownership of the learning process, and encourages facilitators to create an environment conducive to discovering new knowledge (Arabee & Mansur, 2006). Levinsen (2004) suggests that the developer of learning programmes should be familiar with the constructivist theory of learning, in order to promote student ownership of the learning process, as they are assisted by the facilitator in discovering new knowledge.

Buhrmann (2010) argues that the pedagogical elements of e-Learning development should be prioritised over technology, to keep the content in context, instead of focusing more attention on the technological components of e-Learning. However, technological input into instructional design should not be completely neglected, especially where the specific medium is more suitable than others, to a specific audience. Sambrook (2003) insists that instructional design should be developed in collaboration with the human resources department, so that the training content can be customised and contextualised to suit the specific skills requirements of the organisation. This can be achieved in conjunction with the assessment of employee profiles, to ensure that the right candidates are selected for the right training programme, and that appropriate methods are used.

In the advent of new technology, that is characterised by constant change and innovation, and that is becoming smaller and cheaper, the custodian of training and development in the organisation should take advantage of the availability of new technology (Hoffman, 2009). Such technology should be taken into consideration during instructional design.

2.9 DELIVERY MECHANISM

Hoffman (2009) asserts that technological innovations are evident in the state-of-the-art multimedia and internet technology. They are also evident in how such technologies influence the way every person lives, plays, enjoys, and conducts business – even those who participate in the educational programmes. Technological innovations have already started to revolutionise learning processes away from a lecturer centric model that puts emphasis on what the lecturer has to offer to the student. The student would have to receive learning

material, and memorise the learning material as given by the lecturer (Li et al., 2001). On the other hand, the integration of technology into the learning process makes it possible for students to take control of their learning process, supported by student centric learning models.

In the e-Learning model, learning material is distributed asynchronously or synchronously to the students, who will then be able to go through the learning process at their own pace. According to Taran (2006), a synchronous mode enables real-time interaction between the facilitator and the student, and among students themselves in a conversational mode. However, an asynchronous mode allows the facilitator to initiate a discussion, and then have students respond by commenting on the subject and asking questions, so that the lecturer is able to drive the learning process towards coverage of specific learning outcomes. In a severe skills shortage situation, a synchronous mode of delivery could be more suitable than asynchronous, because it allows active interaction when the student needs assistance with a concept (Allen et al., 2004).

The asynchronous mode of delivery allows the student/trainee to interact with the facilitator after the learning material has been posted on the server. Trainees freely access learning material at their disposal, whenever convenient. With the guidance of the facilitator, the trainee will engage, interpret and create meanings from the learning material provided. In this way, the trainee would be learning through discovery – which is an active and stimulating learning method (Li et al., 2001). Learning by discovery is a continual process like a treasure hunt, where each discovery leads to another.

Students learning in a collaborative learning environment have to discuss and investigate learning material, and deduce new meanings that would add value to the creation of knowledge (Alsultanny, 2006). The e-Learning model makes it easy to create and update learning material on the server, so that trainees can access learning material freely, even after the training sessions are over. However, the students have the option to contact the lecturer if they find it difficult to understand a concept.

2.9.1 E-LEARNING COMMUNITY OF PRACTICE

Balcaen and Hirtz (2007) argue that an e-Learning training model has features that are particularly suitable for promoting critical thinking. Employees participating in e-Learning

programmes have an advantage of engaging learning material critically, especially when they are encouraged to learn independently, and work interdependently, to support each other. Kanuka and Garrison (2004) claim that collaborative, yet reflective, learning has great potential for facilitating critical thinking, that would enable a learning organisation to facilitate the transfer and creation of skills and knowledge. Critical thinking is encouraged with communities of practice as a major player in the industry, sharing insight with students who also aspire to be experts in their field of study (Balcaen & Hirtz, 2007).

Within the community of practice, knowledge is socially constructed by the group of participants, who weigh each contribution to add value to the discussion (Salmon, 2002). Each participant in the community of practice is free to make a contribution to a solution to the problem, or to a subject of concern among members of the community. Contributors to the discussion and debate get absorbed into the debate until consensus is reached, and the agreed solution remains tentative until a better solution comes along. The facilitator would be there to ensure that the discussions are not diverted in the wrong direction, and redirect the discussions, if necessary (Levinsen, 2006). In order to realise the success of a community of practice, a developer of an e-Learning training programme takes into account the participants' demographic characteristics such as culture and economic background. This will give an insight into the inclination and preference of each participant, so that they can customise learning programmes in order to achieve success.

2.9.2 INTERACTIVE LEARNING CONTENT

Tavangarian et al. (2004) assert that the constructivist approach to learning is the most suitable approach for an e-Learning environment. In this way, interaction with learning content will be reciprocal and dynamic, where students could learn by discovery (Piaget, 1977). Students should be able to engage learning material in such a way that they can construct knowledge, based on their individual experiences and knowledge (Tavangarian et al., 2004).

The e-Learning system has provided a platform, mapping learning content into the digital media, so then, in itself, it does not necessarily encourage and propel learning through discovery. Laurillard (1995) suggests that an e-Learning-based system can be directly mapped from the conventional learning model. However, instructional designers should

apply creativity in developing e-Learning content that fits any intended e-Learning medium. The medium may only be compatible with a certain document format that has to be developed, using special electronic tools such as Hypertext Mark-up Language (HTML), in the case of regular internet interfacing.

e-Learning solutions are format intensive, characterised by graphics and hyperlinks in a colourful interface. The e-Learning environment is designed to appeal to participants and attract their attention. This is why appropriate instructional design is important. These instructional designs should enable reciprocal interaction between facilitator, student and the learning system itself (Gates & Cooksey, 1998). The student can navigate through the learning material by clicking on the hyperlink that directly opens a new page with the relevant information required by a student. In this way, the learning process is easily accessible, flexible, and student centred. The student can directly access the module that will provide a solution to the current problem.

The connectivity of the learning media enables convenient and flexible access to the learning material for the student, as e-Learning is underpinned by learning any time and anywhere (Hardy et al., 2003). This could be achieved by opening access through enabling interconnectivity of learning processes on the internet. In this case, the learning process goes beyond merely posting learning material on the internet domain, and incorporates interaction elements between the students themselves, students and facilitators, and students and the industry experts (Cross & Hamilton, 2002).

The interaction between all those involved in the learning process, can be supplemented by other communication media such as e-mailing personalised learning communications, using cell phones to speak or send short text messages to each other, and even using blogs, wikis and Facebook (Hardy et al., 2003; Mason & Rennie, 2008; Pierce, 2009). The social tools have proved to be an effective means of facilitating learning, specifically for young students. Facebook and blogs are widely used online tools for sharing information and ideas in the social space, that can also be used creatively to share specific learning information related to specific learning outcomes for a module. This makes the formal learning process less intense for the student, in the case of formal qualifications, or trainees, in the case of vocation-specific skills and knowledge acquisition. Just-in-time and just-in-context leads to the concept of self-directed learning, which will be discussed in the following section.

2.10 TECHNOLOGY ADOPTION

Even though technological innovation seems to have transformed the world market and workplace alike, it is useless if not adopted by people who are supposed to use it effectively.

2.10.1 TECHNOLOGY ACCEPTANCE MODEL

Information systems such as e-Commerce provide efficient and effective ways of carrying out business activities, whereas e-Learning is effective on the learning and education frontier (Mathieson, 1991). These types of Information Systems (IS) are effective only when they are used; however, the use of either e-Commerce or e-Learning is not just based on the system itself, but on other factors such as attitude towards use of the system (Fishbein & Ajzen, 1975). Understanding factors that influence the acceptance of technology, is important in trying to explain why e-Learning has not been effective in uprooting the skills challenge still prevalent in South Africa. In doing so, the researcher will analyse the technology acceptance model in relation to the research problem.

Davis (1985) introduced a model that can be used to explain and influence acceptance of information systems in the workplace, in order to improve business processes. This model could be instrumental in explaining why e-Learning is not used effectively in uprooting the skills shortage in South Africa, since the problem is known (Kraak, 2005; Kraatz & Moore, 2002). The technology acceptance model defines two factors that influence employees' intention to use IS, which, in turn, influences usage behaviour. Then the benefits of the system's existence can be realised. The two constructs of this model are: perceived usefulness and perceived ease of use; the two coexist, as ease of use increases the usefulness of the IS (Venkatesh et al., 2003).

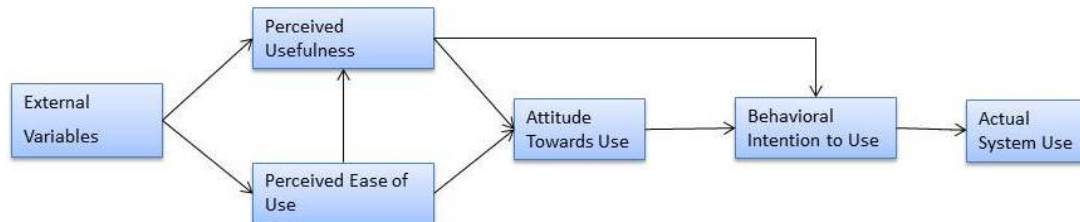


Figure 2.2: Technology Acceptance Model (TAM) adopted from Venkatesh et al., (2003)

With respect to perceived ease of use, the user is inclined towards an IS that is easy to learn, adaptable, and may be usable in more than one business function, whereas perceived usefulness is attributed to IS making the job easier, and the workflow more effective and efficient than before the new IS was introduced (Mathieson, 1991). This model could be applicable to the e-Learning training solution, in the sense that learning is a process through which e-Learning should be useful, and it should be easy to use; otherwise, usefulness will be compromised. This could then lead to a negative attitude towards the use of the IS.

Venkatesh et al. (2003) further extend the constructs' perceived usefulness of the model, to include the social influence processes and cognitive instrumental processes that impose their influences on perceived usefulness of the TAM. These constructs include job relevance, experience, and output quality – which could be related to the acceptance of OSS in the public sector, and the electronic learning delivery mechanism, coupled with the migration process. Perception of e-Learning-based training solutions' usefulness is important where there is constant demand for learning throughout the work life of an employee, and, specifically, where employees are confronted with constant changes in technology (Hunter & Carr, 2002).

Notwithstanding the fact that some e-Learning solutions might be useful, they might, at the same time, be complicated to learn for the novice user of the system or e-Learning solution. It is therefore equally important to match the level of usefulness with ease of use, for a business IS and for e-Learning (Mathieson, 1991; Fishbein & Ajzen, 1975). Otherwise, e-Learning solutions may be rejected by prospective users. e-Learning solutions are meant to promote self-directed learning, lifelong learning, and student centric delivery, instead of redirecting learners' effort and attention from learning itself to struggling with technology used to deliver learning material (Cross & Hamilton, 2002).

Even though this model is important in explaining why employees adopt IT in their workplace, it may also be useful in explaining why employees may adopt e-Learning as a solution to uproot skills challenges. It does not explain why skills shortages prevail, despite its applausive functionality (Asgarkhani & Zealand, 2004; Cox et al., 2004; Cross & Hamilton, 2002; Hunter & Carr, 2002).

2.10.2 DIFFUSION OF INNOVATION

e-Learning provides an innovative platform for facilitating learning both in the workplace and in academic institutions. With respect to the innovative element of e-Learning in the public sector, it would be plausible to understand how employees adopt innovation, or, perhaps, understand a predictive model (Wagner et al., 2011). Rogers (1995) introduces the diffusion of innovation model that could explain and predict adoption of innovation. Innovation refers to anything new that can be used to explain and solve a current problem. Diffusion of innovation goes beyond not only explaining an object as the product of innovation, but also the adoption rate of a creative process that yields better results in a specific situation. Therefore, e-Learning is an innovation in the SA public sector, since it is relatively new in South African education.

According to Rogers (1995), diffusion of innovation is underpinned by five constructs that can help predict and understand issues relating to innovation adoption rate. These constructs are: relative advantage, compatibility, complexity, trialability and observability. Relative advantage refers to the extent employees believe that e-Learning would be better than the traditional learning mechanisms. Employees would adopt innovation if they perceived it to add value to their lives in terms of economic value and social prestige (Duan, He, Feng, Li & Fu, 2010).

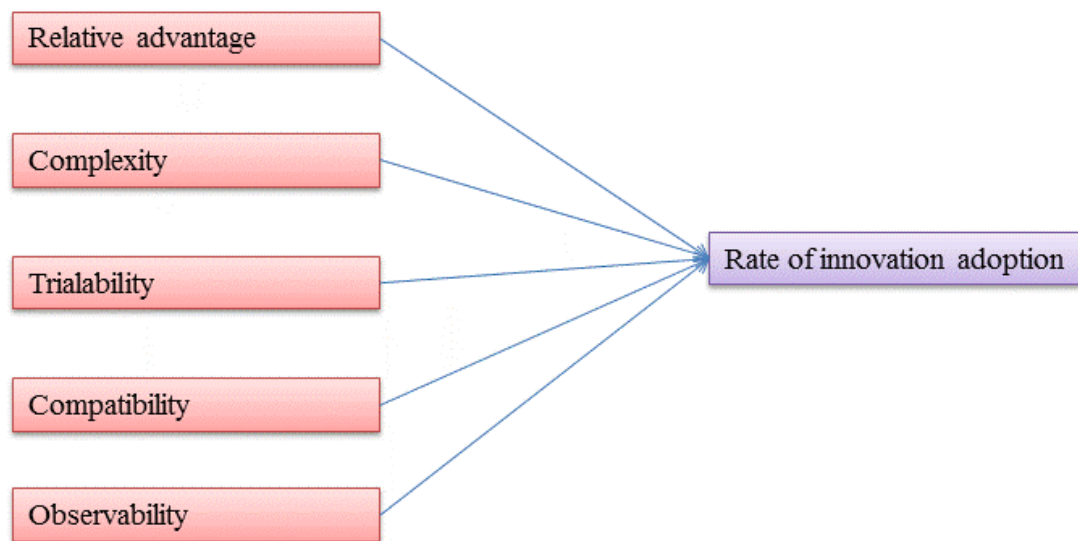


Figure 2.3: Adoption rate for innovation

Employees would be likely to adopt innovation if it was perceived as compatible with the traditional learning experiences and norms. It would be extremely difficult to introduce e-Learning if it contradicted employees' values attached to learning in the traditional sense. Even though e-Learning is marketed as innovation that will change the face of education and learning, it is important to ensure that change doesn't contradict adopters' values and acceptable norms (Adhikari, 2005).

In addition to that, complexity of the innovative system could be problematic, where employees would have to learn how to use e-Learning systems, and then to learn skills delivered through e-learning (Duan et al., 2010; Corrocher, 2010). e-Learning programmes should be designed in such a way that they are easy to use and understand; otherwise, they will be rejected. Some employees might be stuck in the process of learning how to use e-Learning programmes, instead of learning skills needed to improve their performance in the workplace.

Trialability could help avert uncertainty by allowing prospective adopters to try using innovation before they make a decision to either adopt it or not adopt it. This would enable adopters to learn by using innovation, thereby gaining confidence in the application of the new e-Learning, and even test prominent features.

Observability would increase the likelihood of adoption, if employees could easily see the results of innovation – especially if the results are good (Elgort, 2005). Phenomenal results would stimulate discussion among friends and groups, and, in turn, increase awareness of the innovation. Awareness and visibility of the results is more likely to influence employees to adopt innovation, in order to enjoy the observed results.

2.10.3 TECHNOLOGY AND CULTURE

According to Perse and Courtright (1993), every aspect of human life is affected or influenced by culture; different cultural groups respond differently to the same stimulus. Patterns of behaviour are cultivated at an early stage of human life and development. These also affect the defusing of technology and spatiality in the workplace. Employees tend to make reference to their cultural patterns when responding to the demand for change.

Hofstede (2003) defines culture as the collective programming of the mind which distinguishes the member of one human group from another. Among other elements of culture are communication, preference, and levels of tolerance of the uncertain future that would influence the acceptance of change as brought about by software migration in the workplace. The SA public sector workforce is characterised by diversity and multiple cultural groups working together to achieve an organisational goal.

Gou et al. (2009) explain the importance of considering the existing patterns of behaviour, which are determined by cultural norms before infusion of new technology, whereas Perse and Courtright (1993) argue that new technology would be accepted if the existing work-related routines remain the same, and, what is considered to be the culture of the organisation, is preserved. Culture is the most protected phenomenon that defines the community's way of life and how the community interprets and gives meaning to everyday life events (Ruta, 2005). However, in the global knowledge-based economy, ICT is a way of survival – specifically, when the organisation has to appeal to a wider market (Onay, 1999; Nassimbeni & De Jager, 2000). In the developing countries it is still a challenge to acquire technology to automate production processes while struggling to provide basic human needs (Mutula, 2008).

It is important to plan the infusion of technology carefully, and in a manner that would be considerate towards the public's general perception of technology. The sensitivity towards cultural implications in technological change could prove to be vital for the smooth operation of the organisation, and direction towards the realisation of the organisational objectives. Change agents are the custodians for change (Donovan et al., 1998). Therefore, they should ensure that individuals' perceptions about change manage to favour the proposed change, while being sensitive to the individuals' cultural norms and behaviours. One's cultural background influences the way one relates and behaves in response to a specific stimulus – such as the directive to switch technological tools used to do work. Steensma, Marino, Weaver and Dickson (2000) point out that culture could be both constraining and affording when it come managing users' perception of the new technology they will have to use to fulfil their duties successfully in the workplace.

2.11 CULTURE AND LEARNING

According to Donovan et al. (1998), resistance to change and acceptance of new ways of doing business could arise both from threats to traditional norms and from tried and tested ways of doing business. This might be in conflict with the organisation's vision of becoming the leader in the industry, as the organisation would have to change to respond to global economic demands (Jashapara, 2003). Global economic conditions demand skills updates for a fast-changing economy. Cultural changes in an organisation could be encouraged by pointing out successful experiences that are directly linked to effective learning initiatives (Kozulin, 2001).

Other aspects of learning, such as the cultural impact of e-Learning and other ICT-supported learning systems, have already received attention from educationist researchers who studied the role of culture in design and delivery of educational material (Kozulin, 2001). It is important to study cultural influences on learning, so that one can understand the role of culture in the evolutionary process of learning new skills and supporting change that goes with skills demands (Anuradha et al., 2009). Culture defines the general behavioural pattern of the people within a certain society, if students' cultural norms and behaviours are against buying or using electronic tools or media, due to the perception that students would then become lazy and lose the ability to use their minds to their full potential. Therefore, a proposition to use any ICT-supported learning system might be acceptable for such a society.

Kozulin (2001) summarises the relationship between learning and culture by saying that once people have learnt certain behavioural patterns, they hold on to them and defend their way of life. Even though culture is not inborn, it is a way of life that is worth defending to the extent that new productive ways of doing things might be rejected if they are perceived as a threat to the societal culture (Dinev et al., 2009). Kozulin (2001) states that culture, as a source of differences in the cognitive process, is formed through socio-cultural activities. Already two-and-a-half decades ago, a contextual theory of cognitive functions was developed, that proposed a culture-centred approach to learning, stating that different cultures have different systems of mediated learning experiences (Allsopp, 2002).

The students' ability to learn could be limited by differences in culture, especially when cultural influences and learning were ignored during the design of learning material. According to Kozulin (2001), cultural differences tend to disappear under the influence of systematic exposure to formal schooling. These differences are not based on knowledge, but are rather associated with basic skills which one learns with new concepts. Cultural differences create difficulties that may be extended to include cognitive activities such as the ability to identify or define problems, or the ability to work with multiple sources of information.

Kozulin (2001) suggests that Western-style education has evolved to be more a problem-based learning experience, when learning is inspired and driven by the desire to solve the problem at hand. Problem-based learning is stimulating for students, irrespective of their cultural background, because they all want the solution without using any prescribed approach. Students from different cultural groups converge to find a solution, and this process becomes a learning experience, the benefits of which are equivalent to the experience of traditional learning.

2.12 CONCLUSION

In this chapter, the researcher discussed the conceptual constructs of analysis for the study, as deduced from the problem statement. Firstly, implications of the decision to roll out OSS in the South African public sector, and the way that it might impact on the development cycle of OSS in South Africa, were explained. This was done by discussing the composition of the open source community, the open source development lifecycle, and the open source community of developers' source of motivation to keep developing software without monetary rewards for their work.

In the discussion of the second main concept of this study, the effect of change in the workplace reflected that however developmental the change is, employees are the most important drivers for change. OSS migration in the public sector forces the change agents in the public sector to pay attention to the dynamics of change. Employees have to be at the centre of the change programme, as they are the single main determinant of successful change.

The section on technology and culture revealed that individual behavioural patterns are directly related to culture and initial education. Individual employees' perceptions of the proposed change are references to their cultural background, and their knowledge of what is expected after the change programme. Educating employees in the importance and benefits of change, helps address the uncertainty about expectations. The educating process would have to take place while those who are affected by change are still working, in order to sustain delivery in the public sector.

The discussion on e-Learning delivery mechanisms shows that effective learning can take place without compromising delivery in the public sector. This can be achieved by applying an e-Learning model in designing learning procedures, during the migration process. In the open source environment, skills transfer and acquisition would have to be ongoing, as the OSS development cycle is not controlled by industry, but whoever is inspired to modify the existing software can take the initiative and release the new version that might have many new features.

The following chapter covers research methodology. It will provide a detailed discussion of the appropriate research methods that will be used to answer the research question and achieve the objective of this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The methodology chapter of a thesis provides a roadmap of the path the researcher will take in order to achieve the objectives set for this study. It outlines the blueprint of this study, from broad strategy to specific usage of the research instruments that were chosen for the study. It is this chapter that determines whether the study meets the quality requirements of a doctoral thesis, as the examiner checks the appropriateness of the research method for the problem being investigated.

In this chapter, the researcher lays out the plan to conduct the study, which will guide the research process. He also outlines the strategic position that will be followed in conducting the study, as he chose to adopt an inductive strategy of investigation. This is in line with the underlying ontological position, and the social constructivist philosophy standpoint, with regard to the application and choice of research methodology. The research will follow both the qualitative and quantitative research approach, in order to achieve the research objective and answer the research questions. Grounded theory will be applied within the parameters of the qualitative paradigm; meanwhile, a survey will be applied within the parameters of the quantitative approach.

The following discussion unpacks the concepts mentioned above, as they are discussed in detail in relation to their applicability to this study.

3.2 RESEARCH STRATEGY – INDUCTIVE

Blaikie (2007) argues that researchers should formulate a strategy for solving research problems, thereby answering the research questions. The research strategy provides a set of logical procedures to be applied in the knowledge generation process (Remenyi & Williams, 1998). Blaikie (2007) outlines four types of research strategies: deductive, inductive, retroductive and abductive, the selection of which is dependent on the research problem

and questions. Some of the questions might require an in-depth inquiry in order to be answered comprehensively. Therefore, the researcher should examine the research questions, in order to align with appropriate strategy that will enable him to adequately address the research questions (Remenyi & Williams, 1998).

Basically, the researcher examined his research questions in order to select an applicable research strategy. Besides, the researcher realised there was a shortage of suitable instruments that would contextually address the problem and questions. The researcher therefore decided to adopt an inductive strategy in the initial investigation, and then support it with deductive strategy, in order to test variables that emanated from resultant propositions (McCallin, 2003). This strategy allows the study to start from a wider perspective, with the guidance of the research question. Ideally, within inductive strategy, the research process should begin with data collection, so that theory generation can be grounded solely in data, and then conduct literature control (Glaser & Strauss, 1967). This process is fundamental to grounded theory generation.

However, the researcher read literature on the subject that somehow addresses certain aspects of the problem, in order to sensitise himself to trends and developments in the field of study. Corbin and Strauss (1990) support the use of literature in an inductive study, so that the researcher could gain theoretical sensitivity. It is theoretical sensitivity that guides the researcher's inquiry as he follows through emerging themes to find more information, in order to understand theoretical gaps (Corbin & Strauss, 1990).

In addition to the reasons why the researcher chose inductive strategy, is that the literature survey did not provide sufficient insight into the problem, that could enable the researcher to deduce a hypothesis. The researcher acknowledges the fact that almost everything in any field of inquiry has been researched and written about. However, the context in which other studies have been conducted, is different from the context of this study. Among other search strategies, the researcher conducted a search by means of Sabinet and the Nexus database (for completed and in-progress thesis and theses), to find any published work that addressed the problem as it appears in the problem statement of this study. He could formulate a theoretical base from returned results. This indicated that the study should start from a wider perspective. Inductive strategy was therefore chosen for the formulation of this study.

The primary aim of the inductive strategy of inquiry is not to test theories or eliminate false ones, such as the equally popular strategy of inquiry – the deductive strategy (Creswell, 2007). However, inductive strategy aims to generate theories and establish patterns that can be transferred to a similar scenario, provided they emanate from a similar context to that of the original studied case (Blaikie, 2007). Inductive research strategy will inform the researcher's approach to the study, in line with the research philosophy that guides the researcher's ontological positioning in this study.

3.3 RESEARCH PHILOSOPHY – SOCIAL CONSTRUCTIVISM

According to Guba & Lincoln (1994), research philosophy defines an investigator's basic beliefs (or worldview) that guides the investigator in conducting research and questioning about the studied phenomenon. Research philosophies have been analysed by many researchers – each recommended for a specific type of research inquiry, or specific discipline, such as positivism and post-positivism, that are popular in studies within natural sciences (Remenyi & Williams, 1998; Krauss, 2005; Chen & Hirschheim, 2004). Krauss (2005) argues that it is crucial to understand the guiding philosophical position from which the researcher views the studied phenomenon.

Chen and Hirschheim (2004) argue that a positivistic approach is a popular and preferred philosophy in IS research. This could seem an imposition to an IS researcher, that compels them to adopt positivistic perspectives in order to conform to the popular view within the researcher's field of study. The positivistic paradigm is characterised by a rigorous, systematic, deterministic and logical-mannered way of finding a solution to a problem, with the expectation of getting the same results where the same method is used in a similar context (Blaikie, 2007; Leedy & Ormrod, 2005). This is in contrast to the inductive way of inquiry, which acknowledges and accepts subjectivity, taking into account the fact that social reality is not confined to a set of rules that can be proved merely to be true or false. This is in contradiction to the methods of inquiry that involve humans and their social perspectives, as their responses to stimuli vary according to their perspectives (Neumann, 1993). Positivist philosophy also advocates investigators' independency from the investigated phenomenon, the testing of predefined hypotheses, and an objective involvement in the research process. Its methodological approaches are experimental, manipulative, verification of hypothesis, and chiefly quantitative (Guba & Lincoln, 1994).

Positivist philosophy is appropriate for research projects that are fundamentally based on research questions that evoke verification, manipulation, and experimental inquiry, in which results are meant to prove or disprove a hypothesis. It is restrictive for this study, as research questions are inductive, and evoke in-depth investigation into the current problem (Creswell, 2009). Moreover, it is difficult to formulate a hypothesis without being aware about existing discussions and debates about the problem, due to a shortage of literature. Therefore the researcher decided to adopt a research philosophy that allows for subjectivity and researcher immersion into the research process, thereby becoming a research instrument himself (Creswell, 1994).

Chen and Hirschheim (2004) suggest that an IS researcher can alternatively adopt a social constructivist, philosophical position, specifically when a social phenomenon is to be investigated in its natural environment. On the other hand, social constructivism is gaining popularity in studies that seek understanding of a studied phenomenon in its natural environment, acknowledging the fact that in a social context, reality is relative (Guba & Lincoln, 1994). In the social constructivist paradigm, research participants and the researcher are co-creators of knowledge and what is perceived to be reality. Meaning of reality is defined by participant interpretation, which is based on their social and cultural norms.

In this study, the researcher seeks to understand e-Learning practice in the South African public sector, which is hardly documented in any form of literature. Therefore, the social constructivist paradigm would enable the researcher to think, plan and design a research methodology that embraces co-creation of knowledge, as participants understand their practice environment better than does the researcher. This is where theoretical sensitivity would be instrumental for the researcher to guide the process of inquiry (Vidich et al., 2003). Within the guidelines of the social constructivist paradigm, the researcher will apply a research approach that will enable him to achieve the research objectives (Smerdon et al., 1999).

3.4 RESEARCH APPROACH – MIXED METHODS

Creswell (1994) compares a qualitative with a quantitative approach in tabular form, to distinguish these two approaches according to their ontological, epistemological and methodological assumptions. This comparison makes the researcher's choice of a qualitative

approach even clearer and simpler for this study, because the research questions require an in-depth inquiry that can be achieved by conducting an in-depth investigation. However, certain aspects of the problem statement and research questions suggest the application of deductive inquiry.

In line with the social constructivist, ontological assumption about the nature of reality, the researcher believes that reality is subjective, and varies, as seen by participants in the study (Smerdon et al., 1999; Creswell, 1994; Remenyi & Williams, 1998). The primary approach to this study will be the qualitative approach. It will enable the researcher to interact with participants in a manner that would otherwise be unacceptable in a quantitative approach. In fact, the researcher would become an instrument of research, since the interpretation and analysis of data is highly dependent on the researcher's theoretical sensitivity, whereas data gathered is based on participants' interpretation of the activities surrounding e-Learning practices in the public-sector. The researcher will have to immerse himself in the situation.

In addition to that, the researcher will make propositions formulated from qualitative analysis, to draw items for a survey questionnaire. This will enable the researcher to test a framework drawn from propositions, using a quantitative approach. Therefore, the researcher will have to employ a mixed approach. It is important to note that once the researcher gains an in-depth understanding of e-Learning practice in the public sector and has formulated propositions, he will then conduct a deductive inquiry, based on variables deducted from propositions. Propositions will be instrumental in this case, by providing important variables as they emerge from qualitative data. This spells out mixed methods, where the initial investigation will be based on a qualitative approach, and then followed up by a quantitative approach. Creswell (2009) suggests mixed method strategies, namely:

- Sequential exploratory strategy
- Sequential explanatory strategy
- Sequential transformative strategy
- Concurrent triangulation strategy
- Concurrent embedded strategy
- Concurrent transformative strategy

Among the abovementioned strategies, the researcher will apply sequential exploratory strategy, that has more weighting on the qualitative approach in the qualitative/quantitative continuum. Sequential exploratory strategy allows the researcher to initially conduct an in-depth inquiry into the studied phenomenon, by first collecting and analysing qualitative data. The resulting proposition will be the point of connection between the qualitative and quantitative inquiry. Important variables would be identified in the qualitative part of the study; then, the quantitative part will be used to determine associations, and their impact on each other. Application of the quantitative method of inquiry will be discussed in detail in Chapter 6 of this study.

3.5 RESEARCH METHODOLOGY

It is important for the researcher to choose an appropriate research design that will provide the best possible procedures to follow in finding a solution to the research problem, thereby answering the research questions. A research methodology will provide a roadmap of the research process, by outlining the research design, details of the data collection method, the sampling procedure and the data analysis procedures.

3.5.1 CASE STUDY DESIGN

According to Mouton (2001), a case study is aimed at providing an in-depth description of a small number of cases. The case study method guides the research on where and how to collect data, and a blueprint of the whole research process. It also provides parameters the researcher has to abide by when collecting data from the participants who were predetermined, during planning, in a case study protocol. The selection of case study methodology is influenced by the objectives of the study. It is case study design that will best enable the researcher to answer research questions, thereby achieving the research objective (Chen & Hirschheim, 2004).

Willig and Rogers (2007) suggest different types of case studies that can be used for a specific investigation, depending on the researcher's intentions for results. The researcher has to make a series of decisions about the unit of analysis and method of collecting and analysing data, in order to determine the appropriate type of case study. Willig and Rogers (2007) outline the following types of case study:

- Intrinsic versus instrumental case study
- Single versus multiple case study
- Descriptive versus explanatory case study
- Naturalist versus pragmatic case study

According to Hamel et al. (1993), the object of the study is determined by the researcher's area of interest with regard to the subject studied, which then becomes a determining factor for an appropriate type of case study. The object of the study is the actual concept or subject being studied during the research process. In this case, the object of the study is the dynamics of e-Learning application in facilitating skills transfer in the public sector. The unit of analysis includes individuals who are directly involved in designing and developing the e-Learning environment, which will be discussed in detail in Chapter 4.

The selected case study will be confined to the departments that are expected to provide relevant information. The boundaries of the case study will define the unit of analysis for this study. Relevant information will be determined by the answers to the research questions, as all research questions emanate from the research problem. The research questions will also serve as a compass in guiding the researcher in finding solutions to the research problem. These questions also form parameters for data collection, which will help the researcher to collect data only relevant to the problem, thus avoiding not ending data collection (Willig & Rogers, 2007).

A descriptive-type case study will be conducted, to enable the researcher to describe processes, concepts and procedures in their own setting and context (Stake, 1995). The descriptive case study is highly dependent on the accuracy of detail and sufficiency of evidence, in order to have an adequate description of the studied case, to draw interrelationships between concepts that emerge from the data (Bromley, 1986). According to Creswell (1994), a comprehensive description of the studied phenomenon makes data coding easier, especially for the purpose of grounded theory analysis. That is where a dense description of the studied phenomenon is important, in relation to the research questions.

3.5.1.1 SCOPE OF THE CASE STUDY

Remenyi and Williams (1998) argue that a case study should be used as an evidence collection approach, where the investigator wants to gain an in-depth insight into the inves-

tigated subject in its original context. This should be within the predetermined boundaries. The case study scope can be as extensive as possible, until all the elements of the problem are covered, and all the research questions are answered. Even though case studies could be extensive, the investigator should set boundaries with regard to the type of information required from the participants. The researcher could be carried away by the richness of data from the participants, and then end up detracting from the main research objective of answering the research questions.

Time, set of event occurred, or location of the investigated subject, can be used as the determining factors of the boundary for the case study (Remenyi & Williams, 1998). The scope of this case study will be set around the event of skills development, in a bid to learn about e-Learning practice in the public sector after OSS migration. The migration only involves the public sector through the OSS migration project custodians – the State Information Technology Agency (SITA). They manage the OSS migration process, including training of end-users.

SITA will be the first point of contact, as the OSS migration project manager will serve as a gatekeeper. The researcher will focus on the public sector departments that have already migrated their information systems, and who are, at this point in time, in the implementation phase of the migration process. The gatekeeper will facilitate communication between the researcher and participants, and enrolment into the study. He will also assist with regard to theoretical sampling, by identifying employees' departments that can provide relevant information required to close the information gap from collected data. It will be difficult, however, to predetermine the sample with precision, because the grounded theory analysis approach will be used to analyse data.

3.6 DATA COLLECTION

In order to achieve the research objectives set earlier in the study, a qualitative paradigm has been adopted, along with an appropriate research design, which will then determine the research instrument that will be used to collect data. Denscombe (2007) outlines data collection instruments that are appropriate for a qualitative study, such as interviews, observation, questionnaires and documents. A case study protocol has been designed according to guidelines provided in Remenyi and Williams (1998), and semi-structured interviews will

be the primary instrument for data collection. The interviews will be bound by a case study protocol. The case study protocol outlines the overview, field procedures, case study questions, and guide, to the case study report (Remenyi & Williams, 1998). The protocol is an instrument for ensuring the reliability of the study, containing a detailed plan of how the researcher wants to achieve the research objectives. The interview questions will be outlined in the interview schedule of the protocol. These interview questions will serve as a guide to prompt the participants to speak freely and share more information. However, the interview questions might not be followed rigidly, as the researcher intends to use grounded theory analysis techniques, which are concurrent with the process of data collection and analysis (Charmaz, 2003).

3.7 GROUNDED THEORY AND SAMPLING

In grounded theory, data collection is carried out concurrently with data analysis. As a result, the researcher will have to analyse each interview transcript before he can conduct a subsequent interview, in order to further explore concepts that have emerged from the previous interview (Creswell, 2007). This process might extend the scope of the case study under investigation, in an attempt to seek clarity and more insight into the concepts that emerge during the interviews. However, the researcher will be vigilant against over-extending the scope in pursuit of more concepts. The research will explore concepts that are relevant to answering the research questions, and, in turn, solve the research problem.

In this way, data collection becomes an iterative process, as the researcher would want to explore some of the concepts further, after analysing interviews that have been already conducted. Each interview conducted will add to the researcher's theoretical sensitivity, in order to follow through concepts that are relevant to the problem. According to Corbin and Strauss (1990), the researcher should be theoretically sensitive when conducting interviews and analysing data, in order to probe for more insight and clarity into the conceptual gaps that might not explicitly spell out the cause and effect, or relationships between the categories. Theoretical sensitivity will then enable the researcher to determine a source of data that is more likely to provide relevant responses, or that is knowledgeable in the concept being examined at that point in the study.

Even though theoretical sampling will play an important role for sampling in a grounded theory study, it is equally important to determine a sample before the investigation takes place, so that the researcher would have a starting point to the investigation. A purposive sample will be drawn from the public sector departments, with the assistance of a gatekeeper. The gatekeeper is in a position to know each government department's status, in terms of project progress. It is the gatekeeper who will be used to identify a theoretical sample, in order to close information gaps in the data. In fact, a combination of sampling techniques will be applied in the study, as theoretical sampling works well within snowball sampling.

In order to identify the next participant who is in a more likely position to bridge the information gap, the researcher would have to ask the current participants about any likely participant who might be willing and able to provide more information on the subject. Snowballing will carry on until data saturation. This is when no new concepts emerge from data. In order to do this effectively, the researcher will have to understand grounded theory as a research design, and how to apply features of grounded theory that are relevant to the study.

Grounded theory is a qualitative research design which is at a developmental stage. There is still disagreement between the founders of grounded theory, about the role of literature in a grounded theory study. Before their conflict of ideas, they argued that theory generation should not be contaminated by preconceived knowledge that could be forced into new theory. They insisted that concepts should be only grounded in data as they freely emerge from it. All the researcher could do was to probe unclear or packed concepts, to get more insight into a concept and determine how it provides an indication of relationships between categories. Glaser (1992) maintains that researchers immerse themselves in the study without any predetermined outcomes, and approach the study with a blank slate. This is not, however, the view shared by Strauss, one of the founders of grounded theory, who advocates the application of literature in order to gain theoretical sensitivity about the investigated subject. Theoretical sensitivity is gained from literature and other sources of information, and it helps the researcher ask appropriate questions that lead to the achievement of research objectives.

Despite the disagreements between the co-founders of grounded theory, it is still an effective research design, especially when the research objectives are developmental, in a sense that in the study something will be developed. It also allows the researcher to conduct an in-depth investigation into, and deeply examine, concepts, in order to formulate a coherent account of events that determine the relationships between concepts. It is this network of concepts that is used to generate theory.

This study will be conducted within the combined parameters of case study guidelines and grounded theory. The case study design principle in this study will help with the definition of the scope of the research, in terms of the unit of analysis to cover in the investigation. Meanwhile, grounded theory principles are useful in analysing data and generation of theory, in order to bridge information gaps, as the research problem is not fully covered by theory and the literature reviewed. Besides, definition of scope for this study case study will be used to develop a case study protocol, which contains a detailed plan of the data collection process; it will be discussed in detail in the subsequent sections of this chapter.

3.8 BIAS IN THE STUDY

Qualitative studies are said to be subjective, especially those that are underpinned in the constructivist, ontological position (Vidich et al., 2003). Subjectivity could lead to bias, because the researcher himself is the instrument of the research process. He is fully involved in the interpretation of data, with the help of his participants. The interpretation could be influenced by his philosophical and theoretical point of view (Corbin & Strauss, 1990; Guba & Lincoln, 1994).

Even though subjectivity is part of qualitative research, Creswell (2007) suggests a technique that can be used to eliminate the temptation to force a preconceived theory into data analysis and the investigation process as a whole, called 'bracketing' (Rolls & Relf, 2006). This technique enables the researcher to acknowledge his bias and inclinations towards one particular idea rather than another, and then put his ideas aside during the research process. The process of acknowledging one's biases and inclination to certain ideas, would help limiting bias. Bias in the study could jeopardise the rigour of the study, as it may lack trustworthiness (known as validity and reliability, in the quantitative paradigm) by missing representing the actual account of events in the field (Krefting, 1991).

3.9 DATA ANALYSIS

In conducting data analysis for a grounded theory study, there must first be an exact transcription of the interview, which will be used to perform all grounded theory analysis procedures. Once the transcripts are secured from a professional transcriber, the steps of data analysis procedure will be open coding, axial coding and selective coding. Data collection and analysis is a reciprocal process, where both collection and analysis are carried out concurrently (Creswell, 2007). Each interview will be conducted after the previous interview has been analysed, to enable the researcher to probe concepts that emerged in the previous interview. The following section will provide a detailed description of the data analysis procedures that will be applied in this study.

3.9.1 OPEN CODING

Once interviews have been conducted and transcribed; the researcher will extract concepts from the interview transcripts. Each concept will be assigned a code consisting of three alphabetical characters that best represent the identified phenomenon. The researcher starts to identify conceptual labels in the interview; these labels depict occurrences of a phenomenon. These conceptual labels are assigned as they are depicted in the interview; usually there may be many in one transcript. These concepts will be grouped together in categories, and each category will be assigned a name that is logically related to the group of concepts it represents (Corbin & Strauss, 1990).

The researcher has to take note of the properties and dimensions of each category, as the properties depict characteristics of the category, and dimensions represent locations of the property along the continuum (Corbin & Strauss, 1990). These are important in establishing relationships between the categories, when generating theory. However, this is not a theory generation phase as yet, since the researcher will still be looking for more data until the research questions are answered, or until the data is saturated (Glaser & Strauss, 1967; Charmaz, 2003; McCallin, 2003; Guba & Lincoln, 1994).

3.9.2 AXIAL CODING

Once open coding is complete, and all concepts have been extracted, the following step will be axial coding. This coding is about creating relationships between categories, in or-

der to formulate a storyline about the account of events. This should be done as freely as possible, without the researcher's intervention, in terms of rationalising the unfolding of the phenomenon. Even though qualitative studies are known to be subjective, it is important for the researcher to bracket his ideas about the likely results. At this stage, the researcher specifies categories in terms of the conditions that give meaning to it (phenomenon), the specific properties that are embedded in the conditions (context), the action/interaction strategies that are used to manage the categories and themes, and the consequence of these strategies (Corbin & Strauss, 1990).

The above elements of the categories are sequentially aligned in Corbin and Strauss (1990) as:

(A) CAUSAL CONDITION → (B) PHENOMENON → (C) CONTEXT →
(D) INTERVENING CONDITIONS → (E) ACTION/INTERACTION STRATEGIES →
(F) CONSEQUENCES

Causal conditions are the events that lead to the development of the phenomenon. In this case, the researcher's role is to identify these causal conditions from data, and, meanwhile, avoid infiltrating data with his preconceived notions about theory. It is also important to acknowledge the fact that the interpretation of relationships will be influenced by the researcher's point of view. This forms part of developing a storyline and shedding light on the development of the story in context.

A phenomenon, as described by Corbin and Strauss (1990), is the central idea about what happens during the investigation, as a result of the actions or interactions within a specific context. The researcher has to examine the transcript to uncover the results of the interaction with the participants in the field. This will then enable the researcher to narrate the full story of the events, and the relationship between events, and then formulate a central idea.

Meanwhile, the context is the main representation of the specific set of properties that pertains to the phenomenon. This identifies the location of the phenomenon along the dimensional range, to specify the magnitude of the effect caused by the interactions that led to the development of a phenomenon. The context defines the intensity, duration or trajectory that pertains to the magnitude of the effect to the phenomenon.

In addition to that, intervening conditions are broader, but provide structural context to the phenomenon. These conditions facilitate or constrain the interaction strategies within a specific context. They give direction to the course of action that can be taken in a specific context, in order to realise the development of the phenomenon in question. These conditions may include time, space, culture, economic status, technological status, career, history, and individual biography (Corbin & Strauss, 1990).

3.9.3 SELECTIVE CODING

This section entails the integration of the entire element identified in the axial coding, which is the fundamental stage of selective coding. At this stage, the researcher has already worked out the categories in term of their properties, dimensions and associated philosophical relationships, to give the categories richness and density (Corbin & Strauss, 1990). The focus shifts from identification of categories and their properties, to the relationships between categories, so as to draw links among the categories and subcategories.

In performing this task, Corbin and Strauss (1990) suggest several steps that can be followed, in order to take a rough list of categories and their properties, and then systematically develop a picture of reality that is conceptually comprehensive, and still be grounded in data:

Explicating the storyline – this requires logical reasoning from the researcher, in order to formulate a storyline that is representative of the reality as conceived by the participants, and yet remain grounded.

Relating subsidiary categories around the core categories – this involves application of properties and dimensions in establishing relationships with core or central categories. The researcher's task, at this stage, is to identify relationships between the core category and other categories in line with the storyline.

This is done by using intervening conditions, interactions, context and consequences, identified during the axial coding phase, to formulate a network of categories and relevant links. These links are determined by categories and dimensional levels – which constitutes the third step.

The fourth step is validating those relationships against data; this is the grounding part of the analysis, as all relationships are checked against data, to ensure that they represent what is depicted in data. If relationships misrepresent data, this could pose problems during the refinement of theory, when the researcher checks with participants as to whether generated theory is the true representation of the information they provided.

3.10 RESEARCH QUESTIONS

This section outlines research questions that will be addressed in this study, in order to achieve the research objectives. These will be aligned to the type of data required to answer the questions, as well as the analysis method that will be carried out. This is done in tabular format:

Research question	Interview questions	Type of data	Analysis
To what extent is the public sector implementing e-Learning in facilitating learning during information systems change to open source platforms?	• What are skills challenges government department is facing after OSS migration process? • How do you deal with such challenges? • How effective is e-Learning in trying to meet skills challenge? • Do you know about any e-Learning training model that has proven to be successful in uprooting the challenges?	• Primary data – in-depth narrative	• Open, axial and selective coding
What factors are affecting e-Learning diffusion in South African public sector	• What are the obstacles that prevent e-Learning from facilitating skills development to the full extent? • What can be done to improve e-Learning practices in public sector?	• Primary data – in-depth narrative data	• Open, axial and selective coding
How do these factors impact on instructional strategy and instructional technology alignment?	• Questionnaire covers following dimensions - Socially orientated instructional strategy - Socially orientated instructional technology; - Compatibility; and - Relative advantage	• Quantitative data from a Survey questionnaire	• Correlation analysis; and • Regression analysis

Table 3.1: Research questions for this study

These research questions will form the basis of inquiry in this study. Some of these questions don't have to be included in the empirical study, as they have been answered in

the previous chapter. Chapter 2 covered the literature survey and the theoretical framework that provide an explanation of theories relevant to the research problem, which, in turn, become useful in answering the research questions.

3.11 CASE STUDY PROTOCOL

3.11.1 OBJECTIVES OF THE RESEARCH

The main objective of the case study is to obtain evidence about the role of using e-Learning in facilitating training in the SA public sector department during OSS migration. This is specifically important where training has to be provided continuously, due to the fast pace changes in the open source environment. This will be achieved by conducting a series of unstructured interviews that will allow participants to openly supply information about their training experiences and perceptions about the use of e-Learning in public sector training, in their context.

There are three key issues to be explored in this research:

- To define factors affecting e-Learning diffusion in the workplace;
- To evaluate the effect of such factors on instructional technology and instructional strategy, alignment strategy in designing an e-Learning experience; and
- To propose a conceptual framework that could provide guidelines for designing an optimum e-Learning experience in the public sector.

These objectives are in line with the research questions, which will be answered by conducting an empirical study described in the case study protocol. Research questions depicted in Table 3.1 will form the basis for the study, along with the research questions depicted in Table 3.1 shows the type of data needed to answer these questions, as well as type data analysis, which will be conducted. In attempting to achieve the objective by addressing the research questions, the researcher will follow the field procedure outlined in the following section.

3.11.2 FIELD PROCEDURE

Field procedure outlines the processes that will take place during data collection. Following the field procedure will allow the researcher to adequately cover the unit of analysis

for this study. As the researcher decided to apply the case study method in conducting this study, the unit of analysis will be the case study. This case study comprises two government departments that have completed the migration process, and have either finished training or are in the middle of the training process:

- Two government departments that have already completed OSS migration process and training; even those that might be still going through the training process, will be selected as case studies.
- In each case study, the researcher will purposefully select training managers in charge of online training and/or traditional brick and mortar training. These departments and training managers will be selected with the help of the OSS migration project manager, who will serve as gatekeeper. His role as gatekeeper will enable the researcher to have access to training managers without being sceptic about the researcher's intentions
- As concepts emerge from data analysis and data collection, a theoretical sample will be selected, with the assistance of the training managers, in cases where more data is required in order to clarify certain concepts. The researcher will, in fact, ask the current participants to identify other participants who might provide more in-depth information about emerging concepts.
- All interviews will be recorded with an audio-digital recorder, to make transcription easy.
- A transcriber will be employed to accurately transcribe interviews for analysis, before the next interview is conducted.
- Training documents will be used as evidence to support interview information.

3.11.3 INTERVIEW SCHEDULE

The interview schedule outlines questions set for the researcher instead of for the participant. These questions serve as prompts. Interviews will be set around the answering of these questions, although probing questions will be asked where the researcher detects gaps in the information provided by the participant.

- What are the skills challenges the government department is facing after the OSS migration process?

- How do these challenges manifest themselves?
- How do you deal with such challenges?
- How effective is e-Learning in trying to meet skills challenges?
- Has the e-Learning training model been successful in uprooting the challenges?
- How is it received by learner/employees?
- What can be done to improve e-Learning effectiveness in the department?
- Who are the stakeholders in the development of e-Learning?
- What is the general shortcomings of e-Learning as training and learning solution in South Africa?
- What are the obstacles that prevent e-Learning from facilitating skills development to the full extent?
- Why does a skills shortage prevail, despite the existence of e-Learning, given its functionality and advantages?
- How do these obstacles manifest themselves?
- How can these obstacles be addressed, in order to overcome skills development challenges?
- Is e-Learning in South Africa contextually different from that of the European countries?

Interviews will be conducted until the abovementioned questions are adequately answered; this will be determined by data saturation. The researcher will know that he has reached data saturation point, when no new information comes from the interviews (Glaser & Strauss, 1967).

3.11.4 CASE STUDY REPORT GUIDELINE

This section of the case study protocol outlines tentative major headings and sub-headings which become the focal point of the case study. However, this cannot be the case for this study, as grounded theory type analysis will be applied. Grounded theory principles are against predetermination of major headings on the report, as they are meant to emerge from data, in line with the concepts. Grounded theory researchers are expected to refrain from forcing their preconceived concepts into the research process (Glaser & Strauss, 1967; Corbin & Strauss, 1990).

Even though the above case study protocol is predominantly used in case study design, it is most useful in grounded theory, for keeping the study focused on the problem. It helps avoiding situations where the researcher gets derailed from the research problem, due to interest on the emerging concepts from data. As much as the researcher is supposed to probe themes that seem to be of value to the solution, he should avoid plunging into a black hole where he will not find the end of the investigation.

3.12 SURVEY RESEARCH DESIGN

The researcher intends to perform process triangulation, to ensure comprehensiveness of the findings for this study. In order to triangulate the research process, the researcher will conduct a survey to gather public sector employees' opinions. A survey technique will be used to collect quantitative data that would allow the researcher to solicit participants' opinions about important variables that emanated from propositions' qualitative analysis. The survey will enable the researcher to operationalize the propositions, in order to perform further testing. In line with the research objectives, the purpose of this survey is to evaluate associations between variables that are deduced from propositions. These dimensions are:

1. **Relative advantage:** this pertains to the degree which the innovation provided adds value to the current business or learning processes enjoyed by public sector employees (Rogers, 1995).
2. **Compatibility:** this dimension pertains to the degree of compatibility with existing values and past experience. An idea or innovation should conform to values and norms of the existing social system (Duan et al., 2010).
3. **Socially orientated instructional technology:** is used to deliver instructional material to candidates as they continue with learning programmes in line with specific outcomes of the learning programmes.
4. **Socially orientated instructional strategy:** this allows the instructional designer to develop learning material in line with candidates' learning styles, meanwhile ensuring that the specific outcomes of the programme are achieved, and that suitable instructional technology is used to facilitate the learning experience.

5. **Technology maturity:** this is an indication of participants' access to Information and Technology Communication tools. These tools include commonly used devices such as cellular phones and smartphones.

3.12.1 SURVEY INSTRUMENT

In addition to the abovementioned dimensions, is the demographic section of the questionnaire (see Appendix 1). The questionnaire is designed in such a way that all dimensions include an exhaustive list of items that are hoped will measure relevant dimensions. Each dimension is measured with a number of items that were drawn from propositions and related literature, with the 5-point Likert scale ranging from 'almost never' to 'almost always', where 1 represents 'almost never' and 5 represents 'almost always' (Gliem & Gliem, 2003). The Likert scale enables the researcher to determine the intensity of items (Maurer & Pierce, 1998). Items in the questionnaire are represented as positive statements to avoid ambiguity, and they were measured by Likert scales.

The questionnaire was distributed to a purposive sample, which comprised every public sector employee who is involved in e-Learning initiatives. Some of them are members of the e-Learning forum in the public sector (Leedy & Ormrod, 2005). The e-Learning forum's purpose, among others, is to bring together members of the public sector, to brainstorm the infusion of e-Learning in the public sector capacity development. Out of 172 e-mail contacts received from the e-Learning forum and other sources, 85 responded, which is a 49.5% response rate.

It has been decided that data triangulation will be conducted, instead of process triangulation, because of budgetary constraints. Process triangulation would have meant the researcher conducting another similar study, using a different research methodology. However, data triangulation would only involve collecting data that is readily available in the stored documents. Another effective way of doing triangulation would have been conducting a quantitative study, using a survey, and then subjecting the results to statistical analysis to see if it produced the same results. The researcher cannot afford that, due to time and budget limitations. This will be discussed further in the limitations of the study.

Even though data triangulation is the primary form of triangulation the researcher is going to perform in this study, a focus group will also be used to refine theory, once it has

been generated. A focus group will provide input into the refinement of the final theory, as it will consist of the expertise in OSS, end-users and department managers. One might refer to this as process triangulation, but it is still verification of data using different instruments.

3.13 CONCLUSION

In this chapter, the researcher discussed a detailed plan of how he is going to conduct this study. Among other concepts discussed, was the research strategy to be adopted, in order to achieve the research objective as outlined in the proposal of this study, followed, in discussion, by research philosophy. This compared two research philosophies: one being positivist philosophy, popular in IS, and the other being the natural science field of study. The second research philosophy is social constructivist philosophy, which is not as restrictive as positivist philosophy, in allowing the researcher interaction and interference with the studied subject, as it involves human social interaction, and requires socio-cultural sensitivity on the part of the researcher.

Subsequent sections discussed a related implementation plan of the inductive strategy, within the social constructivist, philosophical frame of mind. This can only be achieved in the qualitative paradigm, by employing a combination of case study and grounded theory methodologies. Each of these methodologies has methodological features that are useful to this study, in terms of the type of data required to answer the research questions from case study, and a way of analysing data that provides rich data to the grounded theory.

CHAPTER 4

DESCRIPTION OF A CASE STUDY

4.1 INTRODUCTION

In this study, the researcher chose ‘case study’ as a primary research design, along with grounded theory analysis techniques. The combination of case study design and grounded theory analysis techniques allows the researcher to gain an in-depth understanding of the research problem, as described in the introductory chapter of this study (Chapter 1).

The case study should enable the researcher to understand the current application of e-Learning in training programmes, with specific reference to e-Learning in facilitating skills acquisition in order to cope with the changing IS environment in the public sector. That way, the researcher will re-conceptualise e-Learning practice in the public sector as a case study, and then develop theory which may help in optimising e-Learning practice in the public sector, thereby contributing to fight against skills shortages and unemployment, where possible.

In this chapter, the researcher will discuss the importance of theoretical sensitivity, in relation to the application of the grounded theory analysis technique. It is important to note this, because during many conversations with colleagues, the researcher got the feeling that many of the colleagues believed that grounded theory research should be approached without any theoretical perspectives from the researcher. However, the co-founders of grounded theory, Glaser and Strauss (1967), state that grounded theory procedures are suggestive guidelines, but not a package of prescribed principles. They also encourage theoretical sensitivity, in order to understand philosophical principles underlying emerging concepts.

This chapter will also describe the participants as they shared experiences with the researcher during the interviews. The data collection and analysis section provides a detailed description of how the grounded theory analysis technique (Charmaz, 2003) was applied in

the case study, and data triangulation describes how the researcher tries to ensure that data collected and analysed is reliable or trustworthy.

4.2 THEORETICAL SENSITIVITY

Experts in grounded theory argue that researchers should not contaminate theory development with preconceived ideas, but suggest they approach grounded theory development with an open mind, and respond to data only (Glaser, 1992). Theory should be grounded in data, without the inducement of the researcher's knowledge of the subject. However, grounded theory as a research design evolved from the position where the theoretical framework could not be used as a means to constrain interpretation of results, to a deductive position advocated by Charmaz (2003), who, along with the co-founder of grounded theory, Strauss (in Corbin & Strauss, 1990), recommends that researchers should conduct an initial literature survey.

Under these circumstances, the literature survey serves a different purpose from that in quantitative research. According to Corbin and Strauss (1990), theoretical sensitivity enables the researcher to formulate research questions that are relevant to the research problem, and that also address the research objectives. Theoretical sensitivity is acquired by reading on the relevant topic, in order to gain an insight into dimensions of the research problem. Without theoretical sensitivity, the researcher would wander around asking questions that are not focused on the research problem, and thereby struggle to reach data saturation – which means that the research process will take longer than necessary.

Theoretical sensitivity is even more crucial in developing a case study protocol for this study – specifically, when developing the interview schedule for a specific sample. In developing an interview schedule, the researcher had to ensure that interview questions exhaustively covered the main research question, by finding all the items needed to answer the research questions from the literature survey. The researcher had to apply theoretical sampling, which involves finding prospective participants who are more likely to provide missing information, or those who can affirm a certain conceptual position emerging from data.

Basically, in this study, the researcher did conduct a literature survey, in order to gain an insight into concepts that he was not familiar with, such as educational theories which

explain how adults learn, and the technology acceptance model, which explains how employees adopt new technology in the workplace (Charmaz, 2003). The researcher thinks that it is important to emphasise the point that it is not wrong to conduct a literature survey when using the grounded theory analysis technique (Corbin & Strauss, 1990; Charmaz, 2003). Although grounded theory data analysis is used, the researcher will bracket his ideas and opinions about what theory should look like, and let it emerge from data. The following section of this chapter will provide a discussion about the case study profile.

4.3 DESCRIPTION PARTICIPANTS AND CASE

In order to gain an in-depth understanding of the problem, and then possibly provide a reasonably detailed answer to the research questions, a case study design was chosen. In this study, the researcher chose multiple participants, because of the decentralised nature of e-Learning practice in the South African public sector (Yin, 2009). In line with the context of the study, it is appropriate to choose the public sector, since it is the biggest employer in the country, and is actively involved in e-Learning based training (Department of Public Service and Administration, 2006). Although the public sector comprises many service departments, one department is the custodian of Information Technology (IT) functions in government – that is, the State Information Technology Agency (SITA). This department deploys its employees to other departments as consultants. SITA is South African government Information Technology agency. It oversees all Information Technology projects that are undertaken by Government. Open Source migration project is managed by SITA.

The researcher could have included other departments in the study as mini case studies, but he then found out that SITA consulting agents are deployed to these departments. He then decided to collect data from multiple participants deployed in different departments, which forms the unit of analysis. Multiple participants enabled the researcher to gain different perceptions on the problem. These cases are made up of a consulting agent from SITA, and independent agents who are in different service departments where they are responsible for training and development. Among other instruments they use for training and development, is e-Learning.

4.3.1 PARTICIPANT#1 SAPS CONSULTANTS

This participant is involved in setting up and implementing e-Learning solutions for the South African Police Service (SAPS). His office provides a variety of training for SAPS personnel, using different learning delivery mechanisms, including e-Learning-based training. This participant is also involved in other e-Learning projects that include children from townships, and is also working part-time for one of the universities in Gauteng, supervising postgraduate students in e-Learning projects.

This participant is running e-Learning courses based on Moodle – an e-Learning programme based on an open source platform. He seems to be more active in e-Learning implementation and research than all the other participants, because he participates in more than one e-Learning project. Besides, he is a member of the Government Information Technology Officers Council (GITOC) that was commissioned to investigate opportunities of government migration to open source platforms. This placed him in a better position to be a gatekeeper, after the original gatekeeper left SITA as a migration project manager. After his interview, he introduced the researcher to his colleagues in other departments, who could provide relevant information for the study.

According to this participant's perceptions about the effective use of e-Learning as a training tool, the SAPS and the South African National Defence Force (SANDF) are two of the leading users of e-Learning in the public sector. Most of the SAPS learning programmes are complemented by the e-Learning mode of delivery. This training unit acknowledges the fact that not all employees are ready or willing to learn through the e-Learning mode. They apply a blended learning mode as a method of phasing in e-Learning, and are experimenting with other creative methods of attracting employees into using the e-Learning mode of learning.

Network infrastructure and computer access at home are major challenges to successful implementation of e-Learning. In turn, logon rate decreases because of trainees' frustration with slow response time to learning activities, where the network infrastructure is not capable of carrying all computing requests simultaneously. However, according to the participant the nature of the trainees' positions in their respective departments has impacted on their tolerance towards the slower response time. For example, the SANDF personnel would seem more tolerant because they are trained to obey orders, whereas other trainees

would give up and try alternative methods of gaining the same knowledge – which, most of the time, is classroom learning.

4.3.2 PARTICIPANT #2 NEW BUSINESS DEVELOPMENT

This participant was employed on a contract basis in the new business development section, after the decision to migrate to open source platform was made official. He was involved in researching and piloting a solution, and then suggesting new business to SITA and the public sector as a whole. His function includes compiling training requirements, and then finding better training solutions – e-Learning, among others.

This participant has a strategic management background from his previous employment. Even though he was not actively involved in training activities, he was involved in the design and development of e-Learning solutions. He is aware of the strategic impact e-Learning might have in the public sector, if implemented properly. The researcher thought this participant could provide insight into the planning and implementation of e-Learning in the public sector – at least, at a strategic level. This participant has seen the piloting of some e-Learning projects, including their success and failure.

The new business development section, among other functions it sets up, is proof of concepts on how e-Learning can be used by other departments within the public sector. Once proof of concepts has been set up, they develop content and packaging, getting it ready to be used in a real live training setting. Before such packaged e-Learning solutions are rolled out to the wide public sector community, these solutions are piloted by setting semi-informal courses that are presented, using the piloted solution.

The most prominent function of the piloted e-Learning solution has been a discussion forum, where experts in some of the open source platforms interact with those who are learning new features of open source software. Developers are under the assumption that open source software is not so different from their predecessor's proprietary software. Therefore, discussion forums suffice in providing needed information or learning of new features of the new IS platform, by enabling asynchronous and synchronous interaction with experts in open source platforms.

4.3.3 PARTICIPANT #3 SITA TRAINING MANAGER

This participant is based at SITA training; it is the hub of technology training in the public sector. Her department is responsible for business training for the public sector. Their training programmes are based on other departments' requirements, especially computing applications. Such application training programmes are coupled with business functions training that are relevant to the trainees' respective departments. She comes face to face with skills challenges in the public sector, so that puts her in a better position to provide information about the skills challenges that might have emerged during and after open source migration.

Her insight into the skills challenges could shed light on the existence or non-existence of skills challenges in the public sector; she could paint a true picture of the e-Learning application in the public sector. Information gathered from her enabled the researcher to understand what the source of skills challenges in the public sector could be, if no other factor was responsible. This insight enabled the researcher to probe further into the problem, following grounded theory principles (Glaser & Strauss, 1967; Charmaz, 2003). The researcher had to go back to the first participant as a gatekeeper who understands, and is involved in, e-Learning research, and at the same time knows who is responsible for what function in the public sector.

This training division is responsible for training government officials from other departments. It receives training requirements from different departments as and when they identify skills gaps in their departments. This training division has to design and develop modules that should address skills needs for service departments. Some of the service departments' training requests are catered for by already existing modules that are offered either online, or in face-to-face contact sessions in the SITA training centre.

They offer training modules that are aligned or articulated to South African Qualification Authority unit standards. However, they sometimes receive training requests from the service departments for groups of personnel to be trained, just to satisfy budget requirements for such a department. This usually occurs at the same time as the budget cycle, annually. Such requests are mostly for computer application training, where most of the trainees do not understand the business application of the software they are learning. In the following budget cycle they come back to the centre for another module which is not directly related to their business practice. In that way, progression is lacking, because each

training module the candidates take in the subsequent years, is not related to the previous module.

4.3.4 PARTICIPANT #4 PRODUCT DEVELOPMENT

This participant was involved with IT product development for the public sector employed by SITA. Product Development is an ad hoc division responsible for developing specific products to be used by other departments in the government. However, this division is not part of the new business development division where participant #3 is based, and neither is this participant part of SITA training – which explains, to a certain extent, some of the challenges facing SITA training with regard to e-Learning. This participant is well endowed with technical knowledge, gathering from the technical information he is giving to the researcher. This can also be explained by his qualification in the IT field: He holds a Master's degree in IT.

This participant had a different perspective on the problem, owing to his technical position in his division. He could mention multiple platforms that can be used for e-Learning delivery, which are easy to access and sometime free of charge. The researcher gathered data about what the problem could be, and solutions that other participants could not provide, with respect to learning technologies available and methodologies. After analysing this interview, the researcher realised that he might have to get an outside perspective from a participant who is not employed by the sector, but has understanding of, or has worked on, the e-Learning platform.

This division is not directly involved in implementing e-Learning, or teaching and learning. This is a typical IT department that focuses on new product development. Since open source is relatively new in the public sector, it is this division's responsibility to find new and innovative ways of applying the open source model effectively in government. e-Learning is one of the innovative ways of facilitating training in the public sector, and it is technology based. Thus far, they have successfully set up a collaborative instrument that is used to integrate input from different contributors, as identified and selected by the developers of the forum.

The forum consists of all stakeholders in the migration project, which includes project managers, experts in different areas of technology application, and those who are assigned

responsibilities during the migration. This forum is based on collaborative principles, one of which is e-Learning principles. This participant enlightened the researcher as to the control aspect of collaborative learning, as this forum is open to the public, but is joined by invitation. Interested outsiders have to ask for an invitation. Once the invitation has been extended to them, they can then join in and participate in the discussions. This collaborative forum is also based on the Web2.0 platform, in order to facilitate interaction between users of the platform.

4.3.5 PARTICIPANT #5 IT PERSONNEL FOR DEPARTMENT OF LABOUR

Participant #5 is working for the Department of Labour, which is affected by skills challenges, in the sense that issues of employment and unemployment are the responsibilities of this department. This participant's position in the department is that of IT manager; his previous position was with the Department of Education in Gauteng, and he was also involved in the Gauteng Online Project. The Gauteng Online Project is meant to set up computer workstations in all schools in Gauteng.

He has been involved in many e-Learning-related initiatives that put him in a position to be nominated as a participant in this study, especially with his outsider perspective on the subject under study. In addition to his experience with different e-Learning projects, he is finalising his Master's degree with one of the universities in Gauteng. Data gathered from this participant provided the researcher with insight into broader e-Learning practice in South Africa.

All participants were selected on the basis of their responsibilities within their respective departments. Most of them are employed by SITA, but they serve in other departments – except for participant #5, who is not working for SITA. As indicated in Chapter 3, each of the interviews conducted with the above participants is recorded and transcribed, then analysed as soon as it is finished, before conducting the following interview.

4.3.6 PARTICIPANT #6 REGIONAL TRAINING

Participant #6 works for a training department that serves the public sector. In this case, the researcher spoke to three participants, as they preferred to all seat in one session. They

all work in the same department, but one is an intern in the academy. The academy is one of the major drivers of e-Learning diffusion in public sector training.

They are already piloting some e-Learning initiatives, and they are also investigating a usable e-Learning framework. The participants enjoy the support of the academy leaders, as they themselves have experimented and investigated possibilities and opportunities of employing e-Learning and other online learning mechanisms. They also form part of an e-Learning forum that discusses and investigates e-Learning application in the public sector. In fact, all the participants mentioned above are members of an e-Learning forum.

4.4 SUMMARY OF THE CASE STUDY

Each participant of the case study is discussed above, and in this section the whole case study will be discussed with respect to characteristics found from the case study. Even though most of the participants are working for the department SITA, their exposure to e-Learning practices created diverse perceptions about the impact and role of e-Learning in facilitating skills transfer in the public sector and in the entire labour market. e-Learning practices identified by the participants in this case are not consistent with that definition of e-Learning, which is seen from what some of the department practises. However, even literature does not provide a single consistent definition of e-Learning. Even though that is the case, most of the participants' idea of e-Learning does not cover the basic underpinning principles and characteristics of e-Learning, such as just-in-time, just-in-context learning, flexible, discovery learning model, lifelong learning, and student/learner centric learning experience.

According to Neuhauser's (2004) online course design maturity models level, SITA's e-Learning application can be allocated in the awakening phase. This model provides a phased matrix that enables comparison of one's online course with the levels of maturity along components and appearance, individualised and personal use of technology, socialisation and interactivity, and assessment of key process areas. Not all participants indicated any progression to the higher levels of the maturity level, especially with regard to the key process areas such as 'individualised and personal', 'socialisation and interactivity' and 'assessment'.

SITA, as custodian of migration to open source project, and hub of IT in the public sector, has done much to start up training initiatives and deploy consultants to other departments. Some of the departments are more successful than others in setting up e-Learning training programmes. It is also important to note that outside SITA there is a division dedicated to e-Learning design, and developed in the Department of Public Administration. The researcher decided to include this department in the study, in order to obtain a different perspective on the role that is played, or could be played, by e-Learning in facilitating skills acquisition in the public sector, and that may be of help in reducing skills shortages in the whole labour market.

4.5 DATA COLLECTION AND ANALYSIS TECHNIQUES USED IN THE CASE STUDY

Data collection and analysis were outlined in Chapter 3 of this study. The researcher was not in a position to discuss finer details of the data collection and analysis process. This is attributed to the qualities of the grounded theory analysis technique. Firstly, the grounded theory method entails concurrent data collection and analysis process, which makes both processes highly dependent on each other (Creswell, 2007). Therefore, the researcher could not know beforehand how the analysis would influence data collection. Secondly, the researcher could not know when, and which, themes would prompt theoretical sampling, until data was collected and analysed, after which theoretical gaps would be identified.

After the case study was selected, and participants were identified, according to Yin's (2009) suggestion, the researcher collaborated with a gatekeeper who was identified as an open source migration project manager, and approached prospective participants. Only four staff members were directly involved with open source migration training, with SITA as the custodian of the migration project. The researcher then prepared an interview schedule that contained questions to be asked during the interview session. These questions were based on the research questions as outlined in Chapter 3.

Although the interviews were intended to be unstructured, it is appropriate to have a framework of the activities that have to be followed towards achieving specific objectives. So was the case with data collection process for this study. Consequently, interviews were

semi-structured. This was helpful in facilitating the coding process, where the researcher would expect some common codes or themes to emerge, if they did, after a certain question had been asked. All in all, semi-structured interviews allow the researcher to structure the interview process while giving himself an opportunity to probe further into concepts that come up during the interview. The following questions were asked during the interview, as part of the interview schedule.

The interview schedule outlines questions set for the researcher, instead of the participant. These questions served as prompts. Interviews were set around answering these questions, although probing questions will be asked where the researcher detects gaps in information provided by the participant:

- What are the skills challenges the government department is facing after the OSS migration process?
- How effective is e-Learning in trying to meet the skills challenge?
- What are the obstacles that prevent e-Learning from facilitating skills development to the fullest extent?
- Why does the skills shortage prevail, despite the existence of e-Learning, given its functionality and advantages?
- How do these obstacles manifest themselves?
- How can these obstacles be addressed, in order to overcome skills development challenges?

After the first interview, the researcher analysed the data using AtlasTI. This is qualitative data analysis software. Before assigning a primary document in a hermeneutic unit, data recordings have to be transcribed. The researcher employed transcribers to transcribe voice data stored in MP3 format on a digital recorder. The first transcribed script was 14 pages, containing a 57-minute interview.

Each interview was saved in rich text format for AtlasTI compatibility, and then uploaded to a hermeneutic unit. The hermeneutic unit contains all primary documents in different formats such as videos and graphics, text, and pdf. Once the primary document has been uploaded, the researcher can perform many functions available and afforded by the

AtlasTI software. Even though multiple functions were available, the researcher had to restrict himself to the features that conform to the grounded theory analysis technique.

In addition to interviews, document analysis was conducted in order to triangulate data, thereby ascertaining trustworthiness of data. Trustworthiness of data is applicable in qualitative research, which is the equivalent of validity in quantitative research studies (Krefting, 1991; Yin, 2009). Document analysis enabled the researcher to find congruent results with those found from interview transcripts. These documents consisted of e-Learning strategic plans and curriculum development guidelines obtained from the e-Learning centre.

The analysis method applied in the document is the same as the method used to analyse interview transcripts. The researcher realised that some of the themes that emerge from document analysis don't automatically emerge from interview transcripts. In this case the researcher applied theoretical sampling in order to identify a participant who was in a better theoretical position to clarify and fill in information gaps (McCallin, 2003; Strauss & Corbin, 1997). To a certain extent, analysing documents had an impact on the researcher's theoretical sensitivity, in the sense that some of the concepts were not obvious to the researcher, since he is not familiar with public sector structures. In line with grounded theory analysis technique guidelines, the researcher performed open coding, axial coding and selective coding with both interview transcripts and documents obtained from the government department.

4.5.1 OPEN CODING

Upon uploading the first transcript, the researcher started coding, using open coding as it is the preferred coding method for grounded theory analysis techniques (Charmaz, 2003; Glaser & Strauss, 1967). This coding method is just one method available in AtlasTI, and the researcher had to be cautious that he did not apply deductive reasoning in his coding, after reading some literature on the subject matter. Open coding allowed the researcher to identify and code themes as they emerged from data – 26 themes emerged from the first interview. These themes formed the foundation of the following interview, and prompted the researcher to revert back to literature in order to gain a better understanding before he could start to extract meaning from the data (McCallin, 2003; Glaser, 1992). It is important

to note that literature consultation, in this case, was not to impose existing theories on emerging data, but to gain better a understanding of the themes as they emerged.

As these themes emerged, they were coded, and the extracted codes linked to supporting quotations; some codes had multiple quotations linked to them. The number of quotations linked to a code indicates the groundedness of each code on data. The researcher coded line by line throughout the transcript, and the process continued for transcribed interviews. Different types of codes were identified, such as phenomenon, property, and dimension, and different types of conditioning codes as well as consequence codes. Along with code identification, quotations were identified in terms of their relationships with one another. In the first transcript, the researcher could see the code emergence patterns, but still had to code inductively, otherwise he would have been imposing first transcripts codes on the second transcript, as a codebook (Charmaz, 2006).

Because of experience with the first transcript and literature survey conducted in order to make sense of the emerging themes, the researcher was more theoretically sensitive in coding the second transcript. This approach is, however, not accepted by some grounded theorists, especially those who subscribe to the positivist approach that prohibits infusion of literature, or the researcher's preconceived notions, into the analysis process. However, Charmaz (2006) argues that grounded theory principles and procedures are suggestive guidelines, but not prescriptive or packages that must be adhered to rigidly. This did not mean that the researcher was absolved from maintaining some level of objectivity. He then applied the bracketing technique to ensure that his preconceived notions were eliminated from the coding process.

As a result, new codes emerged from the second transcripts, even though the same questions were put to different participants. This was possible, because the researcher approached data collection with the bracketing technique guarding his bias that might have developed during the first interview (Glaser & Strauss, 1967; Guba & Lincoln, 1994). Open coding was applied to all interview transcripts in preparation for axial coding, which is the subsequent step to open coding.

As new codes emerged, so did new quotations. The second interview became the second primary document of the hermeneutic unit. Common codes existed in both primary documents, and the researcher had to edit quotations in the quotation manager of AtlasTI to add

new quotations into their relationship network. This process continued for all primary documents.

4.5.2 AXIAL CODING

Axial coding is the second step of grounded theory analysis techniques. AtlasTI, as qualitative data analysis software, was still useful because of its functionality to create families using themes that emerge from data (Muhr, 2004). Axial coding entails clustering related themes into a category. The terms ‘theme’, ‘concept’ and ‘category’ are used interchangeably in literature; in this study, the researcher refers to a category as a cluster of themes that emerged during open coding. The process of clustering related themes in AtlasTI is called ‘creating families’ (Barry, 1998).

Some of the themes that were grouped together in one family, or category, were interconnected, as some themes influence others in different ways. As a result, a network was created to depict interconnectedness of themes with a category, according to their relational influences. In addition to that, many themes had multiple quotations linked to them. Whenever a representing code is created, the corresponding quotation is saved under such a code (Muhr, 2004). As more codes were created during analysis of more transcripts, some codes were repeated, indicating a path towards theoretical saturation. This also indicated how grounded the theme was on data.

The more grounded a theme is, the more quotations are linked to a code that represents the theme. Most of the codes appeared repeatedly in all transcripts, indicating similarities of response from participants. This also helps in providing evidence during the theorising stage of the research, especially if these quotations include detailed narratives.

In the category ‘creation process’, the researcher had to ascertain that categories were established at the same abstract level, so that interconnection could be established. Category names kept on changing as new themes found families in such categories, because some themes improved or changed the meaning of the collection of themes, as they emerged later. Other categories’ names had to change as the researcher gained more understanding and feel for the data he was confronted with, which enabled him to outline a clearer network of relationships.

4.5.3 SELECTIVE CODING

After related codes were clustered together to form a category, the following step of the analysis was selective coding. This analysis step entails establishing interconnectedness between categories. As mentioned earlier in this chapter, these categories have to be at the same abstract level. As a result, the researcher came out with 5 categories, each containing more than 19 themes or codes. With AtlasTI one can create families by codes or memos, but it was most appropriate to establish code families because they represent themes that emerge from data.

Some of the families had interrelated codes within themselves. Such interrelationships depict the ways each code/theme influences other codes/themes with the line of events according to participants' account. In discussing the results, the researcher will use such interrelationships between codes; moreover, theorisation will be the basis of such relationships. However, these are merely interrelationships between codes, whereas selective coding entails establishing interrelationships between categories. It is these links that facilitate interlinks between categories.

Some of the codes which belong to a specific category, have influential relationships with other codes that belong to another category, as they may share the same quotation. One quotation can be linked to more than one code, but this is determined at the open coding step of grounded theory analysis (Barry, 1998). A spider-web-like network emerged, as each category was interconnected to at least two other categories. The researcher decided to reflect back on literature, to gain a theoretical understanding of each category he was confronted with, even though this was not meant to influence the theorisation process. The whole analysis process until this stage, was conducted strictly within inductive reasoning, to eliminate any degree of theoretical imposition into the analysis.

Consequently, the researcher was able to understand the spider-web-like network and to make sense of it for interpretation purposes. Each category is represented by a code network, as depicting relationships between each code, and code connectors depict types of relationship such as 'contradict', 'a cause of', 'support', and other connectors. These networks represent interrelationships between 165 codes, after the refining process where the researcher merged some of the codes (Muhr, 2004). This was done by gaining some theoretical sensitivity from literature and documents that were used for document analysis.

It also important to note that almost half of the initial codes were renamed, not to impose the researcher's ideas, but to correct the researcher's lack of creativity in the initial naming of the codes and categories. One of the co-founders of grounded theory (Strauss, in Glaser & Strauss, 1967) suggests that researchers should be theoretically sensitive in order to approach the study with a level of knowledge and understanding of the subject studied. Otherwise, a lack of theoretical sensitivity may hamper the researcher's creativity during both the data collection and analysis stage. In this study, the researcher had to understand the researched subject, in order to ask relevant, probing questions, and know when sufficient data had been collected. As for theoretical sensitivity during analysis, the researcher admits that most of the codes had to be renamed in order to make sense. This made selective coding easier.

4.7 CONCLUSION

This chapter discussed the importance of theoretical sensitivity, as applied in data collection, and, to a certain extent, in data analysis. However, the researcher tried to keep the data analysis as free of preconceived ideas as possible, by applying bracketing techniques. This chapter also covered a description of the participants, and each participant used in the case study, together with a summary of the whole case study. In addition to that, a detailed description of the analysis activities that occurred during the data analysis stage of this study followed, and also triangulation of data.

This chapter provided a detailed description of the participants and the analysis method, to enable the reader to understand how the researcher came to the findings that will be discussed in the following chapter of this study (Chapter 5). An understanding of the data collection and analysis of the study, should help anyone interested in the study to evaluate the rigour of the study.

The following chapter will outline the findings of the study as a product of data collection and analysis methods discussed in this chapter. It will provide a detailed discussion of concepts that emerged in the analysis process, in relation to the conceptualisation covered in Chapter 2 of this study.

CHAPTER 5

DISCUSSION OF RESULTS AND FINDINGS

5.1 INTRODUCTION

Data analysis allows a researcher to understand data and induce meaning that could help explain the current situation. After collecting data through interviews, the researcher transcribed the interviews, and analysed the interview transcripts, using the grounded theory analysis technique as explained in the previous chapter. In this chapter, the results of the analysis, according to the categories that emerged from data, are reported.

Creswell (2007) encourages the use of direct quotations from the source, and refers to the process as honouring the voice of the participant. The researcher therefore used direct quotes from interview transcripts, to support the discussion. The discussion covers categories such as introducing e-Learning, instructional design, collaborative learning, and delivery mechanism. These categories are discussed, along with subcategories that emerged within them.

5.2 EMERGING CATEGORIES

In line with grounded theory analysis technique guidelines, the researcher performed open coding, axial coding and selective coding, from interview transcripts. He also applied bracketing techniques to try and avoid imposing his preconceived ideas, thereby allowing codes to emerge freely from transcripts (Charmaz, 2006). The code list was then used for axial coding, where the researcher grouped related codes into categories. At this stage, the researcher had to apply a level of theoretical sensitivity, in order to understand relationships and then group related codes into categories; some codes were grouped into subcategories.

In this chapter, the researcher will discuss these categories, along with subcategories, in the light of relationships and common characteristics between these categories. Graphic presentations will also be used to represent interrelationships between categories and the formation of storylines (Glaser & Strauss, 1967). The networks consist of nodes and asso-

ciation arrows. Each node has two numbers within curly brackets. In this study the second number is important as it indicates the groundedness of the code in the entire hermeneutic unit. Meanwhile the arrows with label indicate the type of relationships between the codes in the network.

5.3 INTRODUCING E-LEARNING

In this category, the researcher discusses participants' views on how e-Learning should be introduced and applied in the workplace. Participants expressed different opinions about the perceived success of e-Learning and measures that should be taken to ensure that e-Learning, as a developmental tool, is well received by all stakeholders. Basically, 'stakeholders' refer to department and training managers, learner/employees, and HRD consultants. These people are involved in setting up, recommending, participating and approving e-Learning-based training programmes in the public sector.

5.3.1 INTRODUCTORY STRATEGY

Learner/employees tend to resist technology – or any technological innovations that could be perceived as an additional responsibility to their current heavy workloads (Adhikari, 2005). Participants suggested, in different ways, that an e-Learning introductory strategy should be put in place, in order to facilitate a smoother transition from traditional training methods to the new e-Learning-based training. Figure 5.1 depicts the interrelation of codes drawn from the analysis, representing introductory strategy as envisaged by participants,

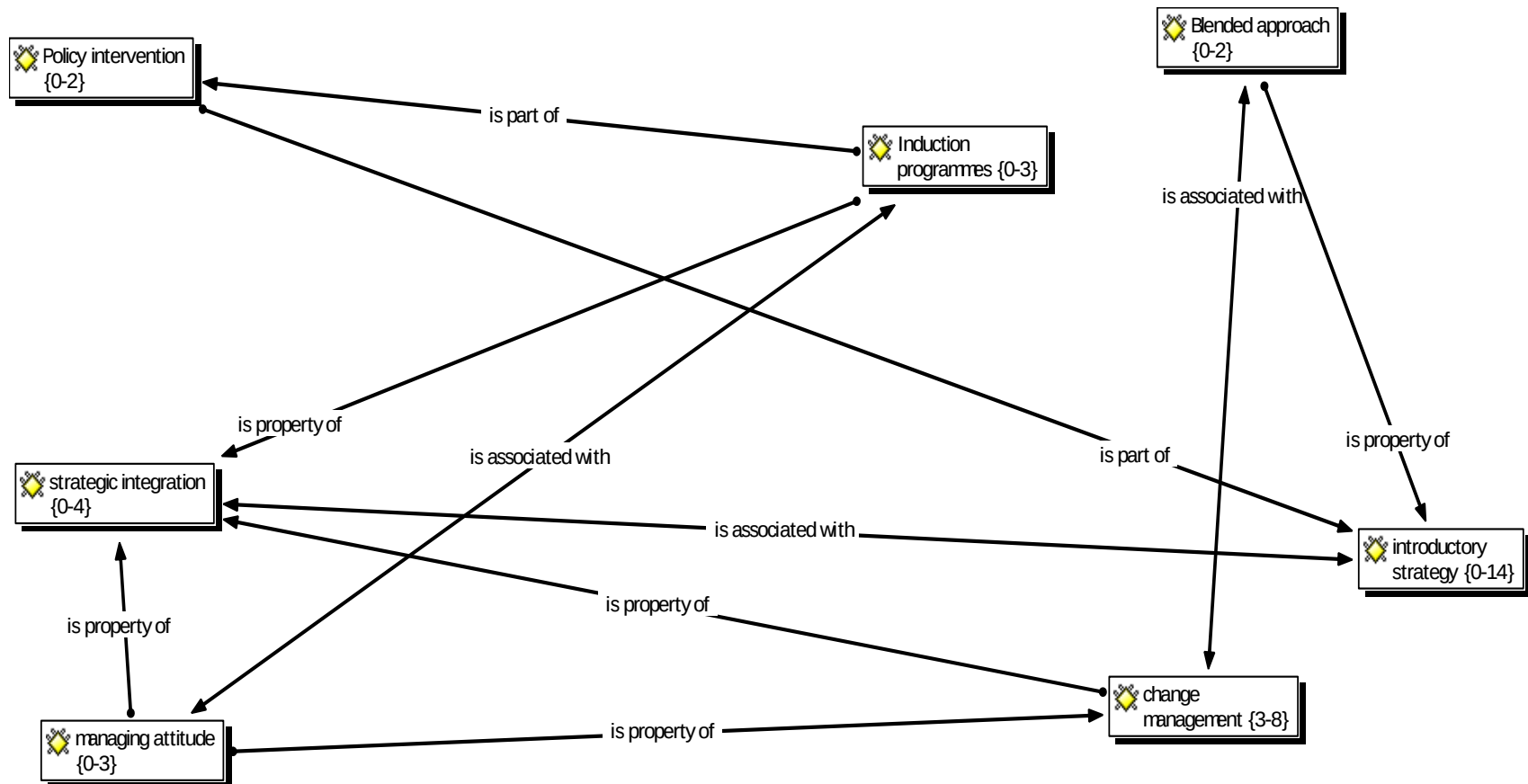


FIGURE 5.1: INTRODUCTORY STRATEGY

Participant #5 suggests that the introductory strategy should start with an intervention policy that should encourage facilitators and learner/employees to adopt e-Learning-based training programmes. Such policy should have sections that introduce e-Learning as one of the learning methods of choice in the public sector or any other organisation. It should also encourage new employees to familiarise themselves with e-Learning from the induction stage of their employment into the public sector.

P5: so in order to kept that let's start it at a lower level and also even if it's a workplace so let's have policies that are driven from the higher level, driving the use of e-learning, it will be, for instance, you attend the organisation induction programme how is it being conducted..., organisation with setup you know the whole induction programme that you'll go and familiarise yourself with policies...

Meanwhile policy intervention could be useful in introducing e-Learning-based training; it is also important to note that e-Learning is relatively new in South Africa. This could mean that even facilitators might need encouragement and persuasion in driving e-Learning initiatives (Venkatesh et al., 2003). Participant #1 suggests that transition to e-Learning could be a complex issue that requires careful consideration of change management strategy, understanding of people's behaviour, and the facilitator's perception (Robertson, 1967).

P1: e-learning is, if you look at the capabilities is ten years old, so 10 years is nothing so those people will not even considered it yet, so that is the simplistic answer, ... change management and people behaviour but also the educators, the educators I think haven't really considered the e-learning alternative enough, umh

Participant #1 also mentions that e-Learning has grown outside government. It is only recently that government is focusing on developing an e-Learning strategy through the Department of Public Service and Administration. However, participant #1 also admits that e-Learning initiatives in the public sector are still fragmented, although some departments are showing a certain level of success. He holds the opinion that Web2.0 application can assist in optimising e-Learning practices, as some departments are already using features such as collaboration within and outside departments.

P1: it's starting to grow, the Department of Public Service and Administration has got the e-learning as part of their strategy in the department of public service administration umh ... then there's the ok the Police department we've started with the Police department we also use the e-learning platform for collaborative exercises not only for e-learning because with e-learning platform especially in the Moodle it gives you an integrated collaboration whereas if you install a wiki or a web, Facebook application they not integrated so within the Moodle

Participant #2 also mentions that e-Learning design and implementation is a complex phenomenon that requires a scientific approach that should be documented for future reference and improvement. He identifies a lack of conceptual depth in e-Learning practices, as anybody who has the interest and the budget just adds electronics to learning concept.

P2: I would imagine e-learning implementation is not a simple, it's a complexity so it has to be approached in a form that is organised, that is scientific... and implement it in a way that can be scientifically sound so that when is running and there is a problem, you can go to your design and actually try to correct the problem,

Participant #2: in his department they are responsible for developing an implementation strategy for government to ensure a proper e-Learning implementation plan. Currently, it would be difficult to sustain an effective e-Learning system, which results in stagnation in the training and development plan for the public sector. Like any other system, e-Learning also depends on proper strategic planning and positioning within that strategic plan (Lederer & Sethi, 1988). According to participant #2, this could be caused by excitement on the part of the stakeholders, who may rush into adopting a foreign e-Learning model, or no model at all.

P2: strategy implementation, I'm a student of strategy, one of the things that we learned about strategy implementation is that you have to design strategy you have to do a thorough analysis of your strategy and you have to design it thoroughly before you implement and the major failure of major initiatives like e-learning, I would say, mostly failed because of proper design and analysis, we've got this thing that look so exciting we are so much in a hurry to get it running then we are in planning to get to that point when it is running,

Participant #1 suggests that while government is trying to design and develop e-Learning systems, it could capitalise on the internship programmes that are currently applied in government. Even though internships could be instrumental in feeding an e-Learning implementation plan, internship programmes are not properly coordinated, however. This leads to a lack of continuity in knowledge and skills development in some parts of the public sector. Internship candidates spend only six months in their allocated departments, and then leave to work anywhere where they can get permanent jobs (Kraak, 2005). In this case, such interns are actively involved in the setup of e-Learning programmes – meaning that if the project is not complete within six months, a new internship candidate will have to continue with the project that was started by the previous intern.

***P1:** interns as learners, so if you...in 6 months the guy is goneso there's no continuation, there's only 2 people in SITA ...and X who was a learner and is appointed and is quite good, it's only the 2 of them, sometimes I find another guy, they've appointed now another guy but I think there's now 3 people but also they still in learning phase they still sorting out for themselves what this thing is*

Introducing e-Learning to a new community of learnership, proves to be difficult, because instructional designers and sponsors of e-Learning programmes have to consider both educational issues and technical feasibility (Bisschoff & Govender, 2007). Technical feasibility is traditionally an IT department's responsibility, whereas e-Learning is the responsibility of instructional designers, given their assumed educational expertise. It is up to instructional designers to decide the learning strategy to be applied within an underlying learning theory.

5.3.2 SOCIAL CONSTRUCTIVE APPROACH

In adhering to grounded theory principles, the researcher bracketed his preconceived notions about e-Learning practices in the public sector, and allowed codes to freely emerge from the data. The researcher had to ensure that categorisation of the codes was well within the context from which they were extracted, so the social constructivist approach emerged as a subcategory to the main category introducing e-Learning, which otherwise could have been a category in itself.

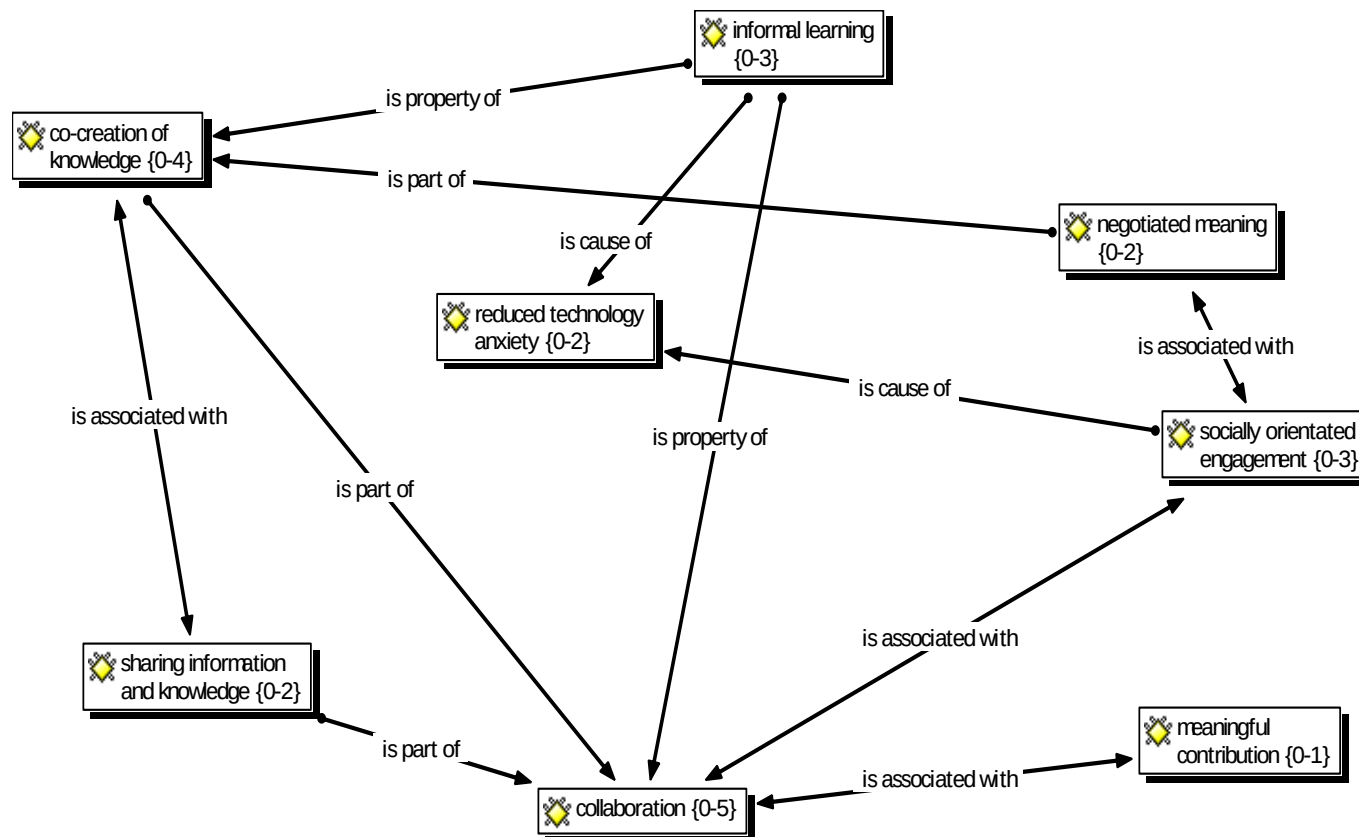


FIGURE 5.2: SOCIAL CONSTRUCTIVIST APPROACH

All participants pointed to the importance of learner-to-learner and learner-to-facilitator interaction as an instrument of learning as depicted in Figure 5.2. Participants #1 and #2 realised the need for a social constructivist approach in developing e-Learning modules.

P1 that will include your logon rate it's not about one or the other it's about, and the fact that you talking blended learning, the instructional design, social constructive design ..and classroom... you look at the philosophy behind Moodle eeh it is social constructivism where you co-create knowledge, so in one stage you need the instructive designer and knowledge of teaching presenting online lessons and exams and even on facilitators

Social constructivists advocate co-creation of knowledge, where all parties involved agree on models and solutions produced collectively (Wägar, 2008). This means that the learner/employee should define learning objectives, and thereby engage learning material in order to make a meaningful contribution to the learning process. Social constructivist theory does not restrict collaboration to the learner/facilitator, but extends to learner/learner collaboration that allows learners to engage each other in order to achieve learning objectives (Wägar, 2008; Greenhow, 2011). Such an instructional strategy could be effectively facilitated through social media. However, some prospective learners in e-Learning programmes are computer illiterate.

P3: we are at a point where all the requirements for developments become visible whether SITA is asked to do something about ... use their functional applications across government departments, it becomes clear that there are sets of employees in government that are not computer literate and have resistance to technology, that you find in older employees, where you go in and, where we've been asked to do application training very often the employees haven't been given the business training in other words an application is only a tool as part of a complete business

Some of the candidates resist incorporation of technology into their learning programme, because they feel it might be a barrier to the grasping and understanding of learning content while they are trying to deal with technology anxiety (Pierce, 2009; Duffy & Cunningham, 1996). Acceptance of learning technology could sometimes be obstructed by a bad introductory approach (Adhikari, 2005). Resistance from candidates could be strong where they are forced to sit and oblige, as they might develop negative attitudes towards

any technology. In this case, introduction to e-Learning is engulfed by many challenges such as poor network infrastructure and inaccessibility to online resources outside the workplace. Candidates in the SADF have to tolerate problems associated with e-Learning, due to the nature of the organisational culture which forces them to obey commands.

P1: There's one thing that we haven't touched on and that's the infrastructure, especially the network that is key constraint a serious constraint the reason why e-Learning as such got off the ground as it would have had we had the network support but the Defence Force their management from the education management ... carried or not so you get the learners in Defence Force who wait 2 minutes for the screen to come down ...slow response time ...sometimes is very slow, depend also on the busy the time of the day, how busy the network is, how busy the server is

Forcing e-Learning on candidates could work for the SADF, but is not a viable solution for learner/employees who are not obliged to conduct them in a prescriptive manner. Candidates from the SAPS tend to be intolerant of a learning environment which is difficult to comprehend, as they would like the learning environment to be accessible and flexible.

P1: "they get a command they will do this, where you sit about 5 minutes for a screen in the Defence Force you will wait for that screen to come down but with the SAPS that's not the situation so that screen is not up for your screen for 15 seconds, they say this is useless go away and the same with other students outside your infrastructure is a key constraint"

Participant #1 further suggests that in order to facilitate learning in the workplace, instructional designers should take into consideration candidates' personalities and learning styles. However, it might be impossible to address every candidate's learning preference in totality. This could be solved by adopting blended approaches, as suggested by participant #1.

P1: some people that very pro open source have got the ability to solve problems themselves. People that that wants to be spoon fed will stay with something...

P1: e-learning there's no facilitator and the classroom involvement eeh it's also for people who are very proactive and wants to learn a new skill umh but that's why the best practice is the blended theory

Participant #5 suggests alternatives that include promotion of using technologies that are already popular and available in the workplace, such as social networks. He believes that if e-Learning is to be successful, instructional designers should apply a socially oriented method that allows for co-creation of knowledge through popular social networks.

P5: what was important there's a lot of transactions that has been taking place was on issues such as Facebook and other social network so it shows that there is usage of that so what is lacking is to plug in the content that those learners will be able to source, in the

Participant #4 shares the same viewpoint with regard to sharing of experiences between learner/employees in the social space. Social networks are already thriving in South Africa, as most of those who have access to the internet subscribe to one or two social networks. Participant #4 believes that instructional designers should develop a business or learning model that can be used to incorporate learning into social media, and, in turn, avoiding anxiety associated with assessments. Allowing learner/employees to participate in social networks will enable informal learning.

P4: we don't really need to put a gun into everybody's head what's like half a billion people on Facebook, it's not the same but 1 of the things that they say with the business models on social media is, get something valuable away for free so if for students you give them the ability to interact with their buddies and share jokes, you give them something away for free,

Participant #2 adds that learner/employees should be able to interact among themselves in an informal environment, to share information and knowledge, either as experts themselves or with experts who have gained working experience through the year. They can achieve such interaction through collaboration in a discussion forum. Discussion forums prove to be one of most used learning tools within government.

P2: more of the discussion forum and semi-informal course that is being run, so it's just more of a discussion forum, we calling in experts from time to time to give more information on how to deal with ... It is a mix in the sense that there is some sort of context, or syllabus that they go through and at the same time it's a discussion from all the practitioners in that environment,

e-Learning practices in the public sector exhibit elements of social constructivist methods of creating knowledge, which could be beneficial in designing an effective e-Learning system, because technology-based learning is already taking place through discussion forums. Collaborative learning is a social constructivist-orientated instructional strategy. It is up to instructional designers to apply social constructivist epistemological principles in the learning development, and then align with appropriate instructional technology conducive to e-Learning practice in the public sector.

Instructional designers in the public sector should consider a social constructivist approach in developing e-Learning initiatives, in order to take advantage of the current social network craze while it lasts, and, meanwhile, maintaining vigilance about technology innovations, and then adapting instructional design accordingly.

5.4 INSTRUCTIONAL DESIGN

Instructional design is one of the categories that emerged from the data. Codes relating to instructional design are grouped together to form this category. This category comprised subcategories containing codes relating to development of instructional material that is relevant and appropriate for the target audience.

5.4.1 TARGET AUDIENCE FOR E-LEARNING PROGRAMMES

e-Learning is like any other learning programme: it is designed to accomplish specific goals – in this case, in relation to skills and knowledge development of a specific learner group. As indicated by participant #1 in the earlier section, e-Learning is not for everybody. e-Learning practice should be developed with the target audience in mind. Figure 5.3 depicts codes representing issues and concerns raised by participants about the importance of identifying the appropriate target group.

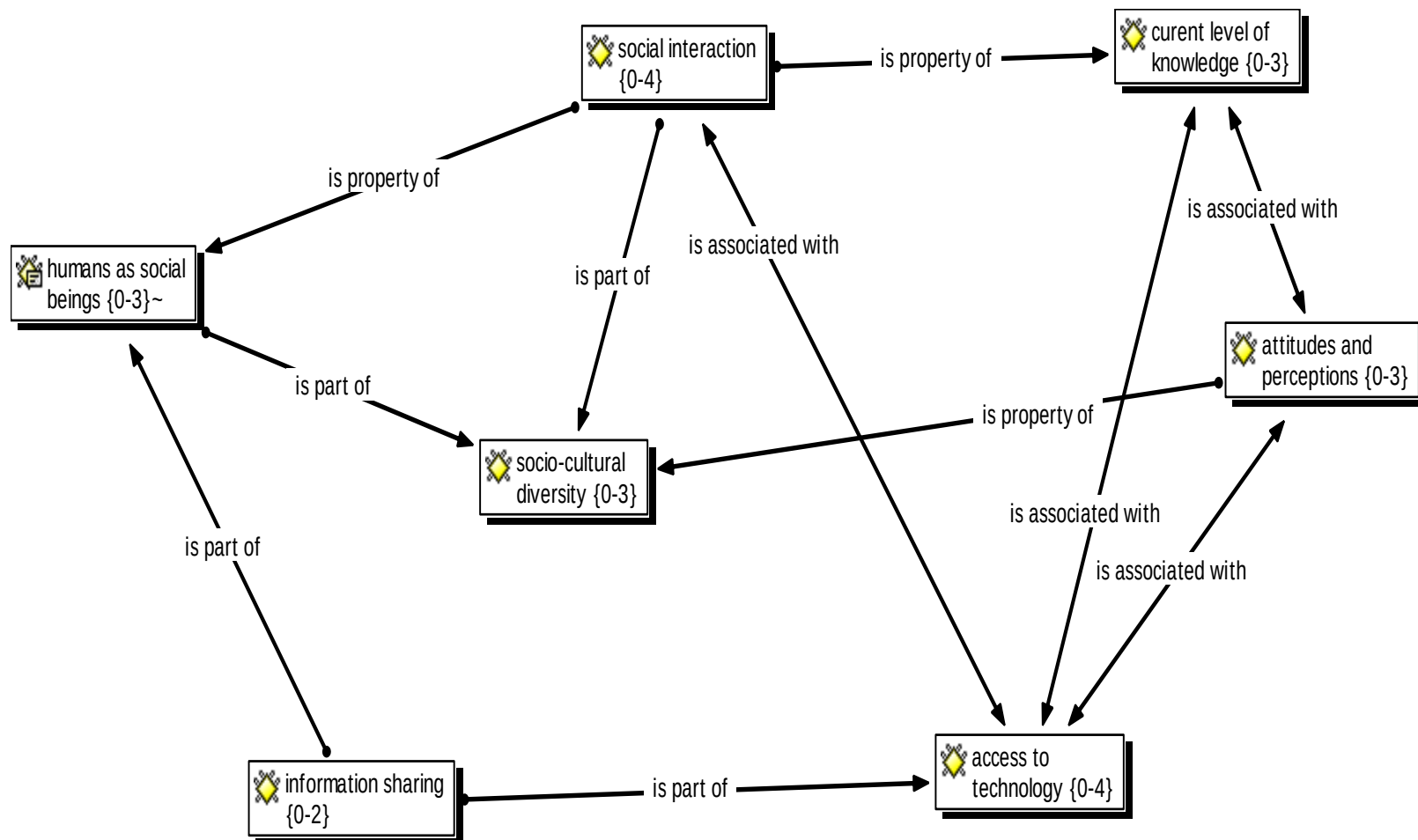


FIGURE 5.3: E-LEARNING TARGET GROUP

Participant #3 asserts that instructional designers should first scan the candidate group to determine technology inclination, technical knowledge of computing, and preferred learning styles. The SA workforce is characterised by socio-cultural diversity, which might have an influence on learner/employees' perceptions of educational technology. This could be a reason why e-Learning solutions are not used to optimum levels.

P3: the instructional designer must know the tools very well in order to design for the best use of the tools, that might be a given in scenario you are sketching, and then moving from that, the instructional designer is going to have to analyse the learning community in terms of how the deployment will be done

P6: despite social cultural diversity in the country technology is common such as Facebook and other social networks. Instructional designer take advantage of that... stop complaining about digital divide.

In addition to technological feasibility considerations, participant #4 remarks that the target audience should be understood in terms of their social orientation, as he refers to learner/employees as social beings. His advice is that learning practices should be socially orientated, as learner/employees have already proved that they would use technology for social gratification instead of serious learning – which could be associated with learning and computer anxiety (Pierce, 2009).

*P4: you need to think about these tools, you need to, you know what I'll do is I would use the social angle but within the tool having that functionality that when they choose they can start pulling out these other tools easily so for..., very interactive social medium tool say for your, maybe for your faculty and don't start off with this ... rely on the fact that people are social beings so you have to capitalise on that so you'll find that a...is really killing us, so you have to create something that **adds more value (relative advantage) to their lives** than just oh it's interactive I can just see whether I can get a mark on this, so I can just do this. Those things are very powerful they have the capabilities to have people collaborating.*

P6: people will get whatever learning instrument or technology required to help them pass their courses. At one time there was no desktop computers to go around now you just pulled out a laptop from your bag. You have laptop because you need it not because you come from

advantaged background. I guess if you do not come from disadvantaged background you come from advantaged background. Hey!! We all come from disadvantaged background... once people realise advantages of e-Learning they will use it.

Growth of social networks can help in creating an engaging learning environment that would enable those who are labelled as introverts, to freely participate in learning activities from their comfort zone. Social technologies available in Web2.0 enable instructional designers to incorporate social learning mechanisms into the learning process (Greenhow, 2011).

P1: you will find the most social kind of people would like contact sessions in class interaction better than the more introvert kind of person but we prefer the computer interaction through collaborations.

However, it is still important to note that some of the government's employees are computer illiterate, which could then pose a challenge for instructional designers in developing an effective e-Learning-based training programme. However, participant #3 suggests that instructional designers should first conduct a variety of situational analysis before rolling out the actual instructional process.

P3: what the level of knowledge, skills and language ability of the learners is, so there's a variety of assessments that need to be done before the instructional design can be started

P2: designers should first take into cognisance who are the audience, and like you have said, people from different background, understand each background, understand what are the chances of them identifying with what you going to give and adjust it accordingly

Participant #2 concurs with this view, by adding that most learner/employees come from different backgrounds, which could mean that each e-Learning participant has to adapt themselves in order to fit within a given e-Learning environment. Participant #2 also proposes that instructional design should be based on a sound theoretical framework to enable theoretical grounding of the learning experience, to ensure that learners progress from their current competence level to advanced levels.

P2: it boils down to design, you've got to look at things like thinking frameworks and learning theories, you've got to look at how to teach people to think innovatively you have to think about all those issues before you tackle your audience and use those tools to match your audience

P3: often we find that the sequence of events in developing individuals isn't approached correctly whether there's a course available for the functional knowledge, there are various reasons we find, SITA get asked to train people on the application and then they still don't have the business knowledge, that is one reason why the skills are lacking.

Once instructional designers understand candidates' competence levels, and the learning requirements of prospective learner/employees in e-Learning programmes, they can start thinking about the educational principles applicable in setting up effective e-Learning-based programmes.

5.4.2 EDUCATIONAL PRINCIPLES

Instructional designers have a duty to design instructional material that is suitable for the target audience, in terms of accessibility and relative advantage to their workplace wellness. This educational principle subcategory comprises a collection of codes that relate to educational assumptions, concepts, frameworks, theories and practices, as pointed out by participants in the study. Figure 5.4 depicts a network of codes representing interrelationships between the concepts that emerged from the interview transcripts:

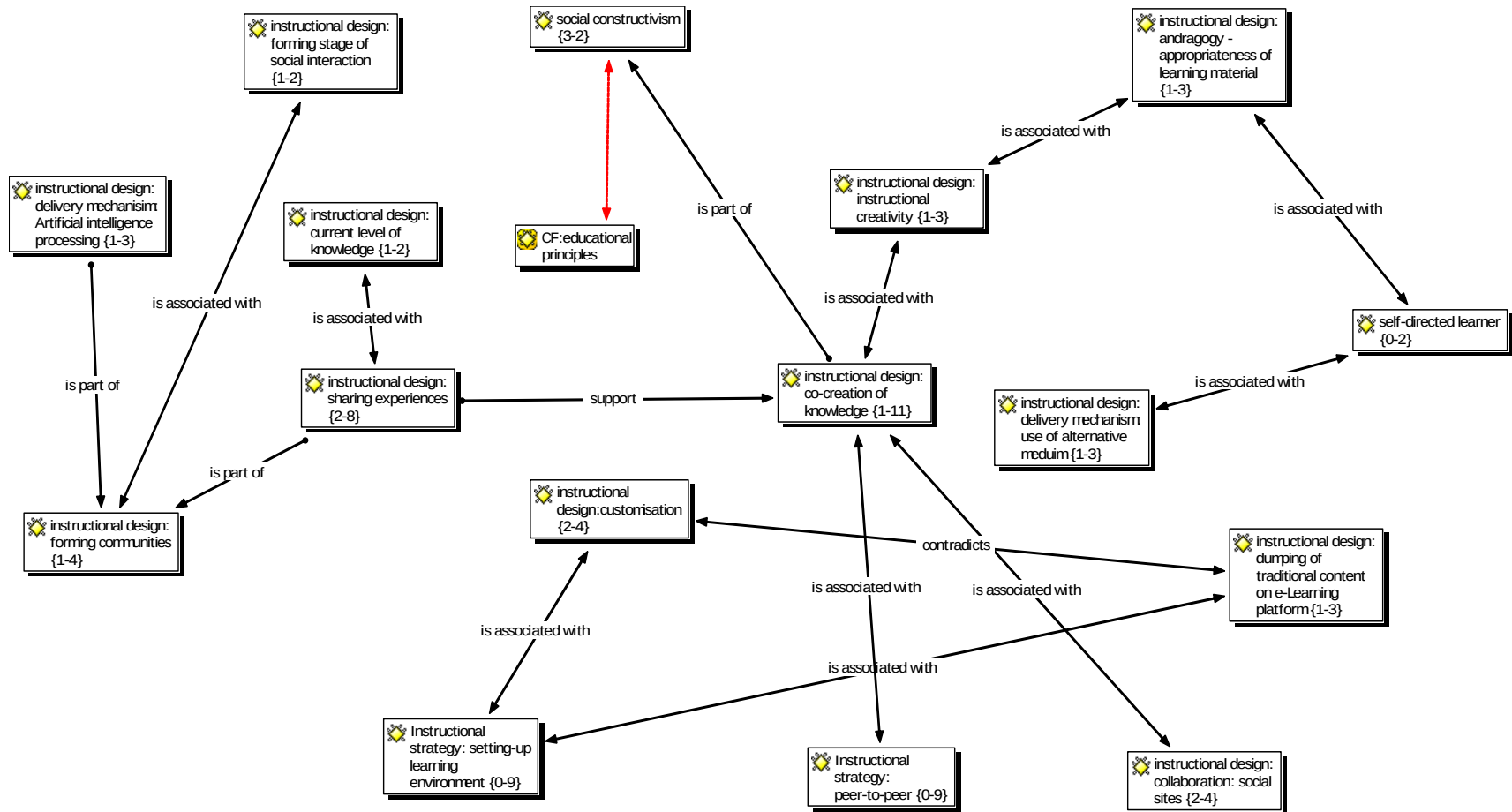


FIGURE 5.4: EDUCATION PRINCIPLE TO BE CONSIDERED

The importance of educational principles surfaces where the instructional designer has a task to ensure that whatever platform is used to facilitate learning, is effective in achieving learning objectives. Some learner/employees are not keen to learn through e-Learning platforms.

***P1:** e-learning if we talk now more theory academic or educational umh my experience with e-learning is that umh e-learning is not for everybody...*

***P6:** I don't have a degree in education but I think if e-Learning has to help in fighting skills challenges it has to be based on some education theory. Maybe, we all have to enrol a degree in education*

Therefore, it is critical to acknowledge the fact that individual learner/employees in the workplace have different learning styles, which forces instructional designers to find and apply an instructional strategy that allows for different learning approaches, in an engaging manner. Participant #3 argues that instructional designers should have a clear understanding of learning style variations for each e-Learning cohort, and then analyse resource requirements to successfully implement effective e-Learning training programmes.

***P3:** you find the learning styles of the people is crucial to be aware that beforehand to understand how to approach the learner, certain learners need to have a facilitative process in other words there is an e-learning facilitator available to not only engage them but to guide them through and be available all the time but you also have your independent learner who's going to just need to understand what must I do and then goes ahead and does the whole thing on their own*

In line with previous suggestions made by participant #2, online learning mechanisms are grounded in the social constructivist paradigm. Among other skills an instructional designer should possess, is the ability to apply educational principles, and an understanding of learning theories that can be applied to frame online learning designs.

***P1:** you look at the philosophy behind Moodle (an open source e-Learning tool) eeh it is social constructivism where you co-create knowledge, so in one stage you need the instructive designer and knowledge of teaching presenting online lessons and exams and even on facilitators*

In support of the same view, participant #5 argues that e-Learning material, or any other online learning material, should not be a direct copy-and-paste product from traditional sessions. He argues that most of his e-Learning experiences are direct copies of traditional learning that are just copied into electronic media. This stifles instructional designers' creative opportunities to adapt learning material through a relevant instructional strategy. Designing instructional material could start from consultation with a prospective learner, to gain an understanding of the target audience and the extent of incorporating social media in learning.

P5: you'll find that people who are designing content for e-learning those are traditional content designers they will just go and design content but not relating to the platform that we use to attract the target audience so it's very important from the instructors, the people who design the content that they also put the social content and also lining up with the current developments which is very important not just to go and dump, most of the content is to go and dump, using the very same digital version of hardcopies use that as content.

P6: Like I said before you cannot just cut content from traditional learning mode and paste it in an online platform then you called that e-Learning. It has to start from planning then do ... there is a proper term for it

The social constructivist approach would allow instructional designers to create a flexible learning environment, thereby empowering learner/employees by allowing them to participate in the design of the online module. This is achieved by adapting to platforms that are familiar to learners, such as social networks, where learner/employees learn by discovering new concepts and applicability of theory, in their work life.

P5: if we want to do learning we must make that platform to be as social as possible, you are doing serious stuff in an easy way that how you can derive... out of that but if you put look at other tools that are used to facilitate e-learning they are very strict, they are very restricting. So you don't want a person who will go there and be very restricted but you want something that has got social content in order to facilitate then people can adopt it and use it

Social networks could be effective tools in the design, development and implementation of e-Learning-based training programmes. Some of the participants brought about communities of practice, which underpins social networks into the interview discussions.

5.5 COLLABORATIVE LEARNING

Collaborations are gaining popularity both in business and academic institutions, where collaborators sharing resources, or working on the same project, could exchange information and ideas, to co-create solutions to eminent problems and knowledge. Sharing of information and ideas could be an interaction between individuals within a community of practice or outside the community (Mkhize et al., 2011). Figure 5.5 shows the network of constructs that should be connected to develop a collaborative experience. Some collaborations are informal, and others are coordinated, depending on the objectives and resources allocated for the learning community participating in collaborative learning (Allan & Lawless, 2005).

Membership of SITA's collaborative forum is by invitation to the qualifying prospective participants who are expected to make a meaningful contribution to the learning group. An administrator makes a judgement decision by qualifying prospective participants, and then allows them to join the group discussing a specific topic regarding a new open source platform.

P4: you might be able to invite external people but then you would qualify them, so in that government wide collaboration we on the administrator, so I set it up I need to say who's in and who's out and then they would do the same with that

The SITA's collaborating group sometimes outsources subject expertise from other discussion forums, by going out of the official government discussion group to find those who may make a great contribution on the current issues of concern. The administrator would even go to the extent of scouting in the social networks, to find bloggers who might be experts in a specific subject.

P4: say I was a local developer in SA I would do 1 of 2 things I would either see if there's existing forums linked in groups specific groups that are discussing that specific topic, it is possible that those groups won't be focused enough or there might ...but you've got specific needs, what I'll do then is I'll create my own group I'll choose a certain media like I would say I'm going on Facebook or I'm going on this, I would find something that's more like a super cool the kind of personalities that use that,... I would find something that is suited to my community, having more technical or whatever and then I would start extending that network ...the thinkers in that area and I would extend an invite to that somebody that writing a blog that's...or start talking to that network and say who are the real experts in open source migration

Inviting renowned experts in a certain field, allows the administrator to create a ripple effect by attracting the experts' followers into their discussion forum. Although collaborating groups would need outside expert contributions to the discussions and debates about issues of concern, it is still important to maintain confidentiality.

P4: think it's just about the confidentiality of the information, say you are in government you typically want to control whoever joins cause you might discuss strategies, com-

munication strategies, things that you want to first vet with different stakeholders before you bring them to the public so in that case you will firstly have the private network

As a result, administrators have to be careful in their selection of the joining members, and ensure that confidential information is not openly discussed in the forums. This is to avoid exposure of government's open source strategies and operations.

Participant #5 suggests that a collaborative forum should apply the same model as was applied by early collaborators in government, but now with the guidance of an expert to facilitate engagement and debate about topical issues in open source migration. Through engagement, collaborators would be able to deduce meaning from, or come to agreement about, new solutions – which could be an extension of the existing knowledge. In setting up collaboration, instructional designers can explore application of technology in facilitating online collaborations. Participant #4 points out that Moodle is an effective and efficient collaborative tool for the SITA collaboration group.

***P4:** within Moodle there are some kinds of collaboration or that kind of functionality that you can use and we kinda put them into our project*

Moodle is an open source application that can be acquired free of charge, which could mean easy access and affordability to instructional designers and collaborators. Besides, Moodle incorporates even extended pedagogical features that can be used for administration and management of the learning process.

Instructional designers are facing the task of converting pure collaborative activities to e-Learning, and enabling an environment where e-Learning practice can be modelled around the existing collaborative instructional strategy. In doing so, it can ease tensions between management and learner/employees about the use of social networks in the office, because a formalised collaborative instructional strategy could be institutionalised, and then form part of institutional policy.

Notwithstanding the importance of administrators' and subject experts' perspectives on the design and development of e-Learning within a collaborative instructional strategy, the researcher would also like to examine learner perspectives as they emerged from interview

transcripts. In the following section, the researcher will discuss e-Learning practice issues, focusing on learner preparation and readiness to engage in collaborative forums.

5.5.1 LEARNER PERSPECTIVE OF COLLABORATION

Some of the participants believe that instructional designers should actively engage learner/employees during the design and development of the e-Learning environment and experience as depicted in Figure 5.6. Instructional designers would then be able to ensure that such e-Learning programmes are effective, thereby ascertaining validity of e-Learning practice for investment.

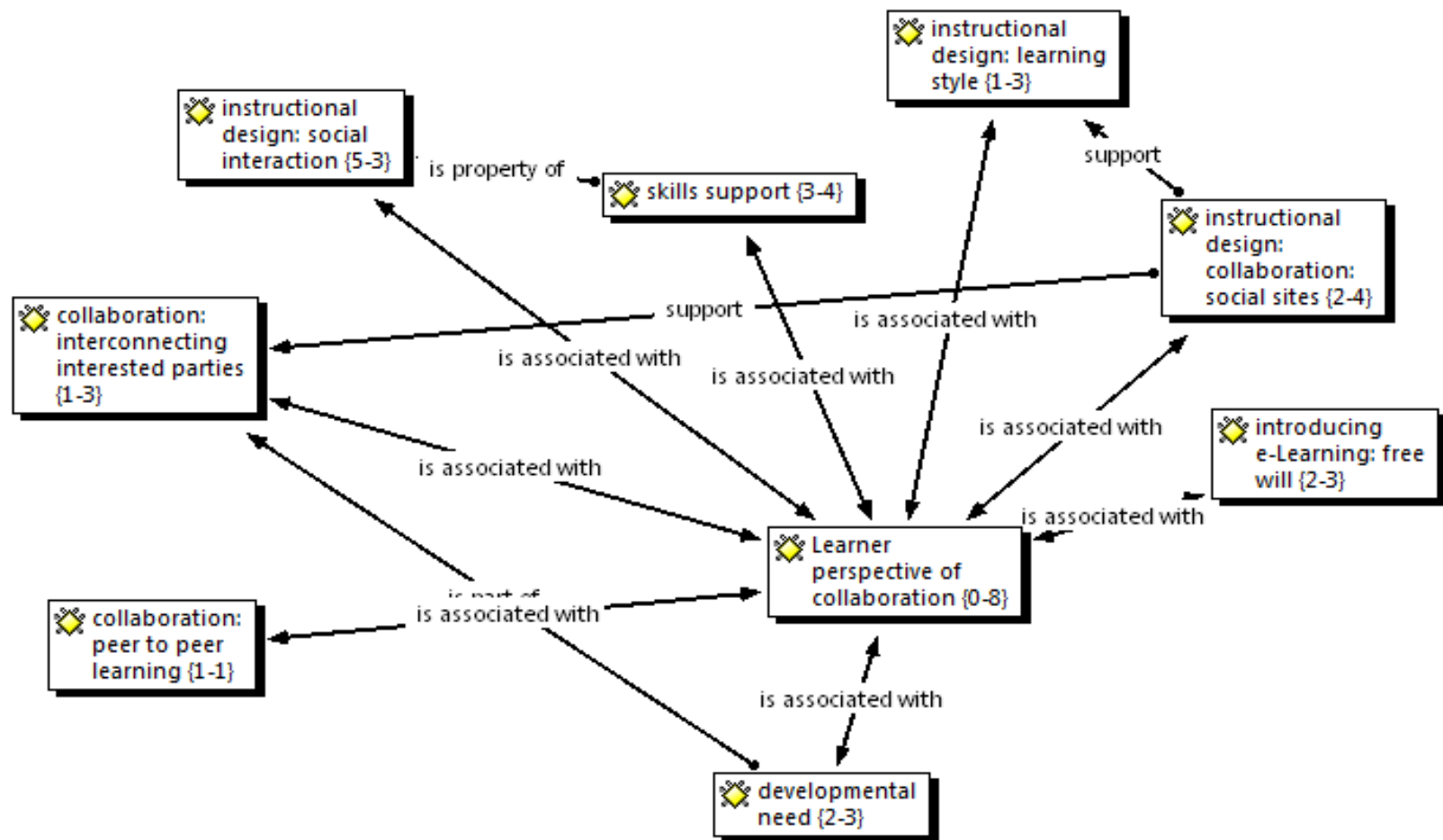


Figure 5.6: Learner Perspective Of Collaboration

In most cases, adoption of technology into an approved and functional system depends on user perception of the same technology, either negative or positive. Participant #1 thinks that acceptance and adoption of technology-mediated learning, or a new technology platform, is directly dependent on learner/employees' inclinations and perceptions about new technology – such as open source technology in government departments (Venkatesh et al., 2003).

P1: With open source, with people those very pro open sources have got the ability to solve problems themselves. People that that wants to be spoon fed will stay with something like Microsoft and Oracle because a company will provide everything that you need to know whereas with, with open source you need to be able to solve the problems yourself because there's not a ... company standing behind you

Participants #1 and #3 suggest that instructional designers should work with what is currently working in instructional strategy collaboration, which is currently delivered in social media. Even though social media might have been established for purposes other than educational intent, it possesses features and qualities of facilitating information and knowledge sharing among social participants. Participant #1 believes that distributing instructional material in social networks would even increase logon rate and sustainable retention rate.

P1: from there you move into the instructional site and come back to the social site I think our retention, our logon rate and the retention rate will be much higher ... I get them to logon at the first time and I got my discussion forums

P6: somebody or organisation should have statistic on Facebook subscription I would guess roughly more than half the population is on Facebook or some kind of social networks.

Government training is characterised by social activities, evident in collaborative learning activities – that is, information and knowledge-sharing activities carried out by participants in their respective departments in an attempt to deal with open source skills requirements. This could be a cue for instructional designers to start examining different instructional strategies that are suited to the currently available instructional technology. That way, it eliminates the possibilities of social and computer anxiety (Pierce, 2009). Learn-

er/employees will otherwise reject a learning programme if they think that such learning programmes have a chance of being difficult, due either to instructional difficulties or technological constraints.

P1: There's one thing that we haven't touched on and that's the infrastructure, especially the network that is key constraint, the reason why we e-Learning as such got off the ground.

P1: but the Defence Force their management from the education management they said we cannot go ahead whether the ...carried or not so you get the learners in defence force who wait 2 minutes for the screen to come down ...slow response time ...sometimes is very slow, depend also on the busy the time of the day, how busy the network is, how busy the server is

Participant #2 also suggests that instructional designers should explore the social learning model in relation to the social constructivist paradigm, thereby employing social media.

P2: social network is the good model to look for, I mean it's more of a forum environment; it's more, what is this? One of these educational models, social constructivist...

According to participants of the study, the social constructivist approach should be the prevailing instructional strategy in public sector. They also indicate that social networks are already accepted by the workforce in most areas of the public sector, except on the management level that discourages the use of social networks in the office or during work hours. Participant #4 insists that social network collaborations bring experts together on a less formal platform, to share information and knowledge within communities of practice – which is beneficial to the department.

P4: peer to peer so I think it will allow some different level of informality but what happening in the social networking tool that we've got is, it's like twitter you follow somebody. I've got lots of followers ... and you'll find it on the web if somebody is with Google, Google has its own blog so if you done with your PhD, finished it you going to open a blog and you going to, once a week you going to type in it, so that's more formal so I think it's different levels, you get the informal where you actually realise somebody knows some-

thing and you start interacting with them or you just follow them to see hey what's coming out with this guy he's very interesting and the other one is subscribing to blogs maybe RSS.

According to participant #4, peer-to-peer learning is an effective way of educating interested masses, where one could simply search for an expert blogger in a specific area of interest, and then start engaging such an expert in topical issues. Even though information and knowledge sharing based on social networks is informal, those who are interested and participate in such discussions, gain knowledge that can be used productively.

5.5.2 LEARN BY DISCOVERY WITHIN A COMMUNITY

In many of the categories and subcategories discussed above, there was mention or implication of the communities of practice (CoP). Figure 5.7 shows the CoP subcategory, the researcher will discuss a concept that seems to be prominent in the transcript, which is directly related to communities of practice; that is, learning by discovery. This concept is not foreign to the field of education, as the researcher noticed continuous emergence of learning by discovery, after reading literature in the field of education and learning theory.

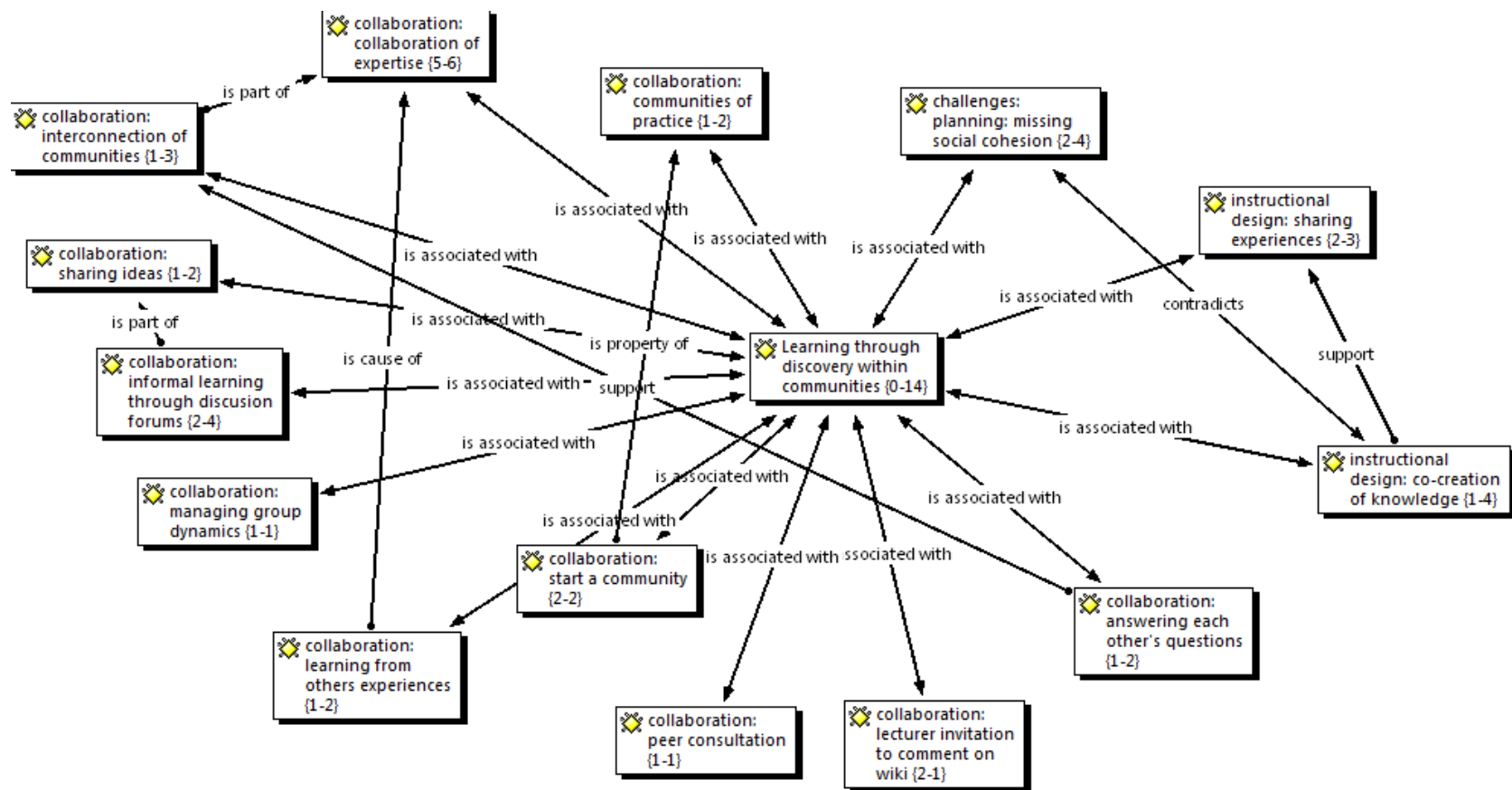


Figure 5.7: Learning Through Discovery Within Communities

Learning by discovery in a community, starts with the creation of the community where learner/employees who are sharing a common interest, converge to discuss critical issues on a specific topic. Cases studies reveal that topics of interest revolve around the optimised usage of an open source platform. Participant #4, who administrates the collaboration forum for government collaboration groups, suggests that collaboration should be designed for free social platforms such as Google, or any other Web2.0 platform where an instructional designer can create a group that can share text or video files. SITA's collaborative forum is secured, because of the security and confidentiality requirement. Some of the learning projects are sensitive in nature, and then high security measures should take priority over functionality. However, free social networks can be used where security is not a sensitive issue.

P4: start to building that functionality into the e-learning tool so whether you in the design of the course or whether you want students to interact you need to build the social media the social learning at stake as facilitating the process of learning either by using that functionality in the application you use such as Google or just signing up to any free collaboration tool, create a group then you collaborate so most of these tools they have a model where you can use those functionality for free and those functionalities you can connect with people ...which is making sure that if you doing a course for the military then there's specific requirements around security confidentiality, so that's what SITA is doing in this project, we could use social networks or social tools that are on the Internet but because of that requirement we need to have something that can secure on our firewall and the access of control is very strict

Once the security requirements have been established in order to create parameters for collaboration forum membership, instructional designers have to consider an instructional strategy that is appropriate for the target audience. In line with collaborative instructional strategy for government open source training, a collaborative environment has to be created within a community of practice. Participant #5 thinks that those social networks are the most effective platform for collaborative learning within a specialised group, called a community of practice. Interaction within the community can be standardised into specific time intervals, or openness and flexibility.

P5: community of practice would see people who share common interest in a particular field something, they will be able to seat and collaborate, discuss, move forward and look at the development, to me community those are groups ... they seat every week or every month or people collaborate through that social platform they are all related and they'll say they also contribute to the management of knowledge and knowledge gathering that can be preserved

In these communities, members get to share their experiences, and learn from those who have been through the learning curve; that way, members of the community don't have to repeat the same mistakes made by those who have become experts over the years.. Less experienced collaborators in the community can learn best practices, with regard to a specific trade, from more experienced community members, without going through trial and error. Sharing of information and knowledge enables all concerned to learn new skills to solve persisting problems.

P4: think the main thing about collaboration in government is the culture is pretty much ...so everybody is busy with their own stuff, fighting their own battles and not knowing that another department has maybe kinda a step further in a particular area and they basically got a better solution, so collaboration for us is about creating the tool that can connect these people so that they can form groups, networks of interests and can become aware of other projects, other best practices, other people that have gone through the learning curve, that have got skills

A collaborative environment allows for co-creation of knowledge, based on the collective and agreed interpretation of the studied phenomenon. As members of the community of practice engage each other in a collaborative environment, different forms of expertise interplay into development of new models that emerge from the convergence of ideas. This is eminent where communities are interlinked in order to engage in issues of common interest, even though communicating individuals might belong to separate communities.

P4: collaboration in terms of the different roles, to ..., and that what's exciting us, getting together to work out a solution for the government we've had architects, we've had business analysts, we've had the now the content developers as where I'm coming from, we've got the technology architects for government and then we've got change managers

who are also involved from beginning to end although they are observing what is coming up first more than anything

Members of SITA's collaboration group are not restricted to one community of practice: they can join multiple communities of practice. In that way, one can find communities of practice interlinked by dual membership. Those members with dual membership can source some input from peers of the other community, where specialised expertise is required to solve a specialised problem, such as that of anti-corruption.

P2: more of the discussion forum and semi-informal course that is being run, the course is called anti-corruption, so it's just more of a discussion forum, we calling in experts from time to time to give more information on how to deal with corruption and so on

A collaborative environment encourages exchange of ideas among learner/employees within a community of practice, which enables learner/employees to learn through discovery. They don't have to enrol for a formal classroom course, and then expect the lecturer to present learning material to them while they become passive recipients of knowledge. They actively engage each other on important issues or concepts relating to the current problem, that makes it easy to find direct and relevant solutions. Sometimes, facilitators can learn in a collaborative learning process as they observe interaction and new perspectives that will then enable the facilitators to reflect on, and research, the new perspective.

5.6 DELIVERY MECHANISM

As in many learning practices and models such as traditional learning, adult learning instructional designers have to think about delivery mechanisms that will enable an efficient learning process, as illustrated in Figure 5.8 and Figure 5.9. Some delivery technologies used are compatible with a specific learning approach. It is for this reason that learning theories are developed over the years, and studied, to ensure that appropriate teaching methods are applied to the specific learning environment. In this section, the researcher will discuss delivery mechanisms applicable to e-Learning in the public sector.

5.6.1 TECHNOLOGY INFUSION

It is clear, at this stage, that the collaborative learning strategy is the prevalent instructional strategy in the public sector. Collaborative learning is currently conducted in discussion forums, which is based on technology. In line with the view of Rogers (1995), any technology-enabled initiatives should be introduced with technology infusion concerns in mind. In this subcategory, the researcher is discussing ways and means of infusing technology into the learning process.

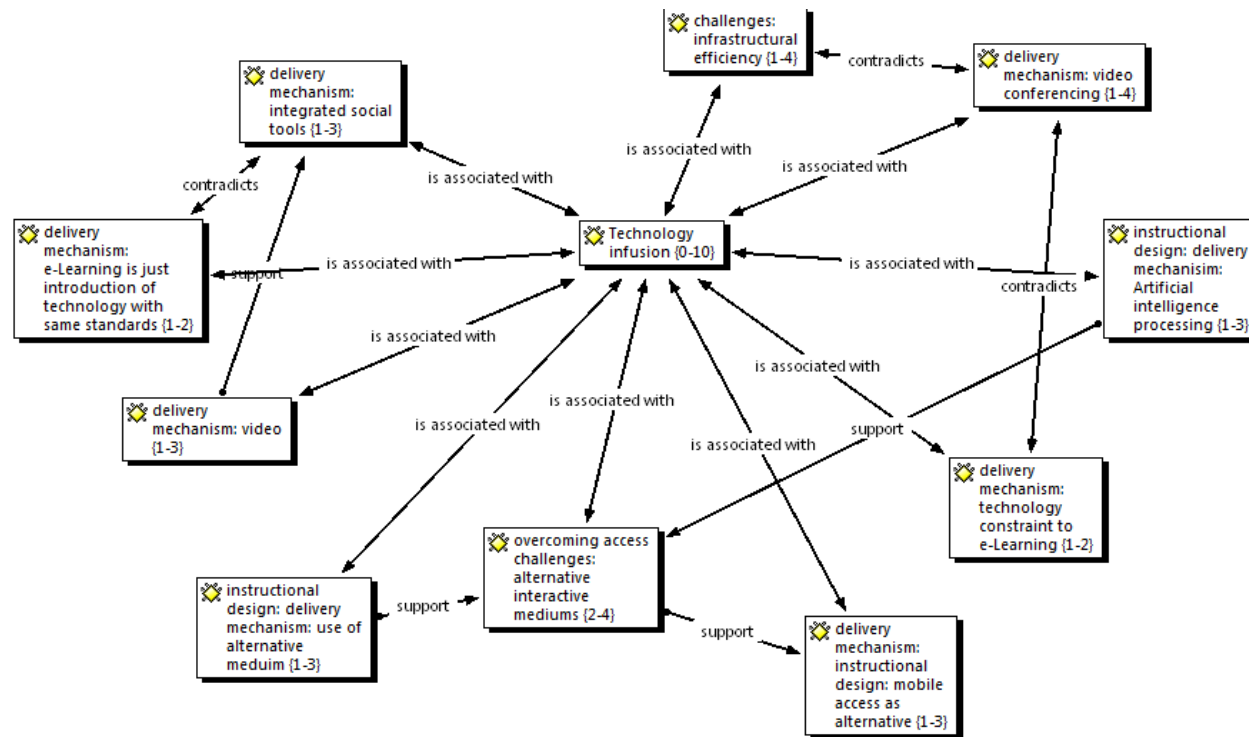


Figure 5.8: Technology Infusion

As SA government departments are engulfed by infrastructural deficiencies, instructional designers should try to design instructional material that is compatible, and that could optimally exploit available computing resources. Participant #1 asserts that some departments are trying hard to ensure that the least technology resources available are used to optimal levels.

P1: they get a command they will do this, where you sit about 5 minutes for a screen in the Defence Force you will wait for that screen to come down but with the SAPS that's not the situation so that screen not up for your screen for 15 seconds, they say this useless go away and the same with other students outside your infrastructure is a key constraint.

P6 people resist certain technology because it brings in with it a new strange environment that is not even functioning properly. If you want to introduce people into some new entice them with something good, not too different to what they a familiar with.

Participant #1 also asserts that technology infusion into the learning process could be made easy by introducing e-Learning at a social activity. This can be achieved by incorporating social computing concepts during the introduction of technology in the learning process, in government employees. Many social networks such as Facebook, Twitter and MySpace have gained popularity in many sectors, such as education, in other private sector workplaces.

Participant #4 argues that social networks should be used as an introductory strategy in the public sector, as many learner/employees are already familiar with, and are using, social networks. He argues that people make meaningful contributions in the social space, with respect to social issues. The same principle can be extrapolated to the learning environment. Even so, the shift from traditional learning to learning through social interaction, should be approached systematically. Participant #4 also believes that social networks can be used for continuous learning in the workplace, where new ideas are constantly required.

P4: it's not, you can pinpoint it down as one little tool, it's actually a migration from ...networks where 1 person contributes to the content through technology making it available and interactive so that lots of people can contribute to that, people they create their own content and that what Web 2.0 ..is, so with this collaboration thing each one of these tools wiki has got certain pros and cons and set application as blog and set applications as

social networking so I think what we've seen in the market ... it's got social networking, it's got micro blogging, it's got blogs, it's got Wikis, it's got RSSP's, it's got ..., it's got everything, so but on the Internet you could get that is just a blogging tool, it's just wiki tool,... what's a business problem you want to solve, if you know what a problem is what a problem you want to solve...

Participant #4 further suggests that academic institutions should incorporate collaborative models into the delivery of learning material to learner/employees. A collaborative model would allow learners to learn new concepts independently. This could be done by letting learner/employees solve a specific problem, with space allowance to make mistakes and learn.

P4: *I've done I, maybe you prepare for class, you read a chapter, get you head around it, get to class, you have a lecture and then you get an assignment so now what will happen is you got syndicate groups, so now there's syndicate groups maybe they in 1 geography, most probably they in Jo'burg, Pretoria, Krugersdorp and maybe somebody came from Cape Town so now you need to get them to collaborate and finish that..*

Social networks are important in facilitating self-directed learning. Participant #2 suggests that some artificial intelligence should be built into e-Learning programmes, to ensure that the correct content is directed to the appropriate learner. Collaboration in a social space should not be confined to desktop computer technology, but should be extended to mobile technology and other forms of ICT. Therefore, instructional material should be adaptive to different technology platforms, such as cellular phones.

P1: *adaptation, we need to...for instance basic one of the ideas being thrown around is M-learning in other words your Mobile Learning, given the fact that the reach of the cell phone is +-90% so if you were to adopt to innovate or use mobile as an alternative or an enhancement to e-learning, that will definitely make a big difference, but trying to get +80% of South Africa to be connected that is more like a dream*

P2: *what e-learning should embrace is try and look for every possible technology or ... like we said, your cell phone, you could be using your cell phone to connect to some remote server, or you could use for instance artificial intelligent techniques that your cell*

phone could send some sort of question or whatever text information and your intelligent server will process that request and send the required information

P5 M-learning... packages that are out there you know about blackberry and any other phone that is there but firstly the move will be how many people have cell phones in SA for instance, MTN for instance they will say we've got 17.1 million subscribers,

Some level of artificial intelligence in the design of instructional material and delivery mode is important, to sustain convenience in selecting a delivery mode that could be used to deliver learning material. A careful selection of delivery mode can extend content reach to those learner/employees using different types of communication technology such as cell phones and video conferencing. Participant #2 further suggests adaption to tele-medicine, which is already successful in the field of medicine, where expert doctors treat a patient via visual technology in another location.

P2: tele-medicine is basically the technology whereby people communicate with experts via video-conferencing, for instance if there's a rural hospital with a lack of Doctors and the sick patients and all that, they will connect via video-conference to a source where there is expert and the expert will diagnose the patient via video-conferencing so the fact that there is lack of Doctors in that rural environment doesn't limit the access to expert information

He also warns that instructional designers, and everyone involved in designing and developing an e-Learning programme, should not undermine the importance of change management, where change in practice is concerned. Ignoring change management initiatives could lead to disaster and failure in the whole e-Learning initiative, as participant #2 states that many failures in systems implementation are attributed to underestimation of the value of change management.

P2: change management is a big issue if you then take that into consideration, your chances of success are very limited because you coming across to people with certain attitudes towards technology, certain attitudes towards the way you implementing your learning type of approach, so change management is one of the main things you need to focus on, because without change management you are increasing your chances of failure

As much as change management is important in ensuring learner/employees' comfortable transition to new learning practices, which in this case involves technology, so that change could be less drastic. Participants #1, #2 and #3 suggest that blended learning should be applied as a bridge from familiar traditional learning to e-Learning, with respect to learner/employees' competence profile.

P3: you find the learning styles of the people is crucial to be aware that beforehand to understand how to approach the learner, certain learners need to have a facilitative process in other words there's an e-learning facilitator available to not only engage them but to guide them through and be available all the time but you also have your independent learner who's going to just need to understand what must I do and then goes ahead and does the whole thing on their own

Participant #3 proposes the assessment of learner/employees' preferred learning styles before instructional technology can be selected, thereby ensuring that instructional material corresponds to a specific instructional strategy. Participants #2 and #3 already agree that blended learning is the most appropriate method of introducing e-Learning in the public sector. Blended learning allows for concurrent application of ICT-based and face-to-face modes in the presence of the facilitator. Learner/employees can attend contact sessions, and then be exposed to e-Learning. Participant #3 adds to the views of participants #1, #2, #4 and #5, that the already popular social networks could be helpful in introducing technology into the learning environment, as many employees are already familiar with social networks.

P3: the popular method is to have a contact session as an introduction and then to set a date where the learning should have been completed at their own time and own pace within a period with a deadline and then to close down a learning and then do reports on the achievement

According to all participants, South Africa is not ready to adopt a fully-fledged e-Learning programme for the entire public sector. Participants advise that instructional designers should be creative, and considerate of the target audience, when specifying learning delivery models and application of technology thereto. As the SA workforce is characterised by diversity, technology infusion is therefore among the most important elements of e-Learning development and design. Once instructional designers have made a decision on

what kind of artificial intelligence needs to be applied in designing and determining the delivery mode, they have to decide on the human aspects of learning and technology, to ensure that the targeted audience can be reached with current technology.

5.6.2 INSTRUCTIONAL TECHNOLOGY

Learning through technology could be a struggle for learner/employees who are not familiar with the technological mode of delivery. This could be even worse for public sector employees who have never used technology for learning purposes. Technology application in any business or educational setting involves multiple issues that should be considered, in order to make infusion of such technology work. This could be evident to users who have to migrate from a familiar technology platform (proprietary software) to a new and improved platform – which could be efficient, but difficult to use.

P5 I'm accessing content via my mobile device, it need to be adaptable to that device in order to interact with it, so it is that same content but for different platforms that will be able to be user friendly and...Of course it may not be only relied to the issue of the instructional designers but also the drives for my ...the top management, the willingness to be able to provide that particular platform, moving forward you'll say let's make it a policy issue and ...from there we'll say we must be able to put the necessary requirements...do we have people who are really dedicate for content, who develops our content so the people that develops the content is the one that will also talk about the issue of adaptability then will say different platform that we are targeting will be able to make that content adaptable to that so the technological aspects

As suggested by participant #5, above, management should support the use of social networks, instead of trying to ban or restrict access in the workplace. However, it might also not be possible to convince management to allow social networks usage. Besides, learner/employees themselves might not be ready to switch learning media instantaneously. Participant #5 therefore suggests the use of electronic media that is readily available and familiar to learner/employees, as an alternative access strategy.

According to participant #5, instructional designers should design learning material that is compatible with technology already in the hands of the targeted learner/employees. Participant #2 also agrees that pioneers of e-Learning should consider infusing an e-Learning

training platform in a manner that gently moves the learner/employee from the familiar, and already available, technology, to new, unfamiliar technology.

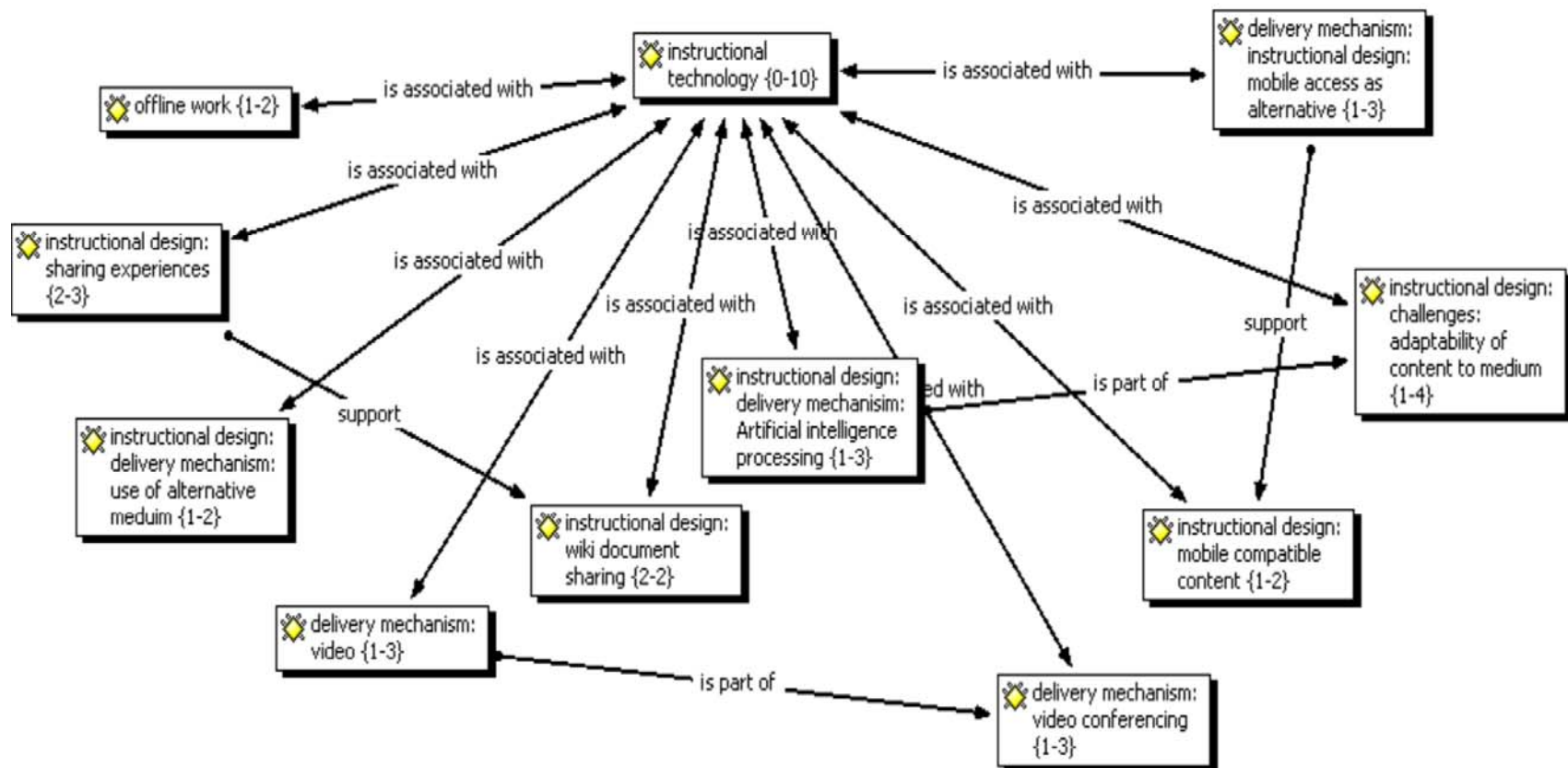


Figure 5.9: Instructional Technology

In 2003, more than 70% of the population was covered by three South African network providers.

P2: that's a problem, what e-learning should embrace is try and look for every possible technology or idea that is used by technology for instance you've got your, like we said, your cell phone, you could be using your cell phone to connect to some remote server, or you could use for instance artificial intelligent techniques that your cell phone could send some sort of question or whatever text information and your intelligent server will process that request and send the required information either via the same means or via, or maybe forward that information to a convenient source for the user it could be sent via e-mail or via any other form, there is things like video conferencing that you should think of integrating, there is interactive white board,

Participant #2 adds that e-Learning initiatives in South Africa should not be confined to mainstream online computing only, but should be extended to mobile computing by using some kind of artificial intelligence system that will redirect content, based on the access technology used by a learner/employee.

P2: adaptation, we need to.....for instance basic one of the ideas being thrown around is M-learning in other words your Mobile Learning, given the fact that the reach of the cell phone is +-90% so if you were to adopt to innovate or use mobile as an alternative or an enhancement to e-learning, that will definitely make a big difference, but trying to get +80% of South Africa to be connected that is more like a..dream

Participants #2 and #6 add that issues of digital divide should not be a stumbling block to innovative means of learning, or effectively delivering learning material to learner/employees in the public sector. Even though some learner/employees might argue that they don't have access to the internet after leaving their offices, participants #2 and #5 argue that e-Learning can be asynchronous or synchronous, depending on availability of network connection at the time of the learning process.

P2: is an advantage because most of the working environment are connected, maybe that will be the starting point to look at upgrading skills of our workforce via e-learning, there are a lot of initiatives to actually help in the area of lack of connectivity for instance there is what is called off-line connectivity where you can work on-line in the on-line envi-

ronment backup whatever you are working maybe you are using a lot of backup whatever you are using on the laptop and when you are off-line connect on that same learning environment via a CD-ROM or something of that sort, there are some initiatives like that which are working well I think 1 is being in the University of the North West

An asynchronous mode of delivery would allow learners to do their work offline and finish assignments or readings, and then plug in their laptops to the internet at work, to upload their assignment that has been saved on a memory stick, and then send, once plugged on to the internet. Besides, many innovations have been explored in the medical field, such as tele-medicine, and are already being used to help countries that experience a serious lack of doctors.

P2: *tele-medicine is basically the technology whereby people communicate with experts via video-conferencing, for instance if there's a rural hospital with a lack of Doctors and the sick patients and all that, they will connect via video-conference to a source where there is expert and the expert will diagnose the patient via video-conferencing so the fact that there is lack of Doctors in that rural environment doesn't limit the access to expert information*

Educational adaptation of tele-medicine would be tele-learning, that could facilitate delivery of learning material to remote places in the country, since public sector employees service the public in all parts of the country, including rural areas. This could also be done by encouraging one member of the community of practice to share experiences learnt through online intervention.

P4: *I think that's where one of the gaps are in training these days is getting the learning from the person that attended the course to stimulating it with the rest of the group, maybe in the department, the project team, whatever, something that's on my balance score card I want to be...I learn more of these amazing things once I come back to work I've got my certificate and then I start working but the company has invested a lot of money in me so I've got to take part on continuous learning and sharing all of this.*

Sharing of knowledge and information can be achieved by setting up communities of practice where workgroup members can share experiences with one another; that way,

learning does take place. Participant #2 insists that knowledge and skills sharing should not be confined to traditional academic settings.

***P2:** it's not your standard academic environment, it's sort of e-learning environment*

Participant #2 thinks that the digital divide or lack of network infrastructure should not stand in the way of innovative learning/teaching practice in government. Participant #3 maintains that bandwidth limitations are still a major constraint in public, but she also remarks that e-Learning could thrive in the face of adversity.

***P3:** bandwidth, definitely the constraint that we faced with all the time is that you need to compromise the quality of the content based on the capacity of the technology so where we would have a very nice multi-media rich CD to hand out you can't take that same material and send it over the networks to learners who are scattered and using the Internet*

Participant #4 adds that instructional designers should develop material that could be delivered through social media, in order to enable collaboration among learner/employees. Some of the effective social media in enabling social learning and collaboration, is wikis, which are featured in Web2.0 platforms (Merriam, 2001).

***P4:** we had a wiki collaborate around specific document...4, 5 guys putting the things together so that's basically to us collaboration, what we approach from now between government to government collaboration, once we got that in place we prioritise that, it's 1st priority, we are also going to go and collaborate with the community and with the citizens so that is the next level of collaboration so that the government, citizen and also the government business so that's basically with relation to business, you know new business*

Even though collaboration is an important part of learning and sharing of knowledge in the public sector, it should not, however, be the only means of learning. Participant #4 further mentions that the collaborative environment can be used as an introductory strategy to fully fledged e-Learning programmes, where learner/employees would then be familiar with the online environment, thereby engaging in educational discourse without the anxiety associated with formal learning (Pierce, 2009). Collaborative learning could be a starting point for formalised learning, as it might be offered concurrently with any formal learning mechanism necessary to impart knowledge in the workplace.

P4: I can see that once you got somebody that's basically familiar ... you can start introducing them to e-learning and maybe e-learning needs a structured basic curriculum there's certain rules built into but just get people to interact on social networking is already informal learning but it's not e-learning per se, I could get into people into that tool and then once they in parallel with that, ... maybe giving them an advanced course from e-learning where they can start collaborating with other people from other areas or learners

According to participant #4, informal learning is attractive to learner/employees because of the openness and flexibility of social media, made possible through active engagement and exchange of ideas on issues of interest to learner/employees. Instructional material should then be designed around a specific instructional strategy, founded on a theoretical basis. Collaborations seem to be prevalent in instructional strategy that could be applied in developing content for e-Learning in the public sector. Collaborative learning is underpinned by the constructivist paradigm, which advocates co-creation of knowledge between facilitator and learner, or among learners themselves.

P4 that in the forming stage of the social media will help a lot, like in ...you have a profile because that the 1st thing you do in social media you open up a profile, based on the group the syndicate leader will say hey guys let's use this tool and will sell it to them and say hey go onto your profile, tell us, you know use key questions,

Participant #5 reiterates the point of flexibility and adaptability, with regard to instructional design, which could be achieved by engagement in analysis between learner and instructional designer on developing instructional material. Continued interaction between learner and instructional designer creates an opportunity for gathering an insight into, and understanding of, resources that are, or are not, at the disposal of the learner/employee. Then, the instructional designer will develop content that is flexible, adaptable and accessible through available media.

P5: there was a move to say how do we move now to mobile devices, because we know that if we look at the evolution of e-learning, it's starts to say it's web based something which just happened to be ...now talk about e-learning, how do we then move now to the mobile platform, there was the time that was I think they called Mobile learning

P5: M-learning, how do we then move to that platform I think that's where we need to move but you know... MTN for instance they will say we've got 17.1 million subscribers, Vodacom has got 20 something million and these are our own people that we have of course if we move there also to say how do we then move compactable content into that platform, so the issue is that the content is the same but we just put it to the relevant platform

Cellular phones are the most popular electronic device in the SA public sector and population at large; in most cases, the same cellular phones are used for MixIt messaging. Instructional designers would do well to design instructional material that is accessible through mobile phone, so that online learning can be accessible to those who might resist e-Learning, but are willing to use their smart phones to participate in a social space. It is then important to pinpoint exactly the type of content, instructional strategy, and mode of delivery that should be used to distribute learning material. In the following section, the researcher will discuss the delivery mechanism category in relation to distribution of learning content.

5.7 LIST OF PROPOSITIONS

This section outlines a list of propositions, as formulated during the discussion of results in this chapter. Propositions are listed by proposition number (# proposition number) and participant number (P1, P2, P3, P4 or P5), indicating which provides evidence that supports the proposition. The researcher further deduced concepts from propositions, to make sense of the broader findings of this study. These concepts are used to create a relationship network, to give light to associations that could be tested, in the next chapter, by means of quantitative analysis.

Proposition #1: P1 - formulate policy to encourage facilitators to use resources that are already at disposal of employee, in order to minimise change management challenges.

Proposition #2: P2 - instructional designers should adopt or derive a systematic approach when developing e-Learning.

Proposition #3: P1, P2 and P6 - e-Learning practice should be applied within the social constructivist paradigm, by enabling co-creation of knowledge.

Proposition #4: P1, P3 and P6 - employees would resist e-Learning training programmes if they were incompatible with their familiar learning delivery methods.

Proposition #5: P5 and P1 - instructional designer should employ socially orientated instructional technologies, such as social networks, in order to successfully deliver socially orientated learning strategies such as collaborative learning practices.

Proposition #6: P4 and P6 - socially orientated technology could relieve anxiety associated with a traditional learning strategy, as most candidates are already indulging in social networks.

Proposition #7: P1 and P4 - use of social media decreases learning anxiety.

Proposition #8: P4 - instructional designers should apply social constructivist principles when developing e-Learning programmes, in order to take advantage of the current social media craze.

Proposition #9: P3 - instructional designer should firstly profile candidate group, and then design learning offering according to their profile, with respect to technology inclination and learning styles.

Proposition #10: P4 - instructional design should be grounded on social constructivist principles in a manner that reveals relative advantage for using social technology.

Proposition #11: P2 - conduct situational analysis.

Proposition #12: P2 and P3 - theoretical depth could help instructional designer to ensure compatibility of new technology-based learning experience with familiar environment.

Proposition #13: P3 and P6 - provide e-Learning experience that is compatible with learning strategy preferred by learners.

Proposition #14: P1 and P5 - online learning design should be based on learning theories, instead of direct transfer of learning material from traditional platform to online platform.

Proposition #15: P2 and P5 - prevailing learning theory that underpins online learning development is social constructivism.

Proposition #16: P4 - collaborations make for sharing of knowledge and ideas in a secure environment and where collaborators share a common interest.

Proposition #17: P5 - collaborative learning is compatible with existing collaborations in government; however, existing collaborations are not systematically technology infused.

Proposition #18: P4 and P5 - collaborations thrive on social media; hence, collaborations are the pillars of online learning in the public sector.

Proposition #19: P1 and P2 – use-of-technology inclination could have negative or positive effect on adoption of technology-supported learning systems.

Proposition #20: P1 and P4 - social media is already widely accepted by learners.

Proposition #21: P1 - e-Learning practice could be boosted by employing social media in learning activities, despite technical difficulties with computing infrastructure.

Proposition #22: P4 - social network collaboration brings together experts in different fields.

Proposition #23: P4, P3 and P5 - social networks can be used to facilitate learning online.

Proposition #24: P4 and P5 - collaborative learning facilitates learning of concepts that provide relative advantage to employees' work life.

Proposition #25: P4 and P2 - collaborative learning enables learning process that is compatible with employees' expectations and assimilation into their work environment.

Proposition #26: P1, P2, P3, P4 and P5 - social media is compatible with collaborative learning strategy.

Proposition #27: P1, P2, P4 and P5 - collaborative learning should be extended to mobile technology.

Proposition #28: P4 - delivery of e-Learning should be adaptive, to allow for different technologies to be reached with instructional material, depending on the type of technology learner/employees can access, in order to participate in a learning environment, and thereby keeping in mind the rapid change of technology.

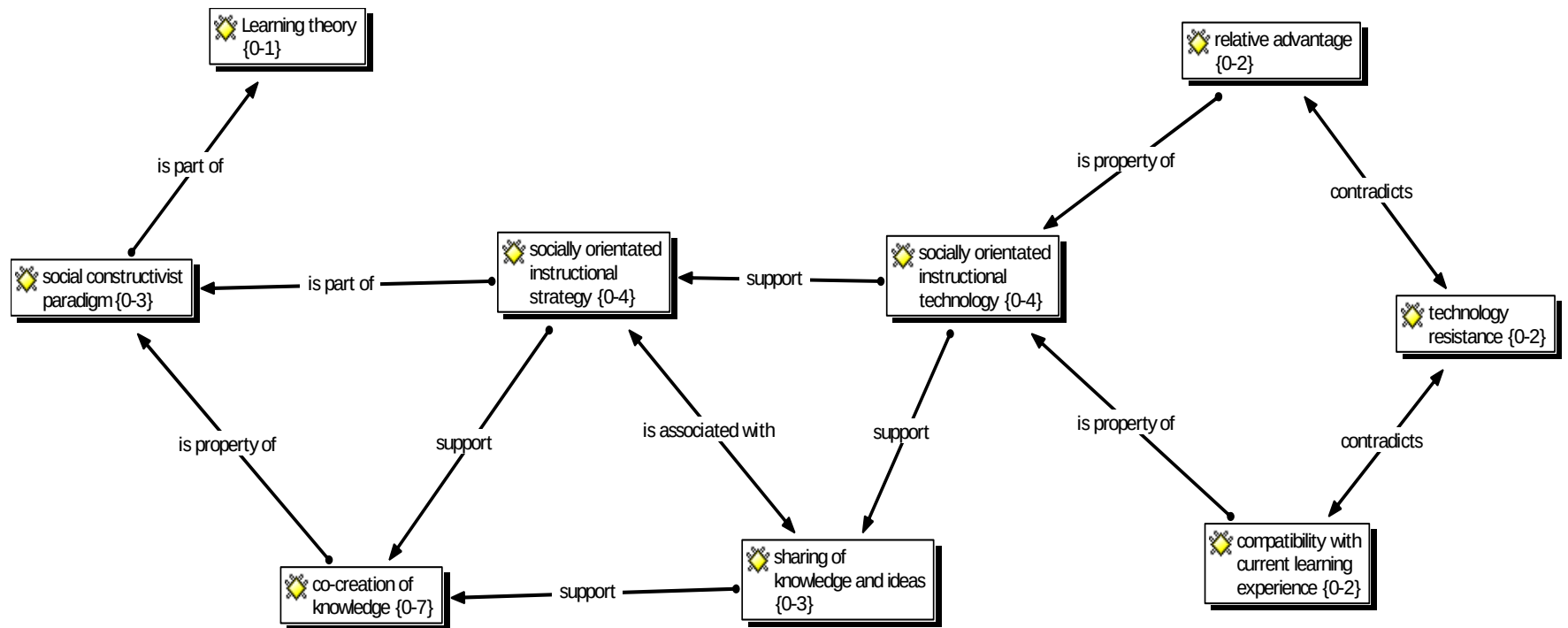


Figure 5.10: Framework Drawn From Propositions

Figure 5.10 shows a relational network between the main concepts that emerged from analysis. At the centre of e-Learning practices in the public sector, is sharing of knowledge and ideas by collaborators in the collaborative forums, enabled by socially orientated instructional technology. This practice owes its credibility to underlying instructional strategy that provides blueprints for e-Learning experience design. In this case, it is the collaborative learning strategy which is underpinned by the social constructivist paradigm, that enables co-creation of knowledge with a learning system.

On the other half of Figure 5.10, is socially orientated instructional technology, whose adoption is associated with perceived relative advantage, as employees would adopt, and even fast-rate socially orientated instructional technology. Socially orientated instructional technology offers a variety of advantages, as social media such as Facebook, Twitter, MySpace, etc. are widely accepted worldwide. Another factor that could influence adoption of socially orientated instructional technology, is compatibility, as employees would prefer a learning platform compatible with a familiar learning environment.

Hope of technology adoption was brought down by threats of network infrastructure constraints, which, in some circumstances, would cripple the e-Learning initiative. This is in contradiction to two constructs drawn from the diffusion of innovation model. Resistance to technology as a whole, could affect any type of technology. However, in this case, social networks and other socially orientated instructional technologies are thriving.

In the following chapter, the researcher intends to conduct a quantitative survey in order to determine the strength of the association between socially orientated learning strategy, socially orientated instructional technology, compatibility, and relative advantage. Establishing such associations would give an insight into, and affirmation to, the worth of a collaborative learning strategy, as facilitated through socially orientated instructional technology.

5.8 CONCLUSION

In this chapter, the researcher discussed categories that emerged from interview transcripts, in relation to the research problem stated in Chapter 1. Discussions uncovered concepts relating to e-Learning practices in the public sector. Such concepts allowed the re-

searcher to make propositions that could be used as guidelines for conceptualising e-Learning training programme design. These propositions will be further explored using statistical analysis methods, in the following chapter of this study.

CHAPTER 6

QUANTITATIVE ANALYSIS AND RESULTS

6.1 INTRODUCTION

The quantitative section of analysis follows on from propositions made from qualitative data analysis. The qualitative approach is the primary research approach for this study. It is used to gain an in-depth understanding of important variables relating to e-Learning practices in the SA public sector. Such variables are outlined in Figure 5.10 in the previous chapter of this study. The quantitative method of inquiry is deemed necessary for this study, as it allows the researcher to explore associations between dependent and independent variables, as deduced from the qualitative analysis of this study, and thereby make assertive conclusions about relationships between important variables in e-Learning practices, in the context of the public sector HRD.

Through grounded theory analysis, the researcher gained an in-depth understanding of e-Learning practices in the public sector, by extracting and discussing important themes (McCallin, 2003). He managed to extract themes such as e-Learning practice challenges, instructional design, delivery mechanisms and collaborative learning. In this chapter, the researcher intends to explore the associations between socially orientated instructional technology, as a dependent variable, and independent variables such as socially orientated learning strategy, compatibility, and relative advantage.

This exploration will shed light on concerns raised by participants #1, #2, #3 and #5, who are concerned about problems relating to computer anxiety during the learning process, where employees become anxious because they are not familiar with the new delivery method. Meanwhile, they are also concerned about perceived relative advantages brought about by new e-Learning programmes. Analysis of quantitative data, in relation to determination of association between dependent and independent variables, will be discussed in the following sections.

6.2 VALIDITY AND RELIABILITY

In an attempt to ensure validity, the researcher conducted a pilot study by sending out 18 questionnaires, and asked for comments from training managers in various training and development departments within the public sector. They made comments about clarity, understanding of questions, and difficulty in answering the questionnaire. Feedback to the pilot was focused on the use of technical terms that were not understood by some participants, because most of them are not well conversant with e-Learning practice in their workspace. However, the pilot yielded its intended result, as it tested what it was meant to test. In order to ensure content validity, the researcher performed factor analysis, discussed below.

6.2.1 FACTOR ANALYSIS

In order to simplify analysis, the researcher had to reduce the number of items into factors that were designed to measure a specific dimension of the questionnaire. This would also improve content validity, as the researcher intended to ensure that items in each dimension measured what was represented in the dimension. The questionnaire used to collect data contained four major dimensions that measured socially orientated instructional technology, socially orientated instructional strategy, compatibility, and relative advantage. Each of these dimensions had a number of items. The researcher performed factor analysis to extract items, using the Principal Component Analysis extraction method. This method extracted items that had an eigenvalue > 1 , and suppressed those that had eigenvalue < 1 . Extracted items were then grouped into relevant dimensions, with a level of certainty about the validity of each.

Factor naming in this study is similar to names given to dimensions as they appear in the questionnaire. Table 6 shows items extracted from each dimension:

	Mean	Analysis N	Factor loading
SOCIALLY ORIENTATED INSTRUCTIONAL STRATEGY			
In online learning environment, students should learn ...			
by exchanging of ideas with fellow students	3.08	80	.607
by reflecting on real-life cases	3.77	79	.664
by relating current knowledge to new material	4.00	79	.677
by open-ended engagement	3.11	80	.789
by drill and practice	3.79	81	.661
SOCIALLY ORIENTATED INSTRUCTIONAL TECHNOLOGY			
For learning purpose students should use ...			
discussion forum	3.00	81	.673
wikis	2.52	81	.816
e-mail	1.94	79	.491
additional resources	3.74	78	.659
instant messaging	2.46	80	.670
YouTube	2.31	80	.754
RELATIVE ADVANTAGE			
Online learning experience...			
can be adapted to my own needs	4.15	79	.761
increase the efficiency of my study	4.18	80	.579
widens my personal learning experience	4.27	79	.700
enables me to easily access my course material	4.20	79	.667
COMPATIBILITY			
Online learning experience...			
is more suitable to lifestyle	3.95	80	.840
is more suitable to my learning style	4.05	79	.634
meets my personal career goals	3.04	79	.606
*is compatible to my perception of education quality			
TECHNOLOGY MATURITY			
I access...			
Ordinary cell phone	3.96	74	.660
Desktop	3.28	74	.650
LAN connected computer	3.93	74	.622
Smart phone	3.38	74	.694
Laptop with Internet connectivity	3.68	74	.425

* Discarded item because it didn't meet extraction criteria

Table 6.1: Factors extracted using Principal Component Analysis

In addition to the application of eigenvalue as criteria for extraction, the researcher also investigated factor loadings. In Table 6.1, factors are extracted using the Principal Component Analysis method. Each dimension was measured independently, in order to reduce items that did not meet the extraction criteria. In all dimensions factor loading ranged from 0.425 to 0.840. Extraction criteria suppressed all items that had a factor loading that was less than 0.4, as the best factor loading should be closest to 1. Furthermore, the researcher went on to perform reliability tests to ensure the same instrument would yield the same result, if the research process were replicated.

6.2.2 RELIABILITY TESTING

Cronbach's alpha was used to test the reliability of results. According to Gliem and Gliem (2003), an alpha value that is less than 0.5 is poor and unacceptable. Each dimension was then subjected to a reliability test to determine Cronbach's Alpha. These dimensions' Cronbach's Alpha were determined together with Cronbach's alpha when an item is deleted. This enables the researcher to determine which items would increase Cronbach's alpha, if the item is deleted from the measure.

A series of tables below show each dimension Cronbach alpha and items that constitute that dimension. Table 6.2 shows a Cronbach alpha of 0.619 for compatibility dimension. This dimension would yield 0.748, if item deleted online learning experience can be adapted to my own needs. However, this dimension has a strong theoretical presence (Zhang et al., 2010).

Compatibility		.619
	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
Online learning experience...		
can be adapted to my own needs	12.64	.748
increases the efficiency of my study	12.61	.373
widens my personal learning experience	12.52	.436
enables me to easily access my course material	12.57	.562

Table 6.2: Reliability statistics for compatibility dimension.

Also, Table 6.3 shows a Cronbach alpha for relative advantage which is equal to 0.742. this Cronbach alpha is more reliable than any others. None of the items would increase the reliability of this dimension if deleted. It is worthwhile to retain all items.

Relative advantage		.742
	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
Online learning experience...		
is more suitable to my lifestyle	10.85	.726
is more suitable to my learning style	10.75	.672
meets my personal career goals	11.76	.682
is compatible to my perception of education quality	11.04	.649

Table 6.3: Reliability statistics for relative advantage dimension

Next, is Table 6.4, which is showing a Cronbach alpha of 0.542 for socially orientated instructional technology. This is the lowest Cronbach alpha of all dimensions measuring in this study. Again, none of the items would improve reliability for socially orientated instructional technology dimension, if deleted.

Socially orientated instructional technology		.542
	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
For learning purpose students should use...		
discussion forum	13.03	.517
Wikis	13.55	.430
e-mail	14.15	.477
additional resources	12.27	.511
Instant messaging	13.63	.527
YouTube	13.79	.513

Table 6.4: Reliability statistics for socially orientated technology

Table 6.5 gives reliability statistics for socially orientated instructional strategy. The second highest Cronbach alpha is 0.725, which also indicates good reliability. It indicates that exchanging ideas with fellow students would improve reliability of the dimension, if deleted. Meanwhile, literature suggests that collaborations are based on the exchange of ideas within socially orientated platforms such as Linked-In, Facebook and other discussion forums (Wenger & Snyder, 2000; Brown & Duguid, 2002; Mehra et al., 2012)

Socially orientated instructional strategy		.725
In an online learning environment, students should learn...	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
by the exchange of ideas with fellow students	14.75	.779
by reflecting on real-life cases	14.08	.665
by relating current knowledge to new material	13.86	.658
by open-ended engagement	14.65	.576
by drill and practice	14.04	.691

Table 6.5: Reliability statistics for socially instructional strategy.

Technology maturity as shown in Table 6.6, indicates that item ordinary cell phone would improve reliability if deleted. Technology maturity yields the lowest Cronbach's alpha. However, all items appear to have a good factor loading in the factor analysis table, in the previous sector of this chapter.

Technology maturity		.522
	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
Extent ordinary cellphone	14.27	.584
Extent of LAN	14.30	.336
Extent of desktop	14.95	.361
Extent Smartphone	14.85	.543
Extent of internet laptop	14.55	.453

Table 6.6: Reliability statistics for technology maturity.

The validity and reliability tests presented above enable the researcher to approach further analysis with a certain degree of confidence in the data at hand. In the subsequent sections of this chapter, the researcher describes the data, and performs a variety of statistical analyses in an attempt to answer the research questions posed in Chapter 1 of this study.

6.3 DESCRIPTION OF DATA

The researcher performed a variety of data description and analysis techniques to get a goodness of fit (Sekaran, 2006). Data description allows the researcher to explore and point out trends and significant traits that help paint a picture of e-Learning practices in the public sector. This will be done by performing frequencies and graphic presentations of data, as it is important to bear in mind that the purpose of quantitative data analysis results is to triangulate a process in relation to previous qualitative data analysis.

Testing of significance is not the primary objective of the analysis in this study. The population for this study is limited to a few individuals who have just started or are experimenting with e-Learning in the public sector. Inferential statistics might not serve any significant purpose in this regard (Leedy & Ormrod, 2005). It is also important to note that the researcher has to honour respondents' requests to be highly sensitive to anonymity and confidentiality in any reports made for this study. Therefore, information relating to job specifications and positions would not be discussed in this study, to protect respondents' identity.

The public sector is the biggest employer in the country; however, e-Learning practices are still confined to a few departments that have not yet learnt to optimise e-Learning benefits in dealing with skills deficiencies in the public sector. Therefore, nomination of the unit of analysis for this study is restricted to a smaller population, and very few individuals are involved in setting up e-Learning policy and practice strategy in the public sector (Mouton, 2001; Sekaran, 2006).

6.3.1 AGE AND GENDER DESCRIPTION OF RESPONDENTS

The age of respondents ranges from 19 years to 48 years old, with a range of 29 years, as shown in Table 6.8, whereas Table 6.7 shows the distribution of age categories among male and female respondents. There is no significant difference in the age distribution between the two groups, as it is proportional to the total number of respondents.

Count		Age category				Total
		20 and younger	21 - 30	31 - 40	41 - 50	
Gender	Male	3	18	21	5	47
	Female	3	15	13	2	33
Total		6	33	34	7	82

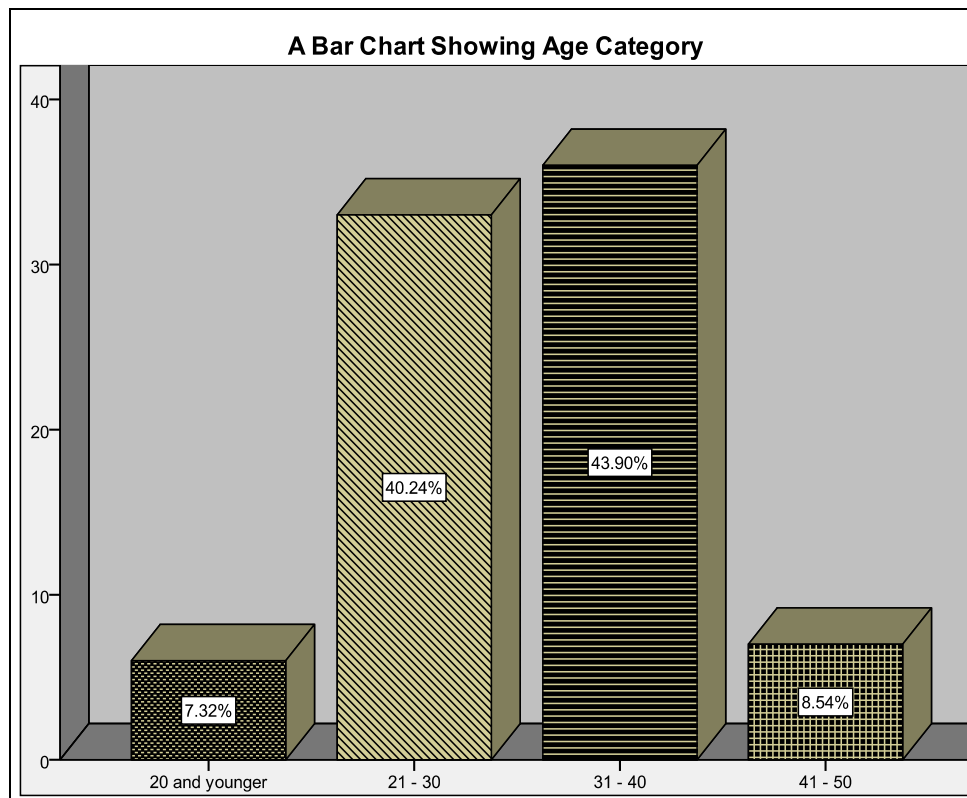
Table 6.7: Cross-Tabulation Of Age Category Between Male And Female Respondents

Statistics: Age

N	Valid	82
	Missing	1
Mean		31,24
Range		29
Minimum		19
Maximum		48

Table 6.8: Age Statistics

Figure 6.1 shows a graphic presentation of the age distribution among all respondents, as it shows that the largest age category is 31 – 40 years of age, with 43.9% of the respondents, then followed by the 20 – 30 years age category, with 40.24% of the respondents. The smaller size of the 20-years-and -younger category could be explained by the fact that many people under the age of 20 years have just matriculated, and are studying in higher education institutions. Meanwhile, the 41 – 50 years category could be explained by the generational differences theory, as most of them belong to Generation X, which might not be as technologically inclined as the later Generation Y (Morgan & Ribbens, 2006).

**Figure 6.1:** A Bar Chart Showing Age Category

Findings from the qualitative data analysis results in Chapter 5 of this study, indicate that the most prevalent instructional strategy in the public sector, and preferred by e-Learning practitioners, is collaborative learning. This is in line with the definition of e-Learning, as it emphasises collaboration and promotion of lifelong learning that takes place anywhere and anytime (Drinkwater et al., 2004; Cross & Hamilton, 2002; Acton & Golden, 2003). Collaboration could be facilitated through socially orientated media that allows for learner interaction in an asynchronous or synchronous mode of delivery (Wenger & Snyder, 2000). The researcher had to ensure that these facts were taken into account when designing a research instrument to collect data for the triangulation process.

The research instrument used to collect data was explorative, to allow respondents a wider preference and combination of instructional technologies used to facilitate training in the public sector. In the instructional technology dimension, the researcher also added instructional technologies that are not socially orientated, to check if they were more prevalent than socially orientated instructional technologies. Instructional technology prevalence will be discussed in the following section.

6.3.2 USAGE OF INSTRUCTIONAL TECHNOLOGIES IN PUBLIC SECTOR

Participants in the case study discussed in the previous chapter, indicated that they prefer and use socially orientated instructional technologies within communities of practice, where they share knowledge and information regarding challenges faced at work (Wenger & Snyder, 2000; Leacock, 2005). They also indicated that such instructional technologies facilitate mutual advancement towards skills and knowledge improvement, so that they can improve their performance in the workplace (Matlhape & Lessing, 2002).

Determining technology inclination and accessibility for public sector employees, would help to see if e-Learning is possible in the SA public sector (Adhikari, 2005). The technology maturity variable measures employees' use and access to various ICT tools that can also be used for learning purposes. This will help in deciding to further advocate e-Learning in the public sector, or wait until other matters such as the digital divide, are resolved, if they are prohibitive.

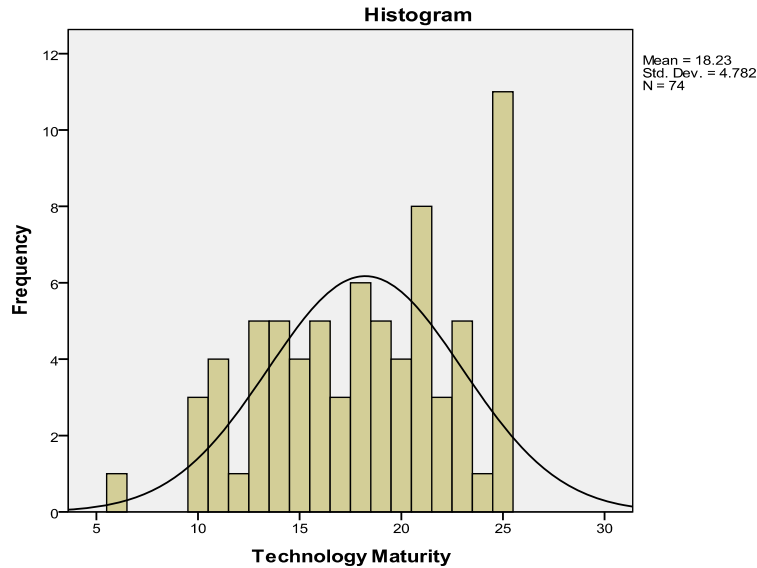


Figure 6.2: Technology Maturity

Technology is an aggregate of five technological instruments that could be used as a platform for e-Learning or any other online business activities. These technological instruments include smart phone, internet-connected laptop, internet-connected desktop, ordinary cell phone, and ADSL. The maximum level of maturity is 25. Figure 6.2 shows a histogram which indicates that the highest maturity level is the most frequent, at 11 respondents. This could mean that public sector employees have a considerable amount of exposure and access to technology. However, technology can be used for different business functions which are not necessarily e-Learning. This could mean there is considerable exposure to, and usage of, technology in the public sector, that may or may not be used for learning purposes. The following section provides a further description of technologies available and used in the public sector for learning purposes.

6.3.2.1 INSTRUCTIONAL TECHNOLOGY – DISCUSSION FORUMS

The research instrument included socially orientated instructional technologies, along with other instructional technologies that seem to be commonly available to most respondents, such as e-mails. However, socially orientated instructional technologies proved to be the most prevalent instructional technology for learning purposes among the sample. Figure 6.3 shows the degree of preference for a discussion forum, which is the most used instructional technology.

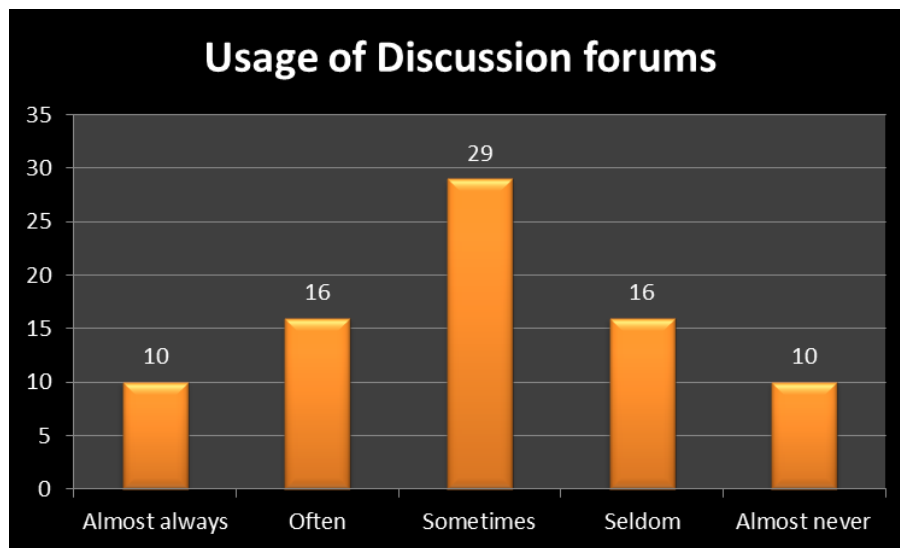


Figure 6.3: A Pie Chart Showing Degrees Of Preference For Discussion Forums

Participants of the previous case studies (in Chapter 5) indicated that they use discussion forums within communities of practice, as they share knowledge and experiences about new opportunities in their line of work (Lave & Wenger, 1991). This allows members of the community to debate and analyse important issues of concern in their practice, thereby negotiating new meanings and then improving their knowledge (Wenger & Snyder, 2000; Senge, 1991). The larger connected portion of the histogram chart shows those who prefer the discussion forum to be used, starting from 'sometimes' with 35.80%, 'often' with 19.75% and 12.35% 'almost always'. The statistical measurement in the subsequent sections will show whether this instructional technology could be matched with any specific instructional strategy with a degree of confidence.

6.3.2.2 INSTRUCTIONAL TECHNOLOGY – WIKIS

Wikis can be categorised as socially orientated instructional technology, as they allow co-contributions in learning activities between learners, irrespective of time and space difference (Drinkwater et al., 2004). Figure 6.4 shows degrees of preferences for Wikis, as participants in the study think it would be an effective instructional technology through which to deliver learning material to learners. Wikis enable document-based collaboration, where learners can work together to compile a solution to a problem (Wägar, 2008; Tavangarian et al., 2004). The largest bar of the histogram is those who think learners should

almost never use wikis, but a combination of those who feel that learners should ‘sometimes’ 25%, ‘often’ 20.99% and ‘almost always’ 4.94%, is significantly large, as it is more than 50% of the sample. Wikis can be used in conjunction with a discussion forum, since they are both socially orientated media (Morgan & Ribbens, 2006; Greenhow, 2011). They both enable interaction, whether asynchronous or synchronous (Leacock, 2005).

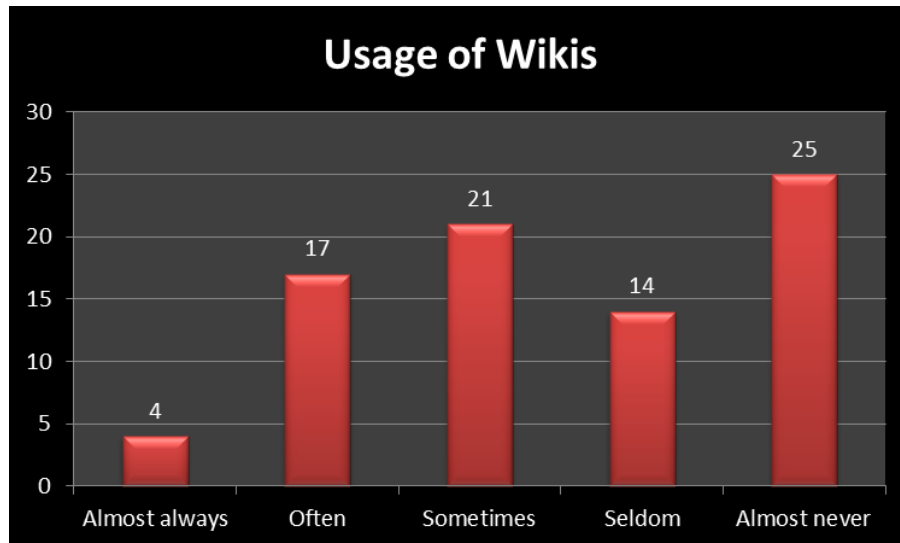


Figure 6.4: A Histogram Chart Showing Degrees Of Preference For Wiki Instructional Technology

Participants in the case study stated that they sometimes have to work together in developing a document, by posting the document online so that members of the community of practice can contribute iteratively.

Even though wikis are not the most popular instructional technology, wikis are used under specialised circumstances where collaborative effort is required to develop an IT policy document, as indicated by participant #4 in the previous chapter. In this case, the collaborative learning strategy is the most prevalent instructional strategy in the public sector. Maybe such prevalence could be explained by a paradigm shift in the learning process as it moves from behaviourist to cognitivist to constructivist theories (Duffy & Cunningham, 1996). Notwithstanding the fact that socially orientated media are important for facilitating a collaborative learning environment, an instructional technology that is not socially orientated also emerged as one of the preferred instructional strategies.

6.3.2.3 INSTRUCTIONAL TECHNOLOGY – ADDITIONAL RESOURCES

The degree of preference for additional resources caught the researcher's attention, as it appears to be the most preferred instructional technology, with more than 65% indicating that they either 'often' (35.90%) or 'almost always' (30.77%) prefer to use additional resources. Despite the socially orientated nature of online learning practices in the public sector, respondents show high preferences for additional resources, as shown in Figure 6.5.

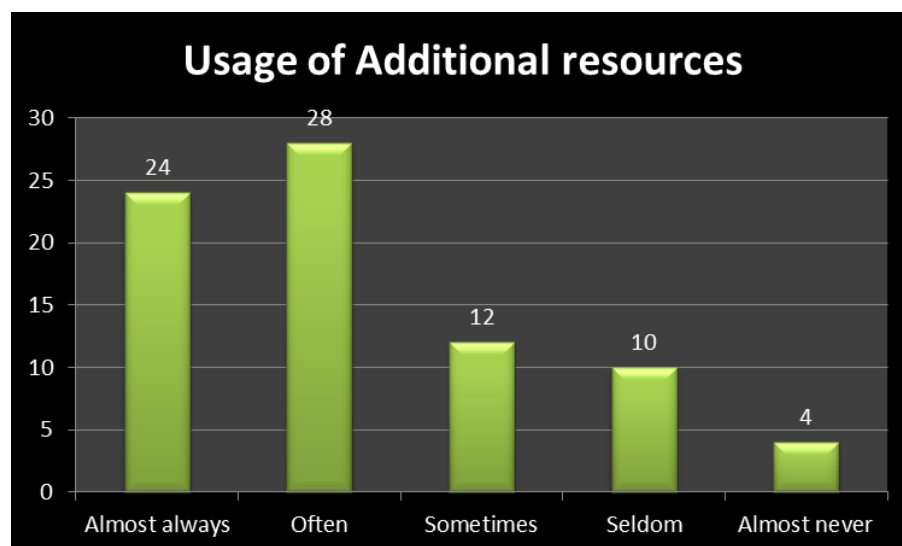


Figure 6.5: A Histogram Chart Showing Degrees Of Preference For Additional Resources

The 'additional resources' feature of e-Learning works as a repository of important items used for learning activities, as planned by instructional designers. In this feature of the online learning environment, one could find tools that are supplementary to the current delivery mechanism. In some of the 'additional resources' features, one can find tools such as YouTube video clips showing interviews, presentations and other educational material. 'Additional resources' should not be discounted in the collaborative learning environment, just because it is not a socially orientated instructional technology. If an instructional designer decides that it would be useful, it should be employed.

In addition to instructional technology, that caught the interest of the researcher, is the degree of preference for e-mails in performing learning activities. The researcher assumed that e-mails would be the most preferred instructional technology for communicating with fellow learners and facilitators. Besides, e-mail is the most common ICT tool of all respondents, as they sent back the completed questionnaires by e-mail. It is clear that despite

having access to e-mail, respondents may not see e-mail as an instructional tool, but as a useful tool for general communication.

6.3.2.4 INSTRUCTIONAL TECHNOLOGY – E-MAIL

Despite a low degree of preference for e-mail, it is interesting to see that the findings are contrary to the researcher's anticipation. Since all respondents submitted responses by e-mail, the researcher would have expected to find e-mails to be the most preferred and used technology in an e-Learning environment. The single biggest portion of the histogram is those who prefer 'almost never' – 34 (43.04%) use e-mails for learning and teaching; meanwhile the second biggest portion is 'seldom' – 24 (30.38%) use of e-mail in the learning process, in figure 6.6.

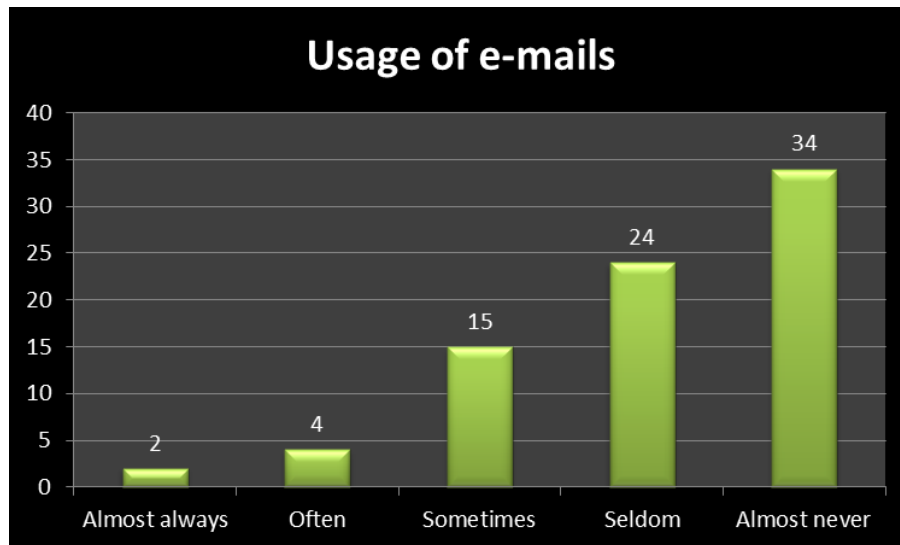


Figure 6.6: A Histogram Chart Showing Degrees Of Preference For E-Mail

This could be explained by the prevalence of the collaborative learning strategy in the public sector, which flourishes in socially orientated instructional technologies such as wikis and discussion forums. Table 6.9 shows acceptance of social media among three categories, the bigger group of social media users being 21-30 and 31-40, which is the biggest group of the sample. This could mean that learning through social media is likely to be accepted in the public sector, as it already exists in the form of collaborative forums.

		Age category				Total
		20 and younger	21 - 30	31 - 40	41 - 50	
Level of Social Media Acceptance	Almost never	1	0	2	0	3
	Seldom	2	12	9	0	23
	Sometimes	2	16	24	3	45
	Often	1	5	0	1	7
Total		6	33	35	4	78

Table 6.9: Cross-Tabulation Of Level Of Social Media Acceptance And Age Category

It is then the instructional designers' responsibility to design learning material that is compatible with social media. Knowing the prevailing instructional strategy in the public sector, it should not be difficult to find a compatible medium such as social media, acceptable. On the other hand, it is important to compare social media acceptance between management personnel in the public sector and employees who are involved with e-Learning practices.

			Job Position		Total
			skilled labour	management	
Level of Social Media Acceptance	Almost never	Count	2	1	3
		% within Job Position	3.1%	7.7%	3.8%
	Seldom	Count	21	2	23
		% within Job Position	32.3%	15.4%	29.5%
	Sometimes	Count	36	9	45
		% within Job Position	55.4%	69.2%	57.7%
	Often	Count	6	1	7
		% within Job Position	9.2%	7.7%	9.0%
Total		Count	65	13	78
		% within Job Position	100.0%	100.0%	100.0%

Table 6.10: Level Of Social Media Acceptance And Job Position Cross-Tabulation

Table 6.10 shows a comparison of skilled employees' acceptance of social media, as well as that of management, in the public sector. Even though the number of those who sometimes prefer and use social media is smaller for management, it is a bigger percentage in proportion. There is no significant difference between acceptance of social media for

skilled employees and for management. It is important to note that statistical procedures were performed on a purposive sample. This sample had already started engaging in e-Learning and collaborative practice. It is likely that there would be no significant difference in the acceptance pattern between the two groups.

Participants in the sample from which data was collected, did not include management that prohibits the use of social networks, as indicated by participants of the case study section in Chapter 5. Those participants referred to management in many different functional departments, as needing personnel to be trained, but not conducting training themselves.

6.4 MEAN DIFFERENCE FOR LEVEL OF SOCIAL MEDIA ACCEPTANCE BETWEEN JOB POSITIONS

It would be helpful to know whether there is a difference in acceptance of socially orientated instructional technology between two job position groups. A difference between two groups' acceptance would provide insight into the application of socially orientated instructional technology resources, to ensure that the right people are targeted with promotional communication. Table 6.11 shows a t-test indicating the mean difference between skilled labour and top management.

Independent Samples Test						
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Mean Difference
Level of Social Media Acceptance	Equal variances assumed	.199	.657	-.295	76	-.062
	Equal variances not assumed			-.282	16.5	-.062

Table 6.11: Mean Differences Between Two Groups

As indicated in Table 6.11, the levels of socially orientated instructional technology acceptance mean that the difference between the two groups is not significantly different. In order to prove significant difference, the p-value should be less than 0.05. Meanwhile, in this instance the p-value is 0.657, which is insignificant. It is then interesting to learn that management's and skilled employees' acceptance of social media is not different. This

makes it possible to assume that socially orientated instructional strategy would thrive in public sector e-Learning practices. In the following section, the researcher will analyse the association between independent and dependent variables, as well as perform regression to determine the best predictor for acceptance of socially orientated adoption. It will also be interesting to see whether socially orientated instructional strategy is the better predictor than other independent variables, of acceptance of socially orientated instructional technology.

6.5 DETERMINING ASSOCIATIONS

This section will help determine the strength and direction of associations between variables derived from the proposition. Associations will be determined between the dependent variable (socially orientated instructional technology) and independent variables (socially orientated instructional strategy, relative advantage, and compatibility). Such associations are important to ascertain that socially orientated instructional technology could be used successfully to facilitate socially orientated instructional strategy (Zhang et al., 2010), which seems to be the prevalent delivery mechanism in the public sector. Each of these variables is made up of four aggregated items, and each item is measured on a Likert scale ranging from 1 to 5 in a measure of magnitude.

In addition to that, the researcher will determine the association between compatibility (Rogers, 1995; Corrocher, 2010), which is a measure of the degree of perceived transitional effort required to adopt new delivery methods, and socially orientated instructional technology. Compatibility influences the adoption rate for new delivery methods, in the sense that if a new delivery method is too different or demands too much effort from the user, in order to yield the same results as traditional delivery methods, users would take a long time to adopt it – or even reject it. Furthermore, determine correlation between dependent variable's association and relative advantage (Duan et al., 2010), which is a measure of the degree to which an innovative learning system adds value to employees' professional aspirations and, perhaps, their personal life.

Socially orientated instructional technology (discussion forums, additional resources repository including YouTube links, wikis, and Facebook) as the pillar of the e-Learning delivery in the public sector, will be tested again, with variables that emerge from the qualita-

tive analysis in Chapter 5. Understanding such associations could provide an explanation of the resistance that may loom, as some learner/employees may not be ready to adopt technology for learning purposes (Venkatesh et al., 2003).

However, the participants also mentioned that socially orientated technology is widely used in the public sector, and it serves as a platform for sharing information and knowledge. They also mentioned that social networks are forbidden in the public sector as a workplace.

In the subsequent sections of this study, the researcher will perform correlation and regression analysis, to determine associations between the dependent variable (socially orientated instructional technology) and independent variables (socially orientated instructional strategy, compatibility and relative advantage).

6.5.1 CORRELATION AND REGRESSION

Associations between the dependent variable and the independent variables will be determined by performing correlation, thereby producing a correlation matrix. Table 6.12 shows a correlation matrix containing associations between independent variables, the dependent variable, and additional variable technology maturity – which is not significantly related to any variables deduced from the diffusion of innovation concept.

Technology maturity aggregates technologies such as cell phones, Smartphone, LAN connected desktop, internet connected laptops, and ADSL connection at home. These are hard technologies that are accessible to public sector employees, but not specifically related to e-Learning practice. Participants consider these technologies to be generic technologies that are used for general communication purposes. Meanwhile, they are specific about instructional technology that could be used for instructional purposes on an e-Learning platform. As mentioned in the preceding sections, participants specifically prefer and use socially orientated instructional technology for learning purposes.

Correlations

		Technology Maturity	Relative ad- vantage	Social Orientated Instructional tech- nology	Social Orien- tated Strategy	Compatibility
Technology Maturity	Pearson Correlation	1	.103	.254*	.249*	.043
	Sig. (2-tailed)		.391	.034	.034	.720
	N	74	71	70	73	73
Relative advantage	Pearson Correlation	.103	1	.308**	.431**	.629**
	Sig. (2-tailed)	.391		.008	.000	.000
	N	71	77	73	76	77
Social Orientated Instructional technology	Pearson Correlation	.254*	.308**	1	.485**	.262*
	Sig. (2-tailed)	.034	.008		.000	.023
	N	70	73	77	75	75
Social Orientated Strategy	Pearson Correlation	.249*	.431**	.485**	1	.485**
	Sig. (2-tailed)	.034	.000	.000		.000
	N	73	76	75	79	78
Compatibility	Pearson Correlation	.043	.629**	.262*	.485**	1
	Sig. (2-tailed)	.720	.000	.023	.000	
	N	73	77	75	78	79

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.12: Correlation Table

Variables such as compatibility and relative advantage are not significantly related to technology maturity. This could be attributed to the context of this study, which is not specifically focused on investigating adoption of technology in general, but of e-Learning as an innovative means of delivering learning programmes. This is in line with Horton and Horton (2003), whose definition of e-Learning emphasises electronic networks as a delivery medium, with the learning process still the same. Innovative traits in e-Learning are attributed to the fact that e-Learning shifts the learning processes from traditional classroom mode to new innovative media, through media-appropriate instructional strategies (Cross & Hamilton, 2002). What makes e-Learning an innovation, is the fact that it transforms the learning process from traditional classroom learning to an online, just-in-time, just-in-context, flexible, and easily accessible learning platform (Cross & Hamilton, 2002; Alsultanny, 2006; Cox et al., 2004; Hanna, 1998).

6.5.2 ASSOCIATIONS AND INFLUENCE OF INDEPENDENT VARIABLES TO DEPENDENT VARIABLES

Socially orientated instructional strategy shows the strongest association with dependent variable, compared with other independent variables. The influence between socially orientated instructional technology and socially orientated instructional strategy is determined by a moderate strength, where $R\text{-value} = 0.485$, whereas compatibility and relative advantage have a somewhat weak strength, with $R\text{-values} = 0.262$ and 0.308 , respectively. All associations are positive, meaning that a move in any of the dependent variables produces a movement in the dependent variable, towards the same direction, even though strength of association is not strong.

The association between socially orientated instructional strategy and socially orientated instructional technology is crucial, because it may help justify the use of social networks in facilitating socially orientated instructional strategies in a form of collaborative learning. The collaborative learning strategy is the prevalent instructional strategy in the public sector. Such justification could be instrumental in convincing top management to allow social networks, or at least elements that could be used for learning purposes, during work hours.

It is also important to know whether the combined strength of an independent variable could result in greater strength, or even change direction of association, than each individ-

Coefficients^a

ually. The researcher will perform regression, to determine the strength of combined independent variables, in determining the magnitude of movement and direction of movement in the dependent variable. The regression model summary indicates that R-value = 0.494, which is stronger than the single strongest variable – the socially orientated instructional strategy.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.494 ^a	.244	.210	2.764	.244	7.305	3	68	.000

Predictors: (Constant), Compatibility, Socially Orientated Strategy, Relative advantage
Dependent Variable: Socially Orientated Instructional technology

Table 6.13: Model Summary

The model summary shows moderate correlation strength, with R-value of 0.494, which still indicates moderate strength, despite being stronger than each independent variable. Meanwhile, F-value = 7.305, which is a ratio of the mean square for regression to the residual mean square. The residual mean square indicates the difference between the actual value of the dependent variable, and the result of the regression equation. The residual difference is significant, with p-value equal to 0.000. The regression and residual are calculated from all independent variables or predictors.

A standardised coefficient for socially orientated instructional strategy and socially orientated instructional technology, is 0.424, which means that one standard deviation shift in socially orientated instructional strategy would yield 0.424 corresponding change in socially orientated instructional technology. This influence is significant, with p-value equal to 0.000.

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.255	2.747		.821	.415
Socially Orientated Strategy	.592	.169	.424	3.512	.001
Compatibility	.300	.129	.262	2.318	.023
Relative advantage	.464	.170	.308	2.726	.008
Technology maturity	.171	.079	.254	2.16	.034

a. Dependent Variable: Socially Orientated Instructional technology

Table 6.14: Coefficient table

A standardised coefficient for compatibility is 0.262, technology maturity is 0.254 and relative advantage 0.308 in Table 6.14. This means that one standard deviation shift in socially orientated instructional technology would yield a change equal to the standardised coefficients for all independent variables. The standardised coefficients are significant, with p-value = 0.023 for compatibility; p-value = 0.034 for technology maturity and p-value = 0.008 for relative advantage.

6.6 CONCLUSION

In this chapter, the researcher discussed the results from the quantitative analysis, in order to describe and determine associated variables determined during the qualitative analysis (Leedy & Ormrod, 2005). Descriptions covered socially orientated instructional technology, which is considered to be the dependent variable in this analysis. Further analysis discussed included associations between variables and their degrees of association, using correlation and regression. Regression analysis was instrumental in determining the predictability of the dependent variable, using independent variables.

Even though the objectives of this study are not to generalise findings, the researcher decided to explore relationships and degrees of influence exerted by independent variables collectively and individually. Findings are that socially instructional strategy has the strongest influence in determining the predictability of socially orientated instructional technology usage in the public sector. This could seem obvious, but it is interesting to see that e-Learning practice in the public sector is socially orientated, whereas socially orientated instructional technologies were perceived as recreational or leisure tools (Mason &

Rennie, 2008; Horton & Horton, 2003). Social networks and other social media are prohibited in the public sector, whereas it is the main instrument of delivery.

Basically, the collaborative learning strategy is dominant in the public sector. This means that instructional designers should consider advocating the use of social networks in facilitating learning in the public sector (Klamma et al., 2007). Social media adds the advantage of mobility, as the social media user can access social functions from almost any electronic device. This could eradicate the issue of the digital divide, because social media is already thriving, so that a learning platform can be shifted to an already existing and thriving medium.

Furthermore, the associations between relative advantage and socially orientated instructional technology prove to be moderately strong, which could mean that learner/employees would adopt e-Learning as a method of facilitating learning if it added value to their lives, both personally and career-wise. Relative advantage is a perception which can be influenced by appropriate promotions. Such promotions should be coupled with real advantage.

CHAPTER 7

RECOMMENDATION AND CONCLUSION

7.1 INTRODUCTION

This study covered numerous concepts, in an attempt to solve the research problem as stated in Chapter 1 of this study. Conceptualisation was carried out in Chapter 2, where most of the concepts addressed some aspects of the research problem, however inadequate. In addition to conceptualisation, the researcher drew research questions that formed the foundation of this study, as subsequent chapters emanated from these research questions.

This chapter is the concluding chapter of the study; it covers discussions such as answering the research questions, presentation of the conceptual framework, contribution of the study, future research, and a summary of the whole study.

7.2 CRITICAL RESEARCH QUESTIONS ADDRESSED IN THIS STUDY

In this study, the researcher set out to investigate the research problem as outlined in Chapter 1. In order to understand the research problem, the researcher set objectives that would enable him to solve or explain the research problem, thereby suggesting a conceptual framework that could at least provide guidelines for designing and developing an e-Learning environment in the public sector. Research questions were formulated, based on the research objectives, which then formed the basis for the investigation carried out in the chapters leading up to this concluding chapter. These questions were:

- What factors are affecting e-Learning diffusion in the South African public sector?
- How do these factors impact on instructional strategy and instructional technology alignment?
- What are the relationships between the proposed framework constructs?

In line with the research aim and objectives, the researcher conducted a literature review, to find existing literature that attempted to address a similar problem, whether in the same or a different context. However, existing literature did not address the problem in its full context – which encouraged the researcher to conduct an empirical research to gain an in-depth understanding of the problem as seen by those affected by the problem in their own environment. This was done by conducting a qualitative study that gave rich data to the context, and detailed experiences of the problem. Analysis of qualitative data resulted in propositions outlined at the end of Chapter 5. These propositions incorporated variables identified by the participants of the study.

Some of the propositions had variables standing out with implied associations within them. Such propositions were congruent with the literature. However, some variables that stood out had to be tested, because they were directly related to the research questions, and they were not obvious in literature. In order to test associations of these variables, the researcher employed quantitative techniques for data collection and analysis. In fact, quantitative data was useful in investigating an answer for the second research question.

7.2.1 WHAT FACTORS ARE AFFECTING E-LEARNING DIFFUSION IN THE SOUTH AFRICAN PUBLIC SECTOR?

Among other themes that emerged from qualitative analysis, were collaborative learning strategy, communities of practice, social constructivist paradigm, social networks, compatibility, relative advantage, socially orientated instructional technology, and socially orientated instructional technology. e-Learning practice in the public sector is characterised by collaborative activities in collaboration forums. Such collaborations could be applied in social network platforms. Participants #1, #4 and #5 indicated that social networks are still seen as a waste of resources, which has led to restricted use of social networks for anything, whereas they believe that e-Learning would thrive in their departments if it was delivered on social platforms.

The participants also added that social networks might be perceived as a recreational tool; however, if used in conjunction with an appropriate learning strategy, social networks could be a most effective instructional tool, in terms of reach and content. This is in line with Acton and Golden (2003), who argue that e-Learning should be accessible, thereby reaching an audience that would otherwise be seen as disadvantaged.

It is then important to find an effective alignment between instructional strategy and instructional technology, in order to set up e-Learning programmes in the public sector. Reflecting back to propositions made in Chapter 5, some propositions highlighted factors such as compatibility and relative advantage, which are constructs of the diffusion of innovation model. In relation to traditional training and development initiatives in the public sector, e-Learning comes as an innovative way of facilitating learning in that sector.

Rogers (1995) suggests a diffusion of innovation model that can be used to explain the rate of innovation adoption. Relative advantage and compatibility were used to determine associations with socially orientated instructional technology. In addition, the association between socially orientated instructional strategy and socially orientated instructional technology, was tested.

7.2.2 HOW DO THESE FACTORS IMPACT ON INSTRUCTIONAL STRATEGY AND INSTRUCTIONAL TECHNOLOGY ALIGNMENT?

Relative advantage and compatibility are constructs of the diffusion of innovation model, and they were also identified in the proposition as deduced from Chapter 5 of this study, as participants mentioned that in their e-Learning practice they use a collaborative learning strategy in socially orientated technology platforms. However, they still did not have an explicit and systematic framework that could be used to design and develop an effective and replicable e-Learning platform. They need a framework that would provide guidelines for development of an e-Learning platform. The framework should encompass relevant and important constructs for development, instead of loosely coupling technology and convenient instructional strategy for informal sharing of knowledge and information.

As participants struggled with new open source software, they realised the need for instant sharing of knowledge and information, in order to improve their understanding of new open source software. Relevant skills acquisition would result in performance improvement in the workplace. Data from interview transcripts reveals that participants are comfortable with informal learning in collaborative forums, which are socially orientated. They take advantage of the Web2.0 enabling environment, because of its social features that enable interactivity. In the propositions, more than merely socially orientated instructional strategy and socially orientated instructional technology, was apparent. In addition to

these constructs were compatibility and relative advantage, that could determine the adoption rate of e-Learning.

The second research question is directly related to determining the impact of factors deduced from the rich data collected for qualitative analysis, on the alignment of instructional strategy and instructional technology. In the middle of the study, the researcher realised that instructional strategy was too general, since it could refer to multitudes of instructional strategies that could be applied in many different circumstances. However, results of the qualitative analysis indicate that participants do not use only instructional technology, but, specifically, socially orientated instructional strategy and technology.

Socially orientated instructional technology brings about an innovative element into facilitation of learning in the public sector; therefore, the researcher tested the associations between the dependent variable (socially orientated instructional technology) and the independent variables (relative advantage, compatibility, and socially orientated instructional strategy). Results revealed a moderate positive association between dependent and independent variables – meaning that a moderate change in each of the independent variables would result in a moderate change in the same direction.

However, correlation did not indicate whether a collective change of independent variables would have a bigger impact than an individual independent variable. Regression analysis indicated that, collectively, independent variables have a stronger impact on socially orientated instructional technology, than each alone. In addition to correlation results, regression analysis indicated that socially orientated instructional strategy is a stronger predictor of a socially orientated instructional technology adoption rate in the public sector. Meanwhile, relative advantage yielded a stronger predictive indicator than compatibility. However, all independent variables could be predictors of socially orientated instructional technology adoption. In the following section the researcher will present a proposed framework.

7.3 PRESENTATION OF PROPOSED FRAMEWORK

Upon collection and analysis of the data, and then presentation of the results, a formulated framework, based on both quantitative and qualitative results, is presented. This framework will provide explicit and systematic guidelines for the design and development

of e-Learning practice in the public sector. It consists of constructs emanating from both the qualitative and quantitative analysis.

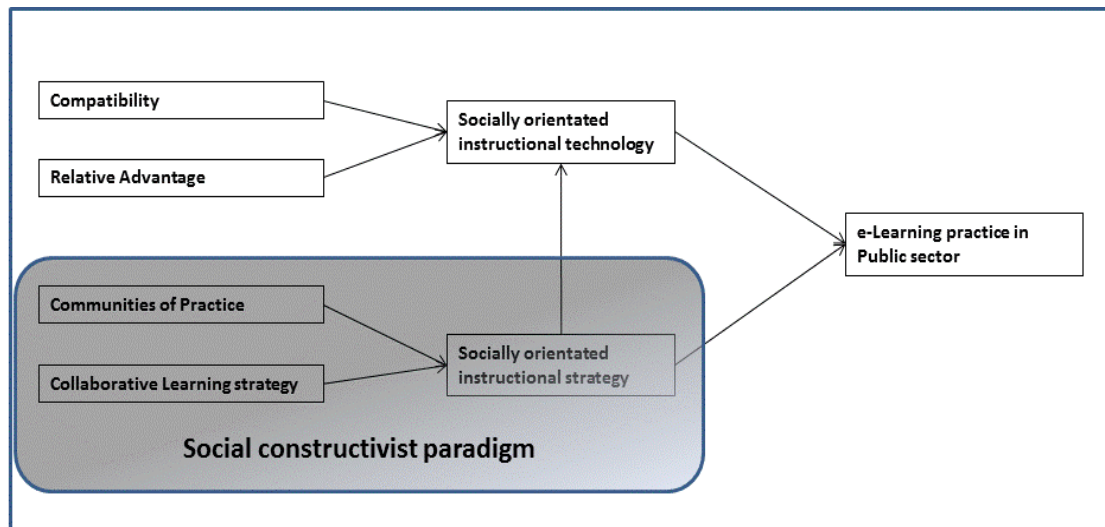


Figure 7.1: E-Learning Practice In Public Sector

In line with the objective to identify factors that affect the alignment and development of instructional strategy and instructional technology used to facilitate the learning process in public sector, both qualitative and quantitative analysis revealed that instructional strategy applied in the public sector is specifically socially orientated, in the form of collaborations with communities of practice. Also, socially orientated technology platforms were being used to facilitate the learning process within these communities of practice.

e-Learning practice in the public sector is characterised by socially orientated instructional strategy and socially orientated instructional technology. However, these are contextualised in terms of an underlying theoretical dimension that explains how to facilitate learning, using socially orientated instructional strategy and technology. Socially orientated instructional strategy is underpinned by the social constructivist paradigm, which explains the epistemological positioning of knowledge creation by learners and facilitators of learning, given the social influences on the learning experience.

The social constructivist paradigm in this case, is supported by communities of practice that enable sharing of knowledge and information between novices and experts in their respective fields of practice. Public sector employees established communities of practice where they could help each other with information and knowledge, on demand. They

formed horizontal collaboration, which enables a situational approach to addressing issues of concern, without imposition of the facilitator.

Training authorities in the public sector can take advantage of the situation, by systematically streamlining collaborative activities in a way that will ensure that everyone concerned makes a meaningful contribution to the forum. The social constructivist paradigm, communities of practice, and collaboration, are widely discussed in literature; meanwhile, socially orientated instructional technology is hardly covered in learning and teaching literature and research.

7.4 CONTRIBUTION TO THE STUDY PRACTICE AND BODY OF KNOWLEDGE

Through this study, the researcher seeks to make a meaningful contribution to e-Learning practice in the public sector, in terms of practical application of socially orientated instructional technology in training and development programmes. In line with that, the conceptual framework presented above, provides an explicit and systematic guideline for instructional designers in the public sector.

In order to fight skills challenges, organisations need to create an environment for instant acquisition of skills. Otherwise, they would miss out on opportunities enabled by the rapidly changing business environment. The rapidity of business environment change could be attributed to rapid changing technology and other factors beyond the control of organisational personnel. However, an organisation such as the public sector can cope with rapid change emanating from both the global and local business environment, if personnel could learn new sets of skills required to face new changes.

This study makes a contribution to e-Learning practice in the SA public sector, by explicating important factors that instructional designers should take into account when developing an e-Learning solution for public sector employees. In addition, there is a contribution towards improved performance (Mathape & Lessing, 2002). Such performance improvement would be seen where employees are competent and confident about their expertise in their respective fields of practice.

Moreover, the framework presented above provides guidelines for the design and development of an e-Learning platform, which could enable flexible learning, collaborative learning, just-in-time, just-in-context, and lifelong learning. This is important for both business practice and academia, as this framework could be applied to provide predictive and explanatory value in the theoretical development of e-Learning practice in the SA public sector as the biggest employer in the country.

According to Acton and Golden (2003), employees should not dread training, but, instead, anxiously look forward to exciting activities brought about by the learning environment. This could be achieved by applying e-Learning practice in the public sector, thereby building on from already existing e-Learning practice in the public sector, underpinned by a collaborative learning strategy delivered in socially orientated instructional technologies.

Secondly, this study changes the understanding of e-Learning practice in the public sector, which, in turn, contributes to the current body of knowledge. e-Learning is currently explained and understood in a context that suits developed countries. Meanwhile, South Africa, and Africa as a whole, is said to be engulfed by a digital gap in terms of internet access and computer literacy (Mutula, 2008). However, social media diffusion in South Africa proves that people can access the internet, and use computers, if they are motivated by social needs – which makes a socially orientated platform more conducive to the introduction of e-Learning (Horton & Horton, 2003).

This framework also provides conceptual depth into the understanding of theoretical underpinning to the application of socially orientated instructional platforms for e-Learning practice in the public sector. Moreover, this framework is transferable to other sectors that may face similar circumstances. Now it is clear that e-Learning design should be founded on a social constructivist's epistemological position, which opens up e-Learning practice to multiple social technology platforms, which, in turn, is already at the disposal of multitudes.

This study reveals that technology is just one among other factors that affect the adoption of e-Learning as an innovative means of facilitating skills transfer in the public sector. It also reveals factors that would have to be addressed, to ensure that e-Learning initiatives are useful and yield intended results. Among others, social media has already proved to be growing among young and old, which means that people have access to computers, but

may not be willing to use internet-connected computers, or else they are not aware that they are actually computer literate and have access to computing. In line with the ever-changing global marketplace, so are educational needs, methods of delivery, and recipients of educational offerings. In explaining generational differences, Morgan and Ribbens (2006) and Prensky (2004) argue that generation Y is infiltrating the workplace, and this generation is more technologically inclined than any previous generation. This could mean that academics and the education fraternity should revise educational principles as well as delivery strategies, thereby sensitising education to the current market.

The power of social networks, which forms the basis of socially orientated instructional technology, was evident in the looting of London in October 2011, where the youth organised themselves, using social media, and brought London to a standstill. Socially orientated instructional technologies are as powerful in facilitating better learning processes in the workplace. However, any technology is only as good as its use (Venkatesh et al., 2003), as participant #4 argued in Chapter 5, knowing that socially orientated instructional technology does not mean that instructional designers should just dump traditional learning material into electronic media.

The framework presented above shows pedagogical constructs that should be considered when instructional designers develop learning material that will be delivered in socially orientated instructional technology. It starts from the epistemological positioning of the learning experience, and then goes on to instructional strategy that is aligned with the social environment. Meanwhile, it also shows factors that affect the rate of adopting socially orientated instructional technology as an innovative way of delivering learning to public sector employees.

7.5 LIMITATIONS OF THE STUDY

This study sought to understand and explain e-Learning practices in the public sector, and then formulate a conceptual framework that could provide guidelines for the design and development of an effective e-Learning environment in the public sector. As a result, a framework was presented in section 7.3 of this chapter. This framework is contextualised to the public sector – and, specifically, the business area that has just started or is already implementing e-Learning. The scope of the study is limited to the public sector, as a

workplace with a need to develop skills and knowledge in order to cope with the changing IS environment.

However, the skills shortage is a national crisis for both the public and private sectors. This study focused only on the public sector, as it is the biggest employer in the country, and because of its eminent need to learn new skills as the sector changes from proprietary software to open source software. The training need is urgent, and e-Learning was mentioned as one of the methods to be used to facilitate training. However, there was no e-Learning system in place, nor was there a working framework for design and development guidelines. Most e-Learning practices were based on intuitive matching of technology with instructional strategy. As a result, the researcher could not test e-Learning practice with already existing instruments that have been tested in other countries. Therefore, a qualitative approach was applied, to gain an in-depth understanding of e-Learning practice in the public sector, as it takes place in the original environment.

Another limitation was participant enrolment for investigation. Most prospective participants were just starting to investigate e-Learning options, and did not have confidence in their knowledge of e-Learning; thus, they declined the invitation, citing a lack of e-Learning knowledge as a reason. Meanwhile, those who were confident about their knowledge of e-Learning could not accept the invitation until the researcher received written permission from the director general of the department. The application process took one-and-a-half years to be finalised. Meanwhile, e-Learning practices evolved.

7.6 FUTURE RESEARCH

This study opened up multiple possibilities for the researcher, as he was trying to curb himself into focusing on the research objective. Otherwise, he would have ventured into many wider areas that evoked interest, and further questions, about the current and future state of e-Learning practice in South Africa a whole. Upon finishing this study, the researcher will embark on further research, exploring new research questions packed with interdisciplinary concepts.

Some of the research questions will prompt endeavours into the exploration of the usability of an e-Learning platform in the organisations that have adopted e-Learning practice. Results of this research could help in suggesting improvements in e-Learning design, from

an aesthetic perspective, and, in turn, improve performance relating to new skills acquired through easy-to-use and useful e-Learning platforms.

Future research could lead to a knowledge management perspective, with regard to application of e-Learning in improving innovation, and preservation of knowledge in organisations that are facing fast-paced change. Changes in the business environment could be prompted by multiple variables such as rapidly changing technology and the economic environment in which the organisation operates.

7.7 CONCLUSION

This chapter is one of the most important chapters of this study, where the researcher has to make a concluding input into the study. Among other things covered in this chapter, is the answering of critical research questions as they were posed in the beginning of the study, thereby achieving the research objective. These research objectives are meant to determine important variables that could contribute to the adoption and success of e-Learning practices in the public sector. This follows the evaluation of these variable influences in the adoption of socially orientated instructional technology as an instrument in delivering e-Learning material.

These objectives were achieved by employing research techniques that enabled the researcher to design a process which overarched the data collection, data analysis and reporting of results. This led to the conclusion and recommendations made in this chapter. Such conclusion and recommendations should enable instructional designers in the public sector to take into consideration important variables, and apply that knowledge in the design of an efficient and effective e-Learning environment.

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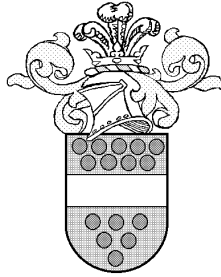
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APPENDIX 1 LANGUAGE EDITING CERTIFICATE



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I, Marlette van der Merwe, ID 4802060118085, hereby declare that the doctoral thesis, 'Reconceptualising an e-learning framework for South African Public Sector training', by Peter L. Mkhize, has been edited by me, according to the APA referencing method required by the North-West University, Potchefstroom.

Marlette van der Merwe

BA, HDiplib (UCT)

Member: Professional Editors' Group

APPENDIX 2 - RESEARCH QUESTIONNAIRE

Online skills training practices survey

This form is meant to collect data about application of technology in skills training. This data will help the researcher verify critical components and develop a model for online skills training.

Most of the questions require a click to select relevant answer.

Complete all 7 sections over 3 pages.

It will take about 7 minute to fill this form.

1. Please enter your personal information:

Name

Surname

Age

Gender

Position

3. Relative advantage

Online learning experience...

can be adapted to my own needs in-	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
crease the efficiency of my study widens	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
my personal learning experience	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
enables me to easily access my course material	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always

4. Compatibility

Online learning experience ...

is more suitable to life style.	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
is more suitable to my learning style	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
meets my personal career goals	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
is compatible to my perception of education quality.	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always

5. Technology access requirements

For learning purposes student should have access to...

ordinary cell phone	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
LAN computer	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
own Internet connected desktop computer	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
smart phone	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
own laptop with Internet connectivity	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always

6. Instructional technology

For learning purpose students should use

discussion forum	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
wikis	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
e-mail to communicate with my lecturer	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
Instant messaging	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always
additional resources downloaded variety of learning material such as YouTube videos	☐ Almost never	☐ Seldom	☐ Sometimes	☐ Often	☐ Almost Always

other tools (Please specify)

7. Instructional strategy

In online learning students should learn

by exchanging ideas with my fellow student

☐ Almost never ☐ Seldom ☐ Sometimes ☐ Often ☐ Almost Always

by reflection on really life cases

☐ Almost never ☐ Seldom ☐ Sometimes ☐ Often ☐ Almost Always

by relating current knowledge and own experiences to reach new knowledge

☐ Almost never ☐ Seldom ☐ Sometimes ☐ Often ☐ Almost Always

by open ended engagement

☐ Almost never ☐ Seldom ☐ Sometimes ☐ Often ☐ Almost Always

by discovering new concepts on my own

☐ Almost never ☐ Seldom ☐ Sometimes ☐ Often ☐ Almost Always

other tools (Please specify)

Thank you
This is the end of the survey
Click submit by e-mail button
Or
You might to save the form then send as attachment

Submit by Email

